

Big Cedar Creek Stream Restoration Final Year 2 Monitoring Report (2010) Stanly County, North Carolina

EEP Project Number D06054-D



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Big Cedar Creek Stream Restoration

Final Year 2 Monitoring Report (2010)

Stanly County, North Carolina

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1.0 EXECUTIVE SUMMARY

This Annual Report details the monitoring activities during the 2010 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, 3,416 linear feet of longitudinal profiles, and 2 crest gauges were installed and assessed across the Site. The 2010 data represent results from the second 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 linear feet (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 Big Cedar Creek and UT1 were enhanced, and 539 LF of Big Cedar Creek and the northern most unnamed tributary (UT2) were preserved.

The 23 monitoring plots are 10 meters by 10 meters in size were used to assess survivability of the woody vegetation planted on Site. They are located to represent the different zones within the project as directed by EEP monitoring guidance. The vegetation monitoring indicated a survivability range of 283 stems per acre to 971 stems per acre with an overall average of 753 stems per acre. Overall, the Site is on track for meeting the initial vegetation survival criteria of 320 stems per acre surviving after the third growing season and the final success criteria of 260 trees per acre by the end of year five.

In general, the majority of the project’s dimension, pattern, profile and in-stream structures have remained stable; however, areas of concern that were noted from Year 1 have worsened during Year 2. Maintenance of these areas has been scheduled to begin in late winter/early spring of 2011. One bankfull event was observed and documented on Big Cedar and UT1 during Year 2.

2.0 PROJECT GOALS, BACKGROUND, & ATTRIBUTES

2.1 Project Location and Description

The Big Cedar Creek Restoration Site (“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 NCDWQ sub-basin 03-07-14 and USGS hydrologic unit 03040105060080.

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

The Big Cedar Creek Restoration 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 Big Cedar to the east, then turns to cross Big Cedar and UT1 upstream of their confluence.

To visit the Site, take Highway 52 for approximately ten miles south, 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 intersection of Mount Zion Road and Big Cedar Creek. UT1, UT2, and the upstream reaches of Big Cedar Creek 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 Big Cedar Creek 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 Project were as follows:

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

The primary objective of the Big Cedar Creek Restoration project 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 through fencing cattle out of the restored reaches and by reducing bank erosion throughout the project site. Aquatic habitat was improved by providing geomorphically stable habitat features and through placement of in-stream habitat structures. Invasive vegetative species removal efforts and reforestation of the riparian buffer with native species complemented the restoration of Big Cedar Creek, UT1, UT2, UT3, UT1A, UT1B, and UT1C. Existing native trees were preserved onsite 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 Big Cedar Creek and six unnamed tributaries to Big Cedar Creek. A total of 11,103 linear feet (LF) of stream channel along Big Cedar Creek and six unnamed tributaries (UT1, UT2, UT3, UT1A, UT1B, and UT1C) were restored. Additionally 1,171 LF of Enhancement II along Big Cedar Creek and UT1 and 539 LF of preservation along Big Cedar Creek and UT2 based on the post-construction as-built survey. The Site has a history of general agricultural usage including cattle, cotton, and corn production. Prior to restoration, the streams on the project 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, Big Cedar Creek, UT1, and UT2 were divided into 11 reaches (As-built Plan Sheets, Appendix D). Big Cedar Creek flows from north to south entering the Site at the northern property line. The reaches on Big Cedar Creek were numbered sequentially from north to south. Big Cedar Creek Reach 1 starts at the northern property line and ends at the confluence with UT2. Big Cedar Creek Reaches 2 through 4 are located between this confluence and the Winston-Salem Southbound Railroad line crossing. Big Cedar Creek 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 Big Cedar Creek. 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 Big Cedar Creek. 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 Big Cedar Creek and ends at its confluence with Big Cedar Creek Reach 3.

A holistic restoration approach was based on the condition of the overall Site and each reach's potential for restoration as determined during the 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 Big Cedar Creek floodplain were incorporated for a more historical replication of channel alignment. The design philosophy employed at the Big Cedar Creek 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 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. The wide variety of structures was used to promote a diversity of habitat features 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

Big Cedar Creek 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
Big Cedar Creek - 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 bring the channel up to the historic floodplain as quickly as possible.
Big Cedar Creek - 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.
Big Cedar Creek - 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.
Big Cedar Creek - 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.
Big Cedar Creek - Reach 5	534	P	P	378	1:5	76	63+79 to 67+57	Preservation.

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Big Cedar Creek 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
Big Cedar Creek - 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 bring the channel quickly up 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.
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 Big Cedar Creek	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 planted.
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 planted.
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 planted.

Table 1. Project Mitigation Approach

Big Cedar Creek 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
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

Big Cedar Creek was restored by Baker through a full delivery contract with NCEEP. The chronology of the Big Cedar Creek Restoration Project 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

Big Cedar Creek 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	Scheduled Dec-11	Scheduled Nov-11	N/A
Year 4 Monitoring	Scheduled Dec-12	Scheduled Nov-12	N/A
Year 5 Monitoring	Scheduled Dec-13	Scheduled Nov-13	N/A

Table 3. Project Contact Table

Big Cedar Creek Restoration Site: Project No. D06054-D	
Designer	
Michael Baker Engineering, Inc.	1447 South Tryon Street, Suite 200 Charlotte, NC 28203 <u>Contact:</u> Christine Miller, Tel. 704-319-7898
Construction Contractor	
River Works, Inc.	8000 Regency Parkway, Suite 200 Cary, NC 27518 <u>Contact:</u> Will Pedersen, Tel. 919-459-9001
Planting Contractor	
River Works, Inc.	8000 Regency Parkway, Suite 200 Cary, NC 27518 <u>Contact:</u> Will Pedersen, Tel. 919-459-9001
Seeding Contractor	
River Works, Inc.	8000 Regency Parkway, Suite 200 Cary, NC 27518 <u>Contact:</u> Will Pedersen, Tel. 919-459-9001
Seed Mix Sources	Mellow Marsh Farm, 919-742-1200
Nursery Stock Suppliers	International Paper, 1-888-888-7159
Monitoring Performers	
Michael Baker Engineering, Inc.	1447 South Tryon Street, Suite 200 Charlotte, NC 28203 <u>Contact:</u>
Stream Monitoring Point of Contact:	Ian Eckardt, Tel. 704-319-7890
Vegetation Monitoring Point of Contact:	Ian Eckardt, Tel. 704-319-7890

Table 4. Project Background Table

Big Cedar Creek Restoration Site: Project No. D06054-D	
Project County:	Stanly County, NC
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

Table 4. Project Background Table

Big Cedar Creek Restoration Site: Project No. D06054-D	
UT1C	0.10 mi2
UT2	0.55 mi2
UT3	0.15 mi2
Estimated Drainage % Impervious Cover:	
BCC Reach 1	<1%
BCC Reach 2	<1%
BCC Reach 3	<1%
BCC Reach 4	<1%
BCC Reach 5	<1%
BCC Reach 6	<1%
UT1 Reach 1	<1%
UT1 Reach 2	<1%
UT1 Reach 3	<1%
UT1 Reach 4	<1%
UT1A	0%
UT1B	0%
UT1C	0%
UT2	0%
UT3	0%
Stream Order:	
BCC Reach 1	3rd
BCC Reach 2	3rd
BCC Reach 3	3rd
BCC Reach 4	3rd
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

Table 4. Project Background Table

Big Cedar Creek Restoration Site: Project No. D06054-D	
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
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. 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, 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 ratio. 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, 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. These data are provided in Appendix B. Six post-restoration pebble counts will be performed on Big Cedar, 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. This 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 following construction, any observed activities or changes in the watershed will be noted and connections to onsite 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, twenty-three 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, at all times ground cover at the project site shall be in compliance with the North Carolina Erosion and Sedimentation Control Ordinance.

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) 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 Qual 4 method listed in North Carolina Division of Water Quality's (NCDWQ) Standard Operating Procedures for Benthic Macroinvertebrates (2006). Laboratory identification of collected species will be conducted by a lab 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 can affect the extent to which a native buffer can be established.
- The presence of beaver can affect vegetation survivability and stream function.

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

4.0 MONITORING RESULTS – 2010 YEAR 2 - 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

Second year monitoring dimension and profile data were sampled in November 2010. Results from the second year monitoring samples were compared with the as-built and Year 1 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 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 2.

Riffle Cross-sections 24, 31, and 32 aggraded slightly. The channel bed at Cross-section 24 has shifted upward toward as-built conditions. The aggradation at Cross-sections 31 and 32 may reflect sediment being transported through the system. These changes in channel geometry will be monitored.

Pool Cross-sections 8 and 27, which are located in the apex of meander bends, show evidence of bed scour. The outside of meanders experience an increase in shear stress during large storm events that can cause scour and deepening. Scour and deepening of some pools is expected.

Riffle Cross-sections 5, 7, 9, and 28 have experienced bed degradation during Year 2. Cross-section 5 has experienced extensive downcutting. The bed scour at cross-sections 7, 9, and 28 is located along the side of channel that receives the flow vectors from upstream outer meander bends.

Additional stream related information is discussed in section 4.1.3 “Stream Problem Area View”.

Longitudinal Profile

The Year 2 longitudinal profile was conducted during November 2010. A total of 3,405 LF was resurveyed along representative sections of the restored channels. Survey on Big Cedar Creek was conducted from As-Built Station 12+75 to 18+04 and 47+00 to 57+28. Survey on UT1 started at As-Built Station 13+75 to 30+19. The fourth section resurveyed was along UT2 from As-Built Station 11+00 to 13+05. The representative longitudinal profiles were resurveyed to document stream profile at the end of monitoring Year 2. Pool – to – pool spacing on BCC Reach 1 increased from 127 to 152 feet. The change will be monitored. The pool – to – pool spacing on BCC Reaches 2 and 3 changed very little since the as-built survey. The majority of riffle slopes in BCC Reach 1, 2, and 3 remained similar to as-built values. Riffle slopes on Reaches 1 and 2 of UT1 were also similar to Year 1 values. The pool – to – pool spacing in UT1 Reaches 1 and 2 remained similar to as-built values. Sinuosity was not calculated because only portions of each reach were surveyed.

The longitudinal profile and a summary of parameters measured are provided in Appendix B. Please 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 onsite alluvium comprised mostly of fine gravel to large cobble size material. Since pebble counts are to be conducted only during Monitoring Years 1, 3, and 5, no pebble count data was performed during Year 2.

4.1.2 Stream Problem Areas Plan View

The majority of constructed stream channels are functioning as designed. During Year 1 bed adjustments included bed degradation in a few riffles, scour along the inner arm of a couple J-hook structures, backwatering due to improper elevation on J-hook structure invert, and slight shifts in thalweg alignment due to deposition and toe erosion. The riffles experiencing bed degradation also had portions of their bed armor displaced. The degradation indicated that the increased shear stress that occurs in the designed pool meanders immediately upstream of these riffles wasn't being dissipated during storm events. The degradation at these riffles persists and a couple of riffles have worsened during Year 2. The scour observed at a few J-hook structures along Big Cedar Creek has remained along the inner boulder arms through Year 2. Backwater conditions observed immediately upstream of a couple J-hook structures on Big Cedar Creek during Year 1 weren't visible at the time of the Year 2 assessment. Raw banks are present on portions of Big Cedar Creek, UT1, and UT2. The banks in these areas lacked vegetation and most had damage to the bank matting. This may be a result of rocky soils in portions of the project area that are making it difficult for vegetation to become established. Visual assessment scores are located in Table 5.

Table B.1 (Appendix B) provides a summary of problem areas. See Figures B1- B11 in Appendix B for an overview of all stream problem areas. Table B.2 in Appendix B has additional data further explaining the visual assessment scores. Slight increases in scores from Year 1 to Year 2 reflect minor calculation differences rather than improvements to features.

Table 5. Visual Morphological Stability Assessment						
Big Cedar Creek 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%			
Pools	100%	100%	100%			
Thalweg	100%	84%	83%			
Meanders	100%	100%	100%			
Bed General	100%	98%	99%			
Bank Condition	100%	100%	100%			
Vanes / J Hooks etc.	-----	-----	-----			
Wads and Boulders	100%	100%	100%			
BCC Reach 2 (2239 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	84%	87%			
Pools	100%	100%	91%			
Thalweg	100%	100%	93%			
Meanders	100%	100%	96%			
Bed General	100%	96%	95%			
Bank Condition	100%	100%	82%			
Vanes / J Hooks etc.	100%	93%	95%			
Wads and Boulders	100%	94%	88%			
BCC Reach 3 (1827 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	97%	97%			
Pools	100%	100%	100%			
Thalweg	100%	100%	77%			
Meanders	100%	100%	95%			
Bed General	100%	100%	94%			
Bank Condition	100%	94%	93%			
Vanes / J Hooks etc.	100%	96%	92%			
Wads and Boulders	100%	100%	100%			
BCC Reach 4 (410 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	100%	100%			
Pools	100%	100%	100%			
Thalweg	100%	100%	67%			
Meanders	100%	92%	92%			
Bed General	100%	98%	88%			
Bank Condition	100%	88%	80%			
Vanes / J Hooks etc.	100%	100%	88%			
Wads and Boulders	100%	100%	100%			
BCC Reach 6 (969 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	100%	100%			
Pools	100%	100%	100%			
Thalweg	100%	100%	100%			

Table 5. Visual Morphological Stability Assessment						
Big Cedar Creek Restoration Site: Project No. D06054-D						
Meanders	100%	100%	100%			
Bed General	100%	100%	100%			
Bank Condition	100%	100%	100%			
Vanes / J Hooks etc.	100%	100%	100%			
Wads and Boulders	-----	-----	-----			
UT1 Reach 1 (1248 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	100%	100%			
Pools	100%	100%	100%			
Thalweg	100%	100%	100%			
Meanders	100%	100%	100%			
Bed General	100%	100%	100%			
Bank Condition	100%	100%	100%			
Vanes / J Hooks etc.	-----	-----	-----			
Wads and Boulders	100%	100%	100%			
UT1 Reach 2 (1016)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	100%	100%			
Pools	100%	100%	100%			
Thalweg	100%	100%	100%			
Meanders	100%	100%	100%			
Bed General	100%	100%	100%			
Bank Condition	100%	100%	99%			
Vanes / J Hooks etc.	100%	100%	100%			
Wads and Boulders	100%	100%	100%			
UT1 Reach 3 (1885 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	98%	97%			
Pools	100%	100%	96%			
Thalweg	100%	100%	95%			
Meanders	100%	100%	100%			
Bed General	100%	100%	100%			
Bank Condition	100%	97%	82%			
Vanes / J Hooks etc.	100%	100%	100%			
Wads and Boulders	100%	100%	100%			
UT1 Reach 4 (996 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	87%	87%			
Pools	100%	90%	90%			
Thalweg	100%	100%	71%			
Meanders	100%	100%	29%			
Bed General	100%	76%	87%			
Bank Condition	100%	90%	50%			
Vanes / J Hooks etc.	100%	100%	100%			
Wads and Boulders	100%	100%	40%			

Table 5. Visual Morphological Stability Assessment						
Big Cedar Creek Restoration Site: Project No. D06054-D						
UT1A (85 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	-----	-----	-----			
Pools	-----	-----	-----			
Thalweg	-----	-----	-----			
Meanders	-----	-----	-----			
Bed General	100%	100%	93%			
Bank Condition	100%	100%	100%			
Vanes / J Hooks etc.	-----	-----	-----			
Wads and Boulders	-----	-----	-----			
UT1B (34 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	-----	-----	-----			
Pools	-----	-----	-----			
Thalweg	-----	-----	-----			
Meanders	-----	-----	-----			
Bed General	100%	100%	100%			
Bank Condition	100%	100%	100%			
Vanes / J Hooks etc.	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%			
Bank Condition	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%			
Pools	100%	100%	100%			
Thalweg	100%	100%	100%			
Meanders	100%	100%	86%			
Bed General	100%	100%	97%			
Bank Condition	100%	100%	73%			
Vanes / J Hooks etc.	100%	100%	96%			
Wads and Boulders	100%	100%	75%			
UT3 (73 LF within easement)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	-----	-----	-----			
Pools	-----	-----	-----			

Table 5. Visual Morphological Stability Assessment						
Big Cedar Creek Restoration Site: Project No. D06054-D						
Thalweg	----	----	----			
Meanders	----	----	----			
Bed General	100%	100%	100%			
Bank Condition	100%	100%	100%			
Vanes / J Hooks etc.	100%	100%	100%			
Wads and Boulders	----	----	----			

4.2 Hydrology Data

The on-site crest gauges documented the occurrence of one bankfull event during the second year monitoring period. The highest stage recorded during the second year monitoring period was 0.21 feet. Bankfull verification summaries are included in Table 6. Crest gauge locations are included in the as-built plan sheets in Appendix D. Bankfull verification photos are provided in Appendix E.

Table 6. Verification of Bankful Events

Big Cedar Creek 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	12/8/10	Unknown	Crest Gauge	0.14	BCC Crest Gauge – 12/8/10
UT1 Reach 4	10/10/10	Unknown	Crest Gauge	0.21	UT1 Crest Gauge – 10/10/10

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 were 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. The number of quadrants required was determined using the plot number spreadsheet (07312006-2) provided by NCEEP that 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 2 density of planted bare root stems, based on the data from the 23 monitoring plots, is 753 stems per acre. The vegetation monitoring indicated a survivability range of 283 stems per acre to 971 stems per acre. Only 1 vegetation plot (15) did not meet the projected Year 3 success criteria of 320 trees per acre; however, the site is still on the path to meet both the Year 3 vegetative success criteria and the final year's vegetative success criteria of 260 trees per acre.

No volunteer species were noted in any of the Site's vegetation plots, or were too small to verify. If any woody volunteer species are observed in subsequent monitoring years they will be flagged and added to the overall stems per acre assessment of the Site. 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

Year 1 Monitoring noted that rocky, sandy soils are predominant throughout the site and have limited the establishment of herbaceous vegetation along the banks and within the floodplains of the restored reaches. Bare floodplain areas, noted during Year 2 Monitoring, were limited mostly to floodplains of UT1 upstream of the stream crossing. Bare banks are present along some outer meander bends on Reaches 3 and 4 of UT 1, along UT2, and in the downstream restored section of Big Cedar. These areas lacking good vegetative growth have allowed for areas of scour and pocket erosion to occur on outer meander bends on some of the restored sections of stream.

After one year of monitoring these areas of concern, it is anticipated that they will continue to worsen unless additional stabilization measures are implemented throughout the site. Therefore bio-engineered stabilization measures (vegetated geo-lifts) and brush mattress installation will be implemented on outer meander bends of UT2 and Big Cedar Creek, as well as, on some meanders along Reaches 3 and 4 of UT1. Banks experiencing erosion issues will be regraded and matted. Areas needing immediate ground cover stabilization will be reseeded and mulched to reduce erosion and rilling while the perennial vegetation is becoming established.

A variety of invasive species are present throughout the site and consist of *Ligustrum sinense* (Chinese privet), *Lonicera japonica* (Japanese honeysuckle), and *Rosa multiflora* (multi-flora rose). Though present, these species are not currently affecting the establishment of native species. However, in order to prevent these species from spreading and becoming more densely populated throughout the site, an herbicidal spot treatment application will need to be scheduled during 2011.

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-C11 in Appendix C for an overview of all vegetative problem areas.

4.4 Areas of Concern

Overall the restored channels are functioning as designed with some areas of concern. The areas of concern include the areas of observed bed degradation and raw banks along Big Cedar Creek, UT1, and UT2. These areas will require maintenance which has been scheduled to begin in late winter/early spring of 2011. Though invasive species are currently not affecting native vegetation, they will continue to be monitored and an herbicidal spot treatment application will be scheduled during 2011 for dense populations.

5.0 REFERENCES

- Lee, M., Peet R., Roberts, S., Wentworth, T. CVS-NCEEP Protocol for Recording Vegetation, Version 4.1, 2007.
- North Carolina Division of Water Quality (NCDWQ). 2001. Interim, Internal Technical Guide: Benthic Macroinvertebrate Monitoring Protocols for Compensatory Stream Restoration Projects.
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- Rosgen, D. L. 1994. A Classification of Natural Rivers. *Catena* 22:169-199.
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- US Army Corps of Engineers, WRP, July 2000. Technical Notes ERDC TN-WRAP-00-02.
- US Army Corps of Engineers, 2003. Stream Mitigation Guidelines. Prepared with cooperation from US Environmental Protection Agency, NC Wildlife Resources Commission, and the NC Division of Water Quality. www.saw.usace.army.mil/wetlands/Mitigation/stream_mitigation.html

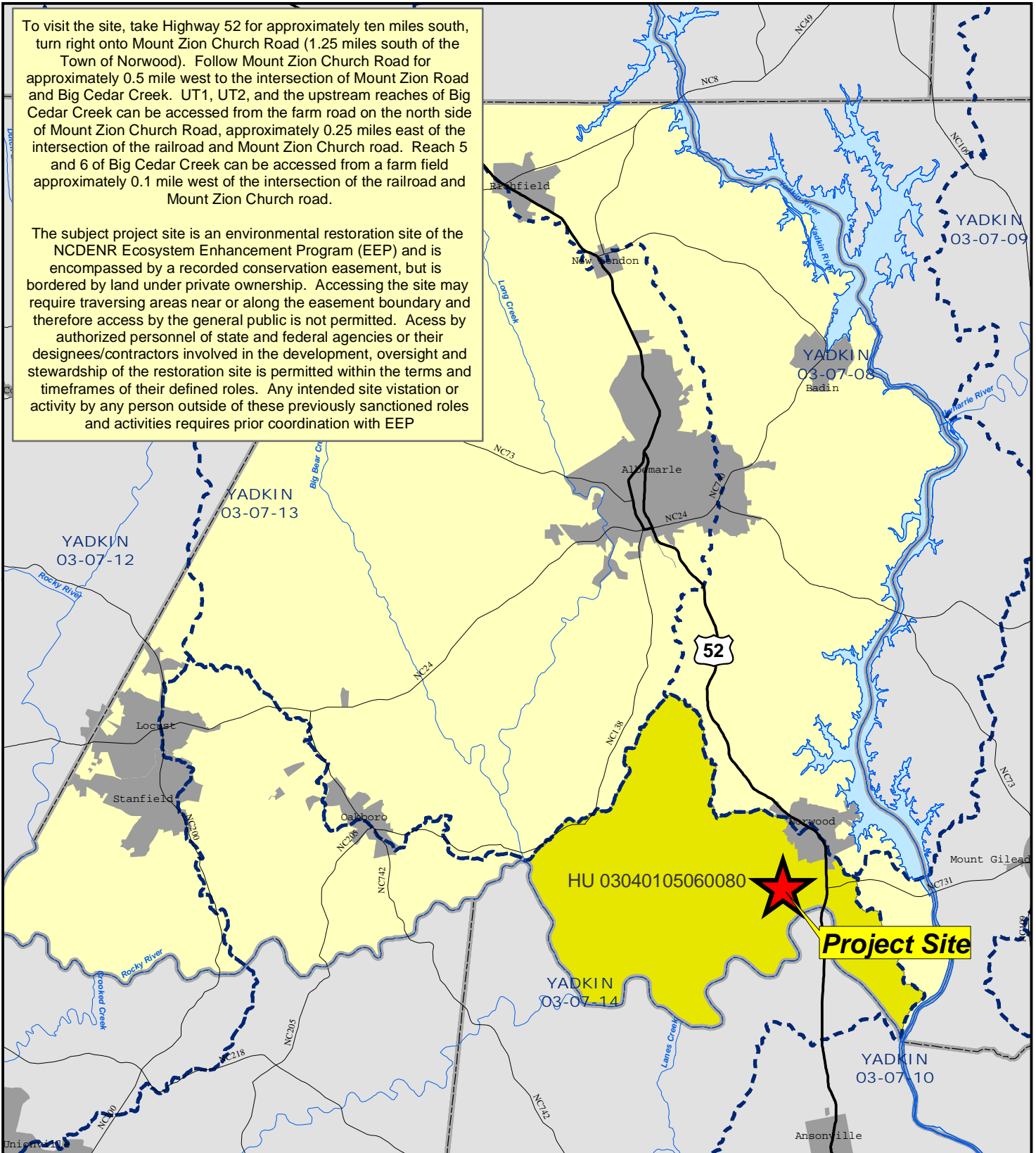
Appendix A

Figures

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

To visit the site, take Highway 52 for approximately ten miles south, 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 intersection of Mount Zion Road and Big Cedar Creek. UT1, UT2, and the upstream reaches of Big Cedar Creek 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 Big Cedar Creek 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



Project Site

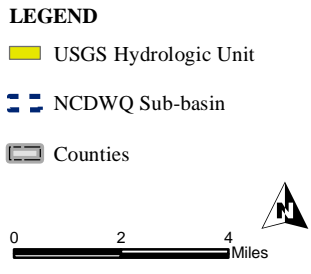
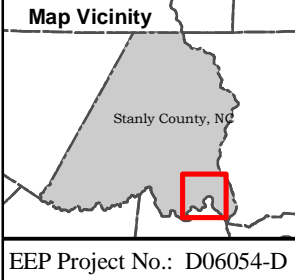
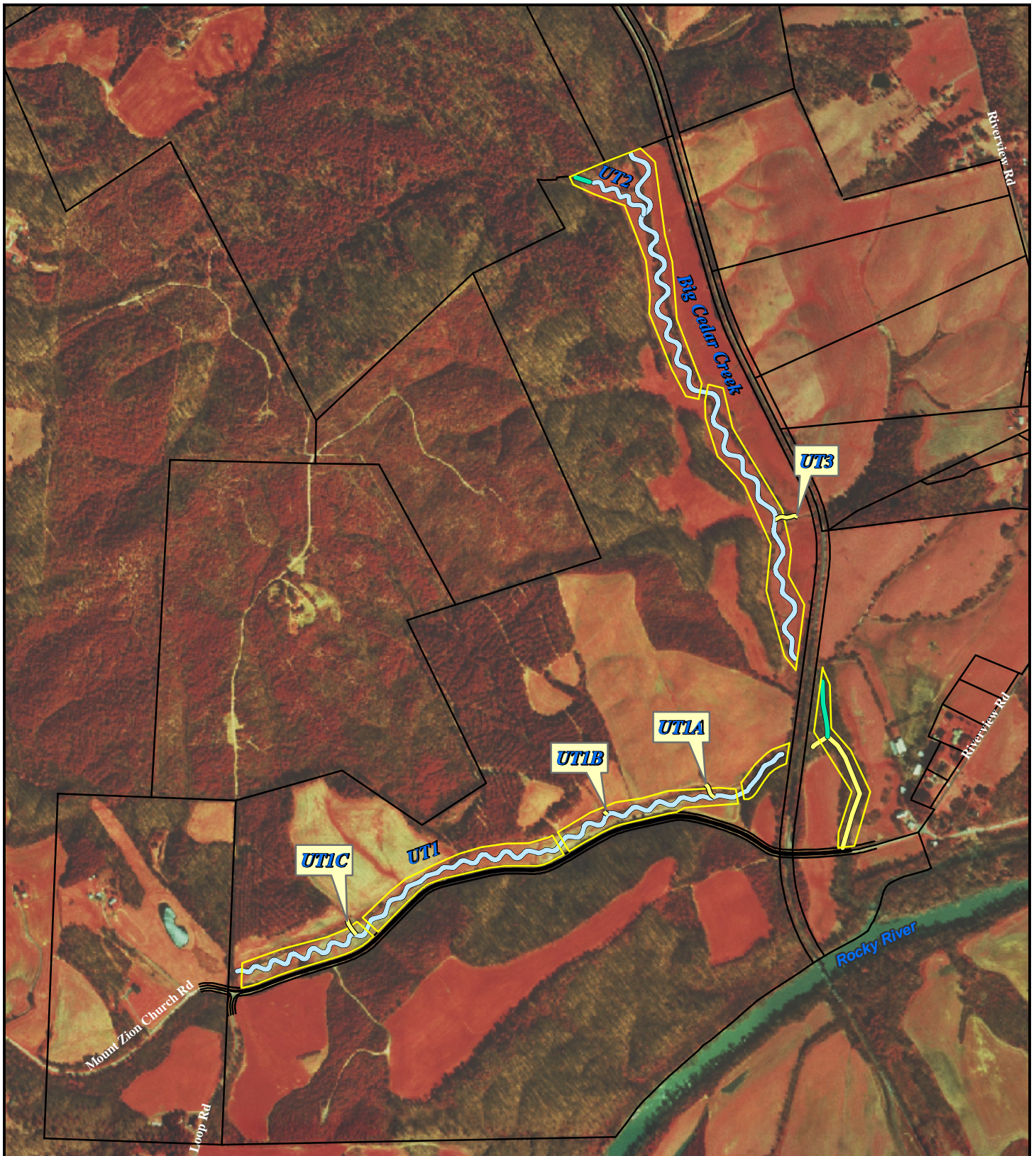


Figure 1: Vicinity Map
Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 2
 Stanly County, NC

December 2010



Map Vicinity

Stanly County, NC

EEP Project No. : D06054-D

LEGEND

- Preservation
- Enhancement
- Restoration
- Parcels
- Conservation Easement

0 400 800 Feet

Figure 2: Restoration Summary
Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 2
 Stanly County, NC

December 2010



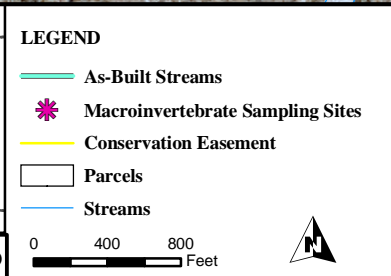
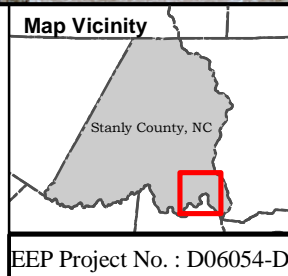
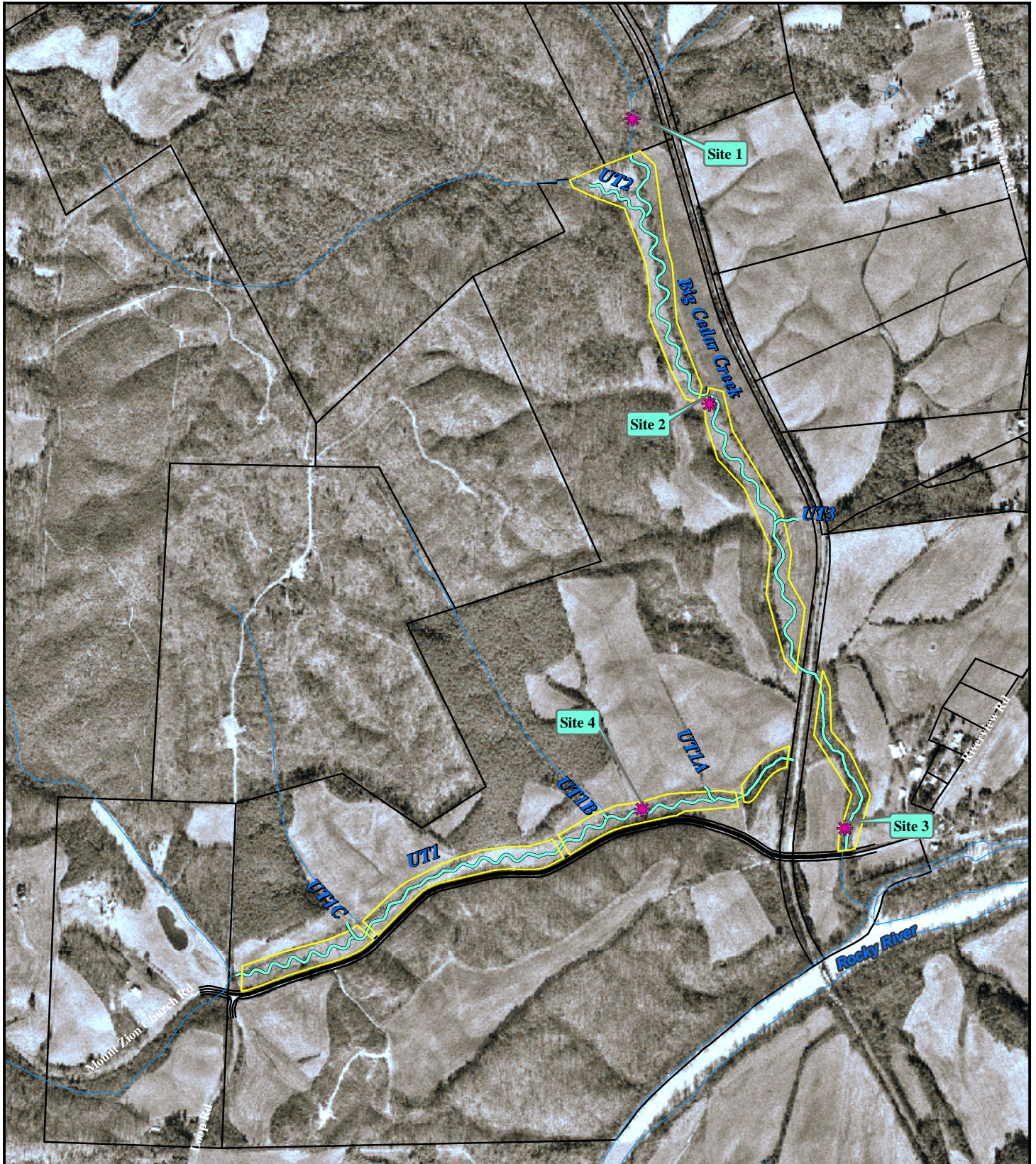


Figure 3: Benthic Macroinvertebrate Sampling Sites
Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 2
 Stanly County, NC

December 2010



Appendix B

Morphological Summary Data

Cross-section Plots

Profile Plots

Morphology Data Table 7 & 8

Tables B.1 & B.2

Representative Stream Problem Area Figures B1- B11

Representative Stream Problem Area Photos

Permanent Cross Section X1
(Year 2 Monitoring Data - collected October 2010)

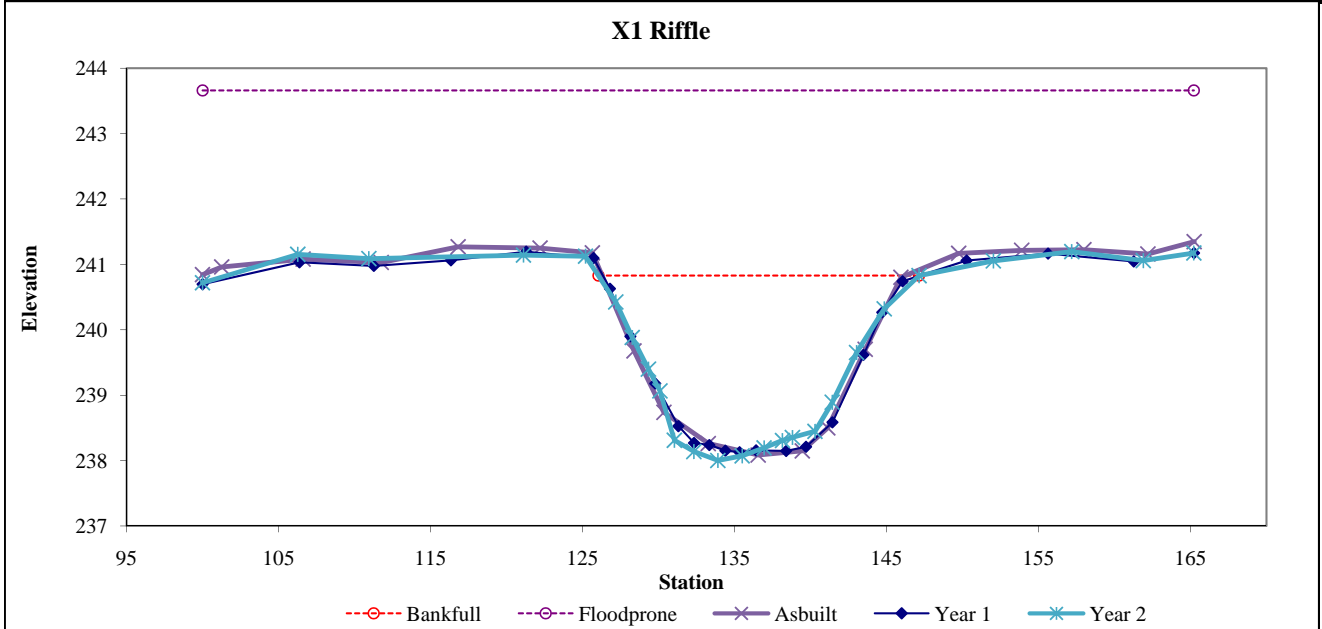


Looking at the Left Bank



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	36.9	21.09	1.75	2.83	12.05	1	3.1	240.83	240.83



Permanent Cross Section X2
(Year 2 Monitoring Data - collected October 2010)

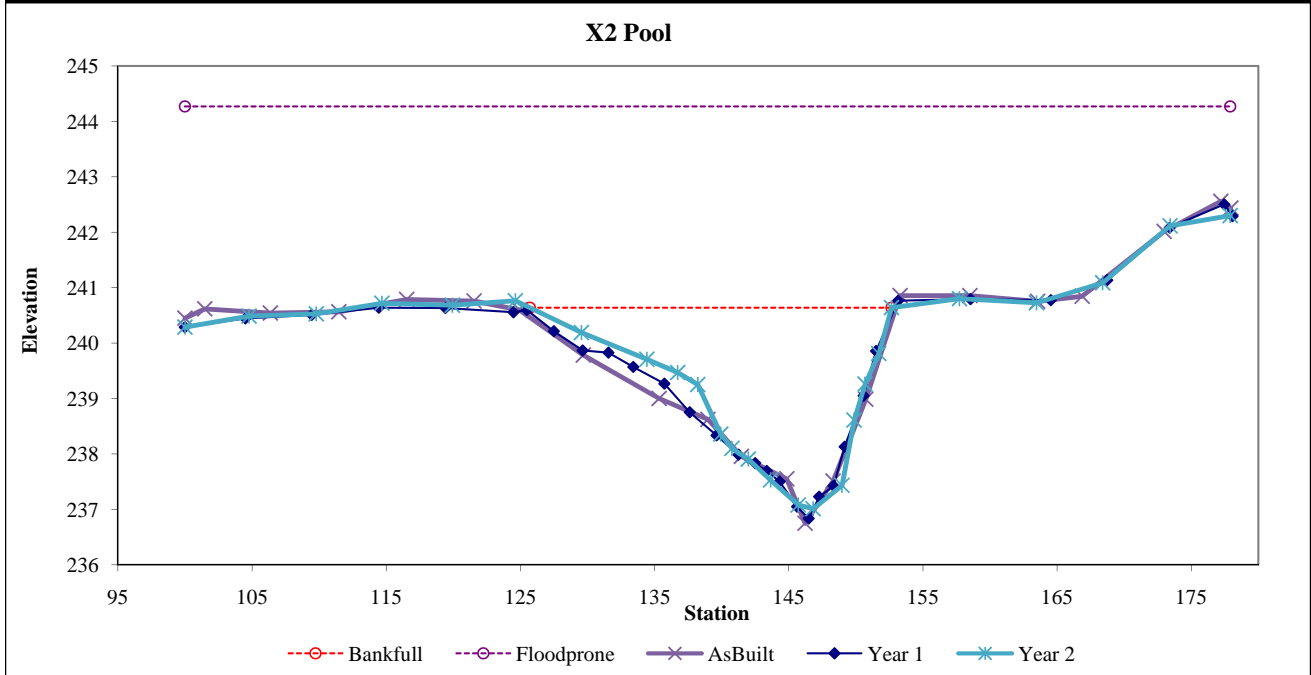


Looking at the Left Bank



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		45.3	26.95	1.68	3.63	16.04	1		240.64	240.64



Permanent Cross Section X3
(Year 2 Monitoring Data - collected October 2010)

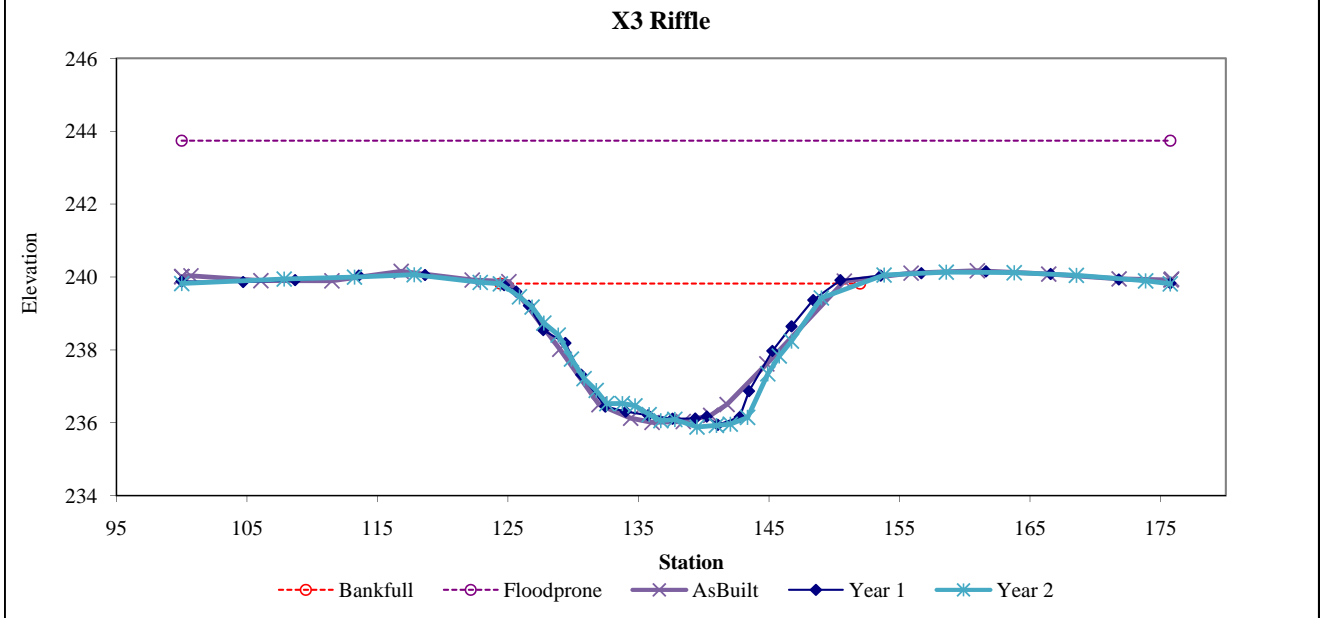


Looking at the Left Bank



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	62.8	27.56	2.28	3.93	12.1	1	2.7	239.82	239.82



Permanent Cross Section X4
(Year 2 Monitoring Data - collected October 2010)

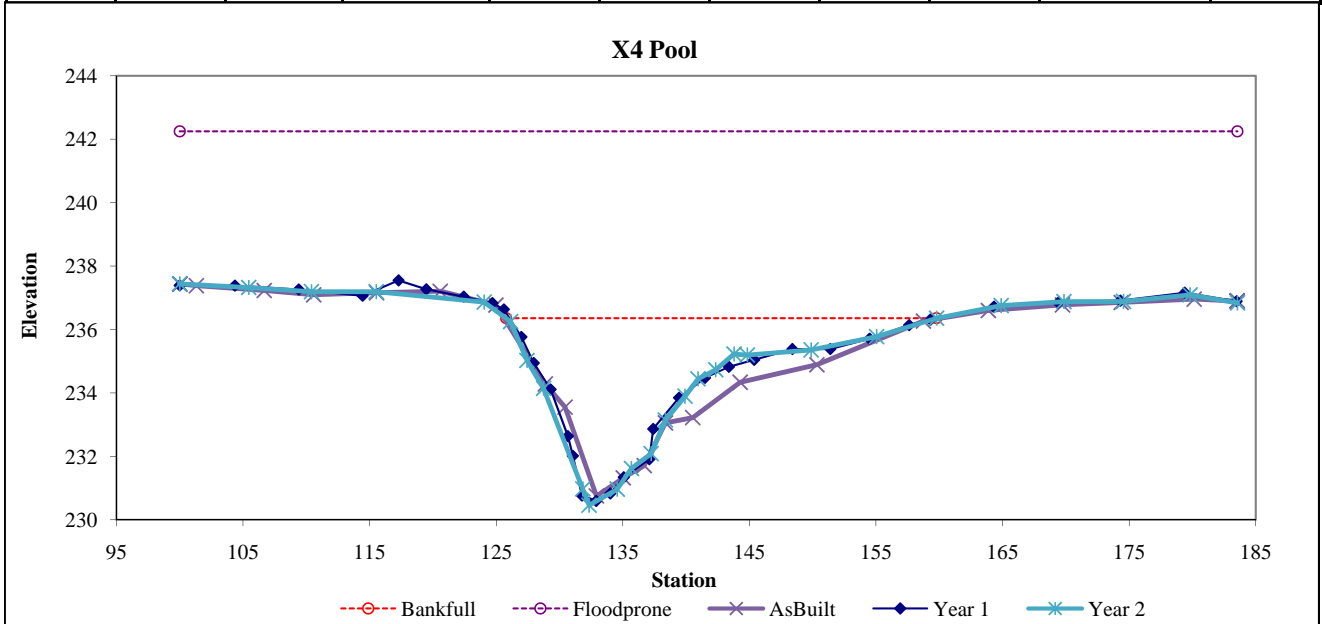


Looking at the Left Bank



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		70.5	34	2.07	5.9	16.4	1		236.36	236.36



Permanent Cross Section X5
(Year 2 Monitoring Data - collected October 2010)

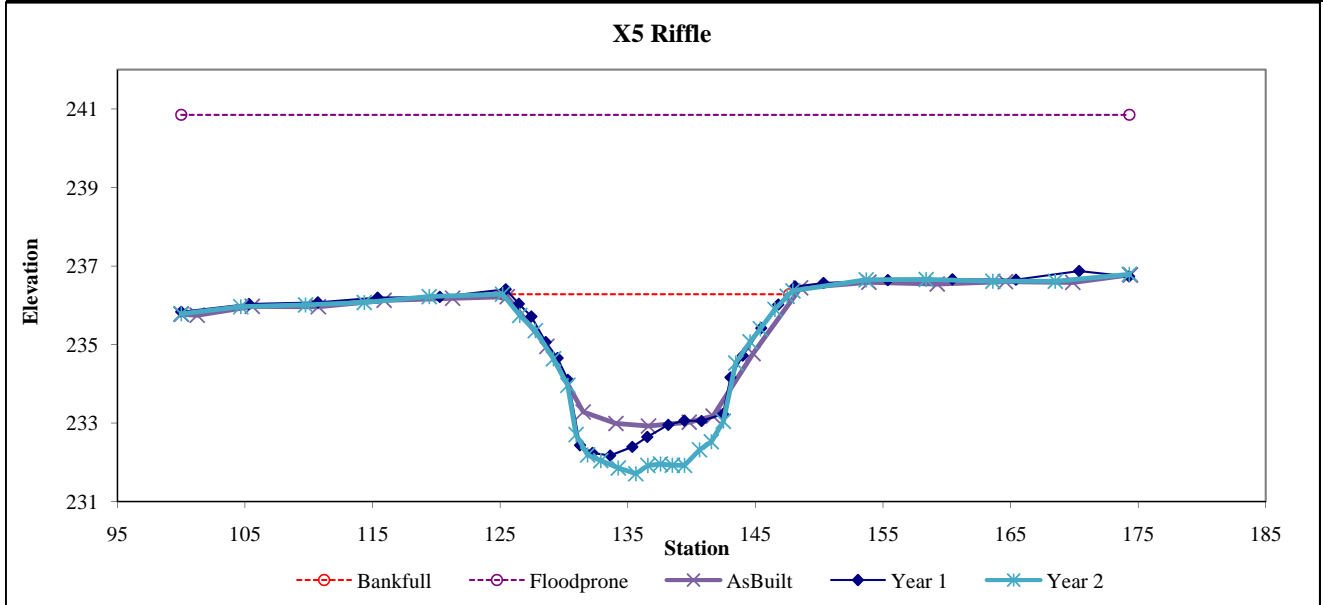


Looking at the Left Bank



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	61.4	22.47	2.73	4.57	8.22	1	3.3	236.28	236.28



Permanent Cross Section X6
(Year 2 Monitoring Data - collected October 2010)

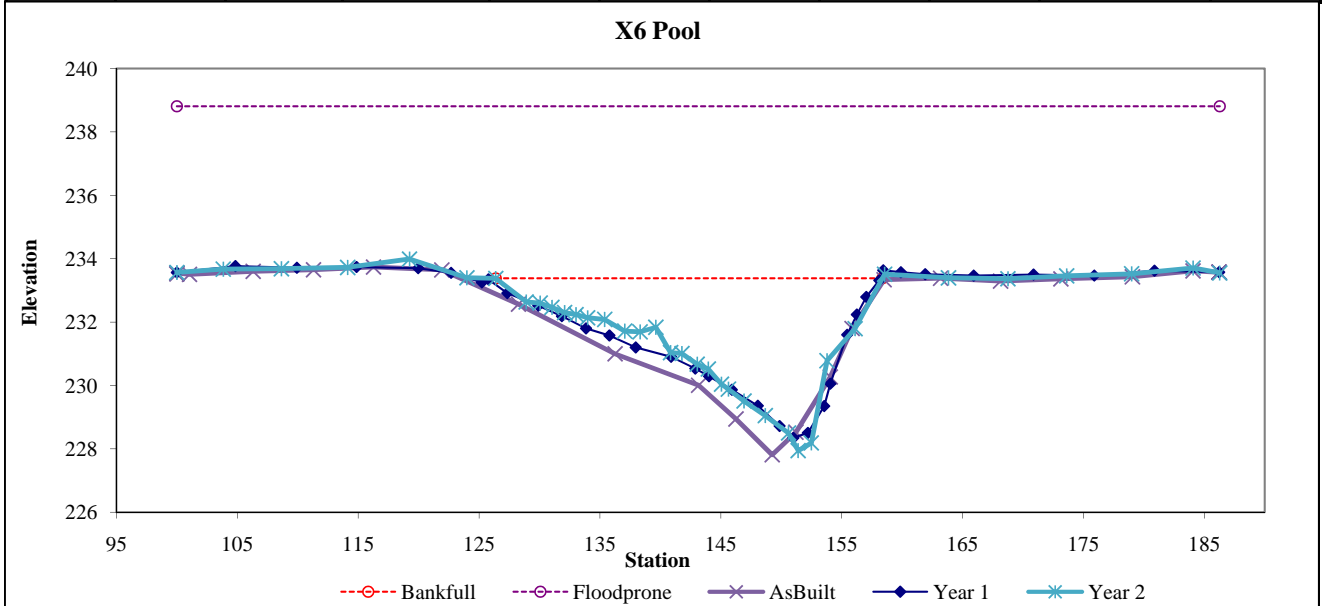


Looking at the Left Bank



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		72.5	31.99	2.27	5.44	14.12	1		233.38	233.38



Permanent Cross Section X7
(Year 2 Monitoring Data - collected October 2010)

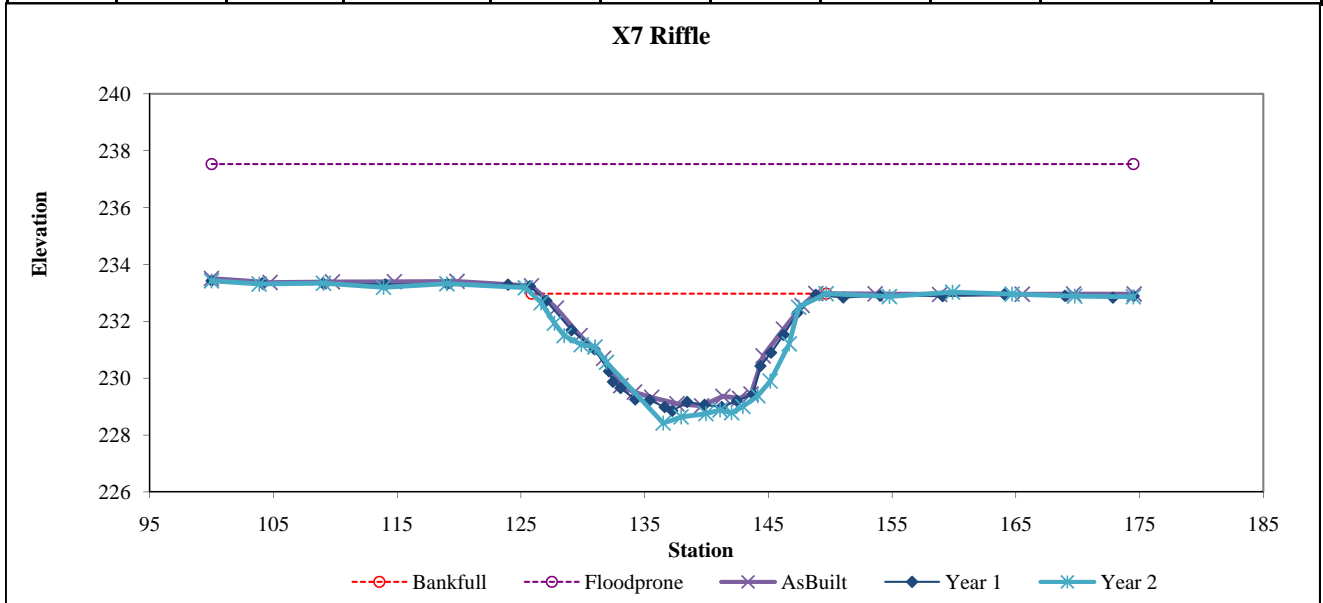


Looking at the Left Bank



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	64.5	23.8	2.71	4.55	8.78	1	3.1	232.97	232.97



Permanent Cross Section X8
(Year 2 Monitoring Data - collected October 2010)

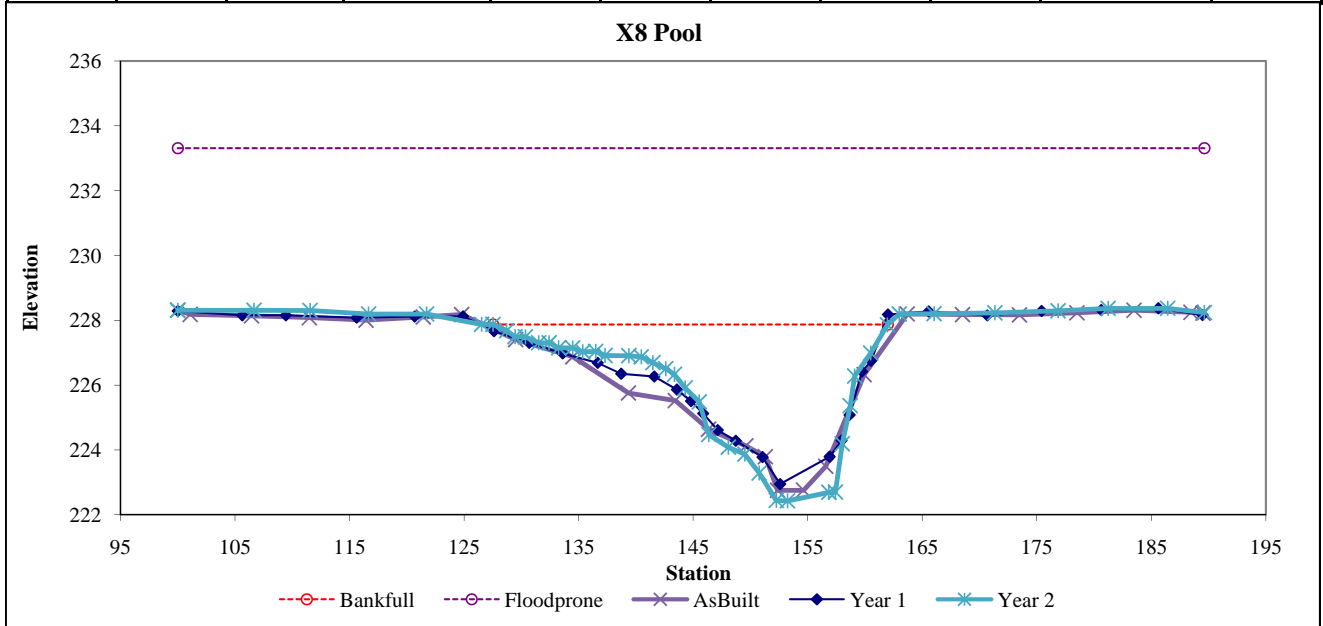


Looking at the Left Bank



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		78.9	34.46	2.29	5.44	15.04	1		227.87	227.87



Permanent Cross Section X9
(Year 2 Monitoring Data - collected October 2010)

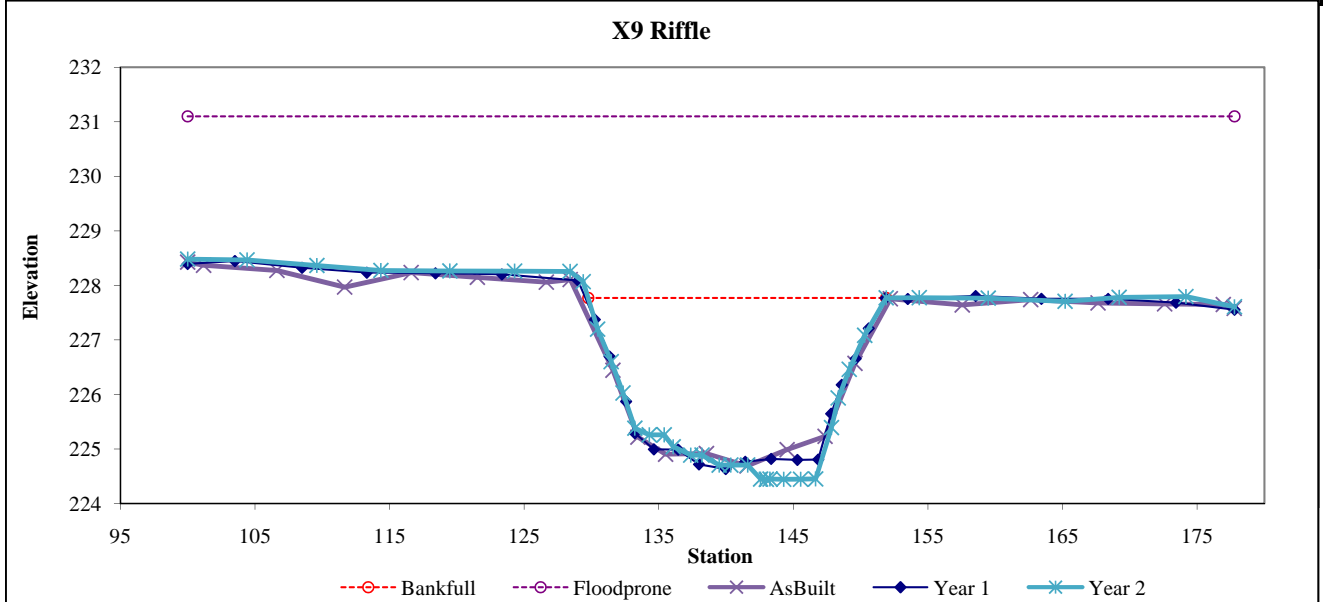


Looking at the Left Bank



Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	E	51.8	22.15	2.34	3.33	9.48	1	3.5	227.77	227.77



Permanent Cross Section X10
(Year 2 Monitoring Data - collected October 2010)

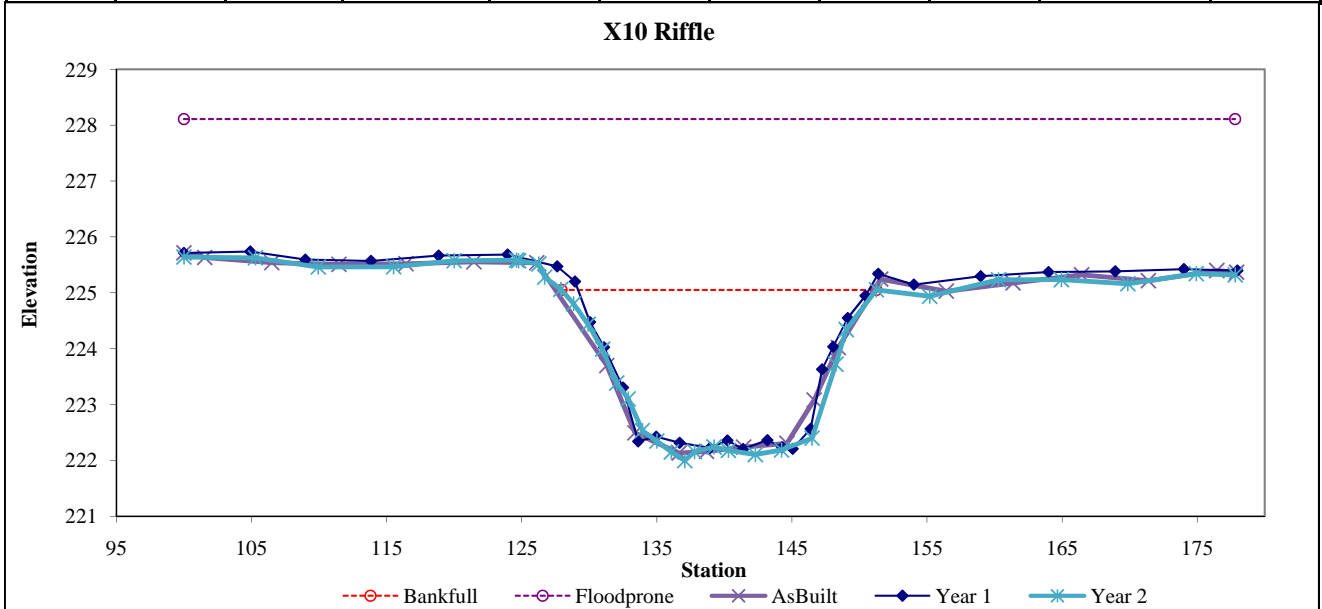


Looking at the Left Bank



Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	47.6	23.31	2.04	3.06	11.41	1	3.3	225.05	225.05



Permanent Cross Section X11
(Year 2 Monitoring Data - collected October 2010)

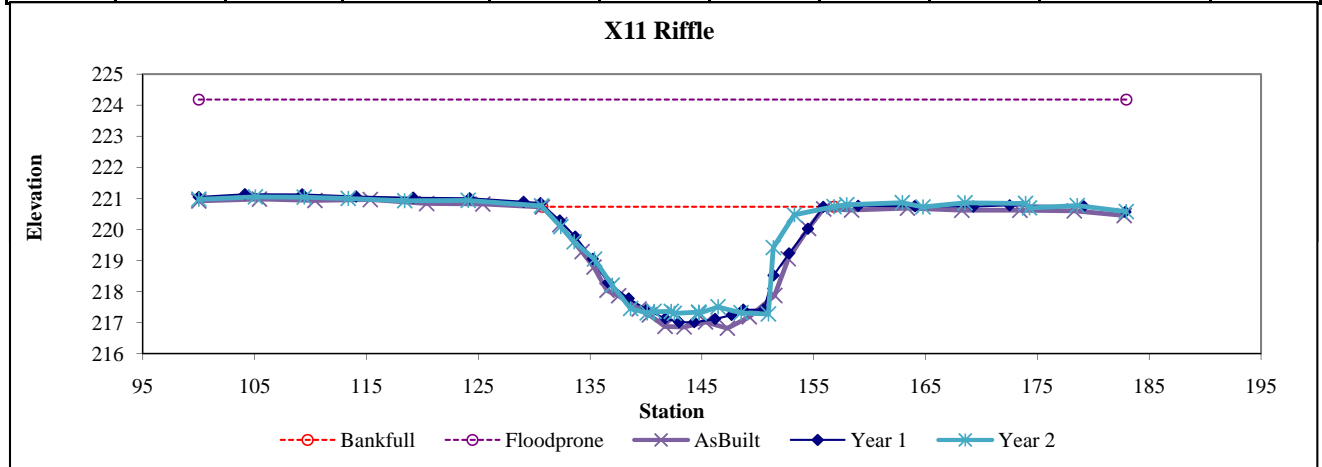


Looking at the Left Bank



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	56.9	26.09	2.18	3.45	11.97	1	3.2	220.73	220.73



Permanent Cross Section X12
(Year 2 Monitoring Data - collected October 2010)

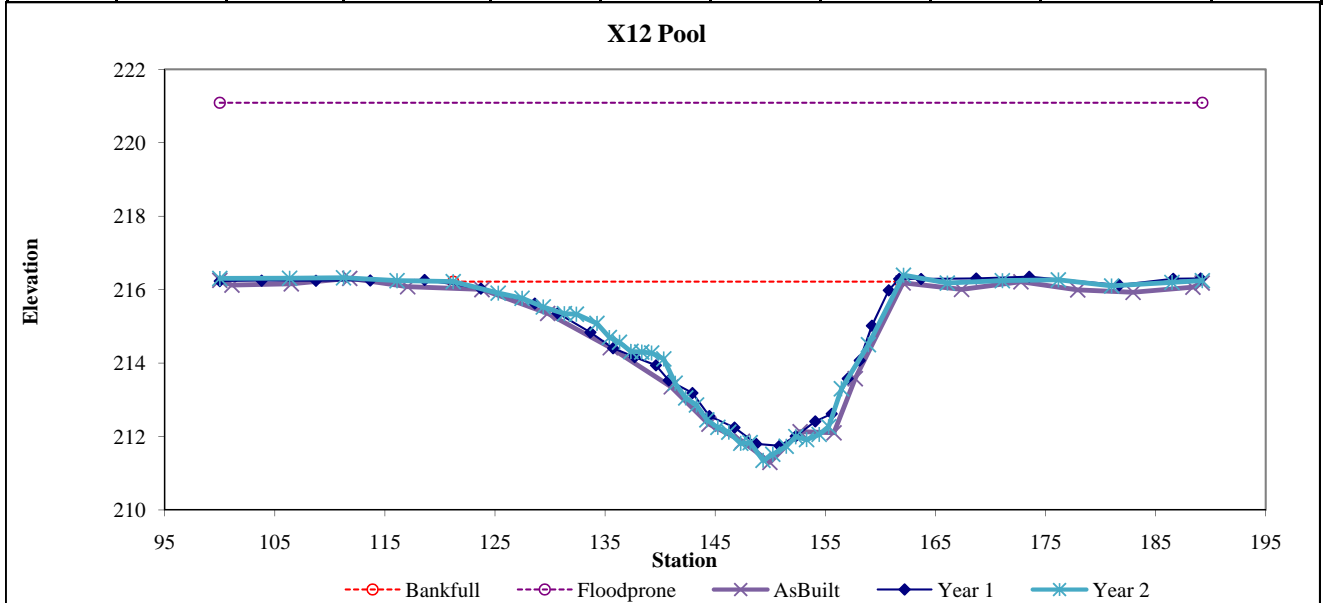


Looking at the Left Bank



Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		89.5	40.61	2.2	4.87	18.42	1		216.22	216.22



Permanent Cross Section X13
(Year 2 Monitoring Data - collected October 2010)

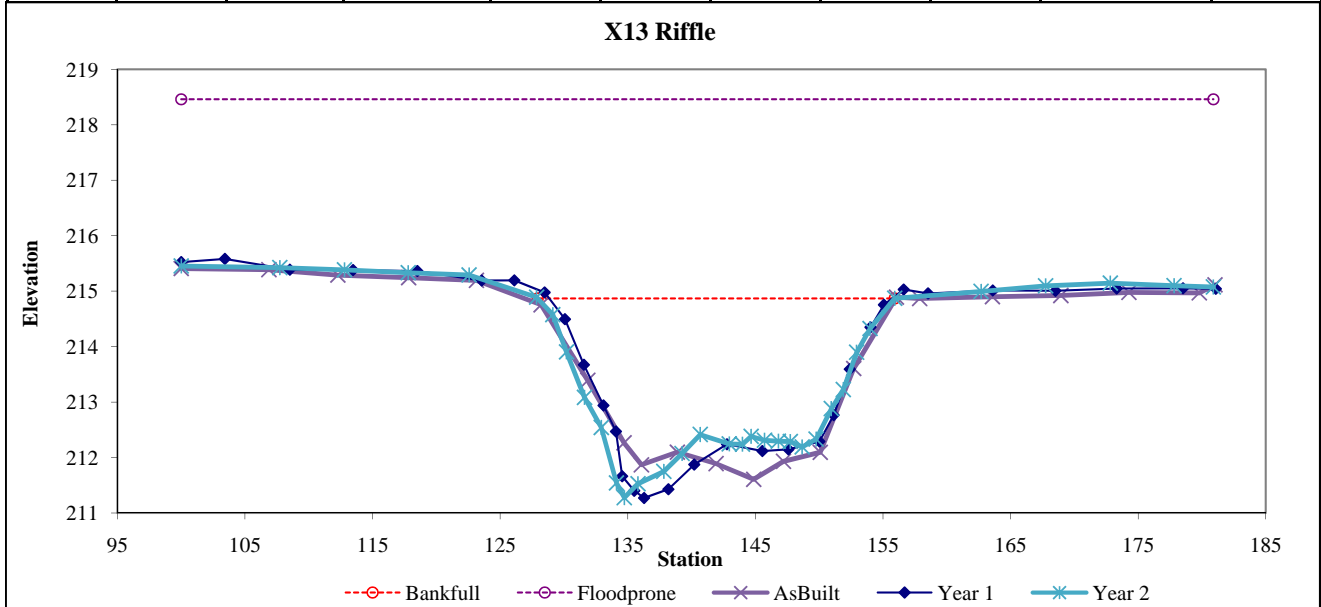


Looking at the Left Bank



Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	59.7	27.98	2.13	3.59	13.11	1	2.9	214.87	214.87



Permanent Cross Section X14
(Year 2 Monitoring Data - collected October 2010)

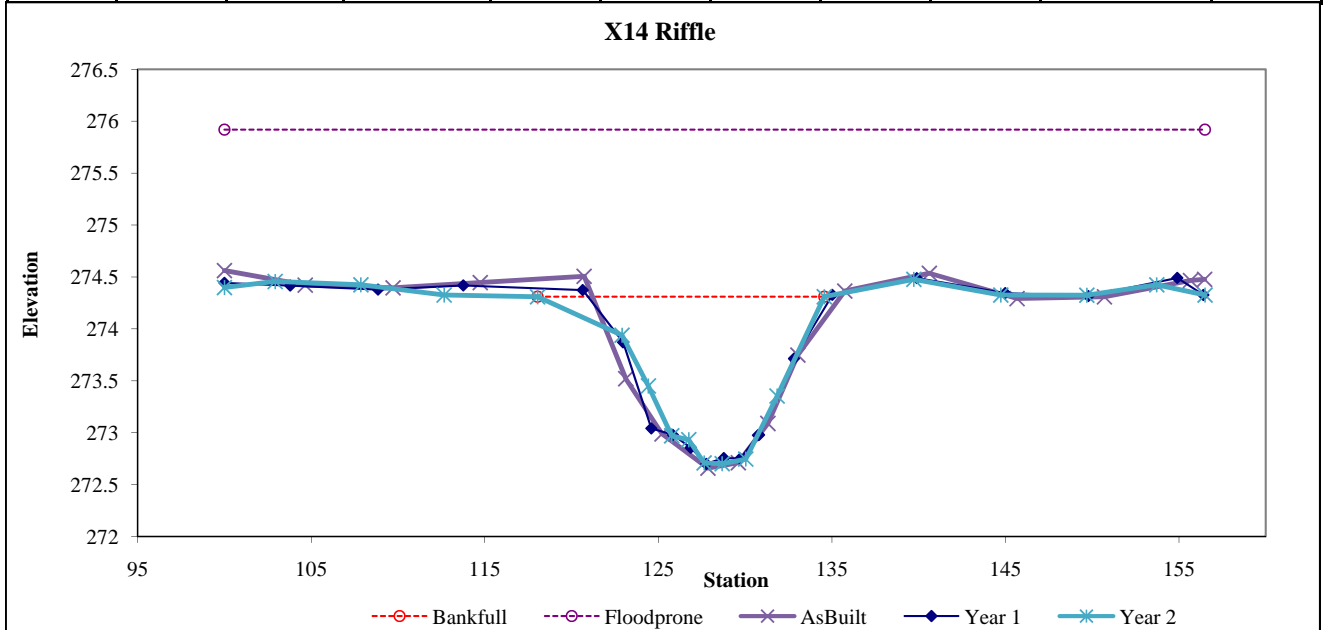


Looking at the Left Bank



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	13.4	16.52	0.81	1.61	20.42	1	3.3	274.31	274.31



Permanent Cross Section X15
(Year 2 Monitoring Data - collected October 2010)

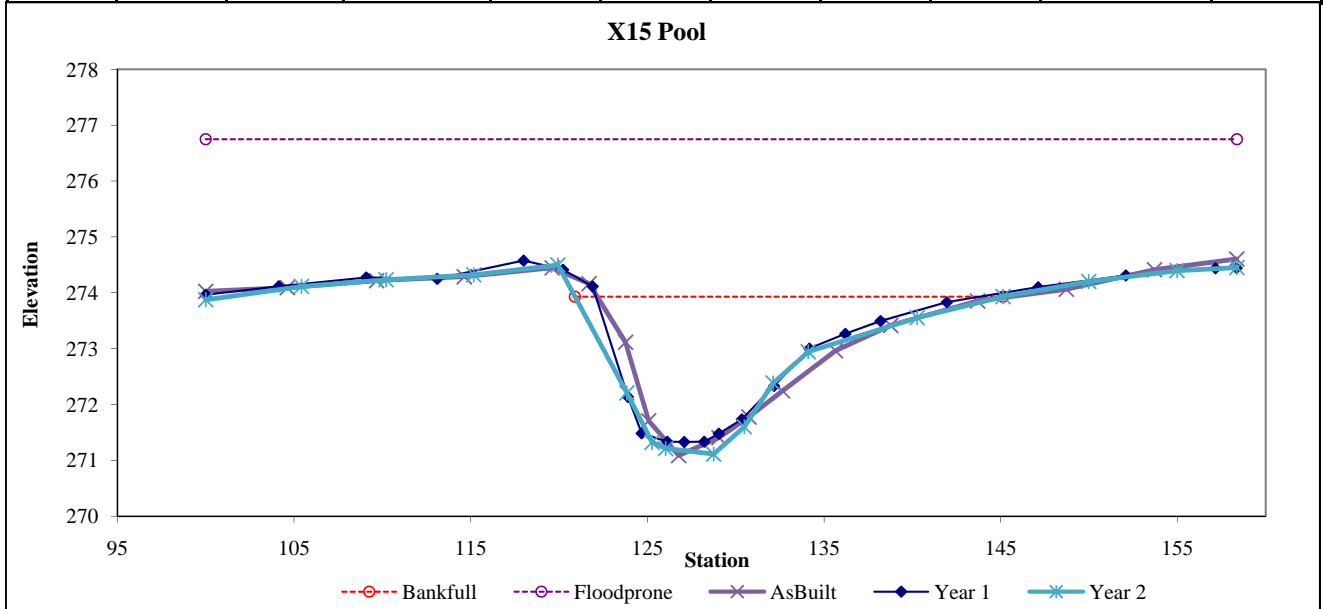


Looking at the Left Bank



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		30.5	24.24	1.26	2.82	19.26	1		273.93	273.93



Permanent Cross Section X16
(Year 2 Monitoring Data - collected October 2010)

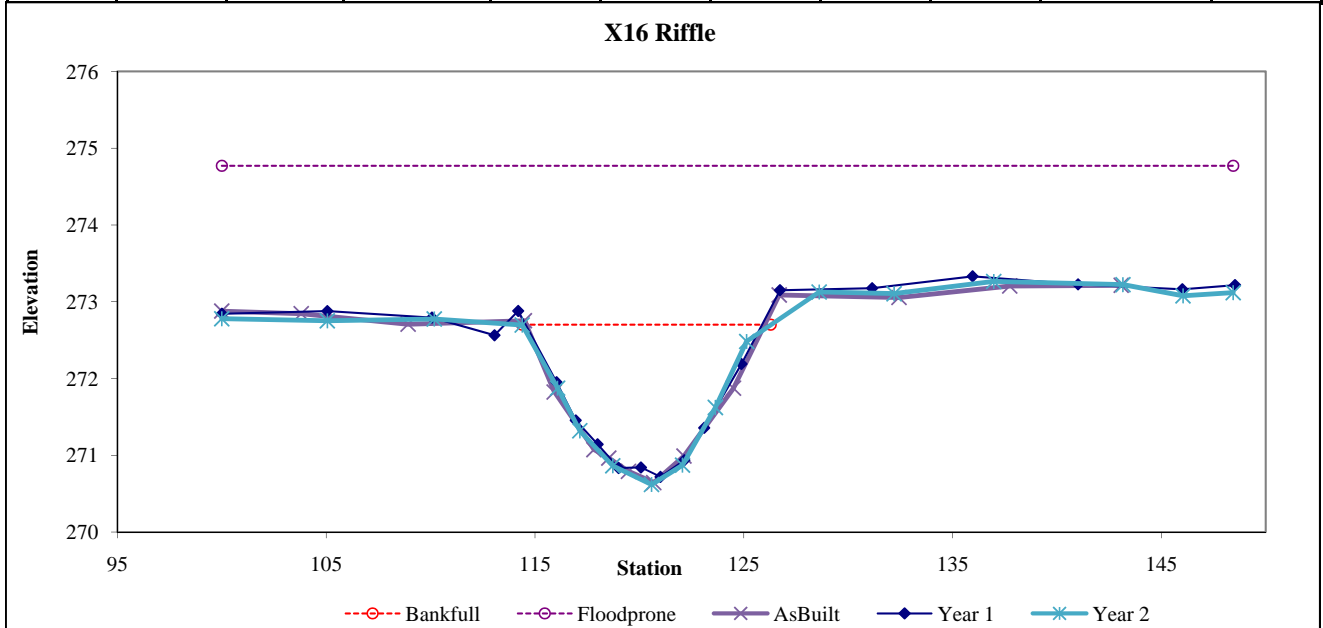


Looking at the Left Bank



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	14.3	11.9	1.2	2.08	9.9	1	4.1	272.7	272.7



Permanent Cross Section X17
(Year 2 Monitoring Data - collected October 2010)

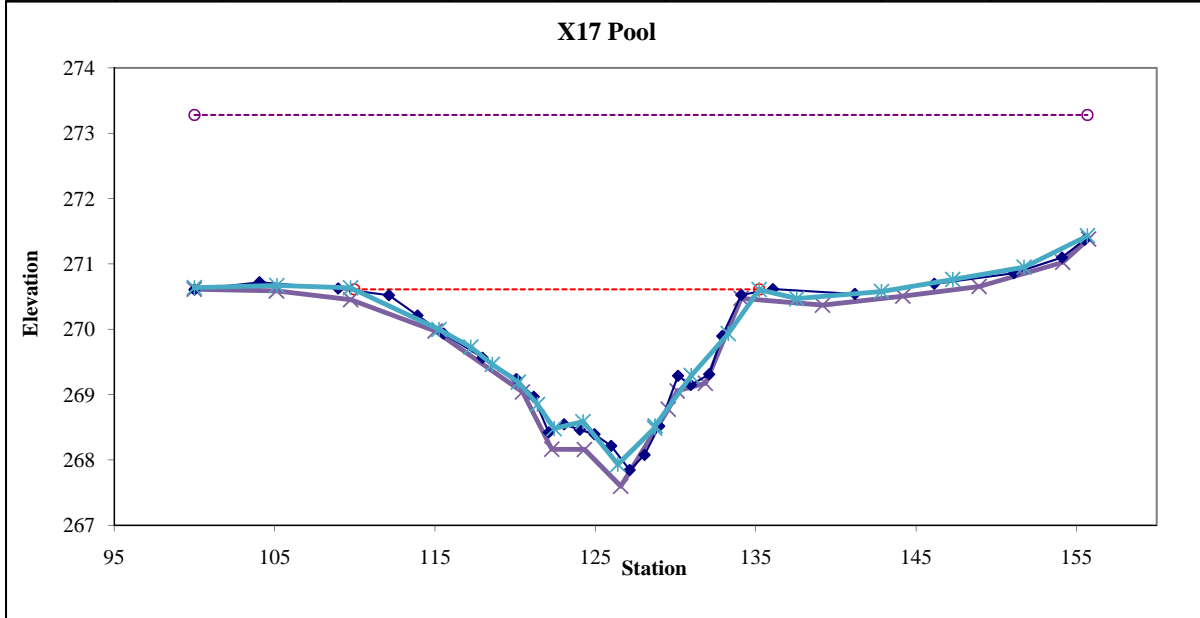


Looking at the Left Bank



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		31.6	25.25	1.25	2.68	20.16	1		270.61	270.61



Permanent Cross Section X18
(Year 2 Monitoring Data - collected October 2010)

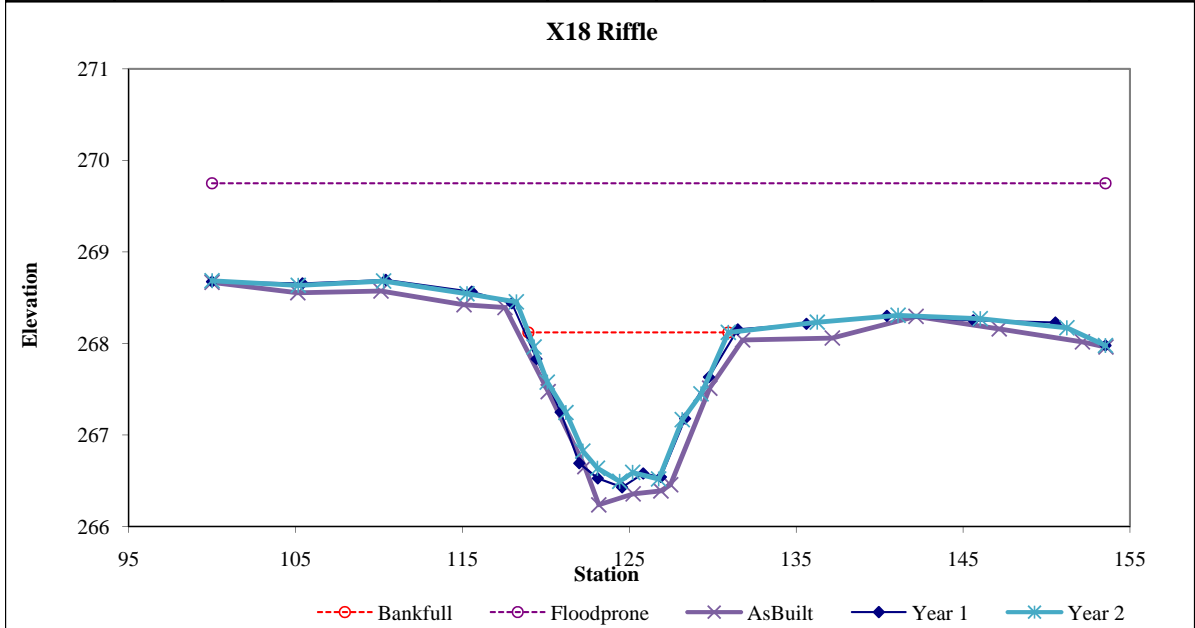


Looking at the Left Bank



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	12.4	11.98	1.04	1.63	11.55	1	4.3	268.12	268.12



Permanent Cross Section X19
(Year 2 Monitoring Data - collected October 2010)

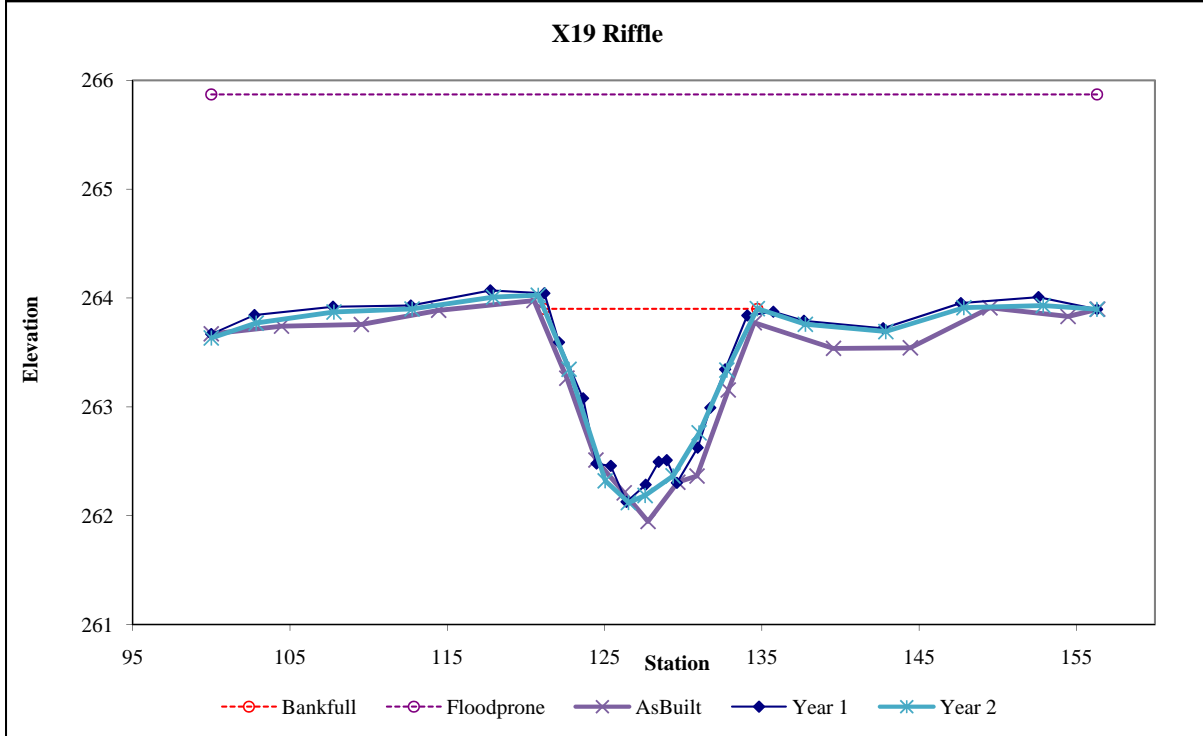


Looking at the Left Bank



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	13.57	1.06	1.78	12.8	1	3.9	264.09	264.09



Permanent Cross Section X20
(Year 2 Monitoring Data - collected October 2010)

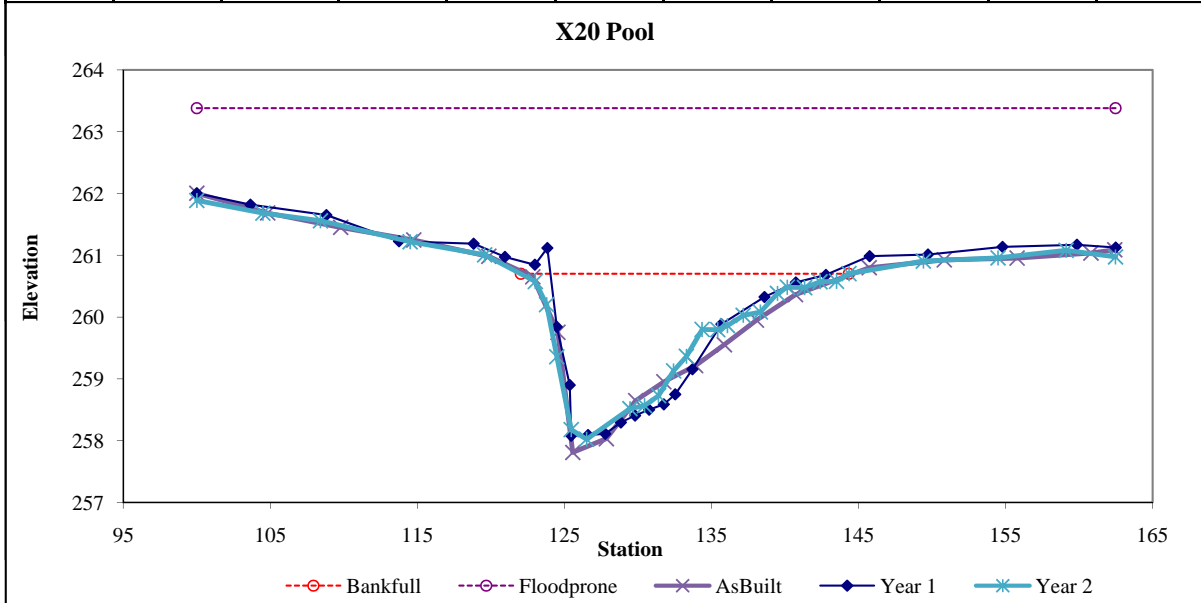


Looking at the Left Bank



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	22.31	1.14	2.68	19.49	1		260.7	260.7



Permanent Cross Section X21
(Year 2 Monitoring Data - collected October 2010)

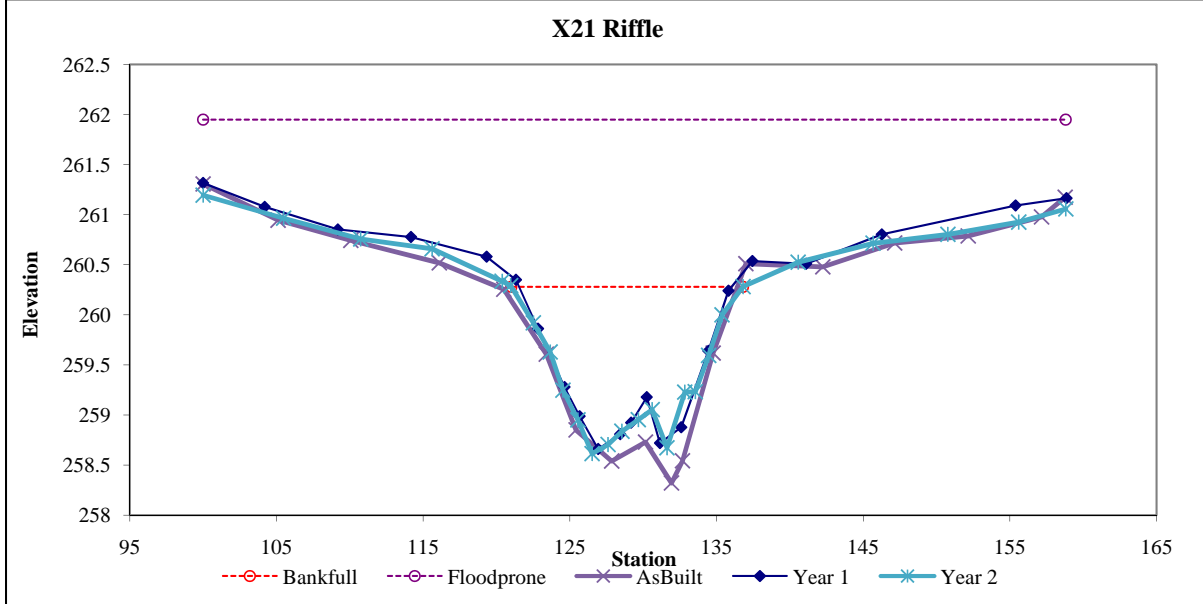


Looking at the Left Bank



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	15.8	0.98	1.67	16.18	1	3.7	260.28	260.28



Permanent Cross Section X22
(Year 2 Monitoring Data - collected October 2010)

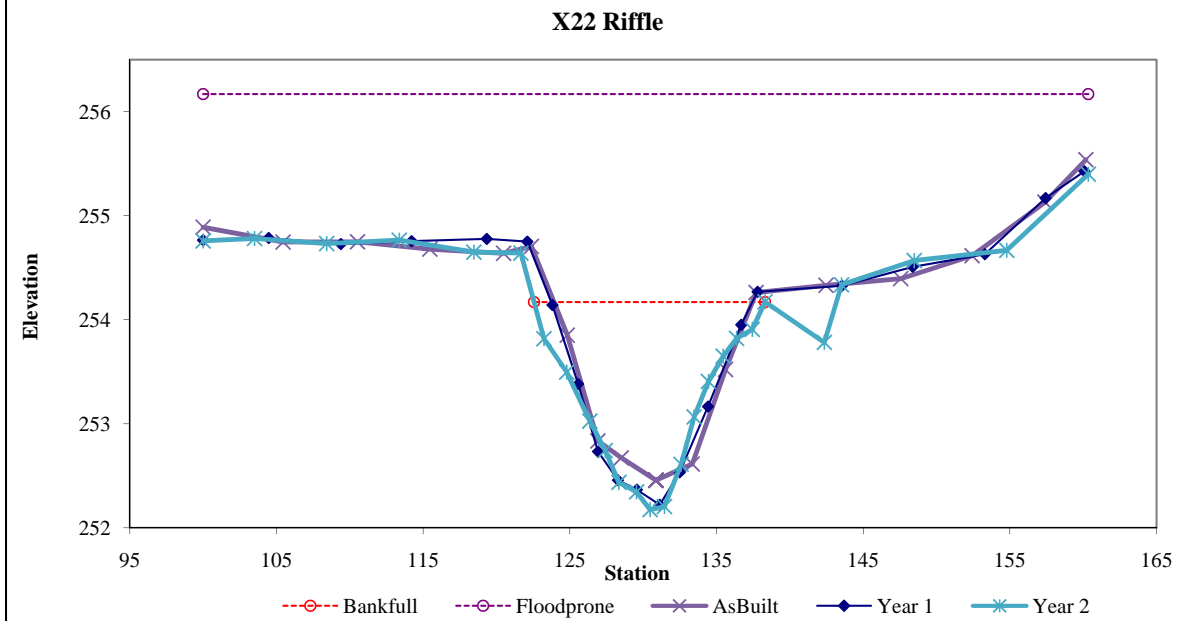


Looking at the Left Bank



Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	16.6	15.76	1.06	2	14.92	1	3.8	254.17	254.17



Permanent Cross Section X23
(Year 2 Monitoring Data - collected October 2010)

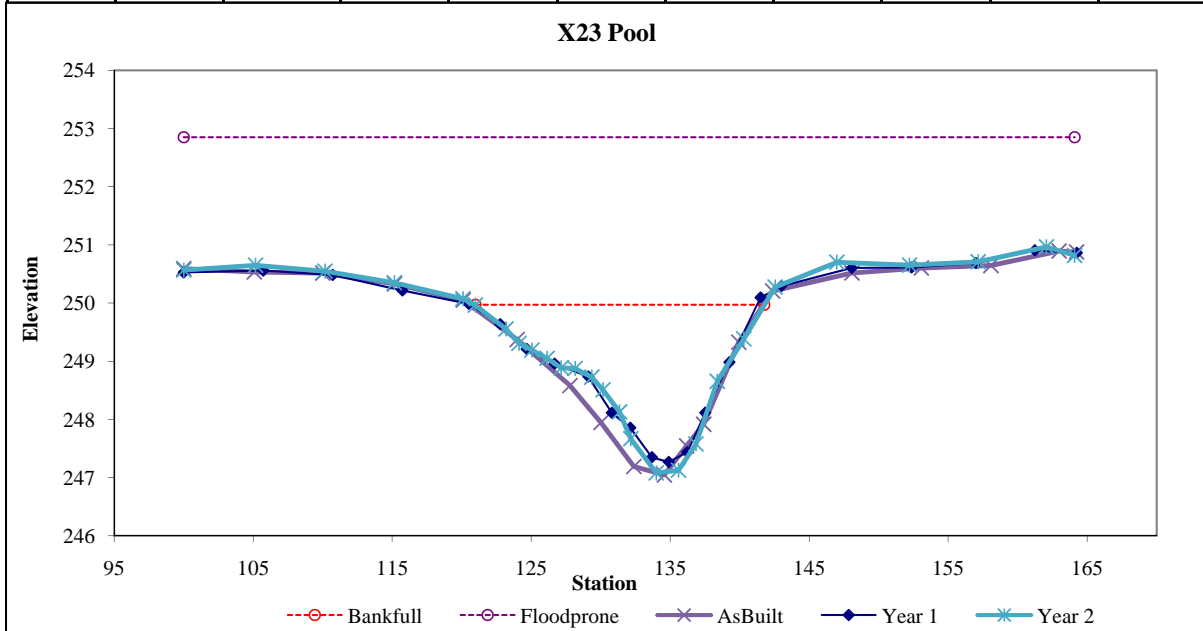


Looking at the Left Bank



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	20.8	1.37	2.89	15.2	1		249.97	249.97



Permanent Cross Section X24
(Year 2 Monitoring Data - collected October 2010)

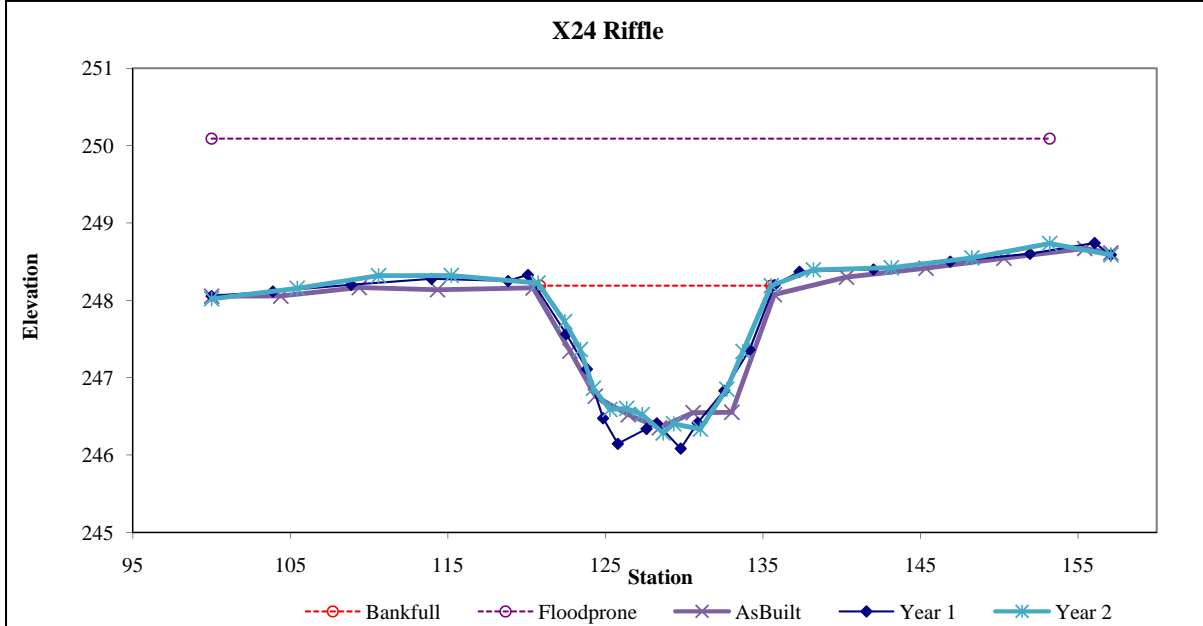


Looking at the Left Bank



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	18	14.69	1.22	1.91	11.99	1	3.6	248.19	248.19



Permanent Cross Section X25
(Year 2 Monitoring Data - collected October 2010)

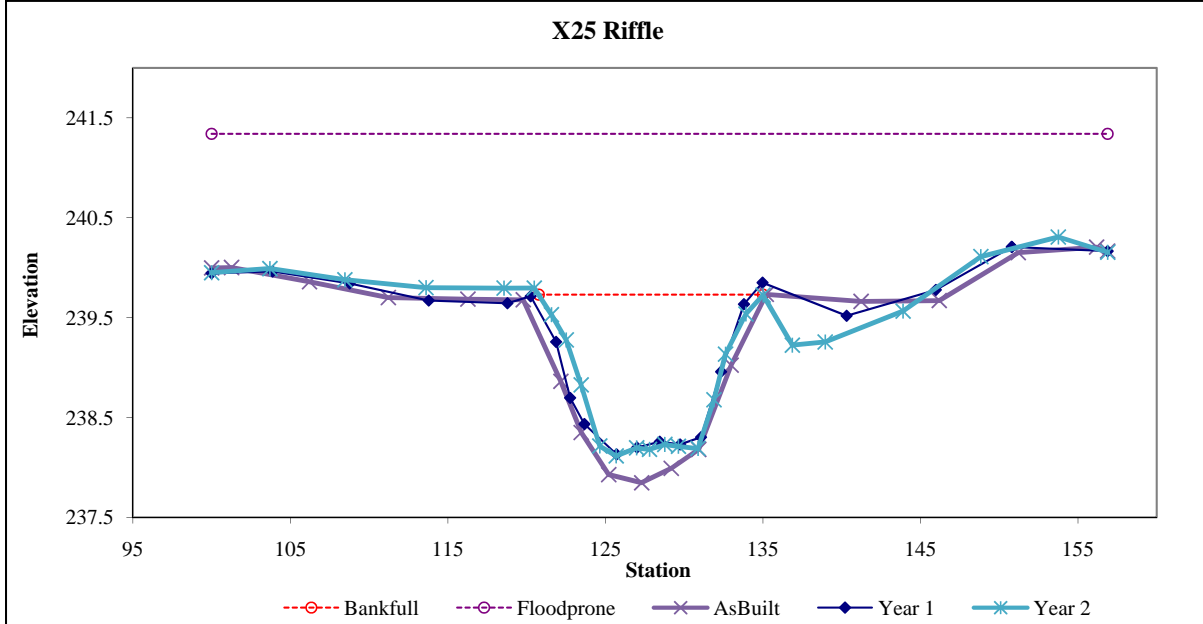


Looking at the Left Bank



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	14.6	14.24	1.02	1.61	13.92	1	4	239.73	239.73



Permanent Cross Section X26
(Year 2 Monitoring Data - collected October 2010)

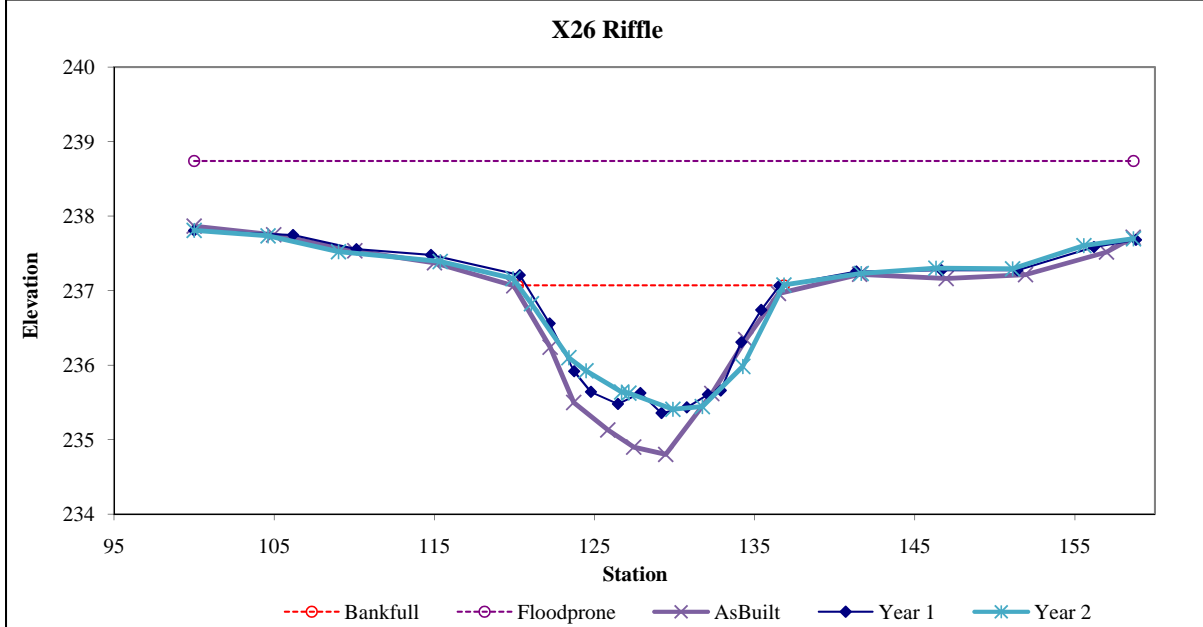


Looking at the Left Bank



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	18.4	16.62	1.11	1.67	15.02	1	3.5	237.07	237.07



Permanent Cross Section X27
(Year 2 Monitoring Data - collected October 2010)

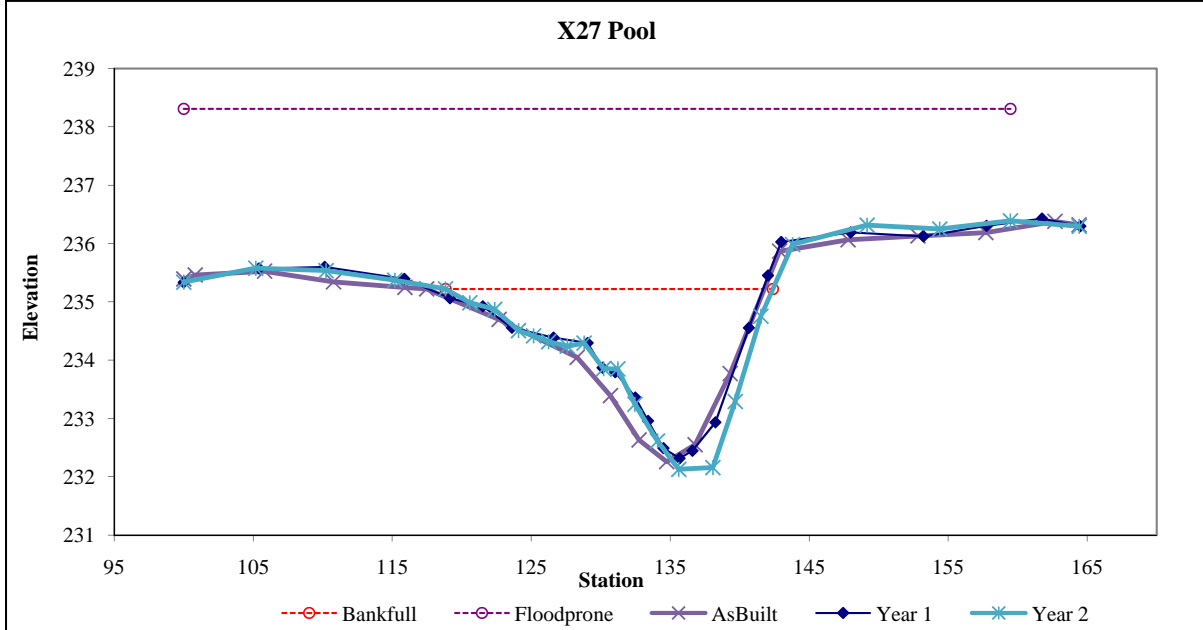


Looking at the Left Bank



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		33	23.56	1.4	3.09	16.84	1		235.22	235.22



Permanent Cross Section X28
(Year 2 Monitoring Data - collected October 2010)

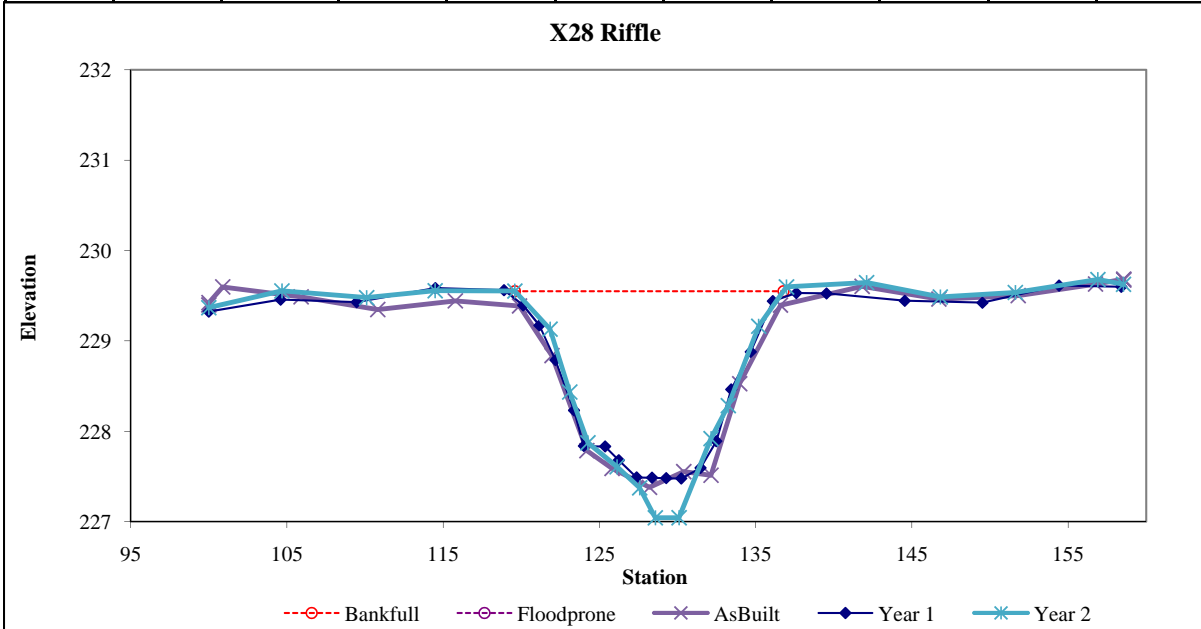


Looking at the Left Bank



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	23.3	17.2	1.36	2.51	12.67	1	3.4	229.55	229.55



Permanent Cross Section X29
(Year 2 Monitoring Data - collected October 2010)

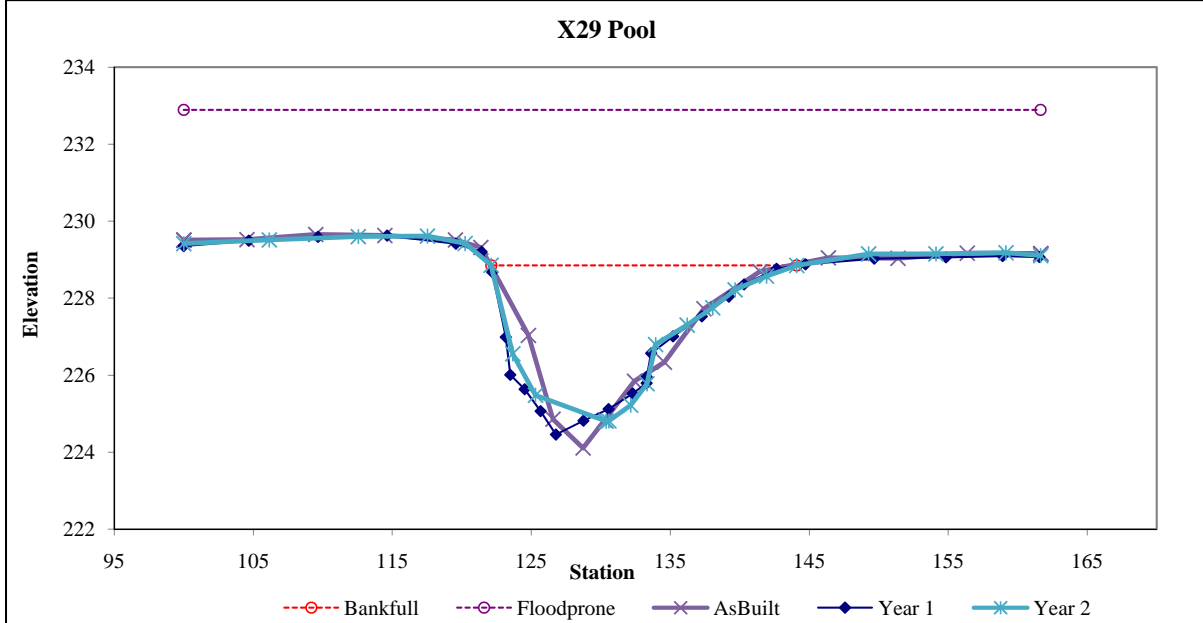


Looking at the Left Bank



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		46.8	21.98	2.13	4.04	10.31	1		228.85	228.85



Permanent Cross Section X30
(Year 2 Monitoring Data - collected October 2010)

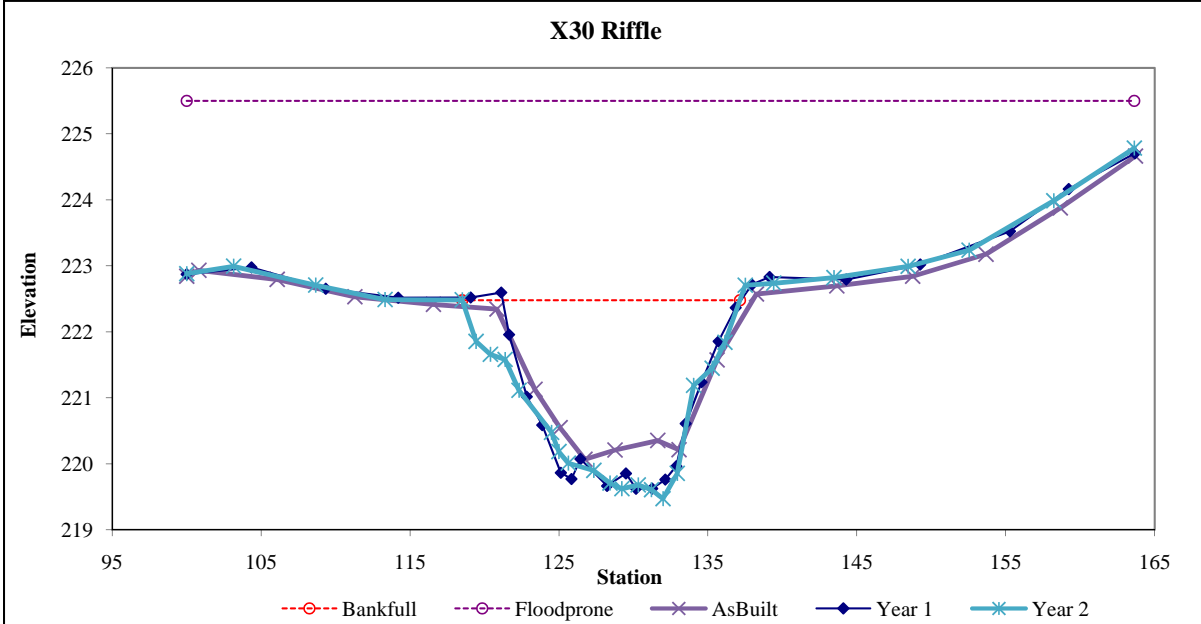


Looking at the Left Bank



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?	33.9	18.66	1.82	3.01	10.26	1	3.4	222.48	222.48



Permanent Cross Section X31
(Year 2 Monitoring Data - collected October 2010)

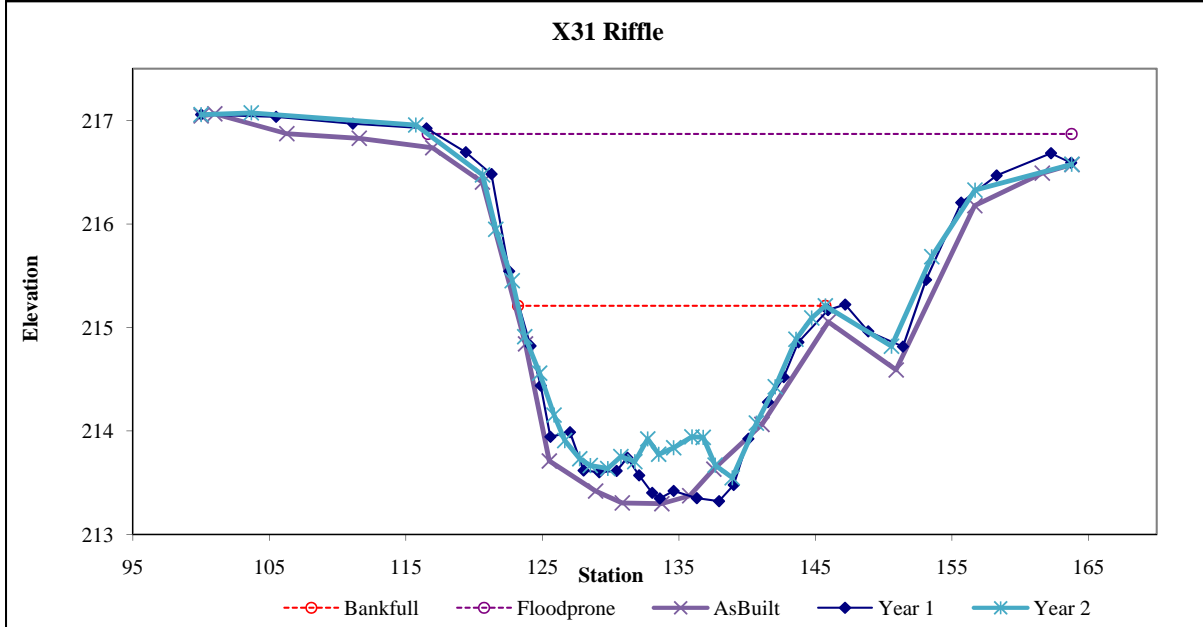


Looking at the Left Bank



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	25.1	22.52	1.11	1.66	20.25	1	2.1	215.21	215.21



Permanent Cross Section X32
(Year 2 Monitoring Data - collected October 2010)

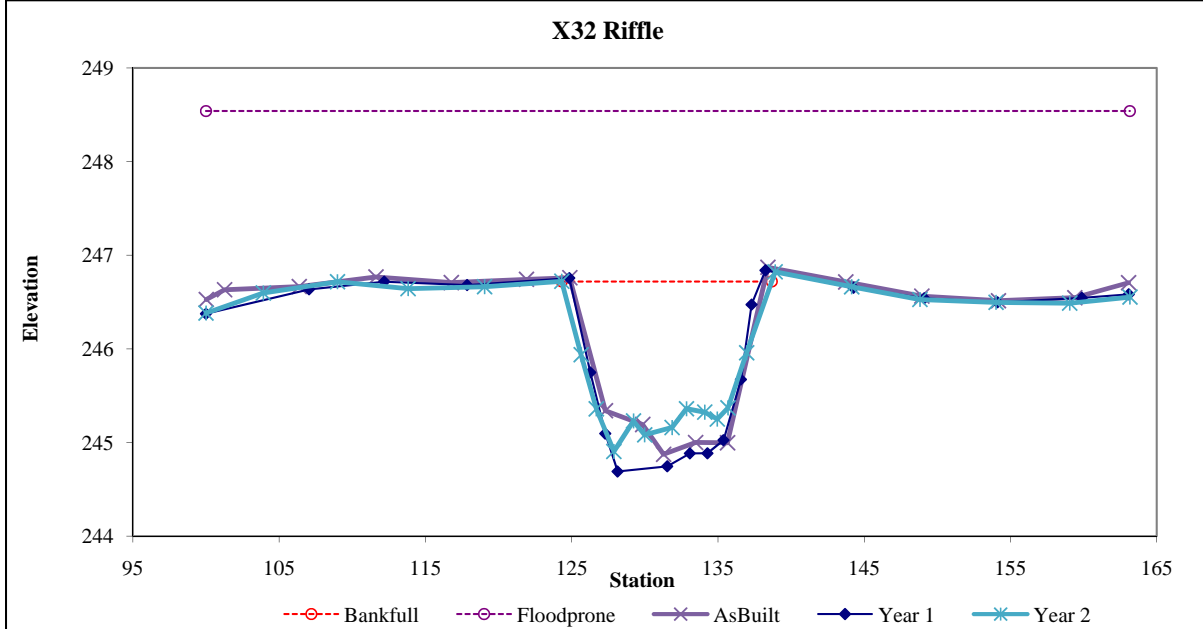


Looking at the Left Bank



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?	17.4	14.36	1.21	1.82	11.87	1	4.4	246.72	246.72



Permanent Cross Section X33
(Year 2 Monitoring Data - collected October 2010)

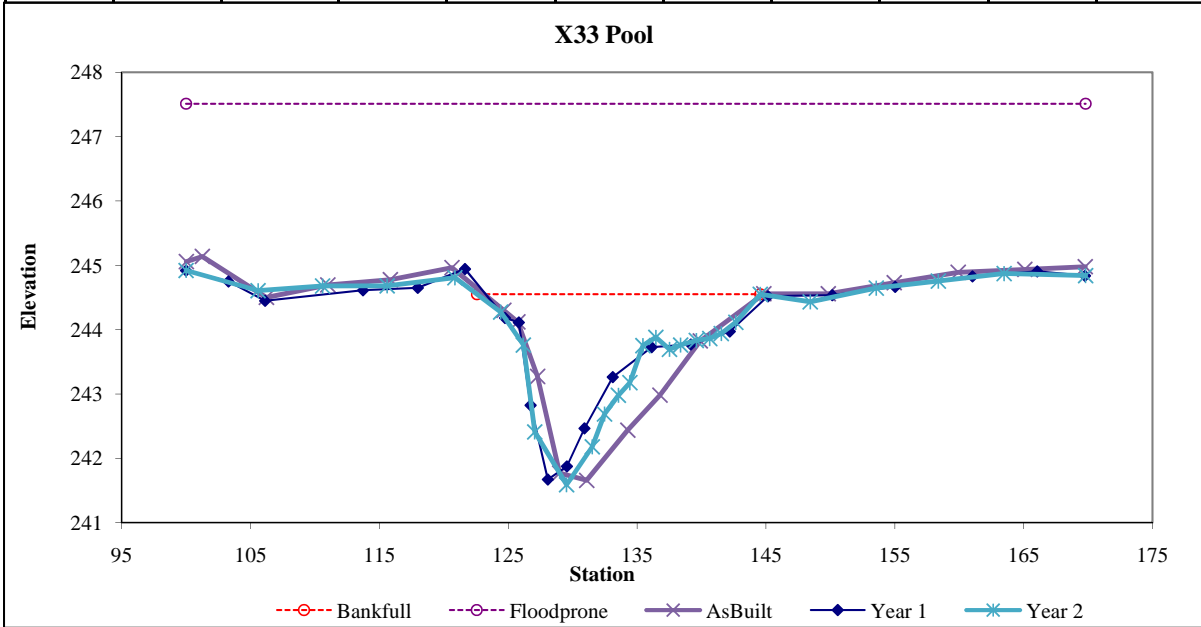


Looking at the Left Bank

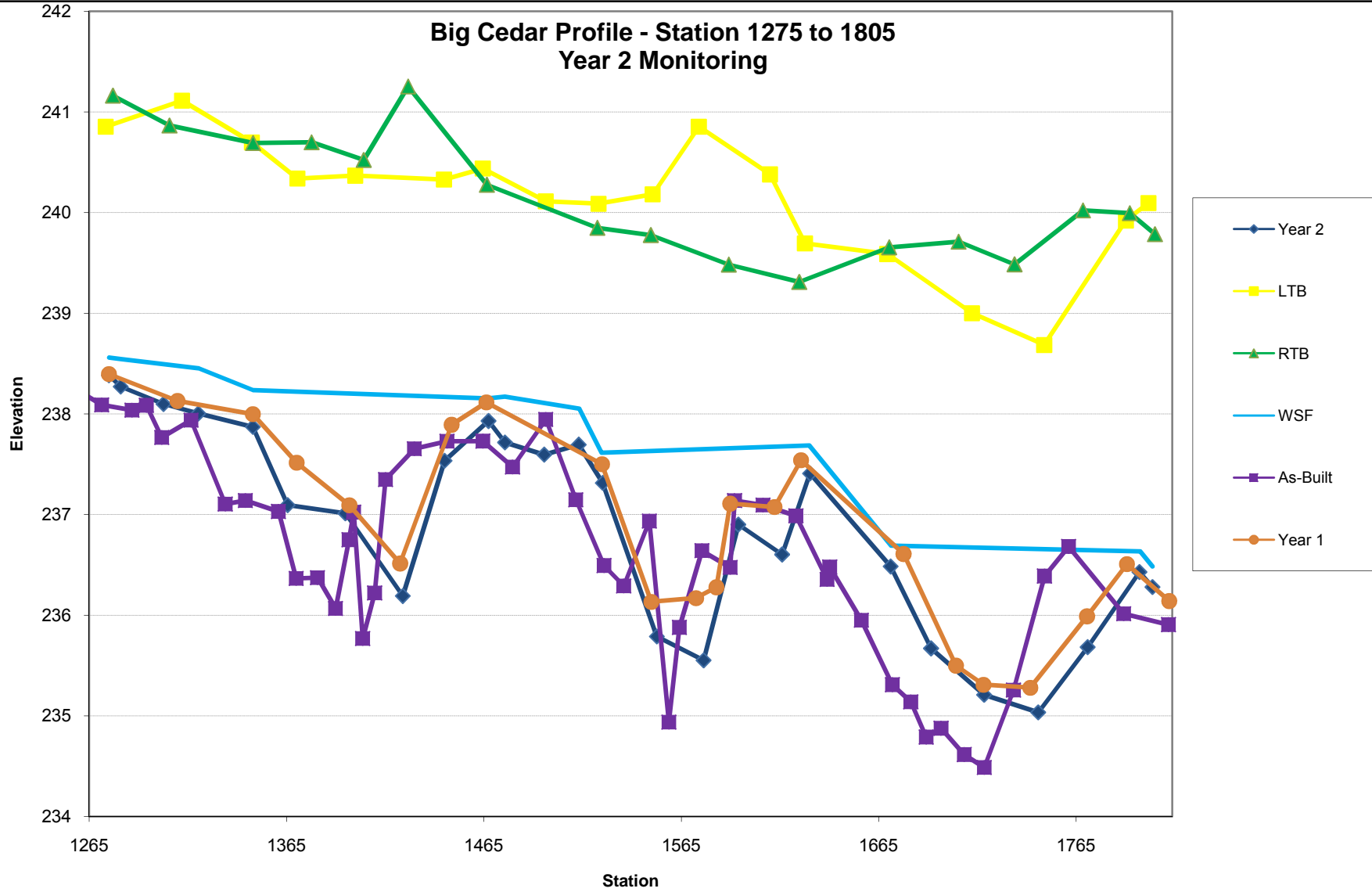


Looking at the Right Bank

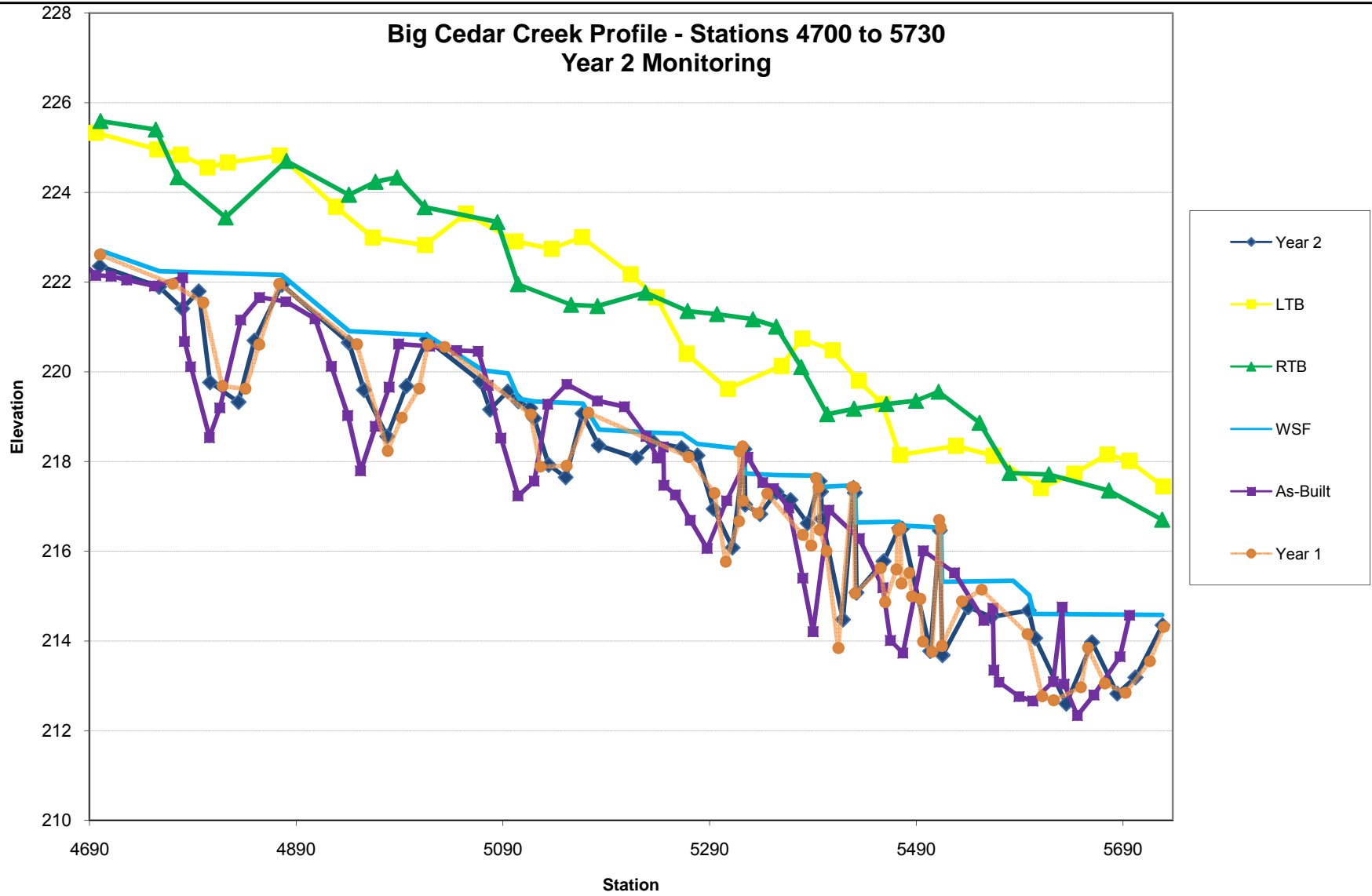
Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		25.8	21.98	1.17	2.96	18.71	1		244.55	244.55



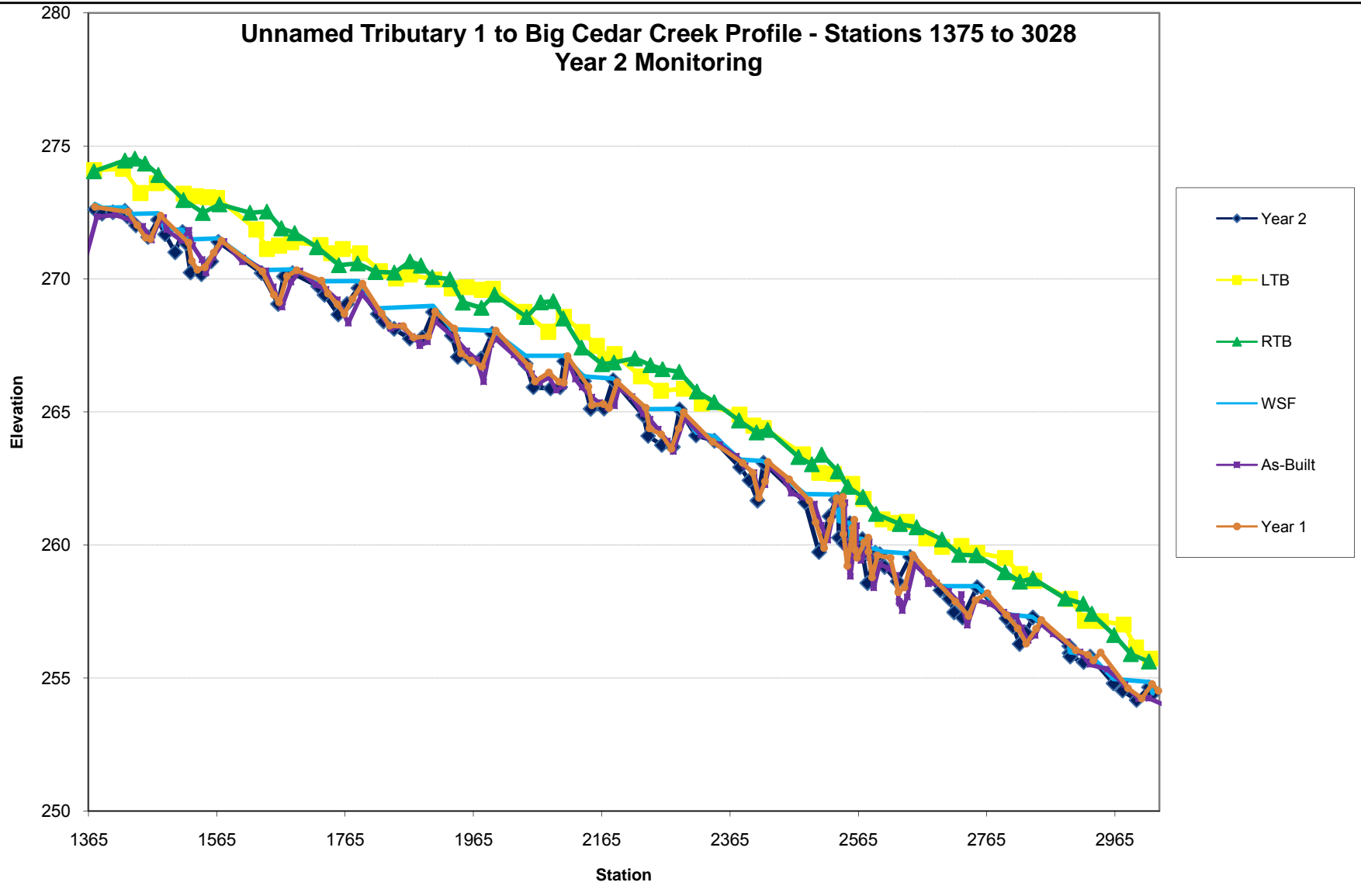
Big Cedar Profile - Station 1275 to 1805 Year 2 Monitoring



Big Cedar Creek Profile - Stations 4700 to 5730 Year 2 Monitoring



Unnamed Tributary 1 to Big Cedar Creek Profile - Stations 1375 to 3028 Year 2 Monitoring



Unnamed Tributary 2 to Big Cedar Creek Profile - Stations 1100 to 1300
Year 2 Monitoring

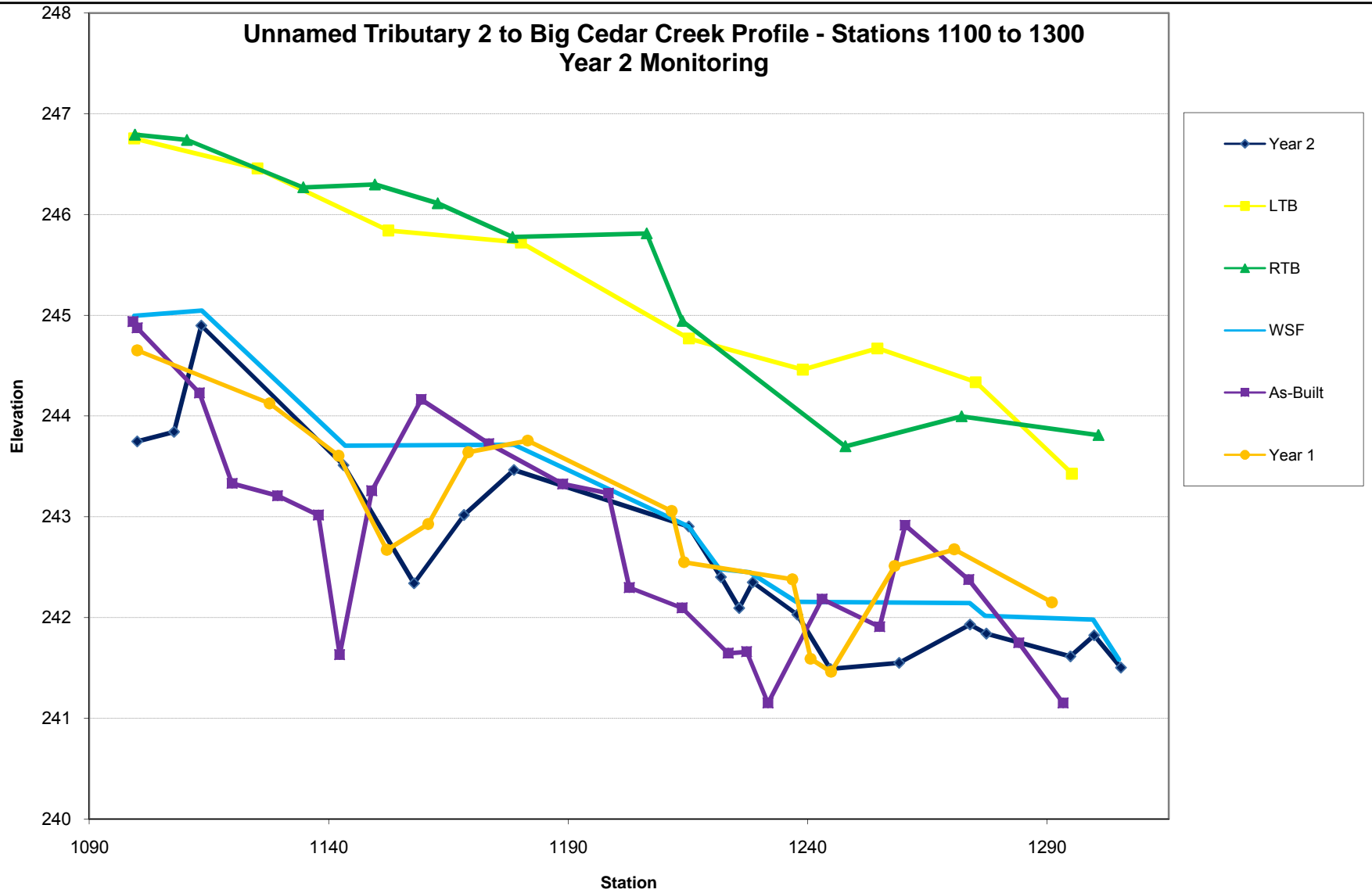


Table 7. Baseline Stream Summary																
Big Cedar Creek Restoration Site Contract No. D06054-D																
BCC Reach 1 (603 LF)																
Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Morgan Creek					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																
BF Width (ft)	----	10.0	35.0	18.7	----	16.3	----	----	----	1	----	33.2	----	----	----	2
Floodprone Width (ft)	----	----	----	----	----	>126.6	----	----	----	1	----	77.5	----	----	----	2
BF Mean Depth (ft)	----	1.3	3.1	2.1	----	2.3	----	----	----	1	----	2.3	----	----	----	2
BF Max Depth (ft)	----	----	----	----	----	2.8	----	----	----	1	----	2.8	----	----	----	2
BF Cross-sectional Area (ft²)	----	18.0	68.0	43.7	----	36.7	----	----	----	1	----	75.1	----	----	----	2
Width/Depth Ratio	----	----	----	----	----	7.1	----	----	----	1	----	14.1	----	----	----	2
Entrenchment Ratio	----	----	----	----	----	>7.8	----	----	----	1	----	2.3	----	----	----	2
Bank Height Ratio	----	----	----	----	----	1.8	----	----	----	1	----	1.0	----	----	----	2
d50 (mm)	----	----	----	----	----	14.0	----	----	----	----	----	3.0	----	----	----	1
Pattern																
Channel Beltwidth (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Radius of Curvature (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rc:Bankfull width (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Profile																
Riffle Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Riffle Slope (ft/ft)	----	----	----	----	0.01	----	----	0.04	----	----	0.01	----	----	0.02	----	2
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	----	----	----	----	46.0	----	----	98.0	----	----	146.0	----	----	----	----	2
Pool Max Depth (ft)	----	----	----	----	----	3.8	----	----	----	----	4.1	----	----	----	----	1
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
SC% / Sa% / G% / B% / Be%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
d16 / d35 / d50 / d84 / d95	----	----	----	----	----	----	<0.063 / 6 / 14 / 100 / 300	----	----	----	----	N/A / 1.2 / 3 / 77 / 800	----	----	----	----
Reach Shear Stress (competency) lb/ft²	----	----	----	----	----	0.88	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	250.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																
Drainage Area (SM)	----	----	----	----	2.3	----	----	2.9	----	----	----	----	8.4	----	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen 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 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 1 (603 LF)

Parameter	Design						As-built						Year 1						Year 2					
	Min	Mean	Med	Max	SD	n	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	----	21.1	----	----	----	1
Floodprone Width (ft)	----	87.0	----	----	----	1	----	65.3	----	----	----	1	----	65.2	----	----	----	1	----	65.2	----	----	----	1
BF Mean Depth (ft)	----	2.0	----	----	----	1	----	1.9	----	----	----	1	----	1.8	----	----	----	1	----	1.8	----	----	----	1
BF Max Depth (ft)	----	2.8	----	----	----	1	----	2.7	----	----	----	1	----	2.6	----	----	----	1	----	2.8	----	----	----	1
BF Cross-sectional Area (ft²)	----	39.0	----	----	----	1	----	37.0	----	----	----	1	----	35.6	----	----	----	1	----	36.9	----	----	----	1
Width/Depth Ratio	----	10.0	----	----	----	1	----	10.4	----	----	----	1	----	10.7	----	----	----	1	----	12.1	----	----	----	1
Entrenchment Ratio	----	4.4	----	----	----	1	----	3.3	----	----	----	1	----	3.3	----	----	----	1	----	3.1	----	----	----	1
Bank Height Ratio	----	1.0	----	----	----	1	----	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	----	----	----	----	----	----	----	----	----	----	----	----
Rc:Bankfull width (ft/ft)	2.5	----	----	3.5	----	3	2.5	3.0	----	3.6	----	3	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	281.0	----	----	285.0	----	2	251.7	272.8	257.2	309.4	31.8	3	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	5.2	----	----	6.6	----	3	5.4	----	----	6.7	----	3	----	----	----	----	----	----	----	----	----	----	----	----
Profile																								
Riffle Length (ft)	----	----	----	----	----	----	52.0	69.0	73.0	83.0	12.9	3	58	66	66	72	----	2	58	66	66	73	----	2
Riffle Slope (ft/ft)	0.0073	----	----	0.0079	----	4	0.003	0.005	0.006	0.007	0.002	3	0.005	0.007	0.007	0.008	----	2	0.004	0.007	0.007	0.009	----	2
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	150.0	----	----	205.0	----	4	128.0	172.0	155.0	232.0	44.0	3	----	127.0	----	----	----	1	----	152.0	----	----	----	1
Pool Max Depth (ft)	----	6.5	----	----	----	1	----	3.9	----	----	----	----	----	3.8	----	----	----	1	----	3.6	----	----	----	1
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	0.31	----	----	----	----	----	0.2	----	----	----	1	----	0.2	----	----	----	1	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	80.0	----	----	----	----	----	53.0	----	----	----	1	----	53.0	----	----	----	1	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	11.6	----	----	----	1	----	11.8	----	----	----	1	----	----	----	----	----	----
Additional Reach Parameters																								
Drainage Area (SM)	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	3.8	----	----	----	----	----	4.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	150.0	----	----	----	----	----	150.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	460.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	573.0	----	----	----	----	----	603.0	----	----	----	----	----	337.0	----	----	----	----	----	354.0	----	----	----	----
Sinuosity	----	1.30	----	----	----	----	----	1.31	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0030	----	----	----	----	----	0.002	----	----	----	----	----	0.002	----	----	----	----	----	0.002	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 7. Baseline Stream Summary																
Big Cedar Creek Restoration Site Contract No. D06054-D																
BCC Reach 2 (2239 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 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 (ft²)	----	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)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Re: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 (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	----	----	----	----	0.7	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	190.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																
Drainage Area (SM)	----	----	----	----	2.9	----	----	2.9	----	----	----	----	8.4	----	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	----	----	----	----	B4/1c	----	----	----	----	----	C4	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	6.6	----	----	----	----
BF Discharge (cfs)	----	72.0	530.0	192.6	----	----	----	----	----	----	524.0	----	----	----	----	----
Valley Length (ft)	----	----	----	----	----	1016.0	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	----	----	----	----	1016.0	----	----	----	----	----	----	----	----	----	----
Sinuosity	----	----	----	----	----	1.00	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	----	----	----	----	0.0077	----	----	----	----	0.0070	----	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

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

Parameter	Design						As-built						Year 1						Year 2					
	Min	Mean	Med	Max	SD	n	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	22.5	24.6	23.8	27.6	2.6	3
Floodprone Width (ft)	----	100.0	----	----	----	1	74.4	74.9	74.5	75.8	0.7	3	74.3	74.8	74.5	75.7	0.8	3	74.3	74.9	74.5	75.8	0.8	3
BF Mean Depth (ft)	----	2.3	----	----	----	1	2.2	2.4	2.4	2.5	0.1	3	2.3	2.5	2.5	2.6	0.2	3	2.3	2.6	2.7	2.7	0.3	3
BF Max Depth (ft)	----	3.3	----	----	----	1	3.3	3.6	3.5	3.9	0.2	3	3.8	4.0	4.1	4.2	0.2	3	3.9	4.4	4.6	4.6	0.4	3
BF Cross-sectional Area (ft²)	----	52.7	----	----	----	1	49.7	56.6	56.9	63.1	5.5	3	56.2	57.6	57.6	59.0	1.4	3	61.4	62.9	62.8	64.5	1.5	3
Width/Depth Ratio	----	10.0	----	----	----	1	9.6	10.1	10.2	10.4	0.3	3	8.7	9.5	9.0	10.8	1.1	3	8.2	9.7	8.8	12.1	2.1	3
Entrenchment Ratio	----	4.3	----	----	----	1	3.0	3.2	3.2	3.3	0.1	3	3.0	3.2	3.3	3.3	0.2	3	2.8	3.1	3.1	3.3	0.3	3
Bank Height Ratio	----	1.0	----	----	----	1	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
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	----	----	----	----	----	----	----	----	----	----	----	----
Re:Bankfull width (ft/ft)	1.9	----	----	3.3	----	15	1.6	2.2	----	3.8	----	15	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	197.0	----	----	312.0	----	13	184.9	229.4	216.6	297.5	33.1	14	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	3.2	----	----	6.3	----	14	3.0	----	----	6.0	----	14	----	----	----	----	----	----	----	----	----	----	----	----
Profile																								
Riffle Length (ft)	----	----	----	----	----	----	41.0	62.0	59.0	102.0	18.5	15	----	----	----	38	----	1	----	----	----	41	----	1
Riffle Slope (ft/ft)	0.0092	----	----	0.0144	----	15	0.0070	0.0110	0.0110	0.0170	0.0030	15	0.020	0.020	0.020	0.020	----	1	----	0.024	----	----	----	1
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	110.0	----	----	223.0	----	15	101.0	135.0	150.0	225.0	39.2	15	----	----	----	----	----	----	----	----	----	----	----	----
Pool Max Depth (ft)	----	5.2	----	----	----	1	5.5	----	----	5.5	----	2	5.2	----	----	5.7	----	2	5.4	----	----	5.9	----	2
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Substrate and Transport Parameters																								
Ri% / Ru% / P% / G% / S%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
SC% / Sa% / G% / B% / Be%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
d16 / d35 / d50 / d84 / d95	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Reach Shear Stress (competency) lb/ft²	----	0.6	----	----	----	----	----	0.62	----	----	----	1	----	1	----	----	----	1	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	150.0	----	----	----	----	----	170.0	----	----	----	1	----	200.0	----	----	----	1	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	29.3	----	----	----	1	----	38.6	----	----	----	1	----	----	----	----	----	----
Additional Reach Parameters																								
Drainage Area (SM)	2.3	----	----	3.1	----	----	2.3	----	----	3.1	----	----	2.3	----	----	3.1	----	----	2.3	----	----	3.1	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	3.5	----	----	----	----	----	3.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	185.0	----	----	----	----	----	185.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	1723.0	----	----	----	----	----	1694.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	2240.0	----	----	----	----	----	2220.0	----	----	----	----	----	200.0	----	----	----	----	----	174.0	----	----	----	----
Sinuosity	----	1.30	----	----	----	----	----	1.31	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0050	----	----	----	----	----	0.0050	----	----	----	----	----	0.0070	----	----	----	----	----	0.0070	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 7. Baseline Stream Summary																
Big Cedar Creek Restoration Site Contract No. D06054-D																
BCC Reach 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 (ft²)	----	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)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Re:Bankfull Width (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Profile																
Riffle Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Riffle Slope (ft/ft)	----	----	----	----	0.0100	----	----	0.0490	----	----	0.0140	----	----	0.0240	----	2
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	----	----	----	----	59.0	----	----	242.0	----	----	146.0	----	----	----	----	2
Pool Max Depth (ft)	----	----	----	----	----	3.3	----	----	----	----	4.1	----	----	----	----	1
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
SC% / Sa% / G% / B% / Be%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
d16 / d35 / d50 / d84 / d95	----	----	----	----	----	----	----	<0.063 / 8 / 17 / 85 / 350	----	----	----	----	N/A / 1.2 / 3 / 77 / 800	----	----	----
Reach Shear Stress (competency) lb/ft²	----	----	----	----	----	0.4	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	100.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																
Drainage Area (SM)	----	----	----	----	2.9	----	----	3.3	----	----	----	----	8.4	----	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	----	----	----	----	C4/1	----	----	----	----	----	C4	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	6.6	----	----	----	----
BF Discharge (cfs)	----	68.0	590.0	210.9	----	----	----	----	----	----	524.0	----	----	----	----	----
Valley Length (ft)	----	----	----	----	----	1860.0	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	----	----	----	----	2046.0	----	----	----	----	----	----	----	----	----	----
Sinuosity	----	----	----	----	----	1.10	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	----	----	----	----	0.0045	----	----	----	----	0.0070	----	----	----	----	----
BF Slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Banfull Floodplain Area (Acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

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

Parameter	Design						As-built						Year 1						Year 2					
	Min	Mean	Med	Max	SD	n	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	22.2	23.9	23.3	26.1	2.0	3
Floodprone Width (ft)	----	100+	----	----	----	1	77.8	79.5	77.9	82.9	2.4	3	77.8	79.6	78.0	82.9	2.9	3	77.8	79.5	77.8	83.0	3.0	3
BF Mean Depth (ft)	----	2.1	----	----	----	1	2.1	2.2	2.2	2.2	0.0	3	2.2	2.3	2.3	2.4	0.1	3	2.0	2.2	2.2	2.3	0.2	3
BF Max Depth (ft)	----	3.0	----	----	----	1	3.1	3.2	3.1	3.3	0.1	3	3.1	3.3	3.1	3.7	0.3	3	3.1	3.3	3.3	3.5	0.2	3
BF Cross-sectional Area (ft²)	----	52.1	----	----	----	1	50.1	52.7	51.8	56.2	2.6	3	50.5	53.9	50.8	60.4	5.6	3	47.6	52.1	51.8	56.9	4.6	3
Width/Depth Ratio	----	11.6	----	----	----	1	10.7	11.4	11.7	11.8	0.5	3	9.8	10.2	10.3	10.5	0.4	3	9.5	11.0	11.4	12.0	1.3	3
Entrenchment Ratio	----	4.1+	----	----	----	1	3.2	3.3	3.2	3.4	0.1	3	3.3	3.4	3.4	3.5	0.1	3	3.2	3.3	3.3	3.5	0.2	3
Bank Height Ratio	----	1.0	----	----	----	1	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----	59.0	----	----	----	----	1.0	----	----	----	----	----	----
Pattern																								
Channel Beltwidth (ft)	52.0	----	----	114.0	----	12	50.0	76.8	79.5	103.0	14.3	12	45.0	65.3	63.0	88.0	16.6	5	52.0	74.0	78.0	84.0	12.0	5
Radius of Curvature (ft)	44.0	----	----	83.0	----	13	40.0	57.2	50.0	103.0	17.6	13	51.0	66.0	71.0	79.0	11.3	7	63.0	74.9	75.0	83.0	6.1	7
Re:Bankfull width (ft/ft)	1.8	----	----	3.4	----	13	1.6	----	----	4.2	----	13	2.2	----	----	3.4	----	7	2.6	----	----	3.5	----	7
Meander Wavelength (ft)	187.0	----	----	313.0	----	11	176.5	240.0	247.6	285.0	35.6	13	176.0	236.0	236.0	291.0	53.5	5	156.0	231.4	230.0	292.0	61.2	5
Meander Width Ratio	2.1	----	----	4.7	----	12	2.0	----	----	4.2	----	12	1.9	----	----	3.8	----	5	2.2	----	----	3.5	----	5
Profile																								
Riffle Length (ft)	----	----	----	----	----	----	37	70	66	127	25	12	35	68	72	97	21	6	20	69	71	111	33	6
Riffle Slope (ft/ft)	0.0080	----	----	0.0169	----	13	0.0020	0.0130	0.0110	0.0310	0.0076	13	0.009	0.016	0.017	0.025	0.010	6	0.001	0.011	0.015	0.036	0.010	6
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	83.0	----	----	185.0	----	13	87.0	140.0	141.0	183.0	26.4	13	90.0	130.0	128.0	130.0	32.0	6	84.0	138.0	134.0	173.0	33.4	6
Pool Max Depth (ft)	----	5.2	----	----	----	1	----	5.4	----	----	----	1	----	5.2	----	----	----	1	----	5.4	----	----	----	1
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	0.8	----	----	----	----	----	0.68	----	----	----	1	----	1.1	----	----	----	1	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	190.0	----	----	----	----	----	180	----	----	----	1	----	225	----	----	----	1	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	36.8	----	----	----	1	----	51.2	----	----	----	1	----	----	----	----	----	----
Additional Reach Parameters																								
Drainage Area (SM)	3.1	----	----	3.3	----	----	3.1	----	----	3.32	----	----	3.1	----	----	3.32	----	----	3.1	----	----	3.32	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	N/A	----	E/C	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	3.7	----	----	----	----	----	3.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	195.0	----	----	----	N/A	----	195.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	1558.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	1809.0	----	----	----	----	----	1823.0	----	----	----	----	----	1030.0	----	----	----	----	----	1027.0	----	----	----	----
Sinuosity	----	1.10	----	----	----	----	----	1.17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0077	----	----	----	----	----	0.0060	----	----	----	----	----	0.0080	----	----	----	----	----	0.0080	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 7. Baseline Stream Summary																
Big Cedar Creek Restoration Site Contract No. D06054-D																
BCC Reach 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 (ft²)	----	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)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Re: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 (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	----	----	----	----	0.8	----	----	----	----	----	----	----	----	----	----
Max Part Size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	200.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																
Drainage Area (SM)	----	----	----	----	3.3	----	----	3.4	----	----	----	----	----	8.4	----	----
Impervious cover estimate (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen 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 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 4 (410 LF)

Parameter	Design						As-built						Year 1						Year 2					
	Min	Mean	Med	Max	SD	n	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	----	28.0	----	----	----	1
Floodprone Width (ft)	----	94.0	----	----	----	1	----	81.0	----	----	----	1	----	81.1	----	----	----	1	----	80.9	----	----	----	1
BF Mean Depth (ft)	----	2.2	----	----	----	1	----	2.1	----	----	----	1	----	2.3	----	----	----	1	----	2.1	----	----	----	1
BF Max Depth (ft)	----	3.0	----	----	----	1	----	3.2	----	----	----	1	----	3.7	----	----	----	1	----	3.6	----	----	----	1
BF Cross-sectional Area (ft²)	----	57.2	----	----	----	1	----	58.3	----	----	----	1	----	62.6	----	----	----	1	----	59.7	----	----	----	1
Width/Depth Ratio	----	11.8	----	----	----	1	----	13.0	----	----	----	1	----	12.4	----	----	----	1	----	13.1	----	----	----	1
Entrenchment Ratio	----	3.6	----	----	----	1	----	3.0	----	----	----	1	----	2.9	----	----	----	1	----	2.9	----	----	----	1
Bank Height Ratio	----	1.0	----	----	----	1	----	1.0	----	----	----	1	----	1.0	----	----	----	1	----	1.0	----	----	----	1
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pattern																								
Channel Beltwidth (ft)	58.0	----	----	91.0	----	3	57.0	89.3	97.0	114.0	29.3	3	----	----	----	----	----	----	----	----	----	----	----	----
Radius of Curvature (ft)	52.0	----	----	53.0	----	3	27.0	46.0	51.0	60.0	17.1	3	----	----	----	----	----	----	----	----	----	----	----	----
Re:Bankfull width (ft/ft)	2.0	----	----	2.0	----	3	1.0	----	----	2.2	----	3	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	207.0	----	----	247.0	----	2	224.3	236.6	236.6	248.9	17.4	2	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	2.2	----	----	3.5	----	3	2.1	----	----	4.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Profile																								
Riffle Length (ft)	----	----	----	----	----	----	43.0	66.5	67.0	89.0	18.0	4	----	----	----	----	----	----	----	----	----	----	----	----
Riffle Slope (ft/ft)	0.0119	----	----	0.0237	----	4	0.0120	0.0140	0.0140	0.0160	0.0020	4	----	----	----	----	----	----	----	----	----	----	----	----
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	105.0	----	----	112.0	----	2	118.0	122.0	122.0	126.0	----	2	----	----	----	----	----	----	----	----	----	----	----	----
Pool Max Depth (ft)	----	5.0	----	----	----	1	----	4.7	----	----	----	1	----	4.3	----	----	----	1	----	4.9	----	----	----	1
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Substrate and Transport Parameters																								
Ri% / Ru% / P% / G% / S%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
SC% / Sa% / G% / B% / Be%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
d16 / d35 / d50 / d84 / d95	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Reach Shear Stress (competency) lb/ft²	----	1.2	----	----	----	----	----	1.1	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	275.0	----	----	----	----	----	260.0	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	53.6	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																								
Drainage Area (SM)	3.3	----	----	3.4	----	----	3.3	----	----	3.4	----	----	3.3	----	----	3.4	----	----	3.3	----	----	3.4	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	3.5	----	----	----	----	----	3.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	199.0	----	----	----	----	----	199.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	350.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	400.0	----	----	----	----	----	410.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Sinuosity	----	1.10	----	----	----	----	----	1.17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0098	----	----	----	----	----	0.0094	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 7. Baseline Stream Summary																
Big Cedar Creek Restoration Site Contract No. D06054-D																
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 (ft²)	----	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
Re: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 (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	----	----	----	----	0.5	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	125.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																
Drainage Area (SM)	----	----	----	----	0.7	----	----	0.9	----	----	----	----	----	0.5	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	----	----	----	----	C4/1	----	----	----	----	----	E4/C4	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	30.0	235.0	84.5	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length (ft)	----	----	----	----	----	1,816.0	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	----	----	----	----	1,998.0	----	----	----	----	----	----	----	----	----	----
Sinuosity	----	----	----	----	----	1.10	----	----	----	----	----	1.10	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	----	----	----	----	0.0116	----	----	----	----	----	0.0132	----	----	----	----
BF Slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 7. Baseline Stream Summary																								
Big Cedar Creek Restoration Site Contract No. D06054-D																								
UT1 Reach 1 (1248 LF)																								
Parameter	Design						As-built						Year 1						Year 2					
	Min	Mean	Med	Max	SD	n	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	11.9	13.5	12.0	16.5	2.6	3
Floodprone Width (ft)	----	73.8	----	----	----	1	48.4	52.8	53.6	56.5	3.3	3	48.5	52.8	53.5	56.4	4.0	3	48.4	52.8	53.5	56.4	4.0	3
BF Mean Depth (ft)	----	1.2	----	----	----	1	1.0	1.1	1.1	1.3	0.1	3	1.0	1.1	1.1	1.3	0.2	3	0.8	1.0	1.0	1.2	0.2	3
BF Max Depth (ft)	----	1.7	----	----	----	1	1.7	1.9	1.8	2.1	0.2	3	1.6	1.8	1.7	2.2	0.3	3	1.6	1.8	1.6	2.1	0.3	3
BF Cross-sectional Area (ft²)	----	15.3	----	----	----	1	14.2	14.9	15.2	15.2	0.5	3	13.6	14.5	13.7	16.1	1.4	3	12.4	13.4	13.4	14.3	0.9	3
Width/Depth Ratio	----	10.8	----	----	----	1	8.8	11.8	12.3	14.2	2.2	3	9.0	11.6	12.1	13.7	2.4	3	9.9	14.0	11.6	20.4	5.7	3
Entrenchment Ratio	----	5.7	----	----	----	1	3.9	4.0	4.0	4.2	0.1	3	4.0	4.1	4.0	4.2	0.1	3	3.3	14.0	4.1	4.3	0.5	3
Bank Height Ratio	----	1.0	----	----	----	1	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	----	----	39.0	----	----	----	1	----	62.0	----	----	----	1	----	----	----	----	----	1
Pattern																								
Channel Beltwidth (ft)	29.0	----	----	64.0	----	13	42.0	65.6	67.0	75.0	10.2	13	48.0	68.0	69.5	78.0	9.3	8	54.0	69.0	72.5	75.0	8.2	8
Radius of Curvature (ft)	28.0	----	----	40.0	----	14	22.0	32.4	33.0	41.0	5.2	14	29.0	32.5	32.5	39.0	3.2	8	24.0	31.3	31.0	39.0	4.9	8
Re:Bankfull width (ft/ft)	----	----	----	----	----	----	1.7	----	----	3.1	----	1	2.3	----	----	3.1	----	8	1.8	----	----	2.9	----	8
Meander Wavelength (ft)	140.0	----	----	157.0	----	12	111.3	151.9	150.7	174.0	15.9	12	150.0	156.6	157.0	166.0	5.4	7	146.0	155.3	154.0	166.0	6.3	7
Meander Width Ratio	2.2	----	----	4.9	----	13	3.2	----	----	5.7	----	13	3.8	----	----	6.1	----	8	4.0	----	----	5.6	----	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	29.0	43.0	43.0	69.0	13.2	9
Riffle Slope (ft/ft)	0.0115	----	----	0.0230	----	14	0.0000	0.0110	0.0120	0.0270	0.0081	14	0.0030	0.0220	0.0220	0.0370	0.0110	9	0.0070	0.0230	0.0210	0.0360	0.0090	9
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	63.0	----	----	115.0	----	13	61.0	95.0	102.0	113.0	17.0	13	70.0	102.0	104.0	128.0	22.0	9	63.0	104.0	102.0	137.0	27.9	8
Pool Max Depth (ft)	----	----	----	----	----	----	2.3	----	----	2.9	----	2	2.2	----	----	2.7	----	2	2.6	----	----	2.8	----	2
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	0.5	----	----	----	----	----	0.4	----	----	----	1	----	0.5	----	----	----	1	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	125.0	----	----	----	----	----	95.0	----	----	----	1	----	130.0	----	----	----	1	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	24.4	----	----	----	1	----	33.4	----	----	----	1	----	----	----	----	----	----
Additional Reach Parameters																								
Drainage Area (SM)	0.7	----	----	0.8	----	----	0.7	----	----	0.8	----	----	0.7	----	----	0.8	----	----	0.7	----	----	0.8	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	4.5	----	----	----	----	----	4.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	69.0	----	----	----	----	----	69.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	959.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	1276.0	----	----	----	----	----	1247.0	----	----	----	----	----	918.0	----	----	----	----	----	910.0	----	----	----	----
Sinuosity	----	1.30	----	----	----	----	----	1.30	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0080	----	----	----	----	----	0.0060	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	0.014	----	----	----	----	----	0.0080	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 7. Baseline Stream Summary																	
Big Cedar Creek Restoration Site Contract No. D06054-D																	
UT1 Reach 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 (ft²)	----	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	
Re: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)	----	----	----	----	0.0242	----	----	0.178	----	2	0.0100	----	----	0.0670	----	2	
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 (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
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/ft²	----	----	----	----	----	1.0	----	----	----	----	----	----	----	----	----	----	
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	250.0	----	----	----	----	----	----	----	----	----	----	
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Additional Reach Parameters																	
Drainage Area (SM)	----	----	----	----	0.9	----	----	1.0	----	----	----	----	----	0.5	----	----	
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Rosgen Classification	----	----	----	----	----	E4/1	----	----	----	----	----	E4/C4	----	----	----	----	
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
BF Discharge (cfs)	----	30.0	260.0	87.7	----	----	----	----	----	----	----	----	----	----	----	----	
Valley Length (ft)	----	----	----	----	----	759.0	----	----	----	----	----	----	----	----	----	----	
Channel length (ft)	----	----	----	----	----	759.0	----	----	----	----	----	----	----	----	----	----	
Sinuosity	----	----	----	----	----	1.00	----	----	----	----	----	1.10	----	----	----	----	
Water Surface Slope (Channel) (ft/ft)	----	----	----	----	----	0.0140	----	----	----	----	----	0.0132	----	----	----	----	
BF Slope (ft/ft)	----	----	----	----	----	0.0139	----	----	----	----	----	----	----	----	----	----	
Banfull Floodplain Area (Acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	

Table 7. Baseline Stream Summary																								
Big Cedar Creek Restoration Site Contract No. D06054-D																								
UT1 Reach 2 (1016)																								
Parameter	Design						As-built						Year 1						Year 2					
	Min	Mean	Med	Max	SD	n	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	13.6	15.0	15.8	15.8	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	56.3	58.5	58.8	60.4	2.0	3
BF Mean Depth (ft)	----	4.5	----	----	----	1	1.1	1.1	1.1	1.2	0.0	3	1.0	1.1	1.1	1.2	0.1	3	1.0	1.0	1.1	1.1	0.1	3
BF Max Depth (ft)	----	1.5	----	----	----	1	1.8	1.9	1.8	1.9	0.1	3	1.7	1.8	1.7	2.1	0.2	3	1.7	1.8	1.8	2.0	0.2	3
BF Cross-sectional Area (ft²)	----	16.8	----	----	----	1	14.5	16.3	16.3	17.9	1.4	3	13.0	15.5	16.0	17.4	2.2	3	14.4	15.5	15.4	16.6	1.1	3
Width/Depth Ratio	----	13.6	----	----	----	1	12.1	12.8	12.4	14.0	0.9	3	11.8	12.7	12.0	14.2	1.3	3	12.8	14.6	14.9	16.2	1.7	3
Entrenchment Ratio	----	5.7	----	----	----	1	3.7	4.1	4.2	4.3	0.3	3	3.9	4.2	4.2	4.5	0.3	3	3.7	3.8	3.8	3.9	0.1	3
Bank Height Ratio	----	1.0	----	----	----	1	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pattern																								
Channel Beltwidth (ft)	30.0	----	----	45.0	----	10	29.0	45.3	48.0	58.0	11.7	10	30.0	46.5	49.5	57.0	10.6	6	41.0	49.0	49.5	59.0	6.5	5
Radius of Curvature (ft)	30.0	----	----	48.0	----	11	20.0	35.3	36.0	47.0	6.2	11	25.0	28.0	29.0	30.0	2.0	5	28.0	39.0	40.0	46.0	7.1	4
Re:Bankfull width (ft/ft)	2.0	----	----	3.2	----	11	1.4	----	----	3.3	----	1	1.8	----	----	2.1	----	2	1.9	----	----	3.1	----	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	173.0	185.4	183.0	201.0	10.6	5
Meander Width Ratio	2.0	----	----	3.0	----	10	2.0	----	----	4.0	----	1	2.1	----	----	4.1	----	2	2.7	----	----	3.9	----	2
Profile																								
Riffle Length (ft)	----	----	----	----	----	----	48.0	67.0	64.0	94.0	14.0	10	42	62	60	92	16	6	37	53	58	96	21	6
Riffle Slope (ft/ft)	0.01920	----	----	0.02800	----	11	0.0080	0.0160	0.0170	0.0220	0.0045	10	0.021	0.024	0.025	0.032	0.004	6	0.020	0.020	0.020	0.030	0.000	6
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	62.0	----	----	140.0	----	11	17.0	74.0	77.0	116.0	28.0	11	41	85	90	110	24	7	47	90	84	101	19	7
Pool Max Depth (ft)	----	3.5	----	----	----	1	----	2.6	----	----	----	1	----	2.9	----	----	----	1	----	2.7	----	----	----	1
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Substrate and Transport Parameters																								
Ri% / Ru% / P% / G% / S%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
SC% / Sa% / G% / B% / Be%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
d16 / d35 / d50 / d84 / d95	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Reach Shear Stress (competency) lb/ft²	----	0.8	----	----	----	----	----	0.8	----	----	----	1	----	1.0	----	----	----	1	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	200.0	----	----	----	----	----	200.0	----	----	----	1	----	215.0	----	----	----	1	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	54.1	----	----	----	1	----	59.7	----	----	----	1	----	----	----	----	----	----
Additional Reach Parameters																								
Drainage Area (SM)	0.8	----	----	0.9	----	----	0.8	----	----	0.9	----	----	0.8	----	----	0.9	----	----	0.8	----	----	0.9	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	B4c	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	4.5	----	----	----	----	----	4.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	76.0	----	----	----	----	----	76.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	924.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	1025.0	----	----	----	----	----	1016.0	----	----	----	----	----	740.0	----	----	----	----	----	734.0	----	----	----	----
Sinuosity	----	1.00	----	----	----	----	----	1.10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0128	----	----	----	----	----	0.0130	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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 7. Baseline Stream Summary																
Big Cedar Creek Restoration Site Contract No. D06054-D																
UT1 Reach 3 (1885 LF)																
Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data					
		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 (ft²)	----	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
Re: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 (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	----	----	----	----	0.9	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	225.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																
Drainage Area (SM)	----	----	----	----	1.0	----	----	1.2	----	----	----	----	----	0.5	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	----	----	----	----	C4/1	----	----	----	----	----	E4/C4	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	35.0	290.0	100.3	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length (ft)	----	----	----	----	----	1518.0	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	----	----	----	----	1518.0	----	----	----	----	----	----	----	----	----	----
Sinuosity	----	----	----	----	----	1.00	----	----	----	----	----	1.10	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	----	----	----	----	0.0134	----	----	----	----	----	0.013	----	----	----	----
BF Slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Banfull Floodplain Area (Acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 7. Baseline Stream Summary																								
Big Cedar Creek Restoration Site Contract No. D06054-D																								
UT1 Reach 3 (1885 LF)																								
Parameter	Design						As-built						Year 1						Year 2					
	Min	Mean	Med	Max	SD	n	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	14.2	15.2	14.7	16.6	1.0	3
Floodprone Width (ft)	----	85.2	----	----	----	1	56.9	57.5	57.1	58.6	0.8	3	56.9	57.6	57.1	58.8	1.0	3	56.9	57.6	57.1	58.7	0.8	3
BF Mean Depth (ft)	----	1.2	----	----	----	1	1.2	1.2	1.2	1.3	0.1	3	1.1	1.2	1.1	1.3	0.1	3	1.0	1.1	1.1	1.2	0.1	3
BF Max Depth (ft)	----	1.5	----	----	----	1	1.7	1.9	1.8	2.2	0.2	3	1.6	1.9	1.7	2.3	0.4	3	1.6	1.7	1.7	1.9	0.1	3
BF Cross-sectional Area (ft²)	----	17.3	----	----	----	1	17.8	18.9	17.9	21.0	1.5	3	15.0	18.3	17.8	22.0	3.5	3	14.6	17.0	18.0	18.4	0.7	3
Width/Depth Ratio	----	12.5	----	----	----	1	12.6	12.8	12.7	13.1	0.2	3	12.9	13.3	13.1	14.0	0.6	3	12.0	13.6	13.9	15.0	0.7	3
Entrenchment Ratio	----	5.7	----	----	----	1	3.6	3.7	3.7	3.8	0.1	3	3.4	3.6	3.6	3.7	0.2	3	3.5	3.7	3.6	4.0	0.2	3
Bank Height Ratio	----	1.0	----	----	----	1	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----	----	37.0	----	----	----	1	----	----	----	----	----	1
Pattern																								
Channel Beltwidth (ft)	22.0	----	----	65.0	----	18	29.0	63.7	68.0	76.0	12.9	18	----	----	----	----	----	----	----	----	----	----	----	----
Radius of Curvature (ft)	30.0	----	----	50.0	----	19	29.0	38.4	37.0	52.0	6.8	19	----	----	----	----	----	----	----	----	----	----	----	----
Re:Bankfull width (ft/ft)	2.0	----	----	3.3	----	19	1.9	----	----	3.4	----	1	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	127.0	----	----	198.0	----	17	129.7	177.7	181.2	220.1	22.0	18	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	1.5	----	----	4.3	----	18	1.9	----	----	4.9	----	18	----	----	----	----	----	----	----	----	----	----	----	----
Profile																								
Riffle Length (ft)	----	----	----	----	----	----	31.0	55.0	59.0	85.0	15.0	18	----	----	----	----	----	----	----	----	----	----	----	----
Riffle Slope (ft/ft)	0.0175	----	----	0.0354	----	19	0.0100	0.0220	0.0200	0.0390	0.008	18	----	----	----	----	----	----	----	----	----	----	----	----
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	61.0	----	----	137.0	----	19	23.0	94.0	106.5	134.0	30.0	20	----	----	----	----	----	----	----	----	----	----	----	----
Pool Max Depth (ft)	----	3.3	----	----	----	1	3.0	----	----	3.0	----	2	2.7	----	----	2.7	----	2	2.9	----	----	3.1	----	2
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	0.7	----	----	----	----	----	0.8	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	190.0	----	----	----	----	----	200.0	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	57.9	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																								
Drainage Area (SM)	0.9	----	----	1.1	----	----	0.9	----	----	1.1	----	----	0.9	----	----	1.1	----	----	0.9	----	----	1.1	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	C4	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	5.5	----	----	----	----	----	5.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	95.0	----	----	----	----	----	95.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	1571.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	1954.0	----	----	----	----	----	1885.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Sinuosity	----	1.20	----	----	----	----	----	1.20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0118	----	----	----	----	----	0.0120	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 7. Baseline Stream Summary																
Big Cedar Creek Restoration Site Contract No. D06054-D																
UT1 Reach 4 (996 LF)																
Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Spencer Creek					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																
BF Width (ft)	----	7.5	27.0	12.9	----	23.1	----	----	----	1	----	8.7	----	----	----	1
Floodprone Width (ft)	----	----	----	----	----	69.2	----	----	----	1	----	228.5	----	----	----	1
BF Mean Depth (ft)	----	1.0	2.5	1.6	----	1.0	----	----	----	1	----	1.2	----	----	----	1
BF Max Depth (ft)	----	----	----	----	----	1.8	----	----	----	1	----	1.9	----	----	----	1
BF Cross-sectional Area (ft²)	----	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
Re: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 (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	----	----	----	----	0.8	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	200.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																
Drainage Area (SM)	----	----	----	----	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 7. Baseline Stream Summary																								
Big Cedar Creek Restoration Site Contract No. D06054-D																								
UT1 Reach 4 (996 LF)																								
Parameter	Design						As-built						Year 1						Year 2					
	Min	Mean	Med	Max	SD	n	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	17.20	19.5	18.66	22.52	2.75	3
Floodprone Width (ft)	----	87.0	----	----	----	1	51.3	57.8	58.6	63.5	5.0	3	56.4	59.5	58.4	63.7	3.8	3	52.80	58.3	58.54	63.63	5.42	3
BF Mean Depth (ft)	----	1.3	----	----	----	1	1.2	1.3	1.3	1.5	0.1	3	1.2	1.5	1.3	2.0	0.4	3	1.11	1.4	1.36	1.82	0.36	3
BF Max Depth (ft)	----	1.7	----	----	----	1	1.8	2.0	2.0	2.3	0.2	3	1.9	2.3	2.0	3.0	0.6	3	1.66	2.4	2.51	3.01	0.68	3
BF Cross-sectional Area (ft²)	----	20.0	----	----	----	1	21.3	24.8	25.3	27.8	2.7	3	20.6	27.2	27.7	33.2	6.3	3	23.35	27.4	25.05	33.93	5.68	3
Width/Depth Ratio	----	12.3	----	----	----	1	11.2	14.2	13.1	18.4	3.1	3	8.2	13.1	12.9	18.3	5.1	3	10.26	14.4	12.67	20.25	5.21	3
Entrenchment Ratio	----	5.4	----	----	----	1	2.3	3.2	3.5	3.8	0.7	3	2.5	3.3	3.6	3.9	0.7	3	2.09	3.0	3.40	3.41	0.76	3
Bank Height Ratio	----	1.0	----	----	----	1	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
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	----	----	----	----	----	----	----	----	----	----	----	----
Re:Bankfull width (ft/ft)	2.0	----	----	3.1	----	9	0.9	----	----	3.6	----	9	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	133.0	----	----	168.0	----	5	136.3	156.1	159.8	181.0	62.9	6	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	1.9	----	----	2.9	----	7	2.0	----	----	3.6	----	7	----	----	----	----	----	----	----	----	----	----	----	----
Profile																								
Riffle Length (ft)	----	----	----	----	----	----	37.0	55.0	54.0	79.0	13.0	10	----	----	----	----	----	----	----	----	----	----	----	----
Riffle Slope (ft/ft)	0.0222	----	----	0.0301	----	12	0.0050	0.0220	0.0230	0.0310	0.0070	10	----	----	----	----	----	----	----	----	----	----	----	----
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	64.0	----	----	105.0	----	9	66.0	81.0	75.0	106.0	13.0	9	----	----	----	----	----	----	----	----	----	----	----	----
Pool Max Depth (ft)	----	4.0	----	----	----	1	----	4.6	----	----	----	1	----	4.3	----	----	----	1	----	4.0	----	----	----	1
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	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/m²	----	----	----	----	----	----	----	68.2	----	----	----	1	----	----	----	----	----	1	----	----	----	----	----	----
Additional Reach Parameters																								
Drainage Area (SM)	1.1	----	----	1.2	----	----	1.1	----	----	1.2	----	----	1.1	----	----	1.2	----	----	1.1	----	----	1.2	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	B4c	----	----	----	----	----	C	----	----	----	----	----	C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	5.0	----	----	----	----	----	4.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	100.0	----	----	----	----	----	100.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	915.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	1501.0	----	----	----	----	----	997.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Sinuosity	----	1.00	----	----	----	----	----	1.09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0161	----	----	----	----	----	0.0160	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 7. Baseline Stream Summary																
Big Cedar Creek Restoration Site Contract No. D06054-D																
UT2 (609 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 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 (ft²)	----	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
Re: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)	----	----	----	----	----	----	----	----	----	----	0.0100	----	----	0.0670	----	2
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 (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	----	----	----	----	1.3	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	300.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																
Drainage Area (SM)	----	----	----	----	0.5	----	----	0.6	----	----	----	----	----	0.5	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	----	----	----	----	G4	----	----	----	----	----	E4/C4	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	20.0	175.0	57.8	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length (ft)	----	----	----	----	----	568.0	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	----	----	----	----	625.0	----	----	----	----	----	----	----	----	----	----
Sinuosity	----	----	----	----	----	1.10	----	----	----	----	1.10	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	----	----	----	----	0.0215	----	----	----	----	0.0130	----	----	----	----	----
BF Slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Banfull Floodplain Area (Acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

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

Parameter	Design						As-built						Year 1						Year 2					
	Min	Mean	Med	Max	SD	n	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	----	14.4	----	----	----	1
Floodprone Width (ft)	----	74.0+	----	----	----	1	----	63.1	----	----	----	1	----	63.1	----	----	----	1	----	63.2	----	----	----	1
BF Mean Depth (ft)	----	1.1	----	----	----	1	----	1.4	----	----	----	1	----	1.5	----	----	----	1	----	1.2	----	----	----	1
BF Max Depth (ft)	----	1.4	----	----	----	1	----	1.9	----	----	----	1	----	2.1	----	----	----	1	----	1.8	----	----	----	1
BF Cross-sectional Area (ft²)	----	14.3	----	----	----	1	----	18.1	----	----	----	1	----	20.1	----	----	----	1	----	17.4	----	----	----	1
Width/Depth Ratio	----	11.8	----	----	----	1	----	9.9	----	----	----	1	----	8.7	----	----	----	1	----	11.9	----	----	----	1
Entrenchment Ratio	----	5.7+	----	----	----	1	----	4.7	----	----	----	1	----	4.8	----	----	----	1	----	4.4	----	----	----	1
Bank Height Ratio	----	1.0	----	----	----	1	----	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	----	----	----	----	----	----	----	----	----	----	----	----
Re:Bankfull width (ft/ft)	1.8	----	----	2.8	----	7	2.5	----	----	3.6	----	7	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	98.0	----	----	142.0	----	6	99.0	122.4	120.5	147.8	17.0	6	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	3.5	----	----	4.2	----	7	5.4	----	----	6.7	----	1	----	----	----	----	----	----	----	----	----	----	----	----
Profile																								
Riffle Length (ft)	----	----	----	----	----	----	20.0	40.8	43.0	56.0	12.5	8	20.0	26.0	28.0	30.0	5.3	3	29.0	31.0	39.0	58.0	16.2	3
Riffle Slope (ft/ft)	0.0230	----	----	0.0504	----	8	0.0090	0.0280	0.0280	0.0490	0.0120	8	0.02	0.02	0.02	0.03	0.00	3	0.02	0.03	0.03	0.05	0.02	3
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	62.0	----	----	99.0	----	7	55.0	76.0	73.0	103.0	15.7	7	----	93.0	----	93.0	----	1	----	87.0	----	----	----	1
Pool Max Depth (ft)	----	3.6	----	----	----	1	----	2.5	----	----	----	1	----	2.6	----	----	----	1	----	3.0	----	----	----	1
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft²	----	0.9	----	----	----	----	----	1.0	----	----	----	1	----	0.9	----	----	----	1	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	220.0	----	----	----	----	----	250.0	----	----	----	1	----	205.0	----	----	----	1	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	44.0	----	----	----	1	----	34.5	----	----	----	1	----	----	----	----	----	----
Additional Reach Parameters																								
Drainage Area (SM)	0.5	----	----	0.6	----	----	0.5	----	----	0.6	----	----	0.5	----	----	0.6	----	----	0.5	----	----	0.6	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	E	----	----	----	----	----	E	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	3.9	----	----	----	----	----	3.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	56.0	----	----	----	----	----	56.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	476.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	605.0	----	----	----	----	----	609.0	----	----	----	----	----	191.0	----	----	----	----	----	206.0	----	----	----	----
Sinuosity	----	1.20	----	----	----	----	----	1.28	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0150	----	----	----	----	----	0.0140	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	----	0.011	----	----	----	----	----	0.014	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 8. Morphology and Hydraulic Monitoring Summary

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

Big Cedar Creek Reach 1 (603 LF)

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	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	19.6	19.5	21.1				28.0	27.3	27.0															
BF Mean Depth (ft)	1.9	1.8	1.8				1.8	1.7	1.7															
Width/Depth Ratio	10.4	10.7	12.1				15.7	15.7	16.0															
BF Cross-sectional Area (ft ²)	37.1	35.6	36.9				50.1	47.5	45.3															
BF Max Depth (ft)	2.7	2.6	2.8				3.9	3.75	3.6															
Width of Floodprone Area (ft)	>64.7	>65.2	>65.22				>78.0	>78.0	>77.9															
Entrenchment Ratio	>3.3	3.3	3.1				N/A	N/A	N/A															
Bank Height Ratio	1.0	1.0	1.0				1.0	1.0	1.0															
Wetted Perimeter (ft)	23.4	23.1	24.6				31.6	30.7	30.3															
Hydraulic Radius (ft)	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)	-						-																	
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)																								
Cross Sectional Area between end pins (ft ²)																								
d50 (mm)																								

Table 8. Morphology and Hydraulic Monitoring Summary																								
Big Cedar Creek Restoration Site: Project No. D06054-D																								
Big Cedar Creek Reach 2 (2239 LF)																								
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				33.0	33.1	34.0				22.5	22.5	22.5				34.8	35.7	32.0			
BF Mean Depth (ft)	2.5	2.3	2.3				2.3	2.0	2.1				2.2	2.5	2.7				2.5	2.34	2.3			
Width/Depth Ratio	10.4	10.8	12.1				14.6	16.3	16.4				10.2	9.0	8.2				13.7	15.25	14.1			
BF Cross-sectional Area (ft ²)	63.1	59.0	62.8				74.3	67.2	70.5				49.7	56.2	61.4				88.2	83.4	72.5			
BF Max Depth (ft)	3.9	3.8	3.9				5.5	5.7	5.9				3.3	4.2	4.6				5.5	5.21	5.4			
Width of Floodprone Area (ft)	>75.8	>75.7	>75.8				>83.5	>83.5	>83.6				>74.4	>74.3	>74.3				>86.2	>86.2	>86.3			
Entrenchment Ratio	>3.0	3.0	2.8				N/A	N/A	N/A				>3.3	3.3	3.3				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)	30.6	29.9	32.1				37.5	37.1	38.1				26.9	27.5	27.9				39.9	40.4	36.5			
Hydraulic Radius (ft)	2.1	2.0	2.0				2.0	1.8	1.8				1.8	2.0	2.2				2.2	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)	-						-						-						-					
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																					
BF Mean Depth (ft)	2.5	2.58	2.7																					
Width/Depth Ratio	8.9	8.65	8.8																					
BF Cross-sectional Area (ft ²)	55.6	57.6	64.5																					
BF Max Depth (ft)	3.9	4.1	4.6																					
Width of Floodprone Area (ft)	>75.8	>74.5	>74.5																					
Entrenchment Ratio	>3.4	3.3	3.1																					
Bank Height Ratio	1.0	1.0	1.0																					
Wetted Perimeter (ft)	27.3	27.5	29.2																					
Hydraulic Radius (ft)	2.0	2.1	2.2																					
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft ²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft ²)	-																							
d50 (mm)	-																							

Table 8. Morphology and Hydraulic Monitoring Summary

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

Big Cedar Creek Reach 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				23.1	22.3	22.2				24.6	23.1	23.3				25.0	24.9	26.1				
BF Mean Depth (ft)	2.5	2.3	2.3				2.2	2.3	2.3				2.1	2.2	2.0				2.5	2.4	2.2				
Width/Depth Ratio	15.6	15.8	15.0				10.7	9.8	9.5				11.7	10.5	11.4				9.9	10.3	12.0				
BF Cross-sectional Area (ft ²)	96.4	86.6	78.9				50.1	50.5	51.8				51.8	50.8	47.6				63.2	60.4	56.9				
BF Max Depth (ft)	5.4	5.2	5.4				3.1	3.1	3.3				3.1	3.1	3.1				3.8	3.7	3.5				
Width of Floodprone Area (ft)	>89.5	>89.5	>89.6				>77.8	>77.8	>77.8				>77.9	>78	>77.8				>82.5	>82.9	>82.9				
Entrenchment Ratio	N/A	N/A	N/A				>3.4	3.5	3.5				>3.2	3.4	3.3				>3.3	3.3	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				
Wetted Perimeter (ft)	43.8	41.6	39.0				27.5	26.9	26.8				28.8	27.5	27.4				30.0	29.7	30.5				
Hydraulic Radius (ft)	2.2	2.1	2.0				1.8	1.9	1.9				1.8	1.8	1.7				2.1	2.0	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)	-						-						-						-						
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 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project 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				27.5	27.8	28.0															
BF Mean Depth (ft)	2.3	2.2	2.2				2.1	2.3	2.1															
Width/Depth Ratio	16.3	17.1	18.4				13.0	12.4	13.1															
BF Cross-sectional Area (ft ²)	88.5	80.7	89.5				58.3	62.6	59.7															
BF Max Depth (ft)	4.7	4.3	4.9				3.2	3.7	3.6															
Width of Floodprone Area (ft)	>89.2	>89.1	>89.2				>81.0	>81.1	>80.9															
Entrenchment Ratio	N/A	N/A	N/A				>2.9	2.9	2.9															
Bank Height Ratio	1.0	1.0	1.0				1.0	1.0	1.0															
Wetted Perimeter (ft)	42.6	41.6	45.0				31.7	32.4	32.2															
Hydraulic Radius (ft)	2.1	1.9	2.0				1.8	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)	-						-																	
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 8. Morphology and Hydraulic Monitoring Summary

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

UT1 Reach 1 (1248 LF)

	Cross-section 14 (Riffle)						Cross-section 15 (Pool)						Cross-section 16 (Riffle)						Cross-section 17 (Pool)					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	14.7	13.7	16.5				33.3	34.8	24.2				11.6	12.0	11.9				24.3	22	25.3			
BF Mean Depth (ft)	1.0	1.0	0.8				1.3	1.1	1.3				1.3	1.3	1.2				1.3	1.3	1.3			
Width/Depth Ratio	14.2	14.2	20.4				26.8	30.5	19.3				8.8	9.0	9.9				18.7	16.4	20.2			
BF Cross-sectional Area (ft ²)	15.2	13.7	13.4				41.6	39.8	30.5				15.2	16.1	14.3				31.6	29.5	31.6			
BF Max Depth (ft)	1.7	1.6	1.6				3.3	3.1	2.8				2.1	2.2	2.1				2.9	2.7	2.7			
Width of Floodprone Area (ft)	>56.5	>56.4	>56.5				>57.2	>57.2	>58.4				>48.4	>48.5	>48.4				>55.8	>55.5	>55.7			
Entrenchment Ratio	>3.8	4.0	3.3				N/A	N/A	N/A				>4.2	4.0	4.1				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)	16.7	15.7	18.1				35.9	37.0	26.8				14.2	14.6	14.3				26.9	24.6	27.8			
Hydraulic Radius (ft)	0.9	0.9	0.7				1.2	1.1	1.1				1.1	1.1	1.0				1.2	1.2	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)	-						-						-						-					
Cross-section 18 (Riffle)																								
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	13.2	12.8	12.0																					
BF Mean Depth (ft)	1.1	1.1	1.0																					
Width/Depth Ratio	12.3	12.1	11.6																					
BF Cross-sectional Area (ft ²)	14.2	13.6	12.4																					
BF Max Depth (ft)	1.8	1.7	1.6																					
Width of Floodprone Area (ft)	>56.6	>53.5	>53.5																					
Entrenchment Ratio	>4.0	4.2	4.3																					
Bank Height Ratio	1.0	1.0	1.0																					
Wetted Perimeter (ft)	15.4	15.0	14.1																					
Hydraulic Radius (ft)	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 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project 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				21.2	22.0	22.3				15.9	15.1	15.8				14.1	14.3	15.8			
BF Mean Depth (ft)	1.1	1.0	1.1				1.3	1.4	1.1				1.1	1.1	1.0				1.2	1.2	1.1			
Width/Depth Ratio	12.4	12.0	12.8				16.8	15.6	19.5				14.0	14.2	16.2				12.1	11.8	14.9			
BF Cross-sectional Area (ft ²)	14.5	13.0	14.4				26.7	31.1	25.5				17.9	16.0	15.4				16.3	17.4	16.6			
BF Max Depth (ft)	1.8	1.7	1.8				2.8	2.9	2.7				1.9	1.7	1.7				1.8	2.1	2.0			
Width of Floodprone Area (ft)	>56.4	>56.3	>56.3				>62.4	>62.5	>62.5				>58.8	>58.9	>58.8				>60.1	>60.1	>60.4			
Entrenchment Ratio	>4.2	4.5	3.9				N/A	N/A	N/A				>3.7	3.9	3.7				>4.3	4.2	3.8			
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)	15.6	14.5	15.7				23.8	24.8	24.6				18.1	17.3	17.8				16.4	16.7	17.9			
Hydraulic Radius (ft)	0.9	0.9	0.9				1.1	1.3	1.0				1.0	0.9	0.9				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 (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 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project 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				15.1	16.9	14.7				15.3	14.0	14.2				16.2	15.8	16.6			
BF Mean Depth (ft)	1.5	1.4	1.4				1.2	1.3	1.2				1.2	1.1	1.0				1.3	1.1	1.1			
Width/Depth Ratio	14.3	15.3	15.2				12.7	12.9	12.0				13.1	13.1	13.9				12.6	14	15.0			
BF Cross-sectional Area (ft ²)	33.3	28.2	28.5				17.9	22.0	18.0				17.8	15.0	14.6				20.9	17.8	18.4			
BF Max Depth (ft)	3.0	2.7	2.9				1.7	2.3	1.9				1.8	1.6	1.6				2.2	1.7	1.7			
Width of Floodprone Area (ft)	>64.2	>64.3	>64.1				>57.1	>57.1	>57.1				>56.9	>56.9	>56.9				>58.6	>58.8	>58.7			
Entrenchment Ratio	N/A	N/A	N/A				>3.8	3.4	3.6				>3.7	3.6	4.0				>3.6	3.7	3.5			
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)	24.9	23.6	23.5				17.5	19.5	17.1				17.6	16.2	16.3				18.8	18.0	18.8			
Hydraulic Radius (ft)	1.3	1.2	1.2				1.0	1.1	1.1				1.0	0.9	0.9				1.1	1.0	1.0			
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft ²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft ²)	-						-						-						-					
d50 (mm)	-						-						-						-					
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																					
BF Mean Depth (ft)	1.3	1.2	1.4																					
Width/Depth Ratio	18.1	19.2	16.8																					
BF Cross-sectional Area (ft ²)	32.5	25.9	33.0																					
BF Max Depth (ft)	3.0	2.7	3.1																					
Width of Floodprone Area (ft)	>64.4	>64.5	>64.4																					
Entrenchment Ratio	N/A	N/A	N/A																					
Bank Height Ratio	1.0	1	1.0																					
Wetted Perimeter (ft)	27.0	28.3	26.4																					
Hydraulic Radius (ft)	1.2	0.9	1.3																					
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 8. Morphology and Hydraulic Monitoring Summary

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

UT1 Reach 4 (996 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				19.2	20.6	22.0				16.8	16.5	18.7				22.6	22.5	22.5				
BF Mean Depth (ft)	1.3	1.3	1.4				2.2	2.3	2.1				1.5	2.0	1.8				1.2	1.2	1.1				
Width/Depth Ratio	13.1	12.9	12.7				8.7	9.0	10.3				11.2	8.2	10.3				18.4	18.3	20.3				
BF Cross-sectional Area (ft ²)	21.3	20.6	23.4				42.0	47.1	46.8				25.3	33.2	33.9				27.8	27.7	25.1				
BF Max Depth (ft)	2.0	2.0	2.5				4.6	4.3	4.0				2.3	3.0	3.0				1.8	1.9	1.7				
Width of Floodprone Area (ft)	>58.6	>58.4	>58.5				>61.7	>61.6	>61.6				>63.5	>63.7	>63.7				51.3	>56.4	52.8				
Entrenchment Ratio	>3.5	3.6	3.4				N/A	N/A	N/A				>3.8	3.9	3.4				2.3	2.5	2.1				
Bank Height Ratio	1.0	1.0	1.0				1.0	1.0	1.0				1.0	1.0	1.0				1.0	1	1.0				
Wetted Perimeter (ft)	19.2	18.9	19.9				23.5	25.2	26.2				19.8	20.5	22.3				25.1	24.9	24.7				
Hydraulic Radius (ft)	1.1	1.1	1.2				1.8	1.9	1.8				1.3	1.6	1.5				1.1	1.1	1.0				
Based on current/developing bankfull feature																									
BF Width (ft)																									
BF Mean Depth (ft)																									
Width/Depth Ratio																									
BF Cross-sectional Area (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 8. Morphology and Hydraulic Monitoring Summary

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

UT2 (609 LF)

Dimension and substrate	Cross-section 32 (Riffle)						Cross-section 33 (Pool)						Cross-section 34 (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)	13.4	13.2	14.4				26.8	21.8	22.0									
BF Mean Depth (ft)	1.4	1.5	1.2				1.1	1.1	1.2									
Width/Depth Ratio	9.9	8.7	11.9				24.4	20.0	18.7									
BF Cross-sectional Area (ft ²)	18.1	20.1	17.4				29.4	23.7	25.8									
BF Max Depth (ft)	1.9	2.1	1.8				2.9	2.9	3.0									
Width of Floodprone Area (ft)	>63.1	>63.1	>63.2				>69.8	>69.8	>69.8									
Entrenchment Ratio	>4.7	4.8	4.4				N/A	N/A	N/A									
Bank Height Ratio	1.0	1	1.0				1.0	1.0	1.0									
Wetted Perimeter (ft)	16.1	16.2	16.8				29.0	24.0	24.3									
Hydraulic Radius (ft)	1.1	1.2	1.0				1.0	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)	-						-											
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 B.1. Stream Problem Areas
Big Cedar Creek Restoration Site: Project No. D06054-D**

BCC Reach 1			
Feature Issue	Station No.	Suspected Cause	Photo Number
Aggradation / Bar Formation	11+60	Offsite sediment.	SPA 1
Bank Scour / Raw Bank			-
Bed Scour/Degradation			-
Engineered Structures - back or arm scour			-
BCC Reach 2			
Feature Issue	Station No.	Suspected Cause	Photo Number
Aggradation / Bar Formation	33+40, Right Bank	Thalweg shifted	SPA 2
Bank Scour / Raw Bank	17+75 - 17+85, Right Bank	Bank slump due to lack of vegetation and no matting.	SPA 3; SPA 4; SPA 5
	19+75 - 19+85; Left Bank		
	23+30 - 23+50, Right Bank		
	24+75 - 25+50, Left Bank	Bank erosion due to lack of vegetation and matting.	
	25+80 - 25+95, Left Bank	Bank erosion due to lack of vegetation.	
	26+80 - 27+05, Left Bank	Bank erosion due to lack of matting.	
	28+00 - 28+10, Right Bank		
	29+00 - 29+25; Left Bank	Bare bank with erosion due lack of vegetation and matting.	
	30+50 - 31+25, Left Bank	Bare bank with scour behind log sill. Cause unknown.	
	32+00 - 32+50, Left Bank	Bank slump and erosion due to lack of vegetation and matting.	
	32+15 - 32+35, Right Bank	Bare bank with erosion rills due to lack of vegetation and matting.	
33+40 - 33+75, Left Bank	Raw bank with no matting.		
37+70 - 37+90, Right Bank	Toe of bank erosion due thalweg shift towards bank.		
Bed Scour/Degradation	25+00 - 26+00	Bed degradation due to loss of bed armor. Upstream pool is small.	SPA 6
	33+50 - 33+85	Upstream pool is small.	
	37+35 - 37+75	Bed armor has been displaced.	
Engineered Structures - back or arm scour	30+50 - 31+25, Left Bank	Bare bank with scour behind log sill. Cause unknown.	SPA 4; SPA 7
	32+00, Left Bank	Scour behind boulder at j-hook structure. Cause unknown.	
Engineered Structures - improper elevations			-

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

BCC Reach 3			
Feature Issue	Station No.	Suspected Cause	Photo Number
Aggradation / Bar Formation	41+75 - 42+15, Left Bank	Thalweg shifted towards right bank.	SPA 2
	43+25 - 43+45	Thalweg shifted.	
	44+25 - 44+60, Left Bank	Thalweg shifted towards right bank.	
	45+75 - 46+00, Left Bank	Thalweg shifted towards right bank.	
	55+25 - 55+75	Thalweg shifted.	
Bank Scour / Raw Bank	48+50 - 48+80, Right Bank	Bank erosion where matted has been pulled up.	SPA 8; SPA 2
	51+50 - 52+25, Left Bank	Thalweg shifted towards left bank.	
Bed Scour/Degradation	51+50 - 52+25	Riffle degradation. Unknown.	SPA 6
Engineered Structures - back or arm scour	53+20 - 53+40	Scour behind boulder tie-in. Unknown.	SPA 4; SPA 7
	54+80	Unknown.	
	55+25	Unknown.	
Engineered Structures - improper elevations	54+25	Structure was noted as being set too low (submerged during Year 1).	SPA 9
BCC Reach 4			
Feature Issue	Station No.	Suspected Cause	Photo Number
Aggradation / Bar Formation	58+00 - 58+50	Thalweg shifted towards left bank.	SPA 2
	59+60 - 60+10, Right Bank	Thalweg shifted towards left bank.	
Bank Scour / Raw Bank	57+90, Left Bank	Overland flow during storm event.	SPA 10
	59+50 - 60+10; Left Bank	Thalweg shifted towards left bank and has scoured toe.	SPA 5
Bed Scour/Degradation			-
Engineered Structures - back or arm scour	58+75	Scour behind log sill. Unknown cause.	SPA 4; SPA 7
BCC Reach 6			
Feature Issue	Station No.	Suspected Cause	Photo Number
Aggradation / Bar Formation			-
Bank Scour / Raw Bank	77+30 - 77+50	Bank sinkhole from uprooted tree at rootball	SPA 11
Bed Scour/Degradation			-
Engineered Structures - back or arm scour			-

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

UT1 Reach 2			
Feature Issue	Station No.	Suspected Cause	Photo Number
Aggradation / Bar Formation			-
Bank Scour / Raw Bank	26+80 - 26+95; Right Bank	Bank scour from lack of vegetation and high overland stormwater flows from the floodplain	SPA 12
Bed Scour/Degradation			-
Engineered Structures - back or arm scour			-
UT1 Reach 3			
Feature Issue	Station No.	Suspected Cause	Photo Number
Aggradation / Bar Formation	33+80 - 34+15	Deposition in pool; Increase in the sediment supply from floodplain erosion	SPA 13
Bank Scour / Raw Bank	34+25 - 34+80; Right Bank	Raw bank from lack of vegetation and matting	SPA 12; SPA 14
	36+40 - 36+80; Right Bank		
	38+25 - 38+95; Right Bank		
	39+50 - 39+80; Left Bank	Bank scour from thalweg migration towards left bank	
	40+20 - 41+25; Right Bank	Lack of vegetative matting	
	40+80 - 41+10; Left Bank	Bank scour from lack of vegetation and stormwater flows from the Mt. Zion Rd. outfall	
	45+75 - 45+90; Left Bank	Raw bank from lack of vegetation and matting	
Bed Scour/Degradation	39+50 - 40+00; Riffle migration & degradation	Thalweg undercutting riffle bed and moving towards toe of left bank	SPA 15
Engineered Structures - back or arm scour			-

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

UT1 Reach 4			
Feature Issue	Station No.	Suspected Cause	Photo Number
Aggradation / Bar Formation			-
Bank Scour / Raw Bank	50+60 - 51+25; Right Bank	Raw bank from lack of vegetation and matting	SPA12; SPA 14; SPA 15
	54+80 - 55+20; Right Bank	Bank scour from lack of vegetation and matting & thalweg migrating towards right bank	
	55+15 - 55+40; Right Bank	Raw bank from lack of vegetation and matting	
	55+50 - 58+50; Right & Left Bank	Bank scour and channel wideing from lack of vegetation and stormwater flows and riffle migration	
	58+75 - 59+15; Right Bank	Bank scour from lack of vegetation and stormwater flows	
	63+05 - 63+30; Left Bank	Bank scour from lack of matting to toe of slope	
Bed Scour/Degradation	55+60 - 56+00	Upstream pool is small	SPA 15
	56+25 - 56+60	No bed armor	
	57+00 - 57+60	Upstream pool is small	
Engineered Structures - back or arm scour			-

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

UT2			
Feature Issue	Station No.	Suspected Cause	Photo Number
Aggradation / Bar Formation			-
Bank Scour / Raw Bank	10+25 - 10+60; Left Bank	Raw bank from lack of vegetation and matting	SPA 16; SPA 17; SPA 18
	10+85 - 11+25; Left Bank	Raw bank from loss of matting	
	11+60 - 11+70; Right Bank	Raw bank from loss of matting	
	12+30 - 12+50; Left Bank	Raw bank from lack of vegetation and matting	
	13+40 - 13+50; Right Bank	Bank slump from lack of vegetation and loss of matting	
	13+75 - 14+25; Left Bank	Bank scour from lack of vegetation and loss of matting	
Bed Scour/Degradation	10+95 - 11+35	Riffle armor is migrating downstream cause is unknown	SPA 19
Engineered Structures - back or arm scour	13+75; Left Bank	Scour behind log sill due to lack of vegetation and loss of matting	SPA 4; SPA 7

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

BCC Reach 1 (603 LF)						
Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature 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?	2	3	N/A	67	
	2. Downstream of meander (glide/inflection) centering?	3	3	N/A	100	83%
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	1/20	97	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0	100	99%
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0	100	100%
G. Vanes	1. Free of back or arm scour?	N/A	N/A	N/A	N/A	
	2. Height appropriate?	N/A	N/A	N/A	N/A	
	3. Angle and geometry appear appropriate?	N/A	N/A	N/A	N/A	
	4. Free of piping or other structural failures?	N/A	N/A	N/A	N/A	N/A
H. Wads/Boulders	1. Free of scour?	4	4	N/A	100	
	2. Footing stable?	4	4	N/A	100	100%
BCC Reach 2 (2220 LF)						
Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performance Mean or Total
A. Riffles	1. Present?	12	15	N/A	80	
	2. Armor stable (e.g. no displacement)?	13	15	N/A	87	
	3. Facet grades appears stable?	12	15	N/A	80	
	4. Minimal evidence of embedding/fining?	15	15	N/A	100	
	5. Length appropriate?	13	15	N/A	87	87%
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?)	13	15	N/A	87	
	3. Length appropriate?	13	15	N/A	87	91%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	14	15	N/A	93	
	2. Downstream of meander (glide/inflection) centering?	14	15	N/A	93	93%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	13	15	N/A	87	
	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	96%
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	1/35	98	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	3/175	92	95%
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	13/390	82	82%
G. Vanes	1. Free of back or arm scour?	8	10	N/A	80	
	2. Height appropriate?	10	10	N/A	100	
	3. Angle and geometry appear appropriate?	10	10	N/A	100	
	4. Free of piping or other structural failures?	10	10	N/A	100	95%
H. Wads/Boulders	1. Free of scour?	13	16	N/A	81	
	2. Footing stable?	15	16	N/A	94	88%

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

BCC Reach 3 (1823 LF)						
Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performance Mean or Total
A. Riffles	1. Present?	12	13	N/A	92	
	2. Armor stable (e.g. no displacement)?	12	13	N/A	92	
	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	97%
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?	11	13	N/A	85	
	2. Downstream of meander (glide/inflection) centering?	9	13	N/A	69	77%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	11	13	N/A	85	
	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	95%
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	5/170	91	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	1/75	96	94%
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	3/125	93	93%
G. Vanes	1. Free of back or arm scour?	9	12	N/A	75	
	2. Height appropriate?	11	12	N/A	92	
	3. Angle and geometry appear appropriate?	12	12	N/A	100	
	4. Free of piping or other structural failures?	12	12	N/A	100	92%
H. Wads/Boulders	1. Free of scour?	11	11	N/A	100	
	2. Footing stable?	11	11	N/A	100	100%
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?	2	3	N/A	67	
	2. Downstream of meander (glide/inflection) centering?	2	3	N/A	67	67%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	2	3	N/A	67	
	2. Of those eroding, # w/concomitant point bar formation?	1	1	N/A	100	
	3. Apparent Rc within spec?	3	3	N/A	100	
	4. Sufficient floodplain access and relief?	3	3	N/A	100	92%
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	2/100	76	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0	100	88%
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	3/80	80	80%
G. Vanes	1. Free of back or arm scour?	1	2	N/A	50	
	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	88%
H. Wads/Boulders	1. Free of scour?	3	3	N/A	100	
	2. Footing stable?	3	3	N/A	100	100%

**Table B2. Visual Morphological Stability Assessment
Big Cedar Creek Restoration Site: Project No. D06054-D
BCC Reach 6 (969 LF)**

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature 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	1/20	98	98%
G. Vanes	1. Free of back or arm scour?	2	2	N/A	100	
	2. Height appropriate?	2	2	N/A	100	
	3. Angle and geometry appear appropriate?	2	2	N/A	100	
	4. Free of piping or other structural failures?	2	2	N/A	100	100%
H. Wads/Boulders	1. Free of scour?	N/A	N/A	N/A	N/A	N/A
	2. Footing stable?	N/A	N/A	N/A	N/A	N/A

UT1 Reach 1 (1247 LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature 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: Project No. D06054-D**

UT1 Reach 2 (1016 LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature 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	1/15	98.5	99%
G. Vanes	1. Free of back or arm scour?	2	2	N/A	100	
	2. Height appropriate?	2	2	N/A	100	
	3. Angle and geometry appear appropriate?	2	2	N/A	100	
	4. Free of piping or other structural failures?	2	2	N/A	100	100%
H. Wads/Boulders	1. Free of scour?	5	5	N/A	100	
	2. Footing stable?	5	5	N/A	100	100%

UT1 Reach 3 (1885 LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performance Mean or Total
A. Riffles	1. Present?	17	18	N/A	94	
	2. Armor stable (e.g. no displacement)?	17	18	N/A	94	
	3. Facet grades appears stable?	17	18	N/A	94	
	4. Minimal evidence of embedding/fining?	18	18	N/A	100	
	5. Length appropriate?	18	18	N/A	100	97%
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	18	19	N/A	95	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	18	19	N/A	95	
	3. Length appropriate?	19	19	N/A	100	96%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	18	19	N/A	95	
	2. Downstream of meander (glide/inflection) centering?	18	19	N/A	95	95%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	19	19	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	19	19	N/A	100	
	4. Sufficient floodplain access and relief?	19	19	N/A	100	100%
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	100%
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	7/345	82	82%
G. Vanes	1. Free of back or arm scour?	12	12	N/A	100	
	2. Height appropriate?	12	12	N/A	100	
	3. Angle and geometry appear appropriate?	12	12	N/A	100	
	4. Free of piping or other structural failures?	12	12	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%

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

UT1 Reach 4 (997 LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performance Mean or Total
A. Riffles	1. Present?	6	9	N/A	67	
	2. Armor stable (e.g. no displacement)?	6	9	N/A	67	
	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	87%
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?)	5	7	N/A	71	
	3. Length appropriate?	7	7	N/A	100	90%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	5	7	N/A	71	
	2. Downstream of meander (glide/inflection) centering?	5	7	N/A	71	71%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	2	7	N/A	29	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	2	7	N/A	29	
	4. Sufficient floodplain access and relief?	2	7	N/A	29	29%
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	3/135	87	87%
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	5/495	50	50%
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?	2	5	N/A	40	
	2. Footing stable?	2	5	N/A	40	40%

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	1/6	93	93%
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	100%
G. Vanes	1. Free of back or arm scour?	N/A	N/A	N/A	N/A	
	2. Height appropriate?	N/A	N/A	N/A	N/A	
	3. Angle and geometry appear appropriate?	N/A	N/A	N/A	N/A	
	4. Free of piping or other structural failures?	N/A	N/A	N/A	N/A	N/A
H. Wads/Boulders	1. Free of scour?	N/A	N/A	N/A	N/A	
	2. Footing stable?	N/A	N/A	N/A	N/A	N/A

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

UT1B (34 LF)

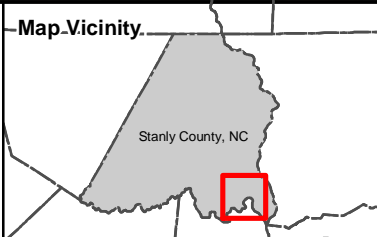
Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performance Mean or Total
A. Riffles	1. Present?	N/A	N/A	N/A	N/A	
	2. Armor stable (e.g. no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

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: Project No. D06054-D**

UT2 (609 LF)						
Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performance Mean or Total
A. Riffles	1. Present?	7	8	N/A	87.5	
	2. Armor stable (e.g. no displacement)?	7	8	N/A	87.5	
	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	94%
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?	4	7	N/A	57	
	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	86%
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	1/40	93	97%
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	6/165	73	73%
G. Vanes	1. Free of back or arm scour?	6	7	N/A	86	
	2. Height appropriate?	7	7	N/A	100	
	3. Angle and geometry appear appropriate?	7	7	N/A	100	
	4. Free of piping or other structural failures?	7	7	N/A	100	96%
H. Wads/Boulders	1. Free of scour?	2	4	N/A	50	
	2. Footing stable?	4	4	N/A	100	75%
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	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	
	2. Footing stable?	N/A	N/A	N/A	N/A	N/A



EEP Project No. : D06054-D
December 2010

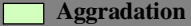









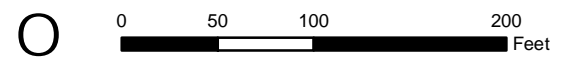
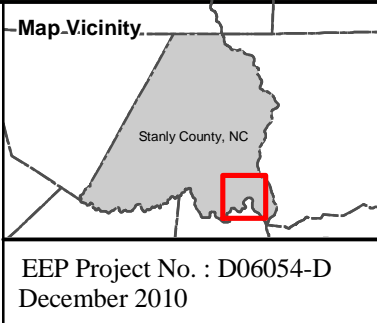
LEGEND	
	Aggradation
	Bed Migration
	Degradation
	Bank Failure
	Bank Scour
	Bank Slump
	Raw Bank
	Structure Problem Areas
	Conservation Easement
	Asbuilt Alignment

Figure B1: Stream Problem Areas
BCC (Station 10+00 to 17+00)
UT2 (Station 10+00 to End)

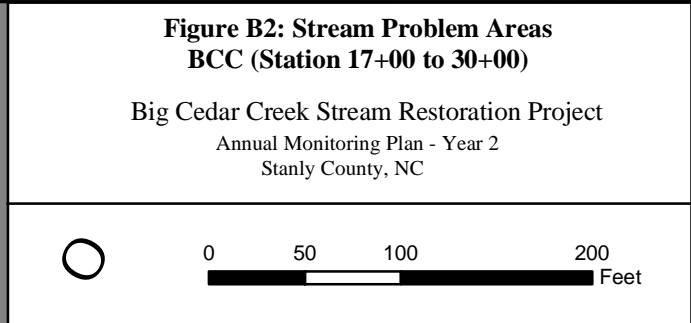
Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC

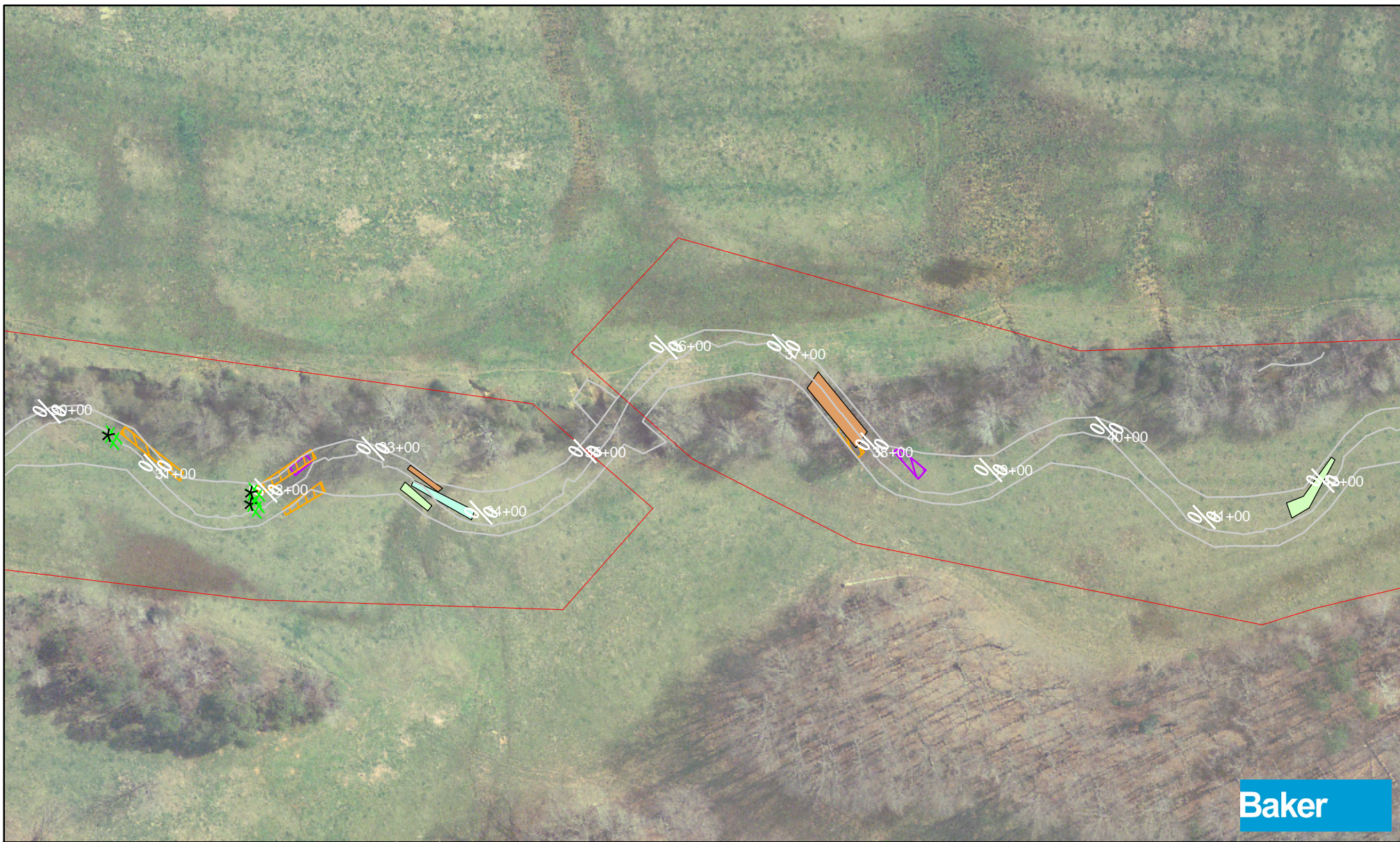




LEGEND

Aggradation	Structure Problem Areas
Bed Migration	Conservation Easement
Degradation	Asbuilt Alignment
Bank Failure	
Bank Scour	
Bank Slump	
Raw Bank	





Baker



Map Vicinity

Stanly County, NC

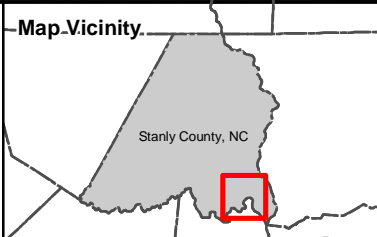
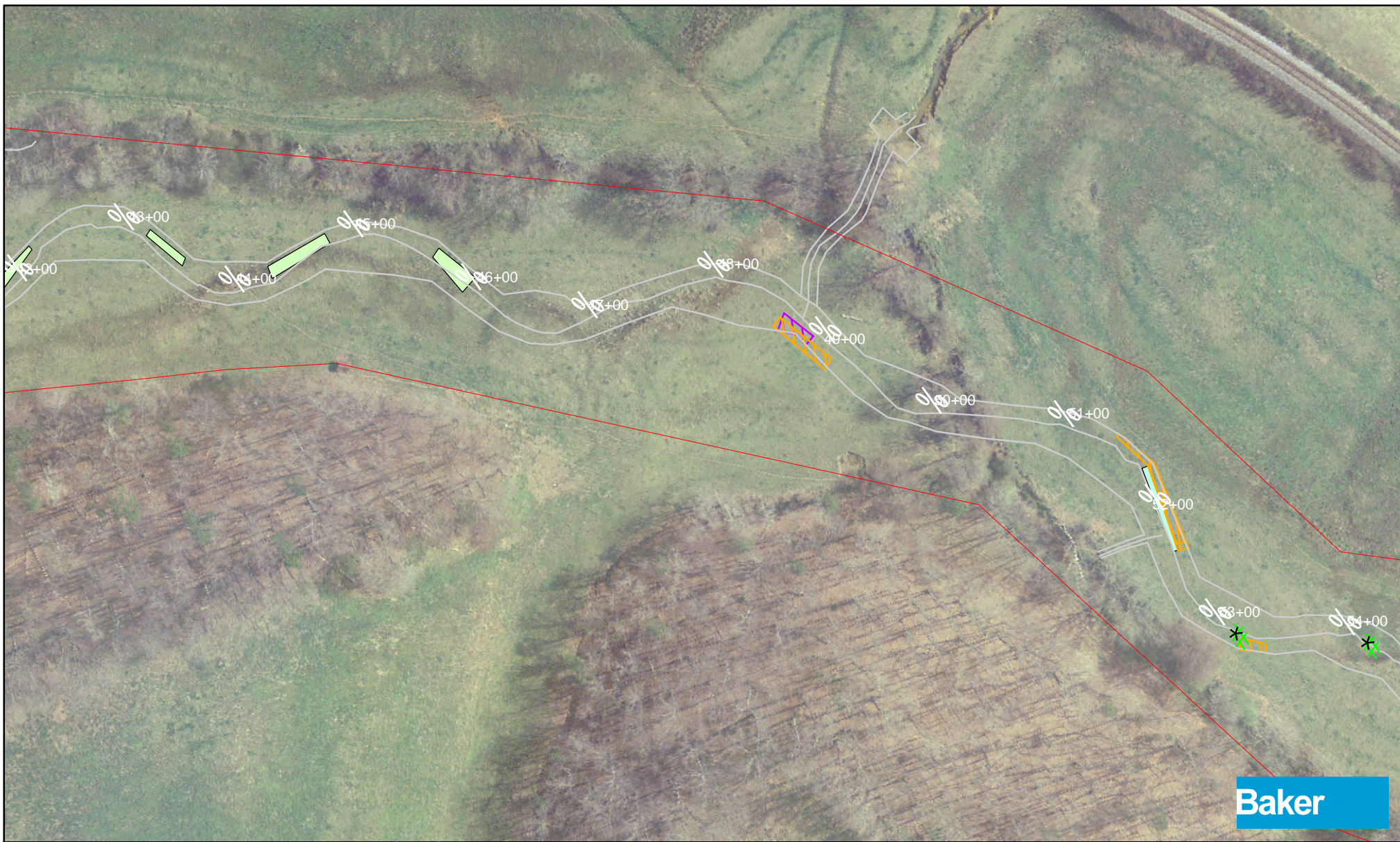
EEP Project No. : D06054-D
December 2010

LEGEND

- Aggradation
- Bed Migration
- Degradation
- Bank Failure
- Bank Scour
- Bank Slump
- Raw Bank
- Structure Problem Areas
- Conservation Easement
- Asbuilt Alignment

**Figure B3: Stream Problem Areas
BCC (Station 30+00 to 42+00)**

Big Cedar Creek Stream Restoration Project
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Stanly County, NC



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LEGEND	
	Aggradation
	Bed Migration
	Degradation
	Bank Failure
	Bank Scour
	Bank Slump
	Raw Bank
	Structure Problem Areas
	Conservation Easement
	Asbuilt Alignment

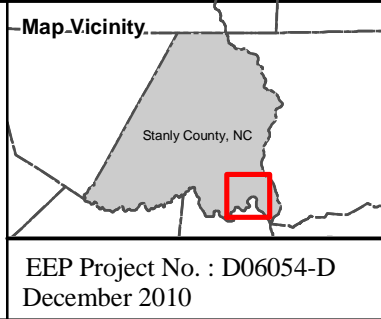
**Figure B4: Stream Problem Areas
BCC (Station 42+00 - 54+00)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC

0 50 100 200 Feet



Baker



LEGEND	
Aggradation	Structure Problem Areas
Bed Migration	Conservation Easement
Degradation	Asbuilt Alignment
Bank Failure	
Bank Scour	
Bank Slump	
Raw Bank	

**Figure B5: Stream Problem Areas
BCC (Station 54+00 to 67+00)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC

0 50 100 200 Feet



Baker



Map Vicinity

Stanly County, NC

EEP Project No. : D06054-D
December 2010

LEGEND	
	Aggradation
	Bed Migration
	Degradation
	Bank Failure
	Bank Scour
	Bank Slump
	Raw Bank
	Structure Problem Areas
	Conservation Easement
	Asbuilt Alignment

**Figure B6: Stream Problem Areas
UT1 (Station 10+00 to 24+00)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC



Map Vicinity

Stanly County, NC

EEP Project No. : D06054-D
December 2010

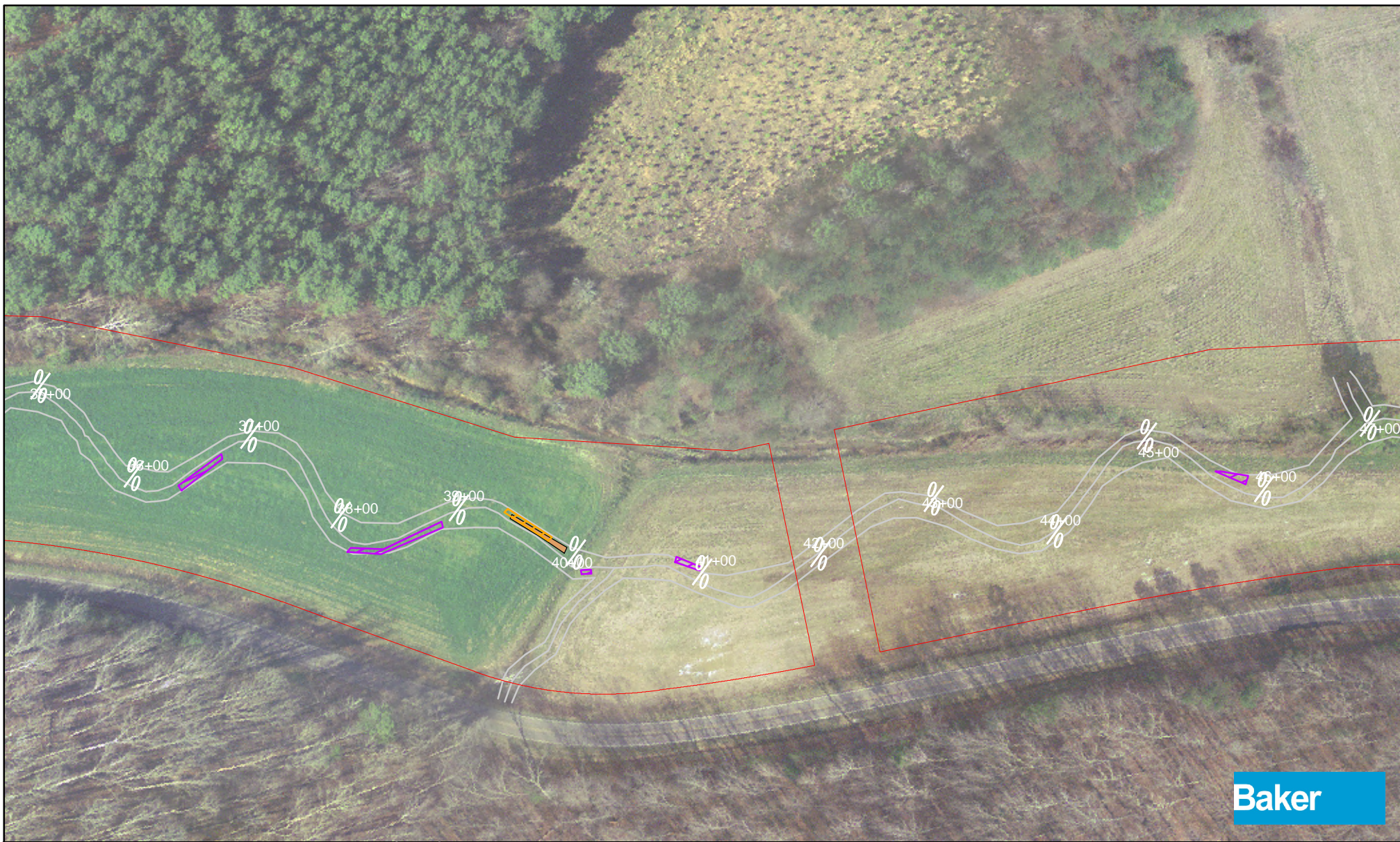
LEGEND	
Aggradation	Structure Problem Areas
Bed Migration	Conservation Easement
Degradation	Asbuilt Alignment
Bank Failure	
Bank Scour	
Bank Slump	
Raw Bank	

**Figure B7: Stream Problem Areas
UT1 (Station 24+00 to 35+00)**

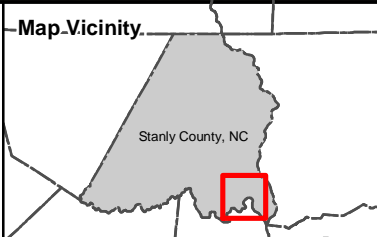
Big Cedar Creek Stream Restoration Project

Annual Monitoring Plan - Year 2

Stanly County, NC



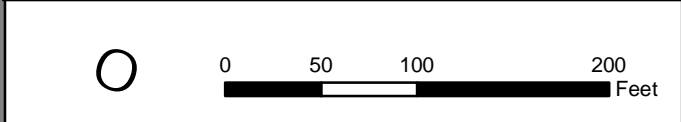
Baker

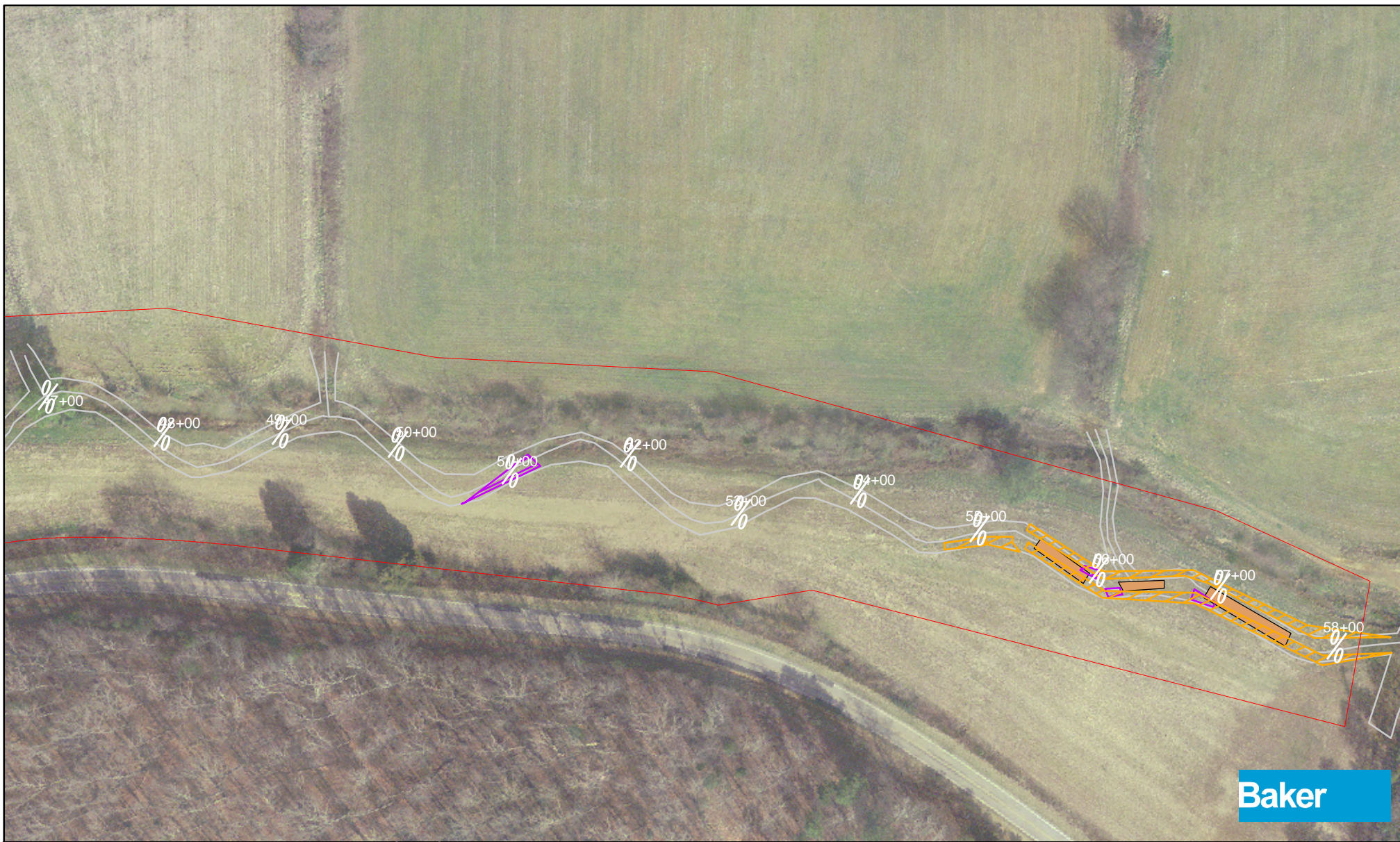


EEP Project No. : D06054-D
December 2010

LEGEND	
Aggradation	Structure Problem Areas
Bed Migration	Conservation Easement
Degradation	Asbuilt Alignment
Bank Failure	
Bank Scour	
Bank Slump	
Raw Bank	

**Figure B8: Stream Problem Areas
UT1 (Station 35+00 to 47+00)**
Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC





Baker



Map Vicinity

Stanly County, NC

EEP Project No. : D06054-D
December 2010

LEGEND

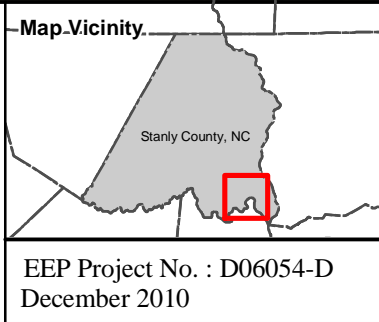
Aggradation	Structure Problem Areas
Bed Migration	Conservation Easement
Degradation	Asbuilt Alignment
Bank Failure	
Bank Scour	
Bank Slump	
Raw Bank	

Figure B9: Stream Problem Areas
UT1 (Station 47+00 - 58+00)
 Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 2
 Stanly County, NC





Baker



LEGEND	
	Aggradation
	Bed Migration
	Degradation
	Bank Failure
	Bank Scour
	Bank Slump
	Raw Bank
	Structure Problem Areas
	Conservation Easement
	Asbuilt Alignment

Figure B10: Stream Problem Areas
UT1 (Station 58+00 to End)
BCC (Station 67+00 to 73+00)
 Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 2
 Stanly County, NC

0 50 100 200 Feet



Baker

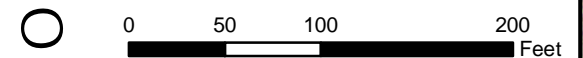


EEP Project No. : D06054-D
December 2010

LEGEND

- Bank Failure
- Bank Scour
- Bank Slump
- Raw Bank
- Aggradation
- Bed Migration
- Degradation
- Structure Problem Areas
- Conservation Easement
- Asbuilt Alignment

**Figure B11: Stream Problem Areas
BCC (Station 73+00 to End)**
Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC



Representative Stream Problem Area Photos



SPA 1 – BCC Deposition from off-site sediment source



SPA 2 – Aggradation from thalweg shift



SPA 3 – BCC Bank Slump



SPA 4 – Erosion/Scour behind log sill



SPA 5 – BCC Toe Erosion from thalweg shift



SPA 6 – BCC Bed Degradation



SPA 7 – BCC scour behind J-Hook boulder



SPA 8 – BCC Erosion from loss of matting



SPA 9 – Log sill set too low



SPA 10 – Bank scour from overland stormwater flow



SPA 11 – Bank Sinkhole from up-rooted tree



SPA 12 – UT1 Bank scour



SPA 13 – UT1 Pool Filling from floodplain sediment erosion



SPA 14 – UT1 Raw Bank



SPA 15 – UT1 Riffle degradation and channel widening



SPA 16 – UT2 Bare & raw bank



SPA 17 – UT2 Bank scour from lack of vegetation due to poor soils



SPA 18 – UT2 Bank Slump



SPA 19 – UT2 Thalweg migration

Appendix C

Vegetation Data

Vegetation Data

Tables C.1 through C.7

Vegetation Monitoring Plot Photos

Vegetation Problem Areas Figures C1-C8

Vegetation Problem Area Photos

Plot 92532-01-0001

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*	Feb 2009 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*
1-1	Viburnum dentatum	(E)	R			5	34.0	4	43	-	<input type="checkbox"/>	2		✓
1-2	Platanus occidentalis	(E)	R			13	94.0	18	157	5	<input type="checkbox"/>	4		✓
1-7	Platanus occidentalis	(E)	R			10	70.0	10	73		<input type="checkbox"/>	3		✓
1-9	Cornus amomum	(E)	R			8	42.0	6	57	-	<input type="checkbox"/>	3		✓
1-10	Carpinus caroliniana	(E)	R			4	18.0	-	-	-	<input type="checkbox"/>	M		✓
1-11	Carpinus caroliniana	(E)	R			7	18.0	-	-	-	<input type="checkbox"/>	0		✓
1-12	Lindera benzoin	(E)	R			3	46.0	-	-	-	<input type="checkbox"/>	0		✓
1-13	Carpinus caroliniana	(E)	R			2	23.0	-	-	-	<input type="checkbox"/>	0		✓
1-14	Platanus occidentalis	(E)	R			6	50.0	6	60	-	<input type="checkbox"/>	2		✓
1-15	Betula nigra	(E)	R			5	38.0	7	70	-	<input type="checkbox"/>	3		✓
1-16	Platanus occidentalis	(E)	R			8	41.0	14	135	3	<input type="checkbox"/>	4		✓
1-17	Lindera benzoin	(E)	R			4	38.0	4	43	-	<input type="checkbox"/>	2		✓
1-18	Cornus amomum	(E)	R			8	60.0	6	57	-	<input type="checkbox"/>	3		✓
1-20	Lindera benzoin	(E)	R			3	37.0	3	33	-	<input type="checkbox"/>	2		✓
1-21	Viburnum dentatum	(E)	R			6	29.0	4	75	-	<input type="checkbox"/>	3		✓
1-22	Platanus occidentalis	(E)	R			10	63.0	13	140	5	<input type="checkbox"/>	4		✓
1-23	Carpinus caroliniana	(E)	R			5	32.0	3	46	-	<input type="checkbox"/>	2		✓
1-24	Platanus occidentalis	(E)	R			7	58.0	7	69	-	<input type="checkbox"/>	3		✓
1-25	Cornus amomum	(E)	R			6	49.0	5	49	-	<input type="checkbox"/>	3		✓

*SOURCE: T=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 1

*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, DISSEASED, VINE Strangulation, UNKNOW, 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: -

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	Feb 2009 Data			THIS YEAR'S DATA						
						dhd 1 mm	Height 1cm*	DBH 1 cm	dhd 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
26-2-1	Platanus occidentalis	(E)	R			9	69.0		12	130	-	<input type="checkbox"/>	4		✓
27-2-2	Cornus amomum	(E)	R			6	49.0		5	52	-	<input type="checkbox"/>	2		✓
28-2-3	Viburnum dentatum	(E)	R			5	37.0		3	58	-	<input type="checkbox"/>	3		✓
29-2-4	Betula nigra	(E)	R			6	65.0		7	78	-	<input type="checkbox"/>	3		✓
30-2-5	Carpinus caroliniana	(E)	R			4	27.0		4	42	-	<input type="checkbox"/>	2		✓
31-2-6	Platanus occidentalis	(E)	R			10	73.0		12	114	-	<input type="checkbox"/>	3		✓
32-2-7	Carpinus caroliniana	(E)	R			4	30.0		5	79	-	<input type="checkbox"/>	2		✓
33-2-8	Betula nigra	(E)	R			5	43.0		4	33	-	<input type="checkbox"/>	2		new growth ✓
34-2-9	Betula nigra	(E)	R			4	24.0		4	29	-	<input type="checkbox"/>	2		✓
35-2-10	Platanus occidentalis	(E)	R			13	103.0	DBH?	17	162	6	<input type="checkbox"/>	4		✓
36-2-11	Platanus occidentalis	(E)	R			11	81.0		13	129	-	<input type="checkbox"/>	4		✓
37-2-12	Cornus amomum	(E)	R			12	55.0		6	67	-	<input type="checkbox"/>	3		new growth ✓
38-2-13	Quercus rubra	(E)	R			3	22.0		4	49	-	<input type="checkbox"/>	2		✓
39-2-14	Betula nigra	(E)	R			3	37.0		3	44	-	<input type="checkbox"/>	2		✓
40-2-15	Platanus occidentalis	(E)	R			11	73.0		14	130	-	<input type="checkbox"/>	4		✓
41-2-16	Fraxinus pennsylvanica	(E)	R			14	91.0		15	162	7	<input type="checkbox"/>	4		✓
42-2-17	Lindera benzoin	(E)	R			4	37.0		4	41	-	<input type="checkbox"/>	2		✓
44-2-19	Carpinus caroliniana	(E)	R			5	30.0		5	63	-	<input type="checkbox"/>	2		✓
45-2-20	Cornus amomum	(E)	R			7	52.0		7	60	-	<input type="checkbox"/>	3		✓
46-2-21	Platanus occidentalis	(E)	R			28	224.0	DBH!!		403	35	<input type="checkbox"/>	4		✓
47-2-22	Betula nigra	(E)	R			5	42.0		7	107	-	<input type="checkbox"/>	4		✓
48-2-23	Viburnum dentatum	(E)	R			5	43.0		8	102	-	<input type="checkbox"/>	3		✓
49-2-24	Cornus amomum	(E)	R			5	49.0		5	64	-	<input type="checkbox"/>	3		✓

2-18 - new growth H=21 D=2 ✓ - LINDERA BENZOIN

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 1
 *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 CV5-EEP Entry Tool ver. 2.2.7

Plot 92532-01-0003

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	Feb 2009 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	
3-1	Platanus occidentalis	(E)	R			9	68.0		9	81	-		3			✓
3-2	Viburnum dentatum	(E)	R			6	48.0		9	82	-		3			✓
3-4	Betula nigra	(E)	R			8	55.0		11	113	-		4			✓
3-5	Cornus amomum	(E)	R			7	52.0		6	55	-		3			✓
3-6	Platanus occidentalis	(E)	R			9	82.0		12	125	-		3			✓
3-7	Platanus occidentalis	(E)	R			11	93.0		15	167	8		4			✓
3-8	Quercus rubra	(E)	R			3	32.0		2	31	-		2			✓
3-9	Betula nigra	(E)	R			5	43.0		5	69	-		3			✓
3-10	Platanus occidentalis	(E)	R			13	94.0		18	185	8		4			✓
3-11	Viburnum dentatum	(E)	R			6	44.0		5	81	-		3			✓
3-12	Platanus occidentalis	(E)	R			9	60.0		13	128	-		4			✓
3-13	Platanus occidentalis	(E)	R			11	80.0		15	150	6		4			✓
3-14	Quercus phellos	(E)	R			6	35.0		3	36	-		2			✓
3-15	Lindera benzoin	(E)	R			4	37.0		3	36	-		1			✓
3-16	Platanus occidentalis	(E)	R			6	48.0		6	66	-		3			✓
3-17	Betula nigra	(E)	R			7	61.0		8	97	-		3			✓
3-18	Platanus occidentalis	(E)	R			15	105.0	DBH?	20	203	8		4			✓
3-19	Platanus occidentalis	(E)	R			10	83.0		18	139	4		4			✓
3-20	Betula nigra	(E)	R			7	62.0		13	105	-		3			✓
3-21	Lindera benzoin	(E)	R			4	43.0		3	44	-		2			✓
3-22	Lindera benzoin	(E)	R			3	35.0		3	34	-		1			✓
3-23	Fraxinus pennsylvanica	(E)	R			11	70.0		13	132	-		3			✓
3-24	Quercus phellos	(E)	R			6	64.0		5	73	-		3			✓

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 2
 *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, HURRICANE, DISSEASED, VINE
 M=missing. 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 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: Party:
 (dec.deg. or m) UTM Zone: Role: Notes on plot:
 Longitude or UTM-E:

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	Feb 2009 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
4-1	Quercus phellos	(E)	R			3	33.0		5	71	-	<input type="checkbox"/>	4		✓
4-2	Quercus phellos	(E)	R			7	73.0		12	151	3	<input type="checkbox"/>	4		✓
4-3	Quercus michauxii	(E)	R			8	66.0		14	138	3	<input type="checkbox"/>	4		✓
4-4	Platanus occidentalis	(E)	R			11	80.0		11	104	-	<input type="checkbox"/>	4		✓
4-5	Betula nigra	(E)	R			7	55.0		10	143	2	<input type="checkbox"/>	4		✓
4-6	Platanus occidentalis	(E)	R			19	134.0	DBH?	30	270	15	<input type="checkbox"/>	4		✓
4-7	Platanus occidentalis	(E)	R			7	67.0		8	98	-	<input type="checkbox"/>	4		✓
4-8	Platanus occidentalis	(E)	R			12	91.0		21	179	6	<input type="checkbox"/>	4		✓
4-10	Betula nigra	(E)	R			5	55.0		9	128	-	<input type="checkbox"/>	4		✓
4-11	Carpinus caroliniana	(E)	R			1	21.0		3	84	-	<input type="checkbox"/>	3		✓
4-13	Cornus amomum	(E)	R			6	55.0		8	100	-	<input type="checkbox"/>	4		✓
4-14	Ilex verticillata	(E)	R			6	40.0		5	42	-	<input type="checkbox"/>	4		✓
4-15	Platanus occidentalis	(E)	R			19	123.0	DBH?	33	380	17	<input type="checkbox"/>	4		✓
4-16	Platanus occidentalis	(E)	R			7	50.0		10	104	-	<input type="checkbox"/>	4		✓
4-17	Betula nigra	(E)	R			7	72.0		11	156	3	<input type="checkbox"/>	4		✓
4-18	Platanus occidentalis	(E)	R			6	49.0		9	98	-	<input type="checkbox"/>	3		✓
4-19	Betula nigra	(E)	R			9	56.0		10	101	-	<input type="checkbox"/>	4		✓

Handwritten scribble: 4-9-? KS

*SOURCE: T=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 3
 *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 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: Party:
 (dec. deg. or m) Longitude or UTM-E: UTM Zone: Role:
 Coordinate Accuracy (m): X-Axis bearing (deg): 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	Feb 2009 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	
5-1	Cornus amomum	(E)	R			8	31.0		10	129	-		4			✓
5-2	Quercus phellos	(E)	R			5	55.0		5	48	-		2			Broken stem ✓
5-4	Platanus occidentalis	(E)	R			4	59.0		14	188	5		4			✓
5-5	Cornus amomum	(E)	R			7	61.0		7	66	-		1			✓
5-6	Betula nigra	(E)	R			4	48.0		3	31	-		1			New growth / Broken stem ✓
5-7	Quercus phellos	(E)	R			4	41.0		4	63	-		2			✓
5-8	Viburnum dentatum	(E)	R			4	27.0		5	92	-		4			✓
5-9	Cornus amomum	(E)	R			11	47.0		11	90	-		3			✓
5-10	Quercus phellos/amomum?	(E)	R			8	70.0		10	149	3		4			✓
5-11	Quercus rubra	(E)	R			3	27.0		6	98	-		3			✓
5-12	Betula nigra	(E)	R			11	77.0		17	142	2		4			✓
5-14	Quercus phellos	(E)	R			6	103.0	DBH?	8	131	-		4			New growth / Broken stem ✓
5-15	Platanus occidentalis	(E)	R			11	86.0		16	162	6		4			✓
5-16	Betula nigra	(E)	R			13	61.0		15	192	5		4			✓
5-17	Quercus phellos	(E)	R			6	55.0		9	123	-		4			✓
5-18	Cornus amomum	(E)	R			6	55.0		7	62	-		2			✓
5-19	Cornus amomum	(E)	R			10	48.0		5	54	-		2			Broken stem / New growth ✓
5-20	Betula nigra	(E)	R			13	129.0	DBH?	23	230	10		4			✓
5-21	Quercus phellos	(E)	R			9	61.0		12	137	2		4			✓

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 4
 *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 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:

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:

 ENTERED 8/10/10

Role:

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Feb 2009 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	
106-1	Cornus amomum	(E)	R			6	58.0		8	127	-		4			✓
117-2	Viburnum dentatum	(E)	R			5	34.0		6	82	-		4			✓
118-3	Cornus amomum	(E)	R			6	34.0		6	63	-		4			✓
119-4	Viburnum dentatum	(E)	R			4	19.0		3	54	-		4			✓
120-5	Platanus occidentalis	(E)	R			11	85.0		16	199	7		4			✓
121-6	Quercus phellos	(E)	R			8	46.0		9	124	-		4			✓
123-8	Platanus occidentalis	(E)	R			12	103.0	DBH?	21	215	10		4			✓
124-9	Fraxinus pennsylvanica	(E)	R			9	82.0		13	179	4		4			✓
125-10	Quercus michauxii	(E)	R			9	50.0		10	95	-		4			✓
126-11	Platanus occidentalis	(E)	R			11	105.0	DBH?	18	208	7		4			✓
127-12	Cornus amomum	(E)	R			7	66.0		8	116	-		4			✓
128-13	Quercus phellos	(E)	R			2	24.0		-	-	-		-		Dead	✓
129-14	Fraxinus pennsylvanica	(E)	R			10	77.0		17	169	6		4			✓
130-15	Quercus michauxii	(E)	R			5	50.0		4	101	-		2		new growth	✓
131-16	Quercus rubra	(E)	R			4	39.0		8	93	-		3			✓
133-18	Platanus occidentalis	(E)	R			12	76.0		18	205	9		4			✓
134-19	Cornus amomum	(E)	R			5	65.0		9	110	-		4			✓
136-21	Cornus amomum	(E)	R			7	59.0		11	116	-		4			✓
137-22	Fraxinus pennsylvanica	(E)	R			14	109.0	DBH?	21	210	7		4			✓
138-23	Quercus michauxii	(E)	R			5	46.0		6	78	-		3			✓
139-24	Fraxinus pennsylvanica	(E)	R			7	72.0		11	161	4		4			✓

*SOURCE: T=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.
 Printed in the CVS-EEP Entry Tool ver. 2.2.7

Plot 92532-01-0007

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: Party:
 (dec.deg. or m) UTM Zone:
 Longitude or UTM-E:

Coordinate Accuracy (m): X-Axis bearing (deg): 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	Feb 2009 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	
141-7-1	Betula nigra	(E)	R			6	71.0		10	137	1		4			✓
142-7-2	Fraxinus pennsylvanica	(E)	R			19	133.0	DBH?	35	279	12		4			✓
143-7-3	Carpinus caroliniana	(E)	R			6	59.0		13	183	5		4			✓
144-7-4	Quercus michauxii	(E)	R			7	61.0		8	59	-		1			✓
145-7-5	Platanus occidentalis	(E)	R			7	76.0		12	134	-		4			✓
146-7-6	Cornus amomum	(E)	R			11	123.0	DBH?	17	247	6		4			✓
147-7-7	Quercus michauxii	(E)	R			5	48.0		4	43	-		1		Broken stem	✓
148-7-8	Cornus amomum	(E)	R			6	73.0		14	173	3		4			✓
149-7-9	Acer rubrum	(E)	R			10	89.0		20	173	4		4			✓
150-7-10	Quercus phellos	(E)	R			6	61.0		8	89	-		4			✓
151-7-11	Quercus michauxii	(E)	R			6	53.0		7	125	-		4			✓
152-7-12	Betula nigra	(E)	R			4	26.0		4	23	-		2		Broken stem	✓
153-7-13	Cornus amomum	(E)	R			8	76.0		15	173	4		4			✓
155-7-15	Platanus occidentalis	(E)	R			15	125.0	DBH?	33	317	21		4			✓
156-7-16	Platanus occidentalis	(E)	R			18	152.0	DBH!!	34	318	21		4			✓
158-7-18	Quercus michauxii	(E)	R			4	27.0		4	30	-		1		Broken stem	✓
159-7-19	Quercus michauxii	(E)	R			5	58.0		-	-	-		-		Dead	✓
160-7-20	Platanus occidentalis	(E)	R			12	97.0		34	273	16		4			✓
161-7-21	Betula nigra	(E)	R			12	44.0		22	251	13		4			✓
162-7-22	Quercus nigra	(E)	R			4	13.0		3	27	-		2		not ground	✓
164-7-24	Platanus occidentalis	(E)	R			12	113.0	DBH?	26	254	13		4			✓
165-7-25	Cornus amomum	(E)	R			4	38.0		-	-	-		-		Dead	✓
166-7-26	Cornus amomum	(E)	R			10	92.0		13	209	5		4			✓

*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, HURRICANE, DISEASED, VINE
 Strangulation, UNKNOW, 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 92532-01-0008

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - Party:
 Taxonomic Standard: Role:
 Taxonomic Standard DATE: Notes on plot:
 Latitude or UTM-N: Datum: Party:
 (dec.deg. or m) Longitude or UTM-E: UTM Zone: Party: ENTERED 2/11/10
 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	Feb 2009 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
1678-1	Corylus americana	(E)	R			4	61.0		7	79	-		4		✓
1688-2	Lindera benzoin	(E)	R			4	41.0		4	36	-		3		✓
1698-3	Fraxinus pennsylvanica	(E)	R			6	43.0		10	95	-		4		✓
1708-4	Platanus occidentalis	(E)	R			5	56.0		15	167	7		4		✓
1728-6	Cornus amomum	(E)	R			6	53.0		11	134	-		4		✓
1738-7	Lindera benzoin	(E)	R			3	34.0		3	50	-		3		✓
1748-8	Quercus phellos	(E)	R			3	17.0		-	-	-		0		Dead ✓
1758-9	Platanus occidentalis	(E)	R			6	58.0		16	159	5		4		✓
1768-10	Viburnum dentatum	(E)	R			4	20.0		5	87	-		4		✓
1788-11	Platanus occidentalis	(E)	R			7	88.0		16	170	8		4		✓
1798-13	Corylus americana	(E)	R			7	61.0		7	72	-		4		✓
1808-14	Lindera benzoin	(E)	R			3	11.0		-	-	-		0		Dead ✓
1818-15	Corylus americana	(E)	R			7	20.0		5	69	-		3		✓
1828-16	Viburnum dentatum	(E)	R			5	30.0		6	92	-		4		✓
1838-17	Cornus amomum	(E)	R			6	57.0		12	107	-		4		✓
1848-18	Fraxinus pennsylvanica	(E)	R			7	46.0		7	88	-		4		✓
1868-20	Corylus americana	(E)	R			6	64.0		6	91	-		4		✓
1878-21	Calycanthus floridus	(E)	R			4	49.0		3	47	-		1		✓
1888-22	Cornus amomum	(E)	R			6	65.0		11	163	3		4		✓
1898-23	Cornus amomum	(E)	R			6	71.0		11	141	3		4		✓
1908-24	Platanus occidentalis	(E)	R			12	90.0		19	197	9		4		✓
1918-25	Betula nigra	(E)	R			7	61.0		-	-	-		-		Dead ✓

*SOURCE: T=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, 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 92532-01-0009

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:

 ENTERED

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	Feb 2009 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
1939-1	Betula nigra	(E)	R			13	158.0	DBH!!	26	290	19		4		✓
1949-2	Platanus occidentalis	(E)	R			18	158.0	DBH!!	37	310	27		4		✓
1959-3	Quercus phellos	(E)	R			6	69.0		10	200	10		4		✓
1969-4	Betula nigra	(E)	R			15	156.0	DBH!!	32	372	21		4		✓
1979-5	Betula nigra	(E)	R			12	151.0	DBH!!	26	281	20		4		✓
1989-6	Platanus occidentalis	(E)	R			21	179.0	DBH!!	37	352	30		4		✓
1999-7	Platanus occidentalis	(E)	R			28	183.0	DBH!!	43	360	30		4		✓
2009-8	Cornus amomum	(E)	R			7	76.0		10	163	4		4		✓
2019-9	Platanus occidentalis	(E)	R			19	143.0	DBH!!	34	295	19		4		✓
2029-10	Carpinus caroliniana	(E)	R			6	96.0		12	163	3		4		✓
2039-11	Quercus phellos	(E)	R			11	107.0	DBH?	10	186	4		4		✓
2049-12	Quercus phellos	(E)	R			8	112.0	DBH?	13	207	8		4		✓
2059-13	Platanus occidentalis	(E)	R			24	175.0	DBH!!	42	265	27		4		✓
2069-14	Symphoricarpos orbiculatus	(E)	R			8	72.0		8	93	-		4		✓
2079-15	Viburnum dilatatum	(E)	R			4	65.0		7	137	3		4		✓
2089-16	Viburnum dilatatum	(E)	R			6	30.0		-	-	-		M		✓
2099-17	Betula nigra	(E)	R			7	104.0	DBH?	15	243	8		4		✓
2109-18	Fraxinus pennsylvanica	(E)	R			15	133.0	DBH?	30	251	14		4		✓
2119-19	Carpinus caroliniana	(E)	R			11	87.0		16	230	8		4		✓
2129-20	Quercus michauxii	(E)	R			6	73.0		5	67	-		3	decay	✓
2139-21	Quercus michauxii	(E)	R			5	42.0		9	146	4		4		✓
2149-22	Lindera benzoin	(E)	R			4	64.0		-	-	-		M		✓
2159-23	Betula nigra	(E)	R			7	73.0		8	253	7		4		✓
2169-24	Platanus occidentalis	(E)	R			17	130.0	DBH?	38	395	25		4		✓
2179-25	Cornus amomum	(E)	R			4	25.0		-	-	-		⊕	Dead	✓
2189-26	Viburnum dentatum	(E)	R			7	48.0		10	193	7		4		✓
2199-27	Quercus phellos	(E)	R			5	45.0		6	126	-		4		✓

*SOURCE: T=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 8

*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 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: (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	Feb 2009 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
220	Cornus amomum	10-1	ⓔ	R		6	57.0		7	69	-		4		✓
221	Betula nigra	10-2	ⓔ	R		11	162.0	DBH!!	19	160	12		4		✓
222	Cornus amomum	10-3	ⓔ	R		5	55.0		7	82	-		4		✓
223	Platanus occidentalis	10-4	ⓔ	R		8	81.0		18	157	6		4		✓
224	Platanus occidentalis	10-5	ⓔ	R		9	69.0		14	139	5		4		✓
225	Betula nigra	10-6	ⓔ	R		12	146.0	DBH!!	22	252	11		4		✓
226	Fraxinus pennsylvanica	10-7	ⓔ	R		19	128.0	DBH?	26	190	8		4		✓
227	Lindera benzoin	10-8	ⓔ	R		4	56.0		4	59	-		2		✓
228	Quercus michauxii	10-9	ⓔ	R		6	59.0		3	34	-		1		new growth ✓
229	Platanus occidentalis	10-10	ⓔ	R		24	163.0	DBH!!	37	285	22		4		✓
230	Cornus amomum	10-11	ⓔ	R		14	99.0		22	222	10		4		✓
231	Lindera benzoin	10-12	ⓔ	R		4	58.0		-	-	-		-		Dead ✓
232	Fraxinus pennsylvanica	10-13	ⓔ	R		7	70.0		13	100	-		4		✓
233	Platanus occidentalis	10-14	ⓔ	R		36	232.0	DBH!!	45	360	25		4		✓
235	Platanus occidentalis	10-16	ⓔ	R		6	76.0		7	86	-		3		✓
236	Fraxinus pennsylvanica	10-17	ⓔ	R		6	64.0		5	54	-		2		✓
237	Platanus occidentalis	10-18	ⓔ	R		19	184.0	DBH!!	43	320	31		4		✓
238	Symphoricarpos orbiculatus	10-19	ⓔ	R		3	50.0		5	129	-		3		✓
239	Platanus occidentalis	10-20	ⓔ	R		8	79.0		10	121	-		4		✓
240	Platanus occidentalis	10-21	ⓔ	R		13	107.0	DBH?	19	172	7		4		✓
241	Viburnum dentatum	10-22	ⓔ	R		4	26.0		-	-	-		-		Dead ✓
243	Platanus occidentalis	10-24	ⓔ	R		13	100.0		29	247	14		4		✓
244	Lindera benzoin	10-25	ⓔ	R		4	13.0		2	19	-		1		new growth ✓
246	Fraxinus pennsylvanica	10-27	ⓔ	R		12	79.0		22	169	10		4		✓

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

GOR: 4=excellent, 3=good, 2=fair, 1=poor, 0=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 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: (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)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Feb 2009 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 11-1	(E)	R			4	46.3		5	76	-		4		✓
248	Platanus occidentalis 11-2	(E)	R			8	44.5		19	211	10		4		✓
249	Platanus occidentalis 11-3	(E)	R			9	84.1		22	207	10		4		✓
250	Cornus amomum 11-4	(E)	R			5	61.9		13	142	3		4		✓
251	Cornus amomum 11-5	(E)	R			8	85.6		11	160	10		4		✓
252	Betula nigra 11-6	(E)	R			5	63.1		-	-	-		-		Dead ✓
254	Symphoricarpos orbiculatus 11-8	(E)	R			7	77.1		9	77	-		4		✓
255	Platanus occidentalis 11-9	(E)	R			8	79.9		19	200	11		4		✓
256	Fraxinus pennsylvanica 11-10	(E)	R			6	76.2		10	129	-		4		✓
257	Ilex verticillata 11-11	(E)	R			4	26.2		6	49	-		3		✓
258	Ilex verticillata 11-12	(E)	R			4	54.9		5	55	-		3		✓
259	Corylus americana 11-13	(E)	R			7	65.5		7	119	-		4		✓
260	Cornus amomum 11-14	(E)	R			4	41.5		9	111	-		4		✓
261	Cornus amomum 11-15	(E)	R			4	55.2		5	73	-		4		✓
262	Betula nigra 11-16	(E)	R			8	65.5		-	-	-		-		Dead ✓
263	Cornus amomum 11-17	(E)	R			6	60.7		11	177	3		4		✓
264	Corylus americana 11-18	(E)	R			5	49.4		8	109	-		4		✓
265	Cornus amomum 11-19	(E)	R			5	62.2		18	92	-		4		✓
266	Platanus occidentalis 11-20	(E)	R			9	90.8		16	180	7		4		✓
267	Platanus occidentalis 11-21	(E)	R			10	100.3	DBH?	20	192	8		4		✓

** Need To Flag **

11 3
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*SOURCE: T=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/Unk ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DIS Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.
 Printed in the CVS-EEP

*SC
*VA
I=un
M=m
*HEK

Plot 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: Datum: (dec.deg. or m)

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m):

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	Feb 2009 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
268	Viburnum dentatum	12-1	(E)	R		4	32.6		0	65	-		4		✓
270	Viburnum dentatum	12-3	(E)	R		4	28.0		4	38	-		4		✓
271	Viburnum dentatum	12-4	(E)	R		6	45.4		7	49	-		4		✓
272	Fraxinus pennsylvanica	12-5	(E)	R		8	67.1		9	61	-		4		✓
273	Platanus occidentalis	12-6	(E)	R		5	68.0		10	116	-		4		✓
274	Fraxinus pennsylvanica	12-7	(E)	R		10	65.8		10	66	-		4		✓
275	Corylus americana	12-8	(E)	R		8	68.0		8	70	-		2		✓
276	Platanus occidentalis	12-9	(E)	R		7	60.0		8	68	-		4		✓
277	Betula nigra	12-10	(E)	R		4	69.5		-	-	-		Dead		✓
278	Platanus occidentalis	12-11	(E)	R		5	60.0		10	71	-		3		✓
279	Cornus amomum	12-12	(E)	R		5	49.1		5	56	-		3		✓
280	Symphoricarpos orbiculatus	12-13	(E)	R		3	55.5		2	13	-		1		✓
281	Platanus occidentalis	12-14	(E)	R		4	41.1		5	55	-		3		✓
282	Platanus occidentalis	12-15	(E)	R		7	62.8		7	77	-		3		✓
283	Cornus amomum	12-16	(E)	R		5	56.1		7	61	-		3		✓
284	Platanus occidentalis	12-17	(E)	R		5	56.9		5	64	-		3		✓
285	Betula nigra	12-18	(E)	R		4	42.7		11	71	-		4		✓
286	Platanus occidentalis	12-19	(E)	R		7	58.8		6	70	-		3		✓
287	Calycanthus floridus	12-20	(E)	R		3	31.4		3	35	-		3		✓
288	Ilex verticillata	12-21	(E)	R		6	65.2		6	59	-		3		✓
289	Cornus amomum	12-22	(E)	R		3	40.5		3	44	-		2		✓

*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.
 Printed in the CVS-EEP Entry Tool ver. 2.2.7

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: 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	Feb 2009 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
290	Betula nigra 13-1	(E)	R			3	18.0		3	39	-	<input type="checkbox"/>	3		✓
291	Cornus amomum 13-2	(E)	R			8	76.0		15	146	3	<input type="checkbox"/>	3		✓
292	Cornus amomum 13-3	(E)	R			8	70.0		9	93	-	<input type="checkbox"/>	3		✓
293	Carpinus caroliniana 13-4	(E)	R			6	57.0		8	133	-	<input type="checkbox"/>	3		✓
294	Carpinus caroliniana 13-5	(E)	R			5	55.0		10	98	-	<input type="checkbox"/>	3		✓
295	Cornus amomum 13-6	(E)	R			7	79.0		11	164	4	<input type="checkbox"/>	4		✓
296	Carpinus caroliniana 13-7	(E)	R			7	72.0		10	145	2	<input type="checkbox"/>	4		✓
297	Betula nigra 13-8	(E)	R			4	88.0		6	97	-	<input type="checkbox"/>	3		✓
298	Platanus occidentalis 13-9	(E)	R			6	62.0		9	141	2	<input type="checkbox"/>	3		✓
299	Cornus amomum 13-10	(E)	R			10	103.0	DBH?	15	160	5	<input type="checkbox"/>	4		✓
300	Betula nigra 13-11	(E)	R			9	81.0		10	167	4	<input type="checkbox"/>	4		✓
301	Cornus amomum 13-12	(E)	R			9	84.0		9	134	-	<input type="checkbox"/>	3		✓
302	Carpinus caroliniana 13-13	(E)	R			6	72.0		11	157	3	<input type="checkbox"/>	3	noting	✓
303	Viburnum dentatum 13-14	(E)	R			7	57.0		10	109	-	<input type="checkbox"/>	3		✓
304	Platanus occidentalis 13-15	(E)	R			3	24.0		3	41	-	<input type="checkbox"/>	2	CC-mislabelled	✓
305	Carpinus caroliniana 13-16	(E)	R			1	14.0		2	38	-	<input type="checkbox"/>	2		✓
306	Platanus occidentalis 13-17	(E)	R			3	18.0		-	-	-	<input type="checkbox"/>	0		✓
307	Carpinus caroliniana 13-18	(E)	R			6	67.0		8	140	2	<input type="checkbox"/>	3		✓
309	Viburnum dentatum 13-20	(E)	R			7	65.0		7	73	-	<input type="checkbox"/>	2		✓
310	Cornus amomum 13-21	(E)	R			7	52.0		7	118	-	<input type="checkbox"/>	3		✓

*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, 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 92532-01-0014

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: Party: Role: Notes on plot:

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

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

(dec.deg. or m) UTM Zone: Notes on plot:

Longitude or UTM-E: UTM Zone: Notes on plot:

Coordinate Accuracy (m): X-Axis bearing (deg): 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	Feb 2009 Data			THIS YEAR'S DATA				Notes		
						ddh l mm	Height 1cm*	DBH 1 cm	ddh lmm	Height 1cm*	DBH 1 cm	Re- sprout		Vigor*	Damage*
311	Ilex verticillata	14-1	(E) R			5	69.0					0			✓
312	Ilex verticillata	14-2	(E) R			8	91.0		9	144	2		3		Bn - mistletoe ✓
313	Cornus amomum	14-3	(E) R			8	73.0		14	163	3		3		✓
314	Carpinus caroliniana	14-4	(E) R			3	26.0		3	36	-		2		✓
315	Viburnum dentatum	14-5	(E) R			5	53.0		5	63	-		3		✓
316	Platanus occidentalis	14-6	(E) R			6	71.0		6	101	-		3		Bn - mistletoe ✓
317	Cornus amomum	14-7	(E) R			9	85.0		10	155	3		4		✓
318	Ilex verticillata	14-8	(E) R			8	61.0		7	74	-		3		Bn - mistletoe ✓
319	Carpinus caroliniana	14-9	(E) R			2	27.0		5	95	-		3		✓
320	Viburnum dentatum	14-10	(E) R			3	41.0		3	69	-		2		✓
321	Carpinus caroliniana	14-11	(E) R			4	42.0		4	64	-		2		✓
322	Platanus occidentalis	14-12	(E) R			5	53.0		12	99	-		3		Bn - mistletoe ✓
323	Ilex verticillata	14-13	(E) R			5	81.0		9	139	3		4		✓
325	Platanus occidentalis	14-15	(E) R			7	82.0		13	142	5		4		✓
326	Cornus amomum	14-16	(E) R			6	82.0		11	200	5		4		✓
327	Ilex verticillata	14-17	(E) R			5	43.0		-	-	-		0		✓
328	Betula nigra	14-18	(E) R			8	82.0		6	55	-		1		✓
330	Platanus occidentalis	14-20	(E) R			5	60.0		9	137	1		4		✓

*SOURCE: T=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 13

*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 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: Party:
 (dec.deg. or m) UTM Zone:
 Longitude or UTM-E: X-Axis bearing (deg): Role:

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

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Feb 2009 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
331	Ilex verticillata	15-1	(E)	R		5	50.9	-	-	-	-	-	-	-	Dead ✓
332	Lindera benzoin	15-2	(E)	R		4	12.5	-	-	-	-	-	-	-	Dead ✓
333	Platanus occidentalis	15-3	(E)	R		5	45.1	10	25	-	-	4	-	-	✓
334	Betula nigra	15-4	(E)	R		4	51.5	5	72	-	-	4	-	-	✓
335	Cornus amomum	15-5	(E)	R		5	46.0	5	75	-	-	4	-	-	✓
336	Lindera benzoin	15-6	(E)	R		4	31.4	-	-	-	-	-	-	-	Dead ✓
337	Betula nigra	15-7	(E)	R		3	39.6	-	-	-	-	-	-	-	Dead ✓
338	Carpinus caroliniana	15-8	(E)	R		3	44.5	-	-	-	-	-	-	-	Dead ✓
339	Lindera benzoin	15-9	(E)	R		2	4.0	-	-	-	-	-	-	-	Dead ✓
340	Platanus occidentalis	15-10	(E)	R		2	32.0	-	-	-	-	-	-	-	Dead ✓
341	Betula nigra	15-11	(E)	R		3	32.3	-	-	-	-	-	-	-	Dead ✓
342	Quercus phellos	15-12	(E)	R		7	52.1	7	100	-	-	4	-	-	✓
344	Quercus phellos	15-14	(E)	R		4	58.2	4	59	-	-	3	-	-	✓
345	Quercus nigra	15-15	(E)	R		4	55.5	5	60	-	-	2	-	-	✓
346	Quercus phellos	15-16	(E)	R		4	70.1	4	70	-	-	3	-	-	✓

*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, *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, HURRICane, DISEased, VINE
 M=missing. 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 92532-01-0016

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): 2 Date: 8/10/10 - 1/1

Taxonomic Standard:

Taxonomic Standard DATE:

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

Longitude or UTM-E:

Coordinate Accuracy (m):

Plot Dimensions: X: 10 Y: 10

1660031.74922327 Datum: NAD83/W
526637.7563 UTM Zone: 18Q
X-Axis bearing (deg): 35.192

Party: Jan F.
P. Lynch
K. SUGGS EMERSON
8/18/10

Notes on plot:

[Empty box for notes]

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	Feb 2009 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	
347	Cornus amomum	16-1	(E) R			5	52.4		6	61	-		4			✓
348	Platanus occidentalis	16-2	(E) R			9	91.7		19	166	7		4			✓
349	Lindera benzoin	16-3	(E) R			2	13.4		-	-	-		-		Dead	✓
350	Carpinus caroliniana	16-4	(E) R			5	48.2		10	100	-		4			✓
351	Betula nigra	16-5	(E) R			6	61.9		10	109	-		4			✓
352	Ilex verticillata	16-6	(E) R			4	55.2		4	51	-		3			✓
355	Quercus nigra	16-9	(E) R			5	50.0		11	145	2		4			✓
356	Quercus nigra	16-10	(E) R			5	47.9		9	142	3		4			✓
357	Platanus occidentalis	16-11	(E) R			7	66.4		17	170	6		4			✓
358	Betula nigra	16-12	(E) R			2	28.7		4	41	-		1			✓
359	Cornus amomum	16-13	(E) R			4	51.5		7	56	-		4			✓
360	Betula nigra	16-14	(E) R			6	88.4		12	163	4		4			✓
361	Betula nigra	16-15	(E) R			2	27.7		4	71	-	✓	4			✓
362	Cornus amomum	16-16	(E) R			6	50.3		9	101	-		4			✓
363	Fraxinus pennsylvanica	16-17	(E) R			6	43.0		9	90	-		3			✓
364	Platanus occidentalis	16-18	(E) R			10	83.5		22	143	5		4			✓
365	Viburnum dentatum	16-19	(E) R			7	70.4		11	106	-		4			✓
366	Platanus occidentalis	16-20	(E) R			10	91.1		18	165	7		4			✓
367	Cornus amomum	16-21	(E) R			5	60.4		7	107	-		4			✓

*SOURCE: T=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, UNKNOW, specify other.

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

Plot 92532-01-0017

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*	X 0.1m	Y 0.1m	Feb 2009 Data			THIS YEAR'S DATA					
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*
368	Platanus occidentalis	17-1	(E)	R		6	66.8	7	79			3		✓
369	Ilex verticillata	17-2	(E)	R		4	52.1	5	45			3		✓
370	Betula nigra	17-3	(E)	R		3	55.5	3	60			1		✓
371	Cornus amomum	17-4	(E)	R		6	61.3	6	77			3		✓
372	Platanus occidentalis	17-5	(E)	R		10	63.7	7	67			3		✓
373	Quercus nigra	17-6	(E)	R		4	39.3	4	43			3		✓
374	Platanus occidentalis	17-7	(E)	R		4	44.5	5	58			3		✓
375	Quercus nigra	17-8	(E)	R		5	59.7	6	61			4		✓
376	Carpinus caroliniana	17-9	(E)	R		3	33.8	3	27			3		✓
377	Carpinus caroliniana	17-10	(E)	R		4	38.1	5	45			3		✓
378	Platanus occidentalis	17-11	(E)	R		5	52.4	5	53			2		✓
379	Platanus occidentalis	17-12	(E)	R		8	63.4	10	68			2		✓
380	Platanus occidentalis	17-13	(E)	R		10	81.4	10	97			4		✓
381	Carpinus caroliniana	17-14	(E)	R		5	46.3	7	62			3		✓
382	Platanus occidentalis	17-15	(E)	R		6	62.8	6	68			3		✓
383	Platanus occidentalis	17-16	(E)	R		5	56.7	6	59			2		✓
384	Quercus nigra	17-17	(E)	R		4	55.5	7	70			4		✓
385	Betula nigra	17-18	(E)	R		7	57.9	6	58			1		✓
386	Calycanthus floridus	17-19	(E)	R		5	23.5	9	56			3		✓
387	Platanus occidentalis	17-20	(E)	R		4	35.4	3	37			2		✓
388	Quercus rubra	17-21	(E)	R		3	33.2	5	40			3		✓
389	Platanus occidentalis	17-22	(E)	R		4	50.0	4	60			3		✓

*SOURCE: T=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, UNKNOW, specify other.

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

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: (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*	Feb 2009 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
390	Quercus phellos	18-1	(B) R			3	47.2		3	28	-				✓
391	Lindera benzoin	18-2	(B) R			3	4.6		-	-	-				Dead ✓
392	Quercus nigra	18-3	(B) R			4	64.0		4	56	-		3		✓
393	Betula nigra	18-4	(B) R			7	70.1		8	81	-		4		✓
394	Cornus amomum	18-5	(B) R			4	52.4		6	100	-		3		✓
395	Cornus amomum	18-6	(B) R			5	51.2		5	54	-		3		✓
396	Lindera benzoin	18-7	(B) R			3	50.9		-	-	-		-		Dead ✓
397	Cornus amomum	18-8	(B) R			5	57.6		6	77	-		4		✓
398	Betula nigra	18-9	(B) R			3	53.6		-	-	-		-		Dead ✓
399	Quercus phellos	18-10	(B) R			4	45.7		4	46	-		3		✓
400	Quercus phellos	18-11	(B) R			4	59.4		5	54	-		4		✓
401	Carpinus caroliniana	18-12	(B) R			2	18.6		-	-	-		-		Dead ✓
402	Quercus phellos	18-13	(B) R			3	18.6		4	32	-		4		✓
403	Betula nigra	18-14	(B) R			3	54.6		3	13	-		1		slower stem ✓
404	Betula nigra	18-15	(B) R			6	56.7		7	86	-		4		✓
405	Quercus phellos	18-16	(B) R			3	44.5		5	46	-		4		✓
406	Platanus occidentalis	18-17	(B) R			5	42.7		7	67	-		4		✓
408	Platanus occidentalis	18-19	(B) R			6	66.8		8	103	-		1		✓
409	Betula nigra	18-20	(B) R			6	64.0		-	-	-		-		Dead ✓

*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 92532-01-0019

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: Party:
 (dec. deg. or m) UTM Zone: Role:
 Longitude or UTM-E: X-Axis bearing (deg): Notes on plot:

Coordinate Accuracy (m): 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*	Feb 2009 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
410	Platanus occidentalis	19-1	(E) R			10	100.0		22	217	10		4		✓
411	Betula nigra	19-2	(E) R			2	51.8								Dead ✓
412	Betula nigra	19-3	(E) R			7	83.5		17	209	9		4		✓
414	Platanus occidentalis	19-5	(E) R			7	59.7		14	137	7				✓
415	Cornus amomum	19-6	(E) R			5	43.6		6	106	-		4		✓
416	Carpinus caroliniana	19-7	(E) R			3	55.2		8	149	1		4		✓
417	Fraxinus pennsylvanica	19-8	(E) R			4	37.8		6	97	-		4		✓
418	Platanus occidentalis	19-9	(E) R			13	168.3	DBH!!	29	300	13		4		✓
419	Betula nigra	19-10	(E) R			11	114.3	DBH?	26	205	6		4		✓
420	Ilex verticillata	19-11	(E) R			5	52.1		-	-	-		-		Dead ✓
421	Platanus occidentalis	19-12	(E) R			7	85.0		20	213	11		4		✓
422	Carpinus caroliniana	19-13	(E) R			2	15.5		5	51	-		4		✓
423	Fraxinus pennsylvanica	19-14	(E) R			10	85.3		12	140	5		4		✓
424	Platanus occidentalis	19-15	(E) R			11	117.3	DBH?	22	175	10		4		✓
425	Platanus occidentalis	19-16	(E) R			3	16.2		2	91	-		4		BN- ✓
427	Carpinus caroliniana	19-18	(E) R			3	25.6		5	79	-		4		✓
428	Platanus occidentalis	19-19	(E) R			8	96.0		19	179	5		4		✓
429	Betula nigra	19-20	(E) R			7	64.9		12	163	3		4		✓
430	Quercus phellos	19-21	(E) R			5	40.8		12	111	3		4		✓

*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. Printed in the CYS-EEP Entry Tool ver. 2.2

Plot 92532-01-0020

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	Feb 2009 Data			THIS YEAR'S DATA					
						ddh 1mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*
431	Platanus occidentalis	20-1	(P)	R		4	51.5	6	69	-		3		✓
432	Quercus phellos	20-2	(P)	R		3	36.6	4	80	-		4		✓
433	Quercus phellos	20-3	(P)	R		5	51.2	8	104	-		4		✓
434	Quercus phellos	20-4	(P)	R		4	41.8	8	67	-		4		✓
436	Carpinus caroliniana	20-6	(P)	R		3	22.6	6	87	-		4		✓
437	Betula nigra	20-7	(P)	R		5	46.3	8	89	-		4		✓
438	Quercus phellos	20-8	(P)	R		5	49.4	8	62	-		4		✓
439	Betula nigra	20-9	(P)	R		6	57.0	7	70	-		4		✓
440	Betula nigra	20-10	(P)	R		5	57.3	13	150	3		4		✓
441	Carpinus caroliniana	20-11	(P)	R		2	31.1	5	91	-		3		✓
442	Platanus occidentalis	20-12	(P)	R		4	52.7	8	71	-		4		✓
443	Quercus phellos	20-13	(P)	R		9	75.0	17	209	10		4		✓
444	Viburnum dentatum	20-14	(P)	R		2	21.6	-	-	-		-	-	Dead ✓
445	Quercus phellos	20-15	(P)	R		0	1.5 (broken stem)	-	-	-		-	-	Dead ✓
446	Lindera benzoin	20-16	(P)	R		2	35.1	-	-	-		-	-	Dead ✓
447	Quercus phellos	20-17	(P)	R		6	82.3	10	108	-		4		✓

*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, -=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 92532-01-0021

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	Feb 2009 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 21-1	(E)	R			5	39.9		5	39	-		3		✓
449	Viburnum dentatum 21-2	(E)	R			5	24.4		6	102	-		4		✓
450	Quercus nigra 21-3	(E)	R			4	50.3		7	52	-		4		✓
451	Quercus nigra 21-4	(E)	R			4	35.1		4	35	-		4		✓
452	Fraxinus pennsylvanica 21-5	(E)	R			14	118.6	DBH?	30	238	10		4		✓
453	Cornus amomum 21-6	(E)	R			6	76.5		10	119	-		4		✓
454	Quercus nigra 21-7	(E)	R			5	40.2				-				Ready ✓
455	Quercus phellos 21-8	(E)	R			6	50.3		10	90	-		4		✓
456	Cornus amomum 21-9	(E)	R			5	50.0		4	47	-		3		✓
457	Ilex verticillata 21-10	(E)	R			6	58.8		8	72	-		4		✓
458	Quercus phellos 21-11	(E)	R			7	60.4		11	131	-		4		✓
459	Viburnum dentatum 21-12	(E)	R			4	25.6		5	76	-		4		✓
460	Platanus occidentalis 21-13	(E)	R			5	68.3				-				Dead ✓
461	Fraxinus pennsylvanica 21-14	(E)	R			7	65.8		19	235	2		4		✓
462	Lindera benzoin 21-15	(E)	R			5	82.0		3	78	-		2		strong ✓
463	Ilex verticillata 21-16	(E)	R			4	50.9		5	57	-		4		✓
464	Viburnum dentatum 21-17	(E)	R			4	38.1		6	106	-		4		✓
465	Viburnum dentatum 21-18	(E)	R			4	39.6		8	124	-		4		✓
466	Cornus amomum 21-19	(E)	R			7	81.4		11	103	3		4		✓
467	Fraxinus pennsylvanica 21-20	(E)	R			11	92.0		21	213	6		4		✓
468	Cornus amomum 21-21	(E)	R			6	57.9		12	181	5		4		✓

** Need to Flag **

*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/Unknow
 ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISSeas
 Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

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	Feb 2009 Data			THIS YEAR'S DATA					
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*
470	Betula nigra 22-1	(E)	R			4	61.0	7	71	-		3		✓
472	Betula nigra 22-3	(E)	R			4	54.3	3	45	-		2		New growth ✓
473	Platanus occidentalis 22-4	(E)	R			8	70.1	12	116	-		3		✓
474	Ilex verticillata 22-5	(E)	R			6	74.4	6	77	-		3		✓
476	Ilex verticillata 22-7	(E)	R			6	67.4	6	106	-		3		✓
477	Quercus phellos 22-8	(E)	R			6	61.3	7	76	-		4		✓
478	Lindera benzoin 22-9	(E)	R			6	61.0	5	59	-		1		✓
479	Viburnum dentatum 22-10	(E)	R			4	26.2	5	27	-		1		✓
480	Quercus michauxii 22-11	(E)	R			6	63.7	-	-	-		-		Dead ✓
481	Ilex verticillata 22-12	(E)	R			4	52.7	4	49	-		4		✓
482	Fraxinus pennsylvanica 22-13	(E)	R			6	29.0	10	103	-		3		✓
483	Cornus amomum 22-14	(E)	R			5	61.0	7	82	-		4		✓
484	Betula nigra 22-15	(E)	R			4	59.4	6	91	-		3		✓
485	Ilex verticillata 22-16	(E)	R			5	52.7	5	52	-		3		✓
486	Quercus michauxii 22-17	(E)	R			6	65.8	11	127	-		4		✓
487	Quercus phellos 22-18	(E)	R			4	25.9	4	43	-		3		✓
488	Cornus amomum 22-19	(E)	R			6	65.8	9	73	-		4		✓
489	Viburnum dentatum 22-20	(E)	R			3	25.0	5	47	-		4		✓

** Need To Flag **

*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

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

*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 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:

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	Feb 2009 Data			THIS YEAR'S DATA					
						dbh 1 mm	Height 1cm*	DBH 1 cm	dbh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*
491	Lindera benzoin	23-1	E!	R		4	62.2	4	67	-		4		✓
492	Ilex verticillata	23-2	E!	R		3	44.5	6	40	-		3		CA ✓
493	Lindera benzoin	23-3	E!	R		4	57.9	7	77	-		4		✓
494	Betula nigra	23-4	E!	R		7	42.7	7	93	-		4		✓
495	Betula nigra	23-5	E!	R		7	33.5	6	104	-		4		✓
496	Betula nigra	23-6	E!	R		6	55.8	13	157	4		4		✓
497	Viburnum dentatum	23-7	E!	R		5	59.7	10	143	4		4		✓
498	Quercus michauxii	23-8	E!	R		6	35.1	9	94	-		4		✓
499	Viburnum dentatum	23-9	E!	R		5	61.0	10	121	-		4		✓
500	Quercus phellos	23-10	E!	R		6	54.3	11	137	3		4		✓
502	Betula nigra	23-11	E!	R	23-12	10	97.5	17	242	9		4		✓
503	Quercus nigra	23-12	E!	R	23-13	8	101.2	12	200	15		4		✓
504	Quercus michauxii	23-13	E!	R	23-14	6	75.0	14	173	4		4		✓
505	Carpinus caroliniana	23-14	E!	R	23-15	4	53.0	11	193	-		4		✓
506	Quercus michauxii	23-15	E!	R	23-16	4	46.6	7	53	-		4		✓
507	Betula nigra	23-16	E!	R	23-17	11	139.6	25	273	14		4		✓
508	Cornus amomum	23-17	E!	R	23-18	11	126.2	16	220	8		4		✓
509	Fraxinus pennsylvanica	23-18	E!	R	23-19	13	100.3	20	207	11		4		✓
510	Quercus phellos	23-19	E!	R	23-20	4	58.2	-	-	-		-		Dead ✓
511	Quercus nigra	23-20	E!	R	23-21	5	53.0	-	-	-		-		Dead ✓
514	Lindera benzoin	23-21	E!	R	23-24	3	36.9	3	22	-		2		Broken stem ✓

* Need to Flag Plot *

*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.

Table C.1. Vegetation Metadata

Big Cedar Creek Restoration Site: Project No. D06054-D	
Report Prepared By	Kristi Suggs
Date Prepared	8/30/2010 11:51
database name	cvs-eep-entrytool-v2.2.7.mdb
database location	C:\kristi
computer name	CHABWKSUGGS
file size	47603712
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
PROJECT SUMMARY-----	
Project Code	92532
project Name	Big Cedar Creek
Description	Restoration Project
River Basin	Yadkin-Pee Dee
length(ft)	11661
stream-to-edge width (ft)	70
area (sq m)	151652.58
Required Plots (calculated)	23
Sampled Plots	23

Table C.2. Vegetation Vigor by Species

Big Cedar Creek Restoration Site: Project No. D06054-D									
	Species	CommonName	4	3	2	1	0	Missing	Unknown
	Betula nigra	river birch	38	13	5	7	9		2
	Cornus amomum	silky dogwood	44	20	4	1	2		
	Corylus americana	American hazelnut	6	1					
	Fraxinus pennsylvanica	green ash	21	3	1				
	Ilex verticillata	common winterberry	5	8			4		
	Quercus michauxii	swamp chestnut oak	8	2	1	4	2		
	Quercus nigra	water oak	6	2	2	1	2		
	Quercus phellos	willow oak	27	5	3		4		
	Symphoricarpos orbiculatus	coralberry	2	1		1			
	Viburnum dilatatum	linden arrowwood	1					1	
	Viburnum dentatum	southern arrowwood	17	7	3	1	2		
	Carpinus caroliniana	American hornbeam	10	10	8		4	1	2
	Calycanthus floridus	eastern sweetshrub		2		1			
	Quercus rubra	northern red oak		3	2				
	Lindera benzoin	northern spicebush	2	3	7	5	10	1	
	Platanus occidentalis	American sycamore	72	20	5	1	3		1
	Acer rubrum	red maple	1						
TOT:	17	17	260	100	41	22	42	3	5

Table C.3. Vegetation Damage by Species

Big Cedar Creek Restoration Site: Project No. D06054-D						
<i>Species</i>	<i>CommonName</i>	<i>Count of Damage Categories</i>				
		<i>No damage</i>	<i>(Other damage)</i>	<i>Unknown</i>		
Acer rubrum	red maple	0	1			
Betula nigra	river birch	11	63	2	9	
Calycanthus floridus	eastern sweetshrub	0	3			
Carpinus caroliniana	American hornbeam	2	33		2	
Cornus amomum	silky dogwood	3	68	1	2	
Corylus americana	American hazelnut	0	7			
Fraxinus pennsylvanica	green ash	0	25			
Ilex verticillata	common winterberry	4	13		4	
Lindera benzoin	northern spicebush	10	18	1	9	
Platanus occidentalis	American sycamore	3	99		3	
Quercus michauxii	swamp chestnut oak	4	13	2	2	
Quercus nigra	water oak	2	11		2	
Quercus phellos	willow oak	5	34	2	3	
Quercus rubra	northern red oak	0	5			
Symphoricarpos orbiculatus	coralberry	0	4			
Viburnum dentatum	southern arrowwood	2	28		2	
Viburnum dilatatum	linden arrowwood	0	2			
TOT:	17	17	46	427	8	38

Table C.4. Vegetation Damage by Plot

Big Cedar Creek Restoration Site: Project No. D06054-D					
<i>Plot</i>	<i>Count of Damage Categories</i>	<i>No damage</i>	<i>(Other damage)</i>	<i>Unknown</i>	
92532-01-0001-year:2	0	24			
92532-01-0002-year:2	0	24			
92532-01-0003-year:2	0	23			
92532-01-0004-year:2	0	17			
92532-01-0005-year:2	3	16	3		
92532-01-0006-year:2	1	20		1	
92532-01-0007-year:2	5	18	3	2	
92532-01-0008-year:2	3	19		3	
92532-01-0009-year:2	1	26		1	
92532-01-0010-year:2	2	22		2	
92532-01-0011-year:2	2	18		2	
92532-01-0012-year:2	1	20		1	
92532-01-0013-year:2	1	19		1	
92532-01-0014-year:2	2	16		2	
92532-01-0015-year:2	8	7		8	
92532-01-0016-year:2	1	18		1	
92532-01-0017-year:2	0	22			
92532-01-0018-year:2	5	14		5	
92532-01-0019-year:2	2	17		2	
92532-01-0020-year:2	3	13	1	2	
92532-01-0021-year:2	2	19		2	
92532-01-0022-year:2	1	17		1	
92532-01-0023-year:2	3	18	1	2	
TOT:	23	46	427	8	38

Table C.6. Vegetative Problem Areas

Big Cedar Creek Restoration Site: Project No. D06054-D			
BCC			
Feature/Issue	Station # / Range	Probable Cause	Photo #
Bare Bank	23+25 - 23+45, Right Bank	Lack of vegetation and damaged matting.	VPA 1; VPA 2; VPA 3; VPA 4
	24+20 - 24+40, Left Bank		
	24+90 - 25+50, Left Bank	Channel is degrading and bank lacks of matting and vegetation in areas.	
	25+80 - 26+00, Left Bank	Lack of vegetation.	
	26+80 - 27+00, Left Bank		
	29+00, Left Bank	Lack of vegetation and damaged matting.	
	29+10 - 29+60, Right Bank		
	32+40, Left Bank	Matting torn away.	
	34+40 - 34+80, Right Bank	Lack of vegetation and damaged matting.	
	38+10 - 38+40, Left Bank	Lack of vegetation.	
	40+20 - 40+60, Left Bank	Lacks vegetation and damaged matting.	
	41+50 - 41+70, Right Bank		
	42+60 - 43+20, Left Bank		
	48+50, Right Bank		
	51+20 - 51+60, Left Bank		
	55+30 - 55+70, Right Bank		
57+00 - 57+60, Left Bank	Bare bank due to overland flow during storm event.		
57+90, Left Bank			
58+35 - 58+55, Right Bank	Lack of vegetation and damaged matting.		
Bare Bench			-
Bare Floodplain			-
Invasive/Exotic Populations	30+40, Left Floodplain	<i>Ligustrum sinense</i> persisting after construction.	VPA 5
	38+50 - 38+75, Right Bank		
	63+00 - 67+00, Right Floodplain		
	69+20 - 72+00, Right Floodplain		
	73+00 - 75+00, Right Floodplain		

Table C.6. Vegetative Problem Areas

Big Cedar Creek Restoration Site: Project No. D06054-D			
UT1			
Feature/Issue	Station # / Range	Probable Cause	Photo #
Bare Bank	26+80 - 26+90; Right Bank	Lack of vegetation able to establish due to overbank storm flows from floodplain area	VPA 6; VPA 7
	31+90 - 32+30; Left Bank	Bare bank due to poor; rocky soils	
	33+60 - 34+15; Left Bank	Lack of vegetation able to establish due to storm flows and poor rocky soils	
	34+25 - 34+80; Right Bank	Loss of matting & lack of vegetative growth	
	36+40 - 36+80; Right Bank		
	38+25 - 38+95; Right Bank		
	39+60 - 39+90; Left Bank		
	40+20 - 40+25; Right Bank		
	40+80 - 41+10; Left Bank		
	43+90 - 44+10; Left Bank	Bare bank due to poor; rocky soils	
	45+75 - 45+90; Left Bank	Loss of matting & lack of vegetative growth	
	48+50 - 48+80; Right Bank	Bare bank due to poor; rocky soils	
	50+40 - 50+60; Left Bank		
	50+60 - 51+30; Right Bank	Loss of matting & lack of vegetative growth	
	53+80 - 54+05; Right Bank	Bare bank due to poor; rocky soils	
	54+60 - 54+75; Left Bank		
54+75 - 55+45; Right Bank	Loss of matting & lack of vegetative growth		
55+50 - 58+50; Right & Left Bank	Loss of matting & lack of vegetative growth due to overbank storm flows from floodplain area		
58+70 - 59+25; Right Bank			
Bare Bench			-
Bare Floodplain	10+90; Right Floodplain	Existing wash area from off-site concentrated flow; however, vegetation is better established and problem area is improving	VP8; VP9; VP10
	11+20 - 11+25; Right Floodplain	Existing bare area behind top of bank due to poor, rocky soils unable to establish vegetation	
	12+30 - 12+75; Left Floodplain		
	15+30 - 16+10; Left floodplain	Existing wash out due to storm event that is stabilizing with vegetative growth	
	20+80; Right Floodplain	Existing bare area because stormwater flows from Mt. Zion Rd. and poor rocky soils have led to the inability of vegetation to establish	
	26+25 - 27+30; Right Floodplain	Bare and erosion in floodplain due to the inability of vegetation to establish due to poor, rocky soils and high storm water flows	
	27+50 - 28+80; Right Floodplain		
	28+30 - 28+80; Left Floodplain	Bare and erosion in floodplain due to the inability of vegetation to establish due to poor, rocky soils	
	29+25 - 29+95; Left Floodplain	Bare and erosion in floodplain due to the inability of vegetation to establish due to poor, rocky soils and high storm water flows	
	29+50 - 29+95; Right Floodplain		
	30+90 - 33+75; Right Floodplain		
	40+15 - 40+30; Right Floodplain	Existing bare area because stormwater flows from Mt. Zion Rd. and poor rocky soils have led to the inability of vegetation to establish	
	43+10 - 43+70; Left Floodplain	Bare and erosion in floodplain due to the inability of vegetation to establish due to poor, rocky soils	
	43+90 - 44+10; Right Floodplain		
44+20 - 44+60; Right Floodplain			
Invasive/Exotic Populations	29+20; Left Floodplain	<i>Ligustrum sinense</i> remaining from pre-construction conditions	VP5
	31+90; Left Floodplain		
	39+30; Left Floodplain		
	59+40 - 60+20; Left Floodplain		
	61+60 - 61+85; Right Bank		
	62+50 - 63+00; Right Floodplain		
63+60 - 63+75; Right Bank			

Table C.6. Vegetative Problem Areas

Big Cedar Creek Restoration Site: Project No. D06054-D			
UT2			
Feature/Issue	Station # / Range	Probable Cause	Photo #
Bare Bank	10+25 - 10+60; Left Bank	Bare bank due to poor; rocky soils and loss of matting	VP11; VP12
	10+85 - 11+25; Left Bank		
	12+30 - 12+50; Left Bank		
	13+40 - 13+50; Right Bank		
	13+75 - 14+25; Left Bank		
Bare Bench			-
Bare Floodplain			-
Invasive/Exotic Populations	Above 10+00 but within easement	<i>Ligustrum sinense</i> remaining from pre-construction conditions	VP5
	11+35; Left Bank		
	11 + 80 - 12+25; Left Bank	<i>Ligustrum sinense</i> and <i>Rosa multiflora</i> remaining from pre-construction conditions	
12+00 - 12+25; Right Bank			

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	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 rubrum</i>							1																	1	1		
<i>Betula nigra</i>	3	5	4	4	4		3		5	2		1	4	5	1	4	2	3	4	3		3	5	64	65		
<i>Calycanthus floridus</i>								1				1				1								3	3		
<i>Carpinus caroliniana</i>	3	3		1			1		2				7	3		1	3		3	2			1	32	30		
<i>Cornus amomum</i>	3	4	1	1	6	5	4	4	1	3	7	3	6	3	1	4	1	3	1		4	2	2	69	69		
<i>Corylus americana</i>								4			2	1												7	7		
<i>Fraxinus pennsylvanica</i>		1	1			4	1	2	1	4	1	2				1			2		3	1	1	25	25		
<i>Ilex verticillata</i>				1							2	1		1		1	1				2	4		20	13		
<i>Lindera benzoin</i>	2	2	3					2		2											2	1	3	27	17		
<i>Platanus occidentalis</i>	7	6	9	7	2	4	5	4	6	9	5	7		2	1	4	10	2	6	2		1		108	99		
<i>Quercus michauxii</i>				1		3	4		2	1												1	3	17	15		
<i>Quercus nigra</i>							1								1	2	3	1			2		1	13	11		
<i>Quercus phellos</i>			2	2	5	1	1		4						3			5	1	6	2	2	1	40	35		
<i>Quercus rubra</i>		1	1		1	1											1							5	5		
<i>Symphoricarpos obiculatus</i>									1	1	1	1												4	4		
<i>Viburnum dentatum</i>	2	2	2		1	2		2	1			3	2	2		1						4	2	2	32	28	
<i>Viburnum dilatatum</i>									1																	1	
Stems/plot	20	24	23	17	19	20	21	19	24	22	18	20	19	16	7	18	22	14	17	13	19	17	19	467	428		
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	N/A	N/A	753	
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	N/A	N/A	892	

* As-built stems/acre were calculated by multiplying the number of live stems by a factor of 40. Year 2 stems/acre were calculated using a factor of 40.5. Therefore Plots 2 and 17 have higher Year 2 counts.

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



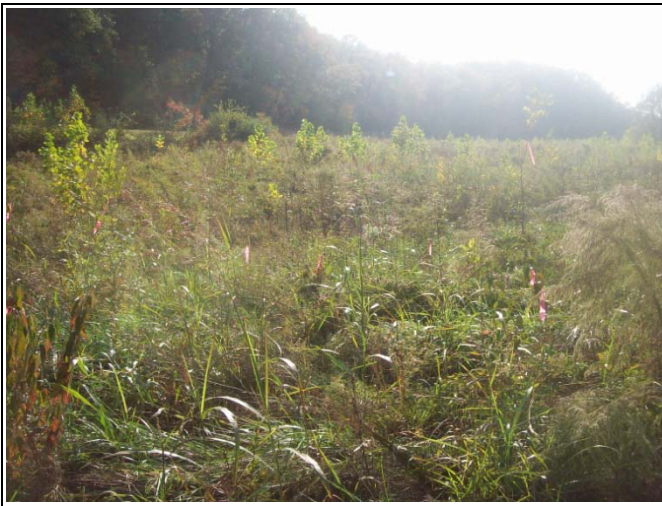
Veg Plot 18



Veg Plot 19



Veg Plot 20



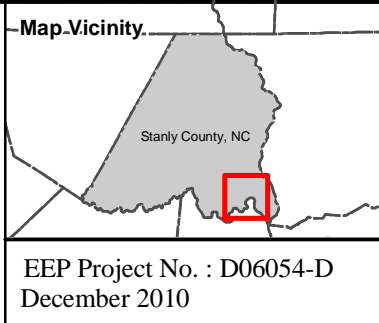
Veg Plot 21



Veg Plot 22



Veg Plot 23



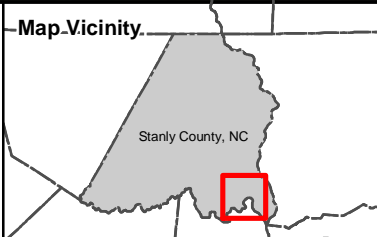
LEGEND

- Conservation Easement
- ▨ Bare Bank
- ▨ Bare Floodplain
- ▨ Invasives
- ▶ Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

Figure C1: Vegetation Problem Areas
BCC (Station 10+00 to 17+00)
UT2 (Station 10+00 to End)
 Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 2
 Stanly County, NC

○

0 50 100 200 Feet



EEP Project No. : D06054-D
December 2010

LEGEND

- Conservation Easement
- Bare Bank
- Bare Floodplain
- Invasives
- Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

**Figure C2: Vegetation Problem Areas
BCC (Station 17+00 to 30+00)**

○ Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC





Map Vicinity

Stanly County, NC

EEP Project No. : D06054-D
December 2010

LEGEND

- Conservation Easement
- Bare Bank
- Bare Floodplain
- Invasives
- Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

**Figure C3: Vegetation Problem Areas
BCC (Station 30+00 to 42+00)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC

0 50 100 200 Feet



Map Vicinity

Stanly County, NC

EEP Project No. : D06054-D
December 2010

LEGEND

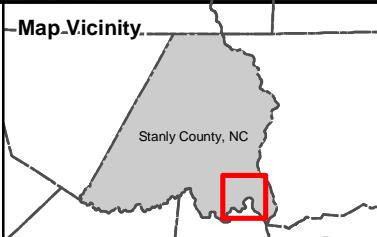
- Conservation Easement
- ▨ Bare Bank
- ▨ Bare Floodplain
- ▨ Invasives
- ➔ Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

**Figure C4: Vegetation Problem Areas
BCC (Station 42+00 - 54+00)**

○ Big Cedar Creek Stream Restoration Project

Annual Monitoring Plan - Year 2
Stanly County, NC

0 50 100 200 Feet



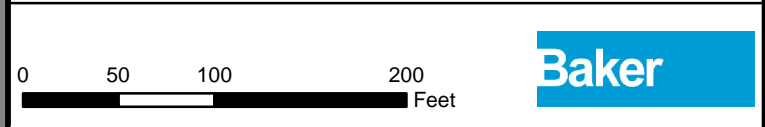
EEP Project No. : D06054-D
December 2010

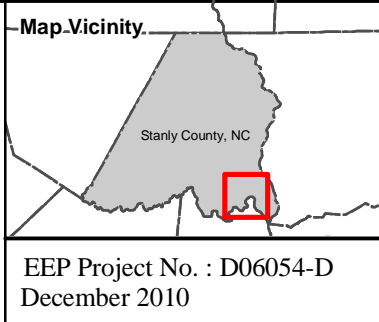
LEGEND

- Conservation Easement
- ▨ Bare Bank
- ▨ Bare Floodplain
- ▨ Invasives
- ▶ Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

**Figure C5: Vegetation Problem Areas
BCC (Station 54+00 to 67+00)**

○ Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC





LEGEND

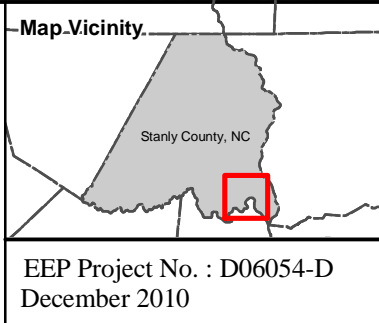
- Conservation Easement
- ▨ Bare Bank
- ▨ Bare Floodplain
- ⊗ Invasives
- ▶ Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

**Figure C6: Vegetation Problem Areas
UT1 (Station 10+00 to 24+00)**

Big Cedar Creek Stream Restoration Project

Annual Monitoring Plan - Year 2

Stanly County, NC



LEGEND

- Conservation Easement
- ▨ Bare Bank
- ▨ Bare Floodplain
- ▨ Invasives
- Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

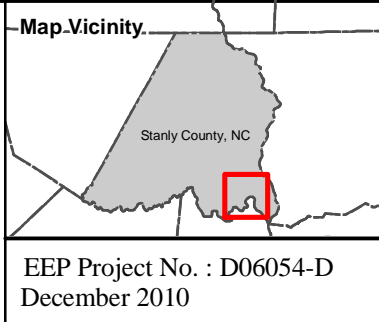
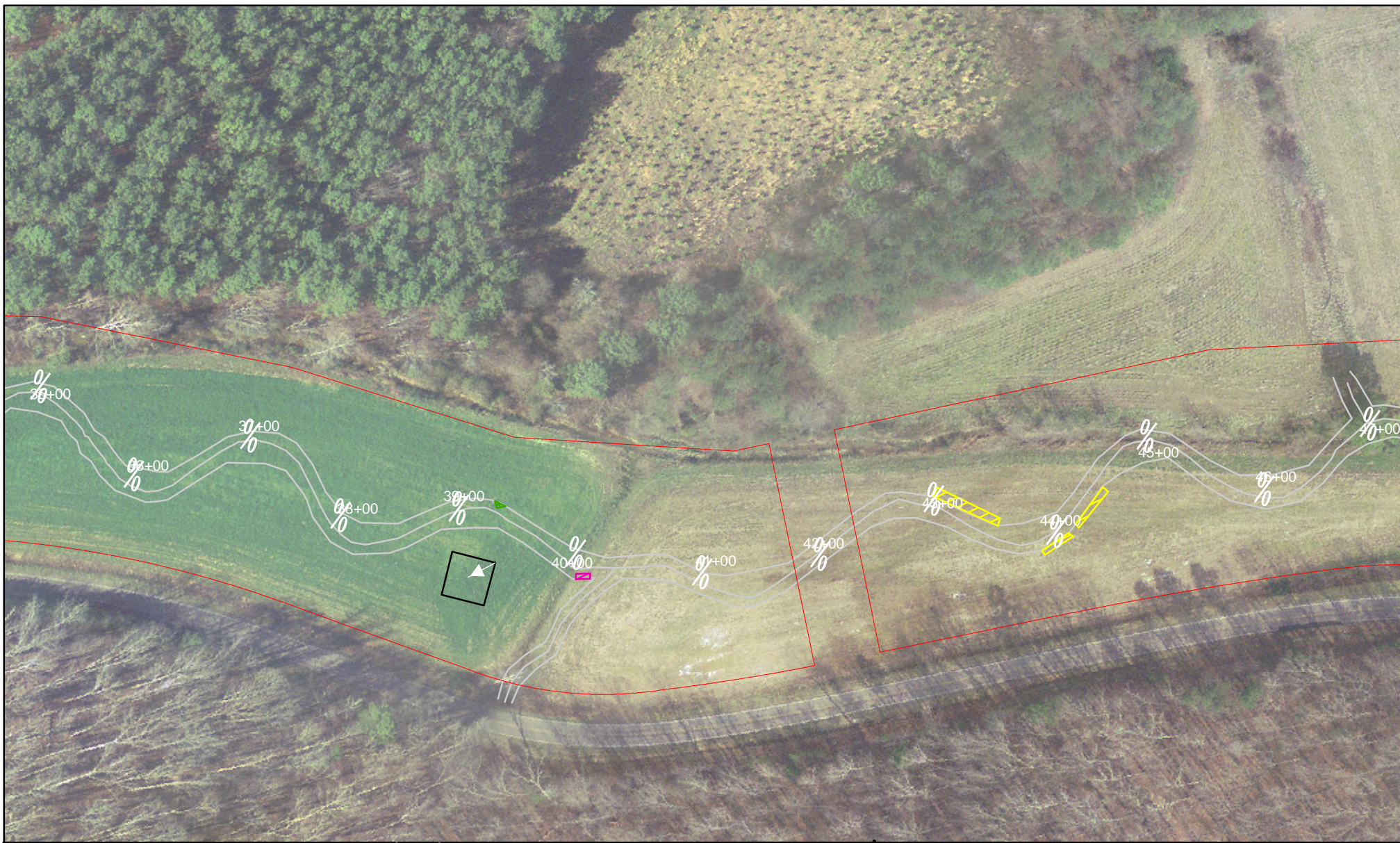
**Figure C7: Vegetation Problem Areas
UT1 (Station 24+00 to 35+00)**

Big Cedar Creek Stream Restoration Project

Annual Monitoring Plan - Year 2

Stanly County, NC

0 50 100 200 Feet

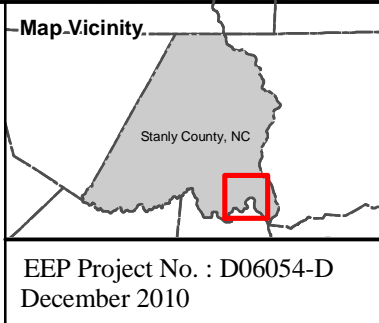


LEGEND

- Conservation Easement
- Bare Bank
- Bare Floodplain
- Invasives
- Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

Figure C8: Vegetation Problem Areas
UT1 (Station 35+00 to 47+00)
 Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 2
 Stanly County, NC

0 50 100 200 Feet



LEGEND

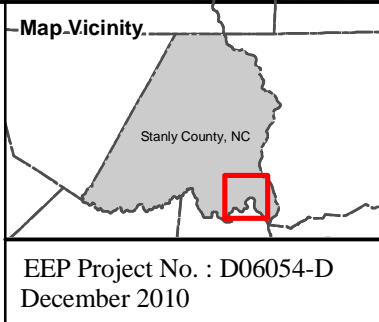
- Conservation Easement
- ▭ Bare Bank
- ▭ Bare Floodplain
- ⊗ Invasives
- ▶ Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

**Figure C9: Vegetation Problem Areas
UT1 (Station 47+00 - 58+00)**

Big Cedar Creek Stream Restoration Project

Annual Monitoring Plan - Year 2

Stanly County, NC



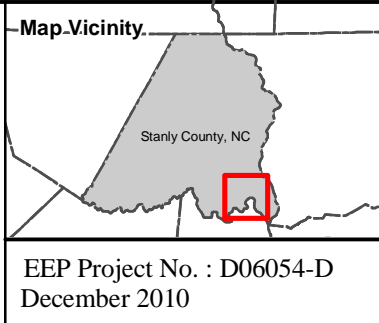
LEGEND

- Conservation Easement
- Bare Bank
- Bare Floodplain
- Invasives
- Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

Figure C10: Vegetation Problem Areas
UT1 (Station 58+00 to End)
BCC (Station 67+00 to 73+00)
 Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 2
 Stanly County, NC

○

0 50 100 200
 Feet



LEGEND

- Conservation Easement
- ▨ Bare Bank
- ▨ Bare Floodplain
- ⊠ Invasives
- Veg Plot Photos
- Veg Plots
- Asbuilt Alignment

**Figure C11: Vegetation Problem Areas
BCC (Station 73+00 to End)**

○ Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 2
Stanly County, NC

0 50 100 200
Feet

Representative Vegetation Problem Area Photos



VPA 1 – Bare bank with damaged matting



VPA 2 – Bare bank with loss of matting



VPA 3 – Bare bank with matting



VPA 4 – Bare bank from overland flow



VPA 5 – Invasive species on bank



VPA 6 – UT1 Bare bank with rocky soils



VPA 7 – UT1 Bare Bank loss of matting



VPA 8 – UT1 Existing & stabilizing wash area



VPA 9 – UT1 Bare Floodplain from rocky soils



VPA 10 – UT1 Bare Floodplain from stormwater flows

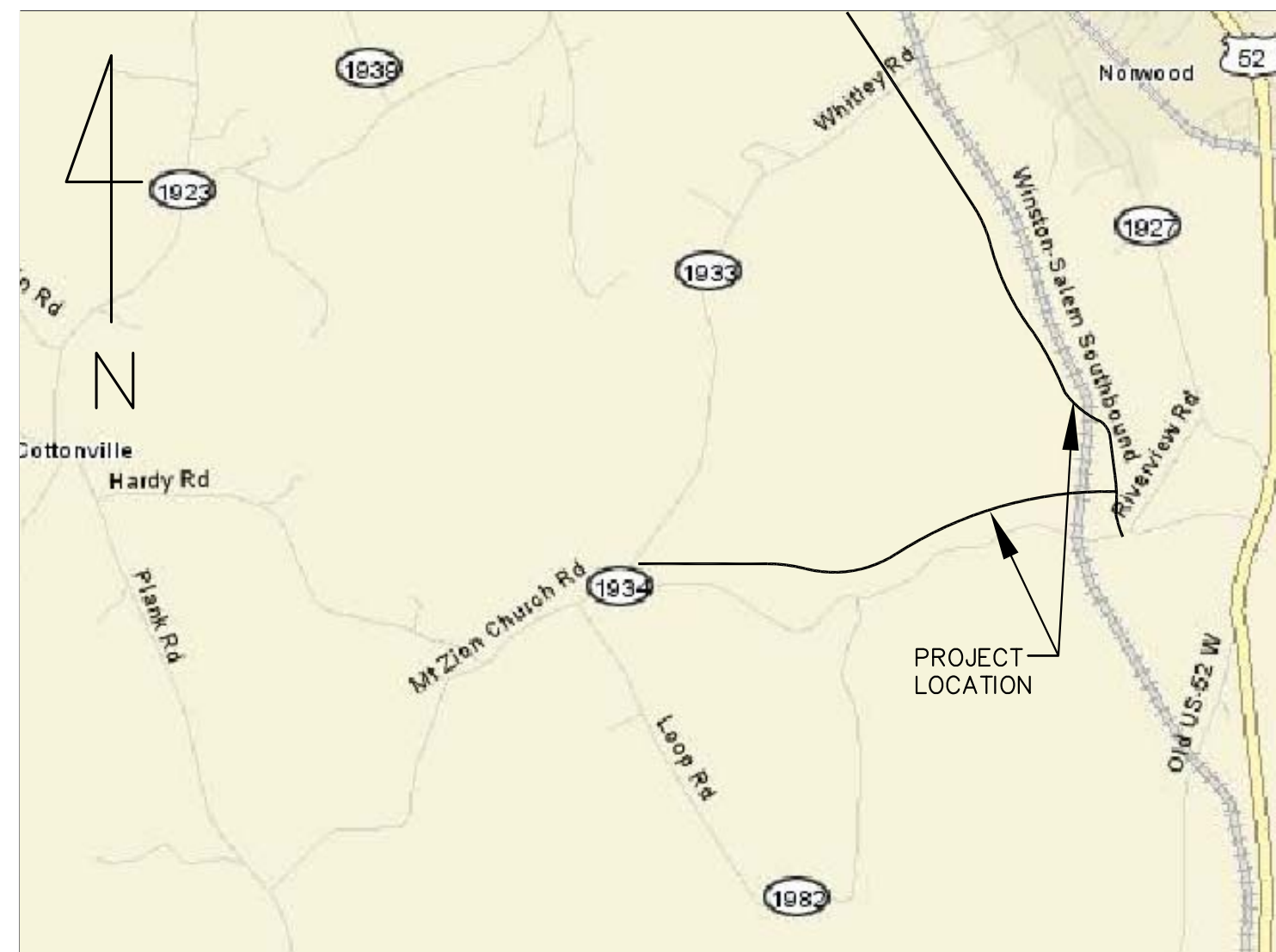


VPA 11 – UT2 Bare Bank with loss of matting



VPA 12 – UT2 Lack of bank vegetation due to poor rocky soils

Appendix D
As-Built Plan Sheets



VICINITY MAP - NTS



BIG CEDAR CREEK STREAM RESTORATION AS-BUILT PLANS

PROJECT REFERENCE NO. 109261	SHEET NO. T1
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08



EEP PROJECT # D06054-D
EEP REVIEW COORDINATOR-TIM BAUMGARTNER

MICHAEL BAKER ENGINEERING CONTACT-CHRISTINE MILLER
PH# 704-334-4454

INDEX OF SHEETS

TITLE SHEET	T1
REFERENCE SHEET	R1
BIG CEDAR CREEK/UT2 AS-BUILT PLANS	P1-P8
UT1 SITE AS-BUILT PLANS	P8-P15

STA. 10+00 BIG CEDAR CREEK
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LONG -80.12770448

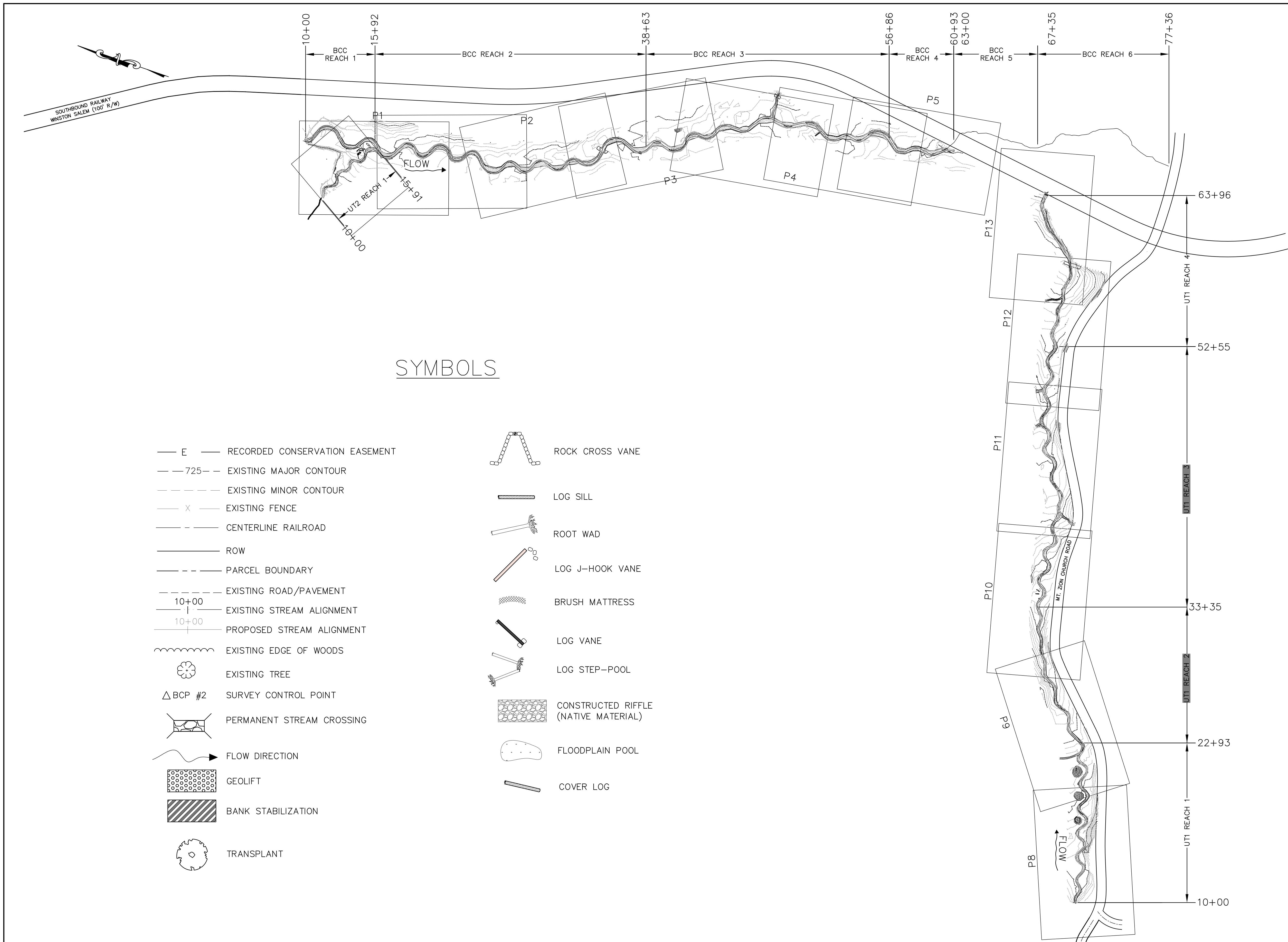
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AS-BUILT STREAM LENGTH = 6736 LF

UT1
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AS-BUILT STREAM LENGTH = 5396 LF

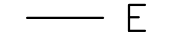
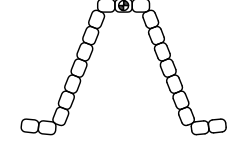
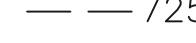


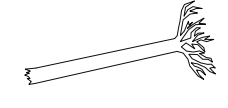

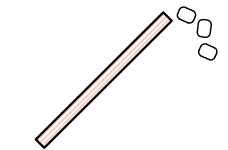
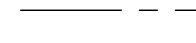

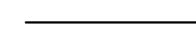

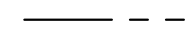
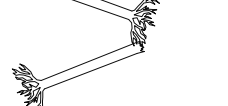

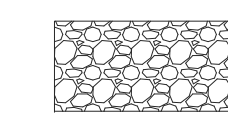
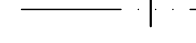
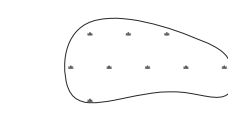



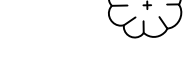
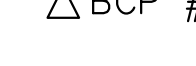

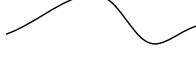



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AS-BUILT STREAM LENGTH = 597 LF

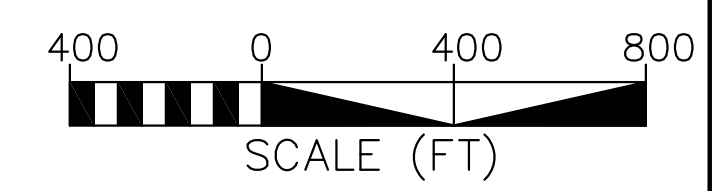
BIG CEDAR CREEK
TITLE SHEET

PROJECT REFERENCE NO. 109261	SHEET NO. R2
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	



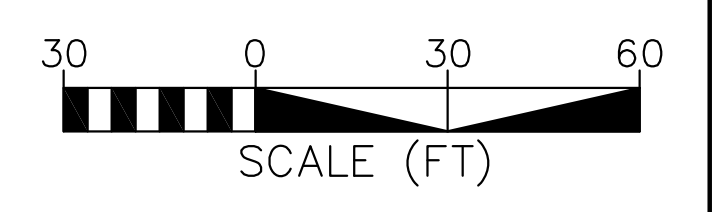
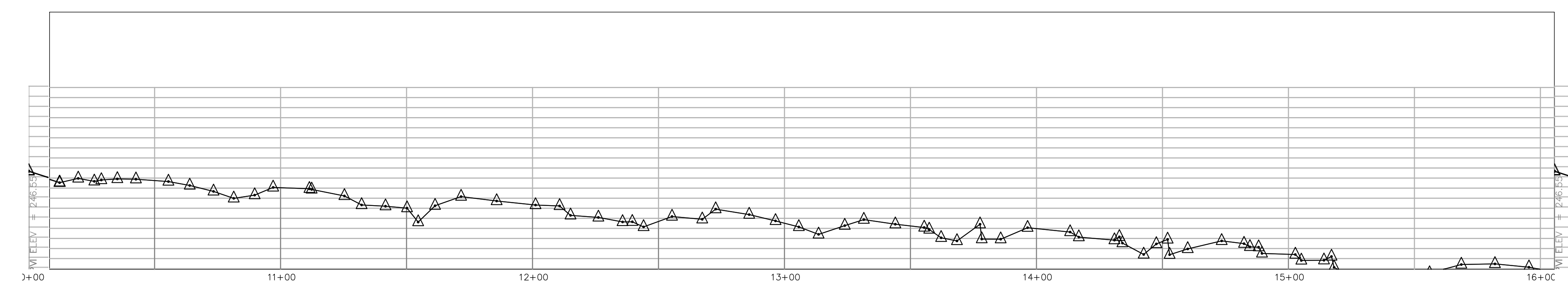
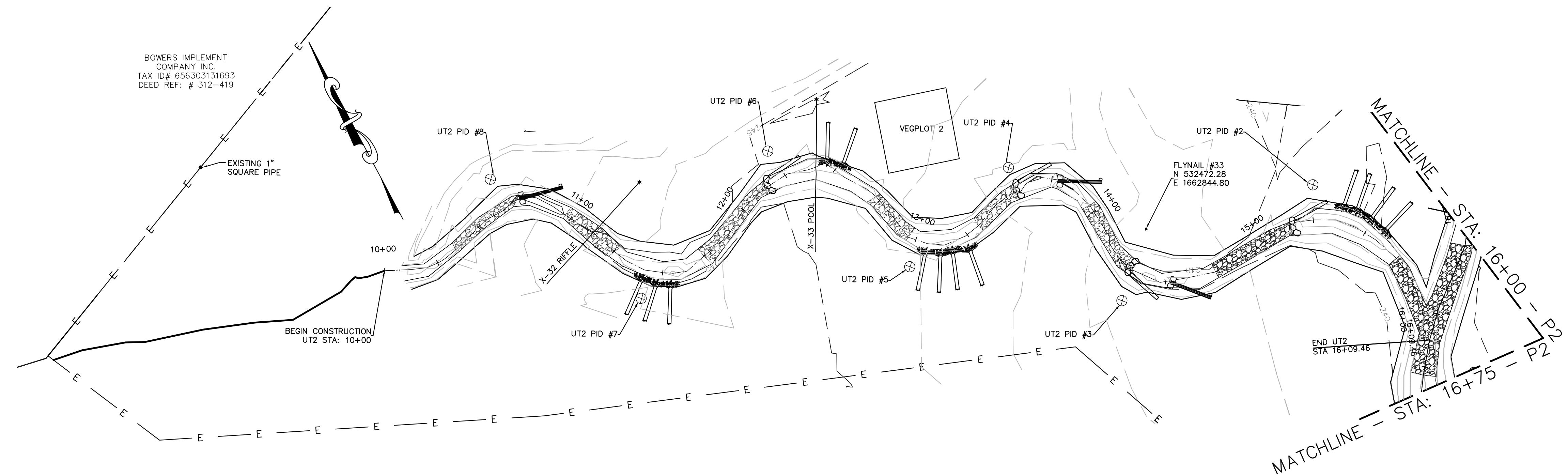
SYMBOLS

- | | | | |
|---|--------------------------------|---|--------------------------------------|
|  | 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 | | |
|  | SURVEY CONTROL POINT | | |
|  | PERMANENT STREAM CROSSING | | |
|  | FLOW DIRECTION | | |
|  | GEOLEFT | | |
|  | BANK STABILIZATION | | |
|  | TRANSPLANT | | |



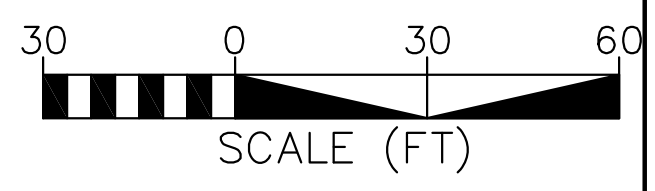
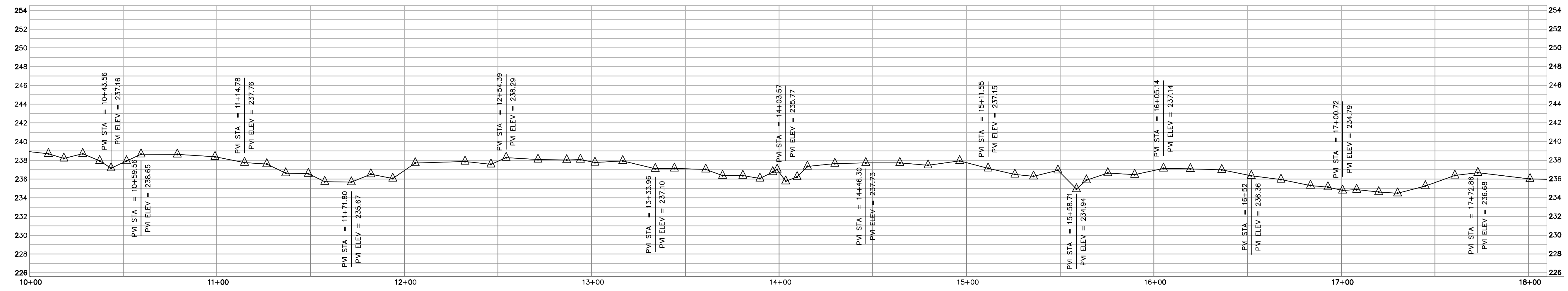
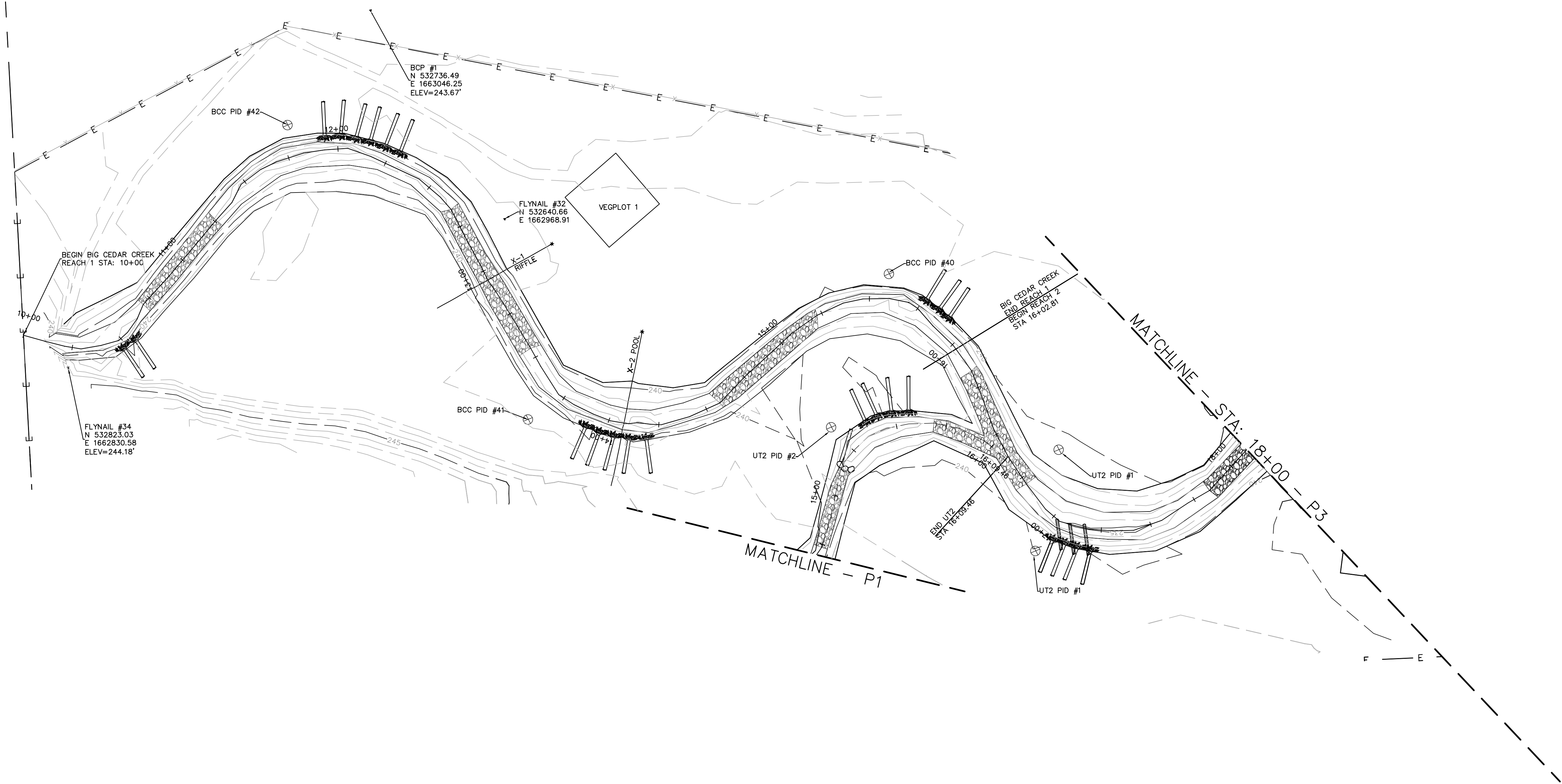
BIG CEDAR CREEK
REFERENCE SHEET

PROJECT REFERENCE NO. 109261	SHEET NO. 5A
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	
<small>Michael Baker Engineering, Inc. 1447 South Tryon Street Suite 200 Charlotte, NC 28203 Phone: 704.334.4454 Fax: 704.334.4492</small>	



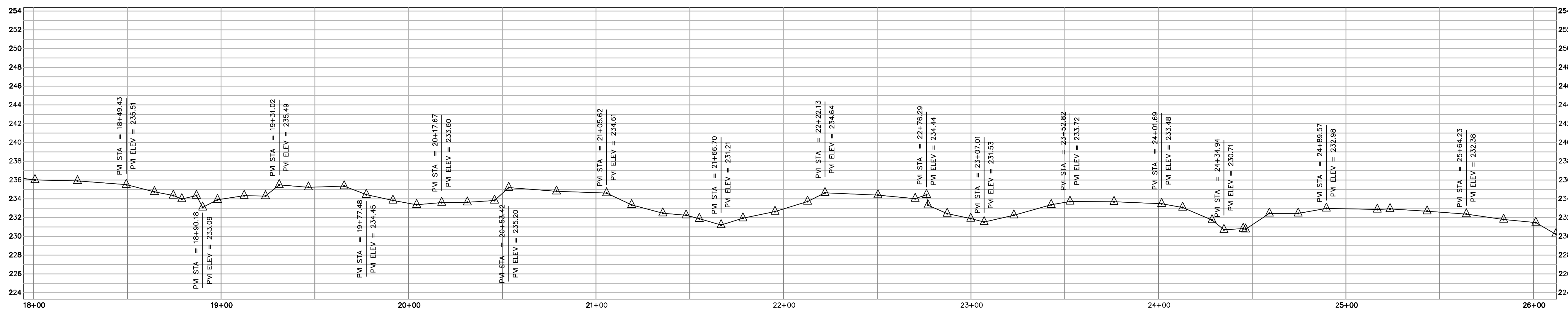
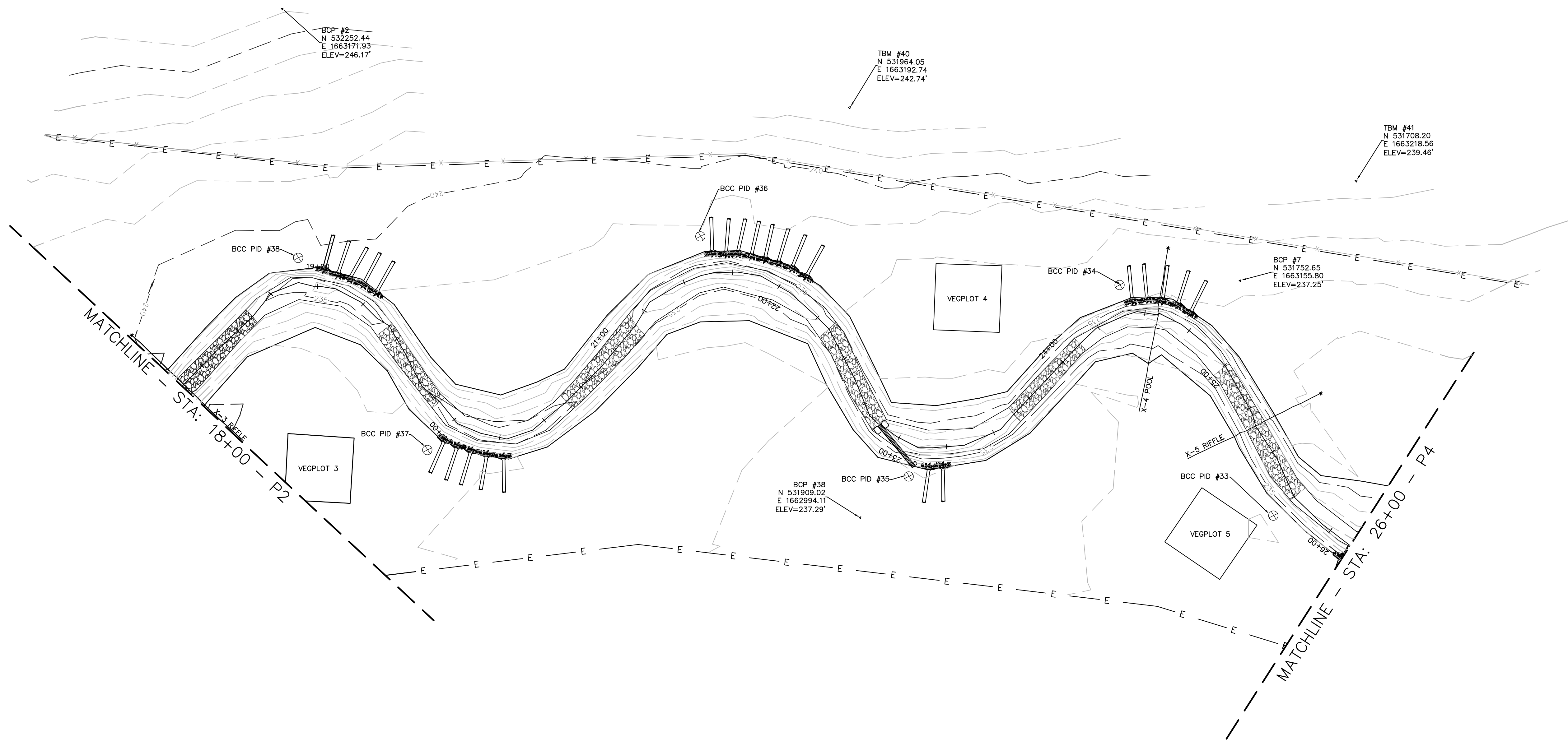
BIG CEDAR CREEK
UT2 SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 5B
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	
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BIG CEDAR CREEK
BIG CEDAR CREEK
SITE PLAN

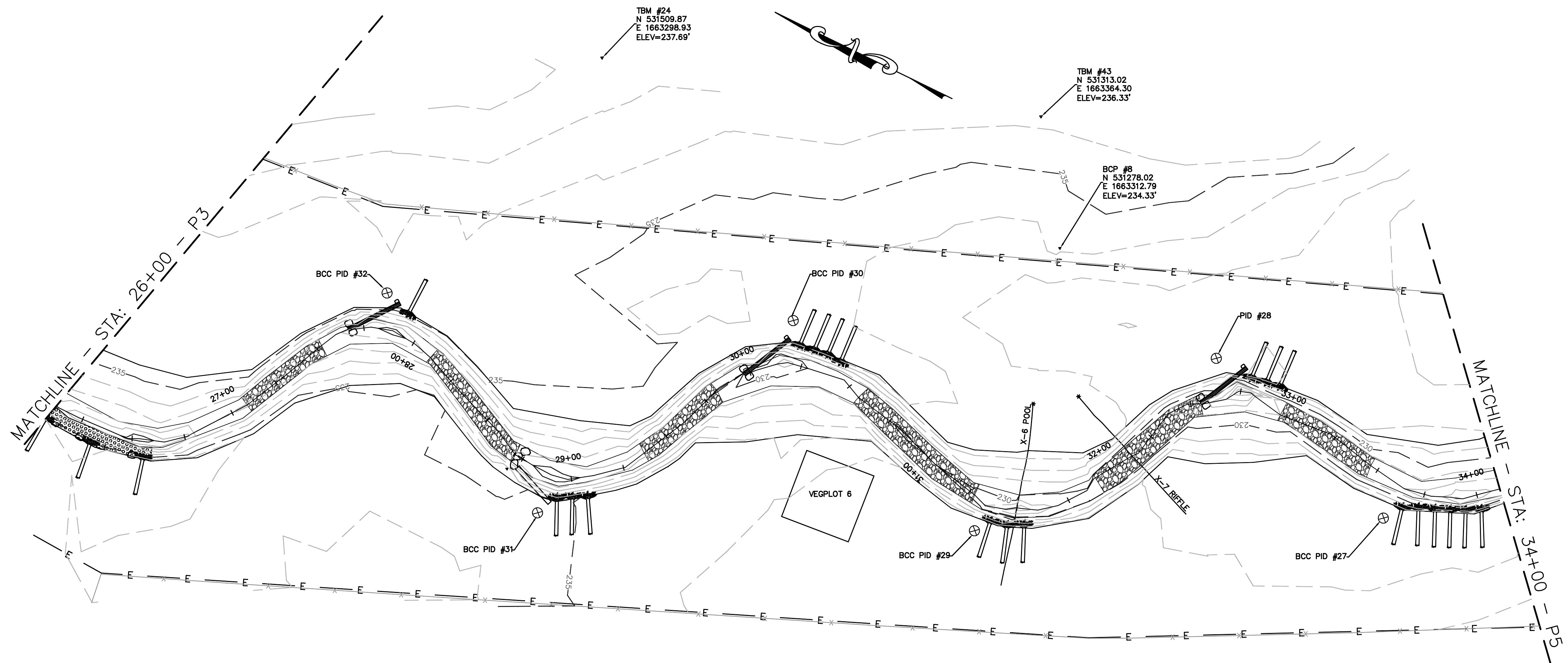
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	DATE 02/15/08
	
<small>Michael Baker Engineering, Inc. 1447 South Tryon Street Suite 200 Charlotte, NC 28203 Phone: 704.334.4454 Fax: 704.334.4492</small>	



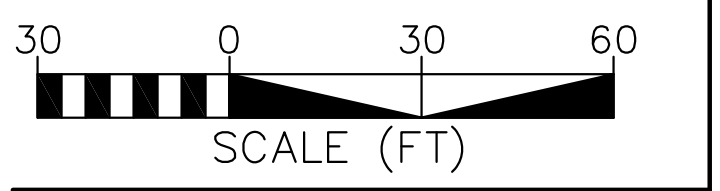
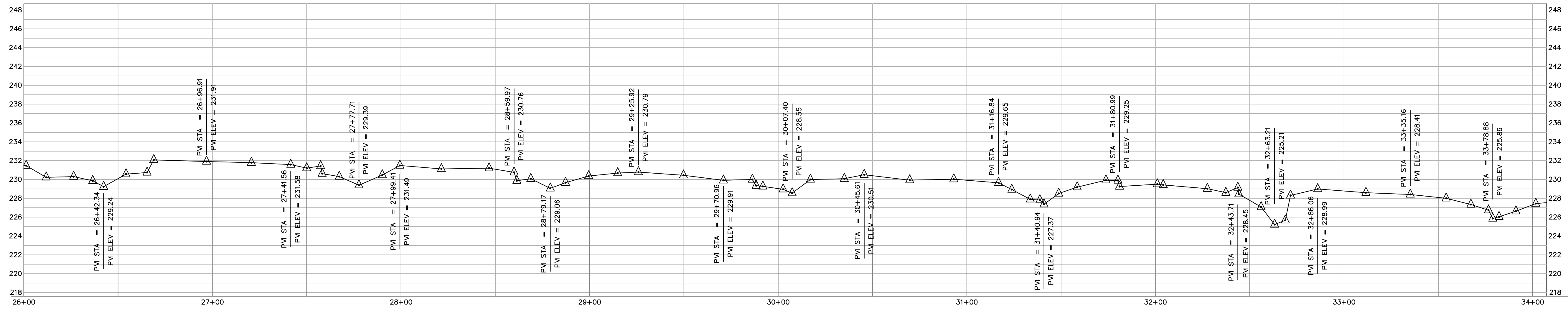
BIG CEDAR CREEK
BIG CEDAR CREEK SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 5D
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	

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Suite 200
Charlotte, NC 28203
Phone: 704.334.4454
Fax: 704.334.4492



THOMPSON ANN L THOMPSON, ET-AL
TAX ID# 656201287591
DEED REF: # 186-219



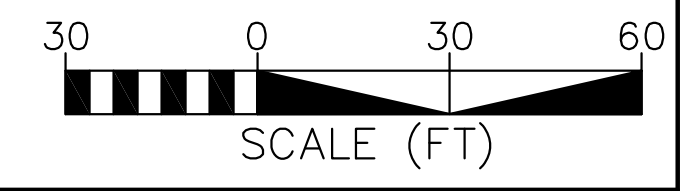
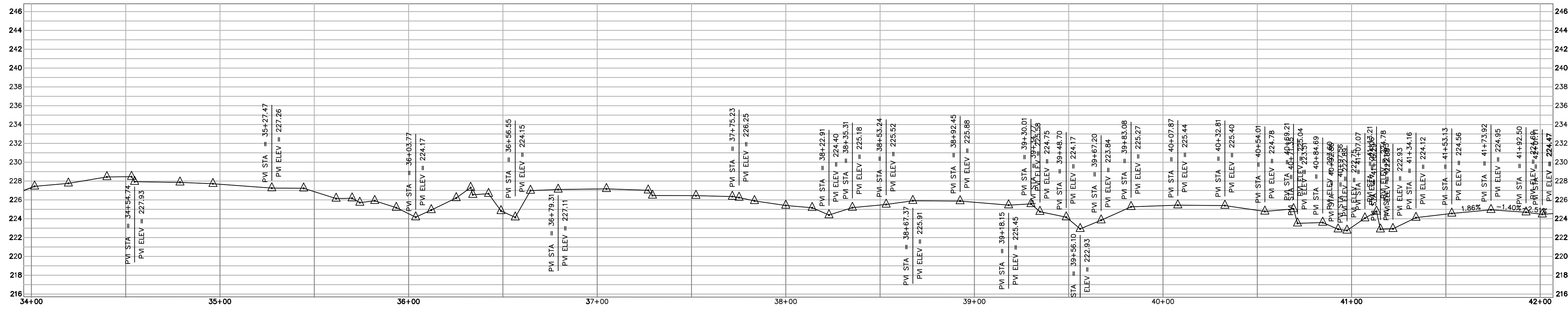
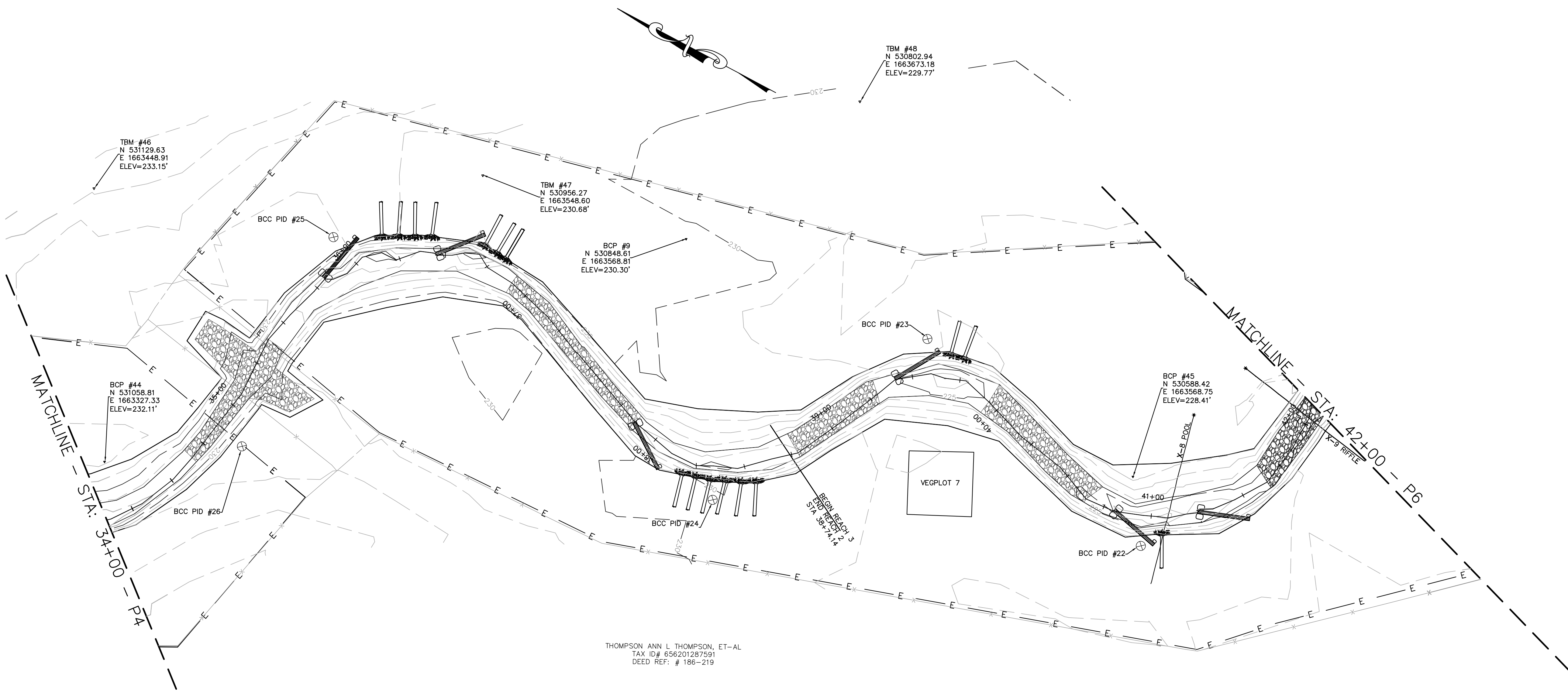
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BIG CEDAR CREEK

BIG CEDAR CREEK SITE PLAN

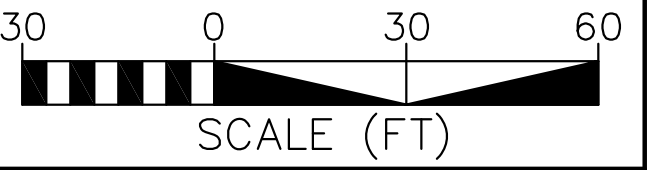
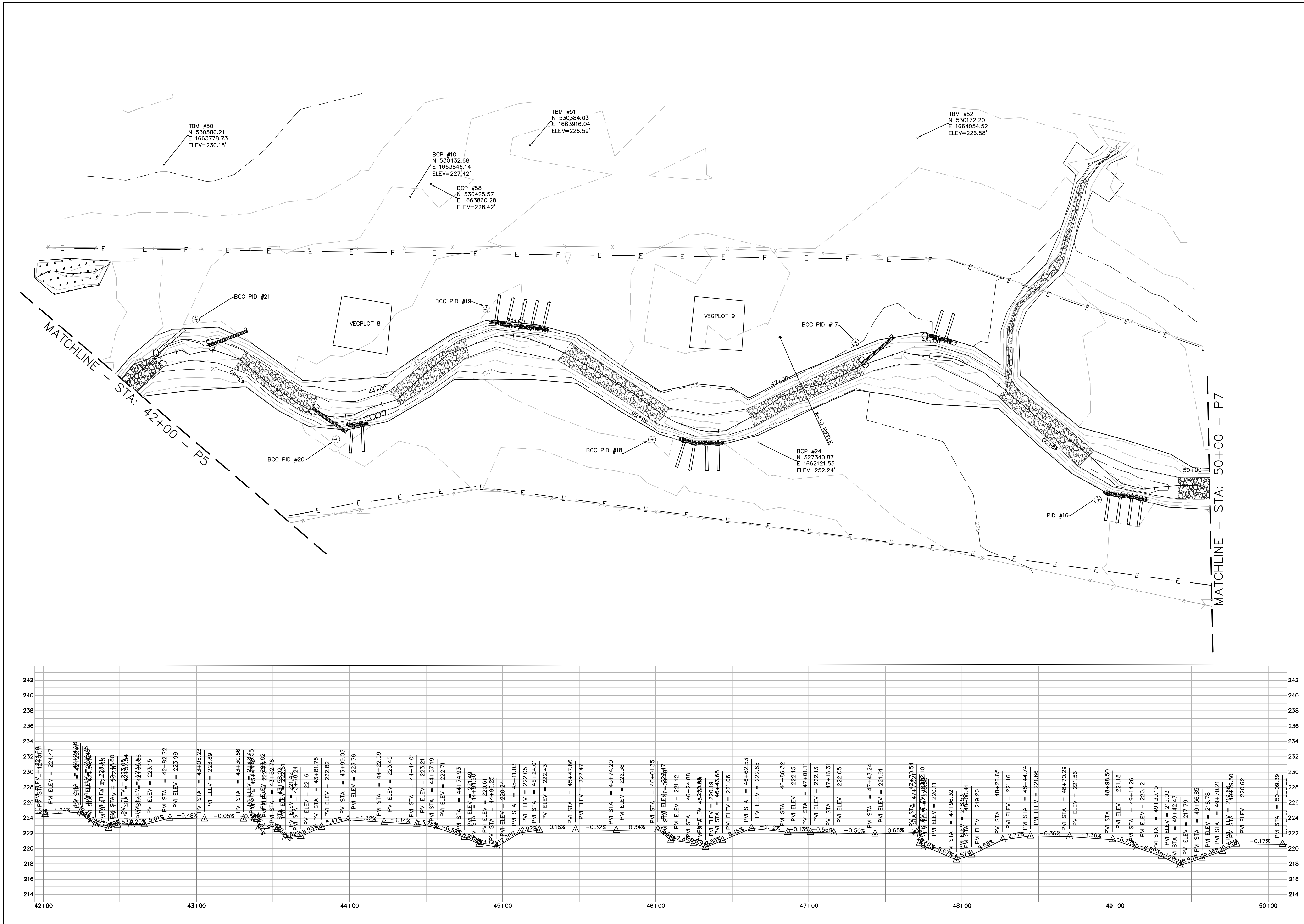
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	APPROVED BY KLT
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Phone: 704.334.4454
Fax: 704.334.4492



BIG CEDAR CREEK
BIG CEDAR CREEK SITE PLAN

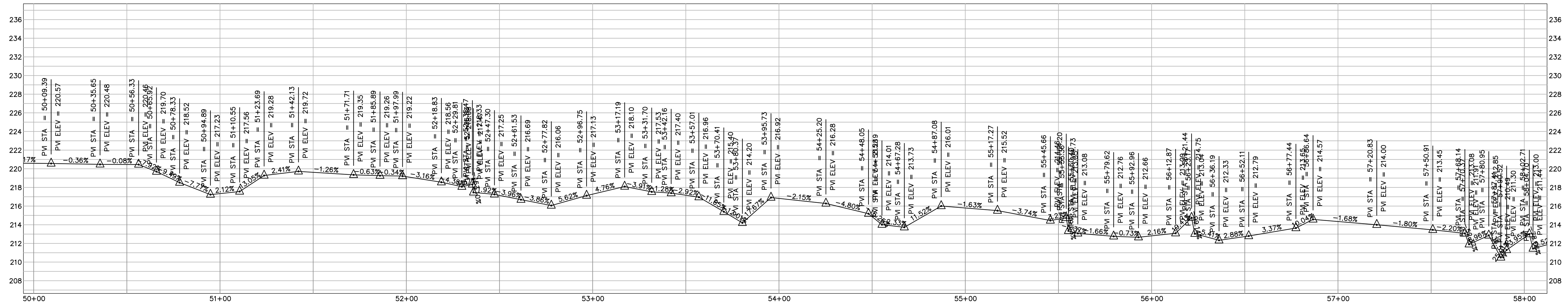
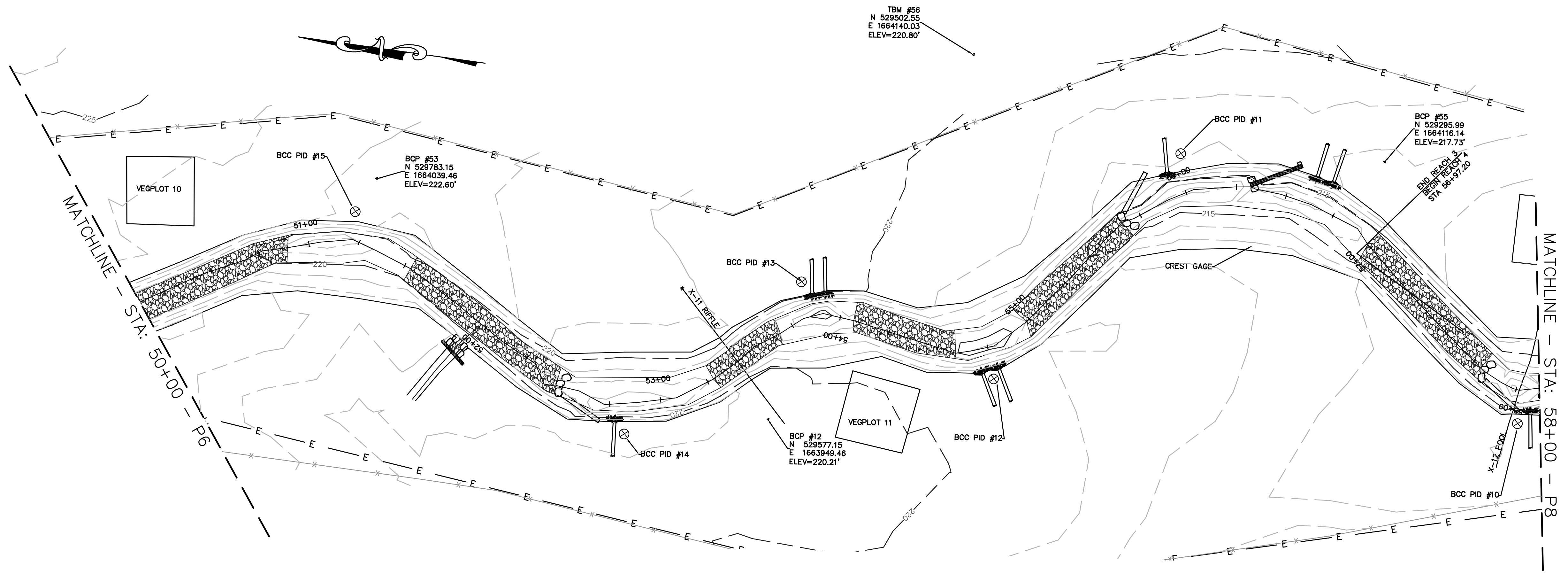
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	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	



BIG CEDAR CREEK
BIG CEDAR CREEK SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 5G
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	

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

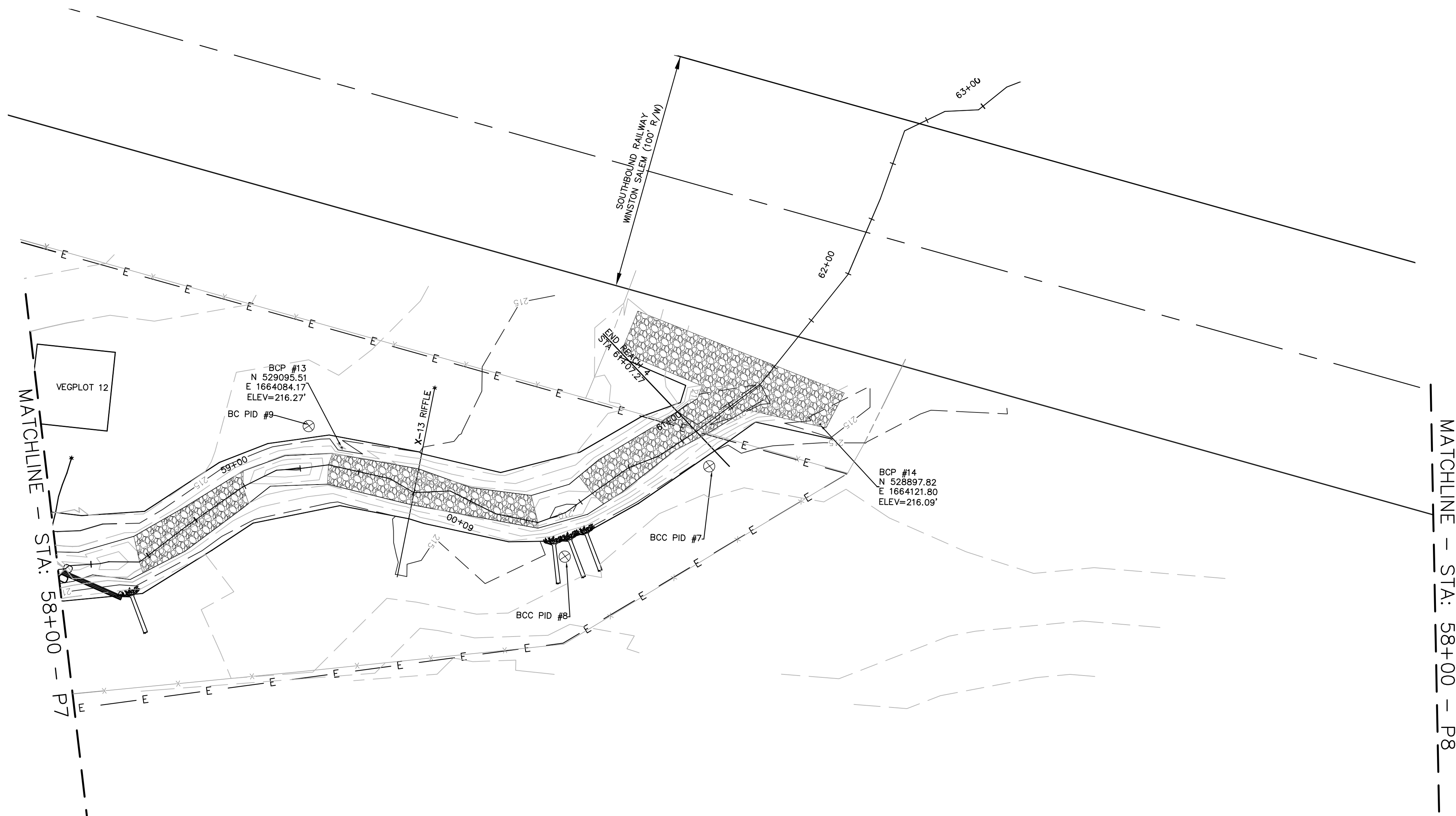


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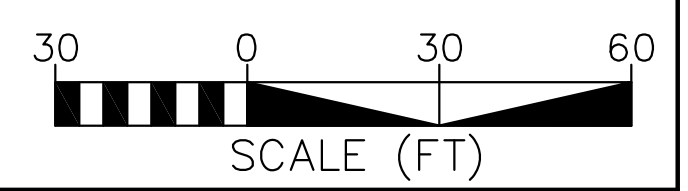
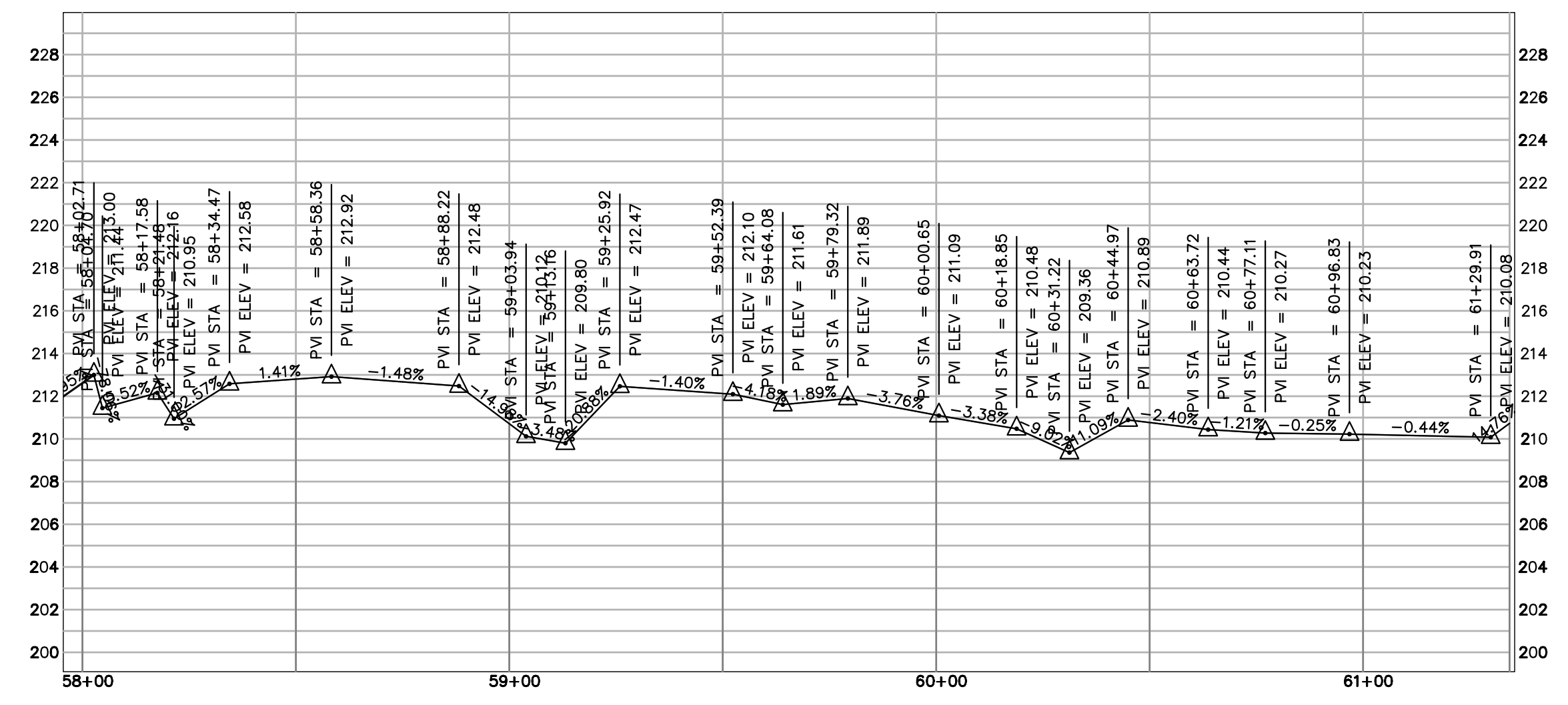
BIG CEDAR CREEK

BIG CEDAR CREEK SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 5H
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	
<small>Michael Baker Engineering, Inc. 1447 South Tryon Street Suite 200 Charlotte, NC 28203 Phone: 704.334.4454 Fax: 704.334.4492</small>	



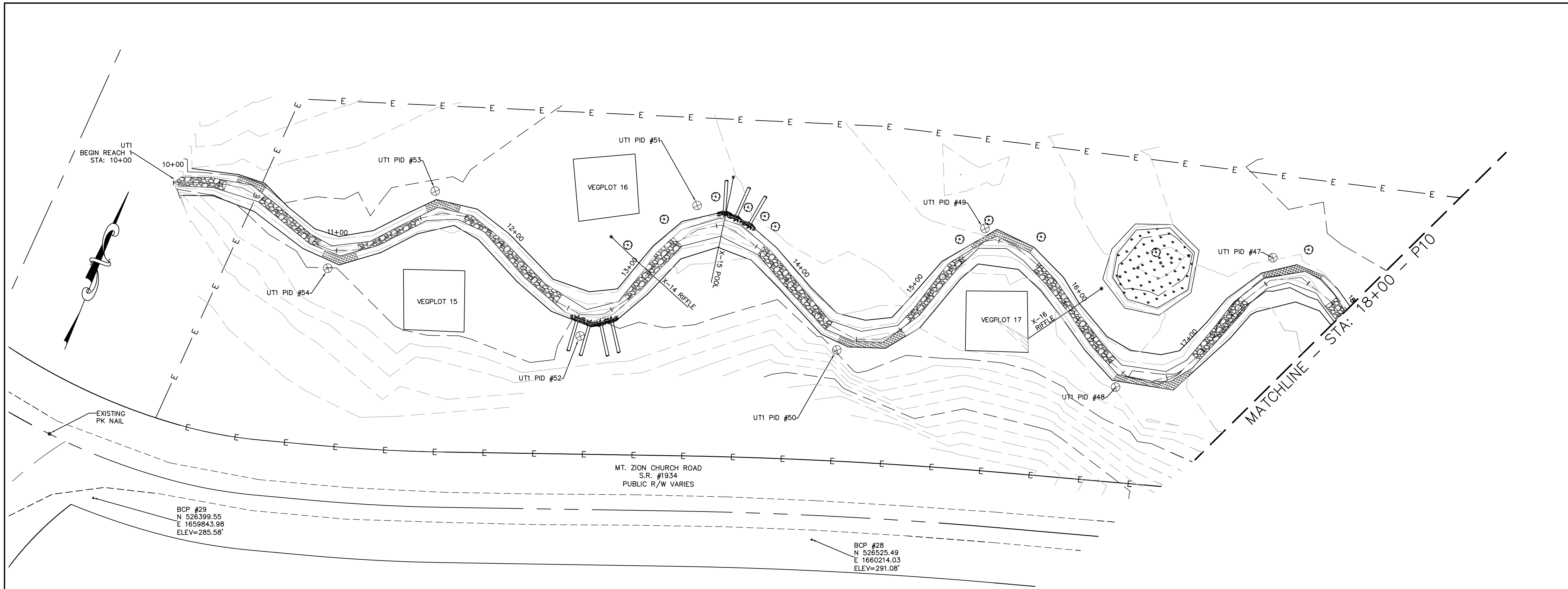
THOMPSON ANN L THOMPSON, ET-AL
TAX ID# 656201287591
DEED REF: # 186-219



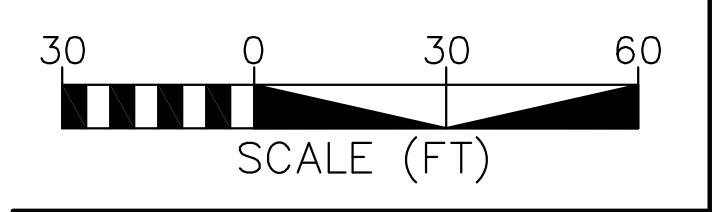
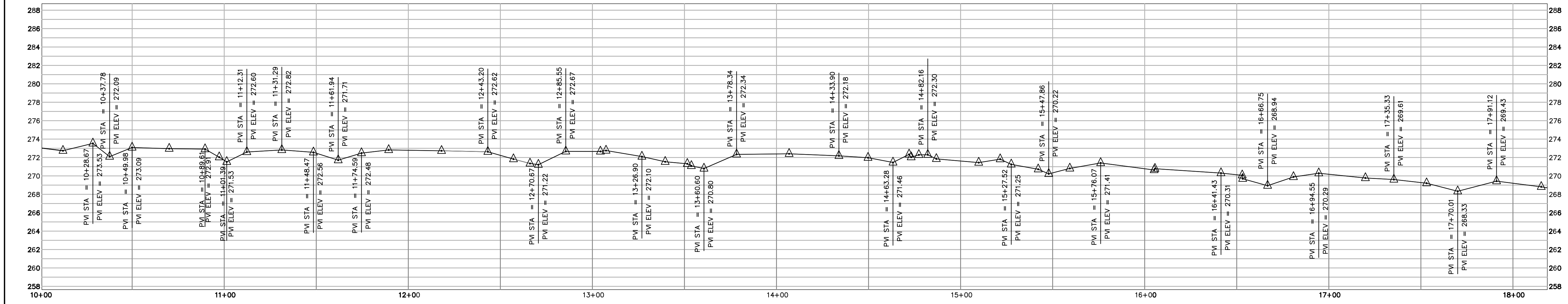
BIG CEDAR CREEK
BIG CEDAR CREEK
SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 5J
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	

Michael Baker Engineering, Inc.
1447 South Tryon Street
Suite 200
Charlotte, NC 28203
Phone: 704.334.4444
Fax: 704.334.4492

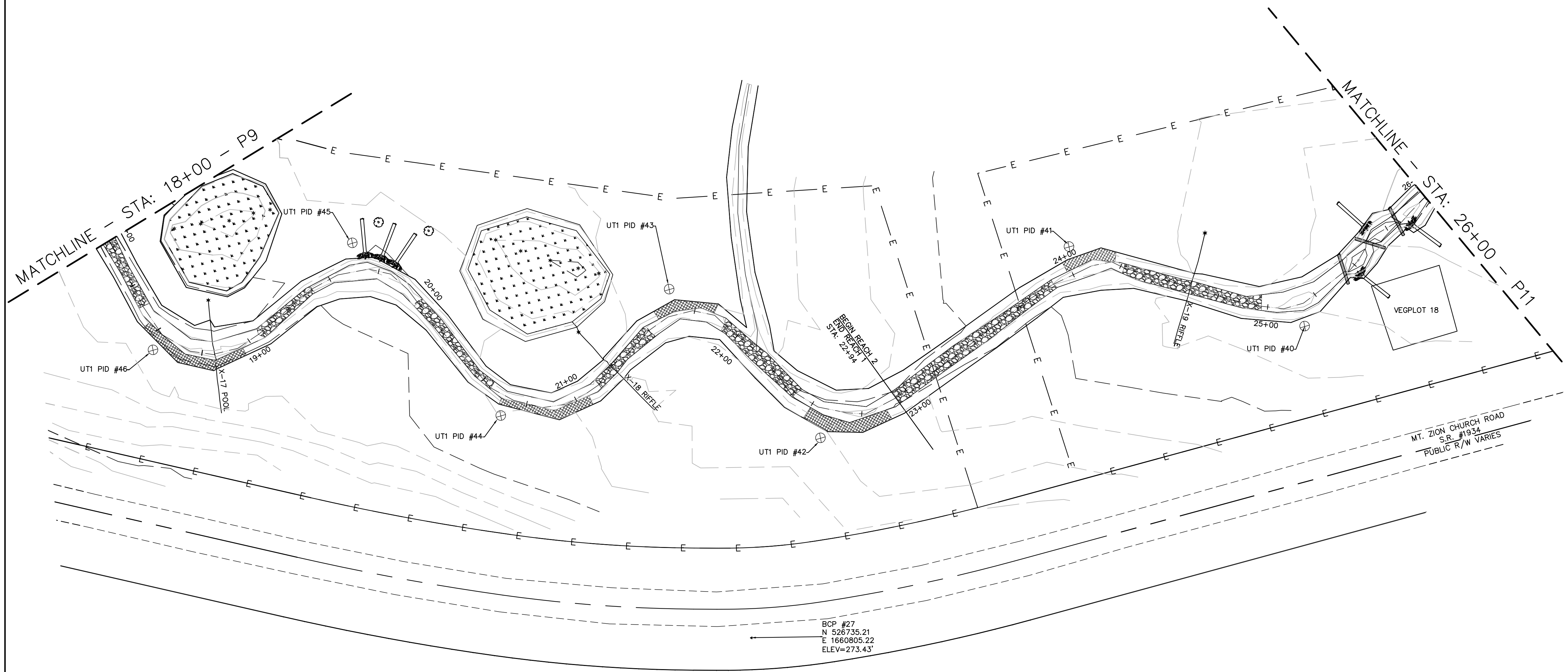


THOMPSON ANN L. THOMPSON, ET-AL
TAX ID# 656201287591
DEED REF: # 186-219

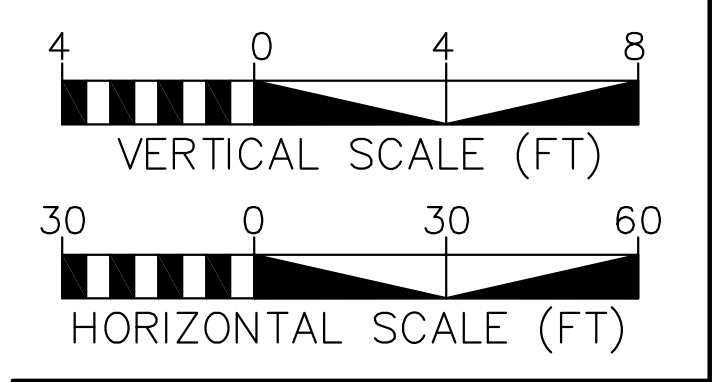
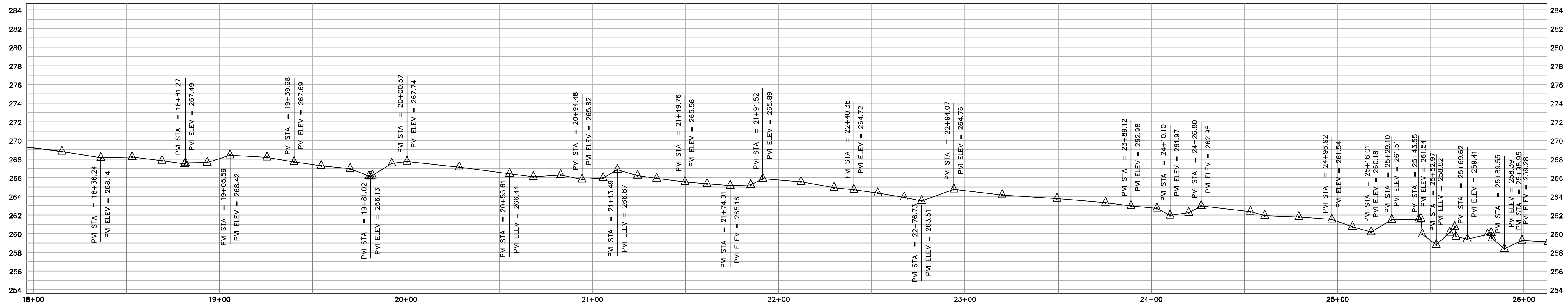


BIG CEDAR CREEK
UT1 SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 5K
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	



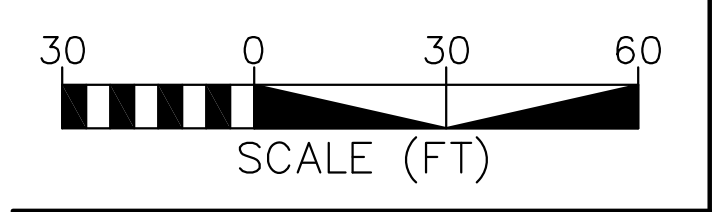
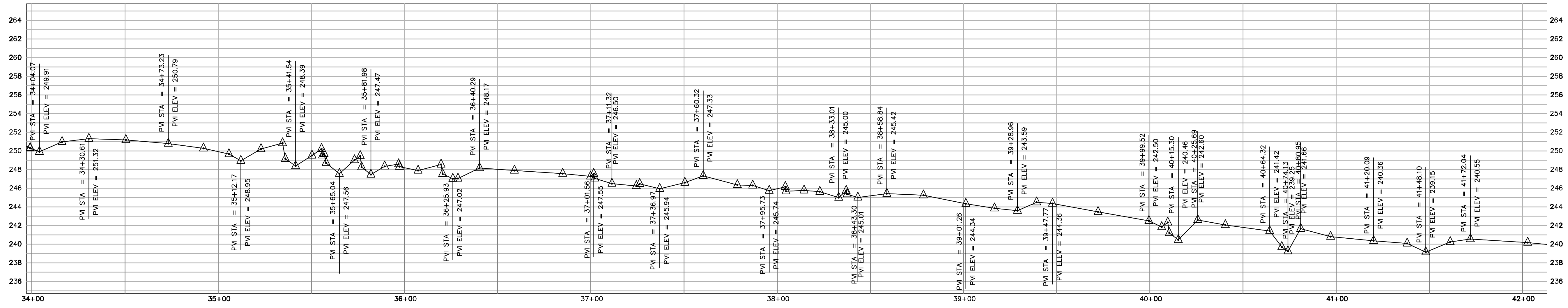
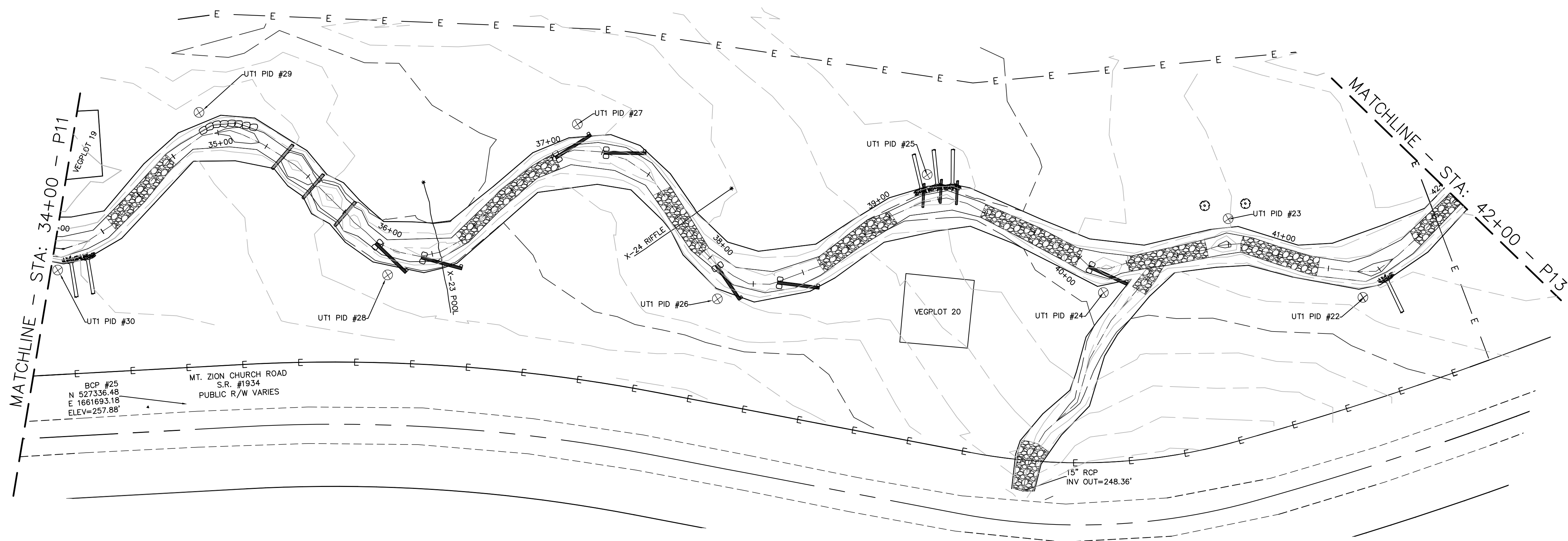
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 E 1860803.22
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BIG CEDAR CREEK
 UT1 SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 5N
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	

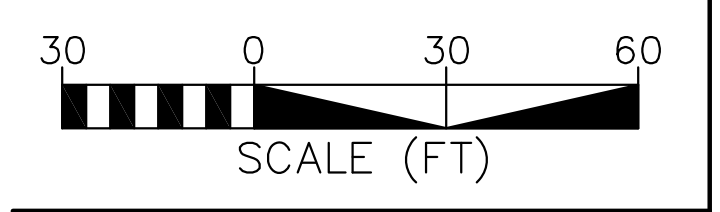
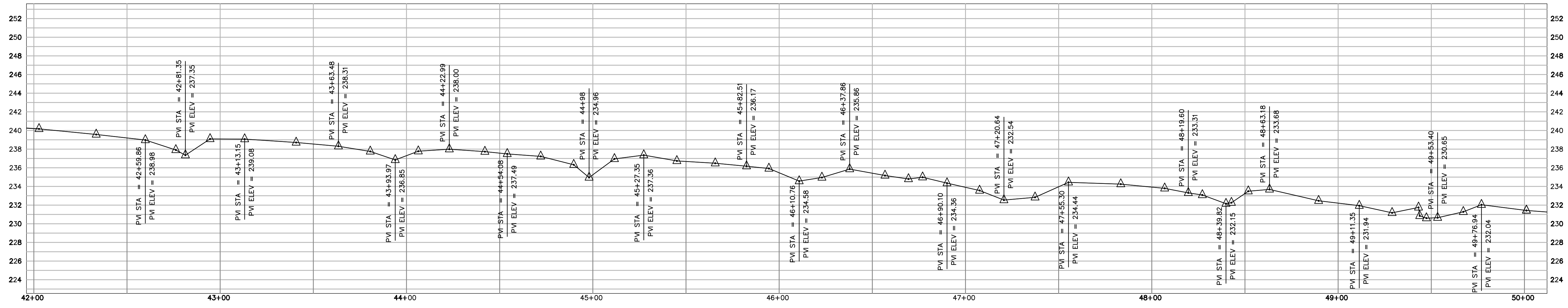
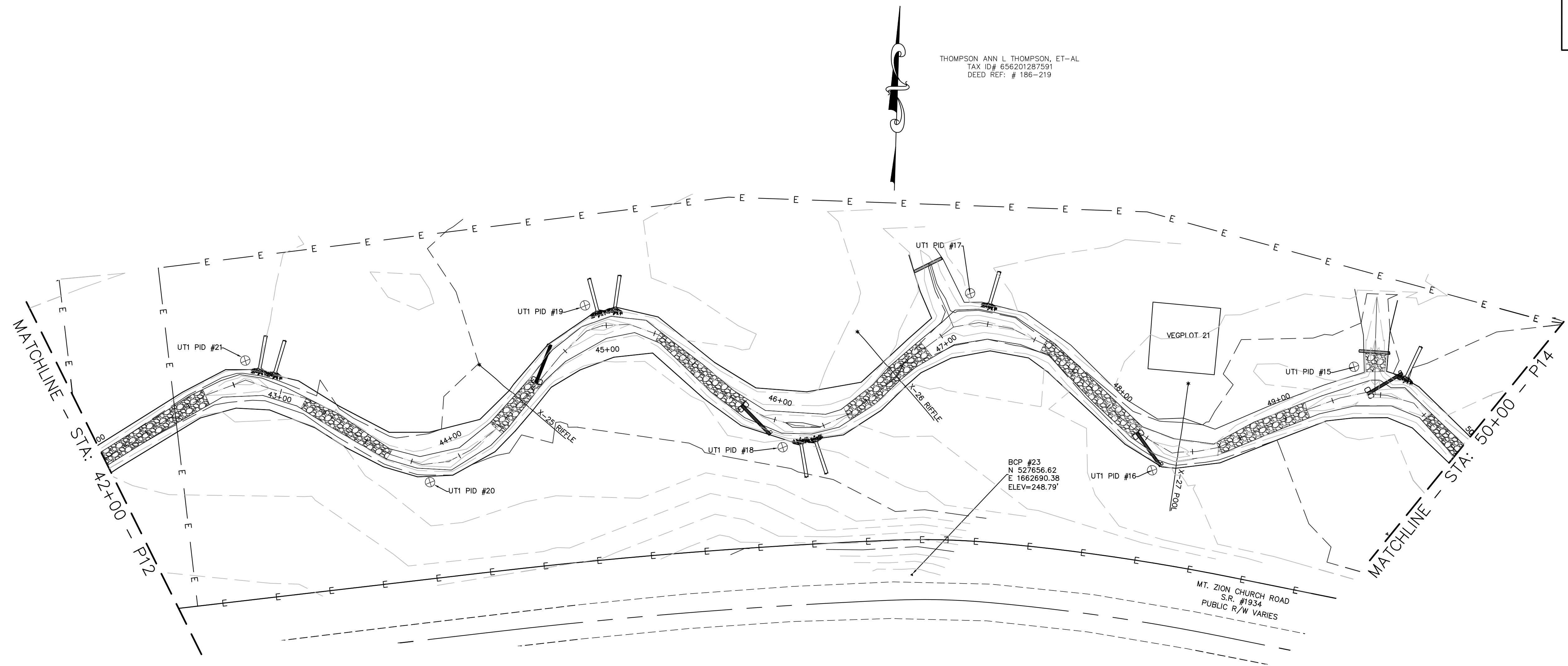
Michael Baker Engineering, Inc.
1447 South Tryon Street
Suite 200
Charlotte, NC 28203
Phone: 704.334.4454
Fax: 704.334.4492



BIG CEDAR CREEK
UT1 SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 5N
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	

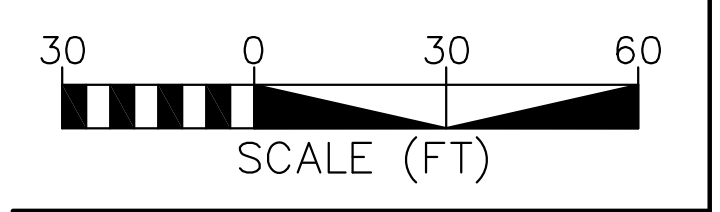
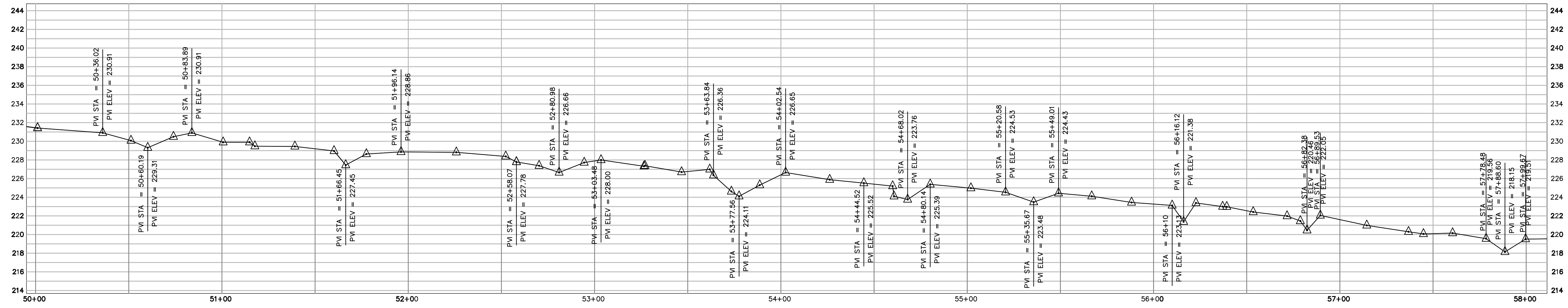
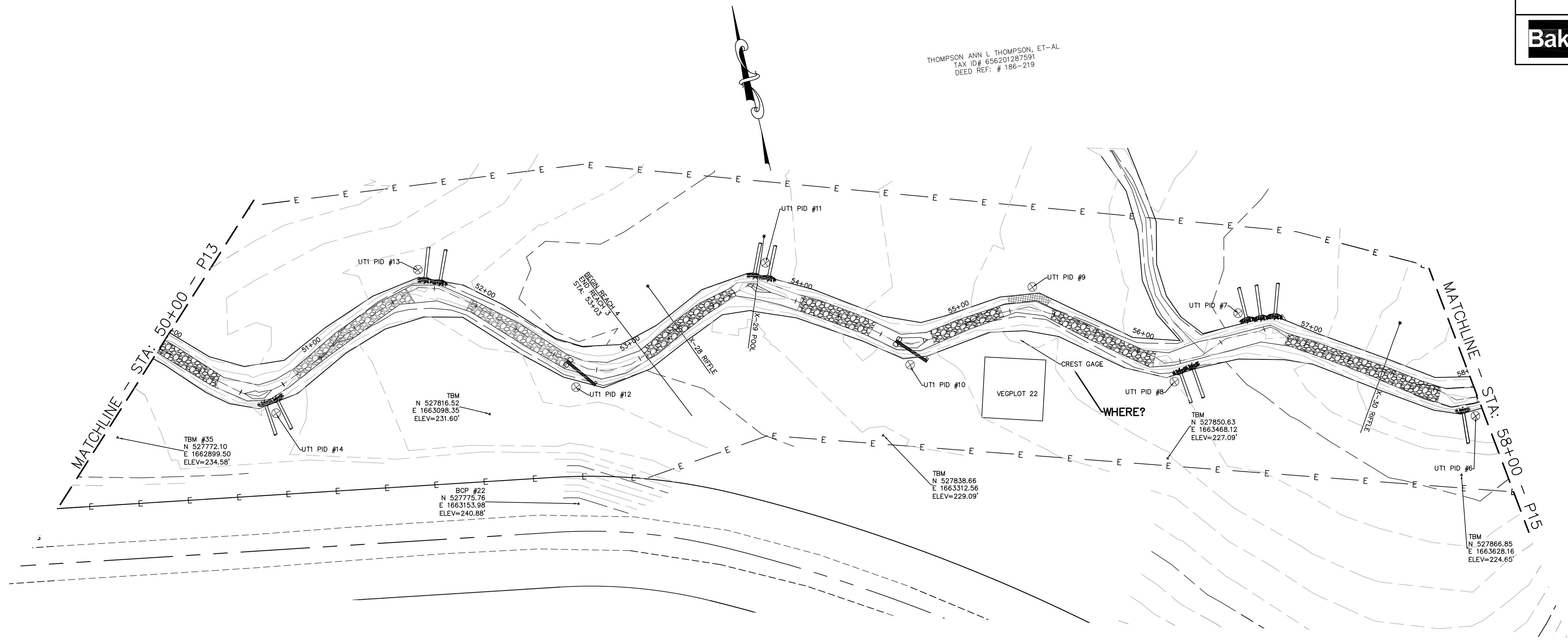
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BIG CEDAR CREEK
UT1 SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 50
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	
<small>Michael Baker Engineering, Inc. 1447 South Tryon Street Suite 200 Charlotte, NC 28203 Phone: 704.334.4454 Fax: 704.334.4492</small>	

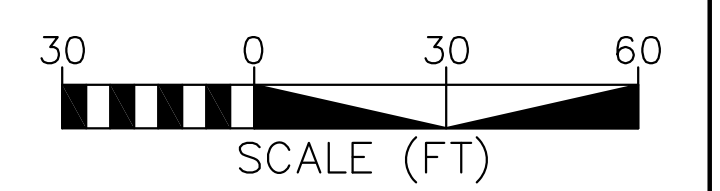
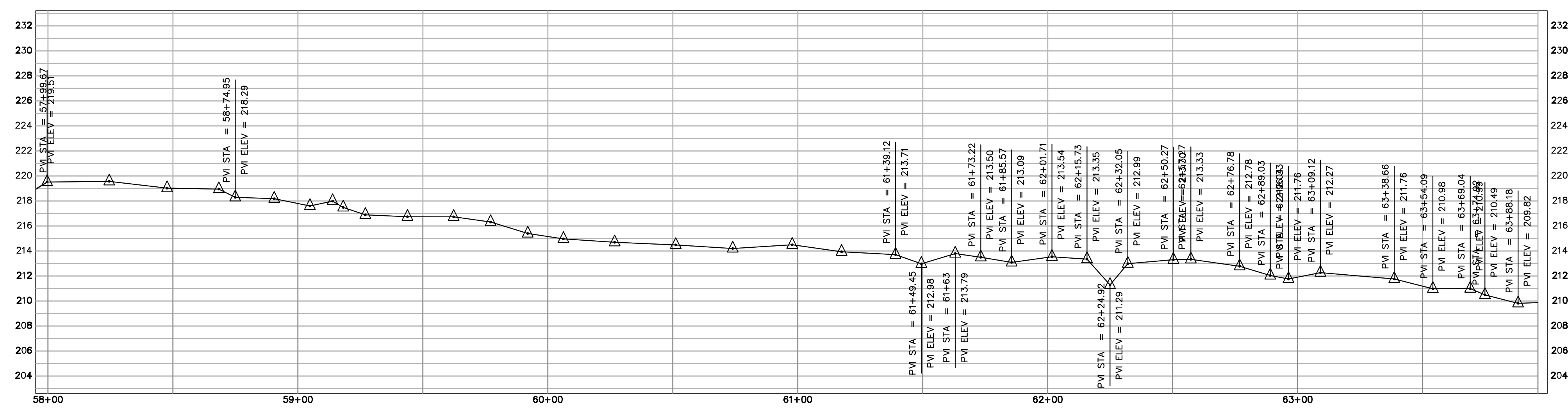
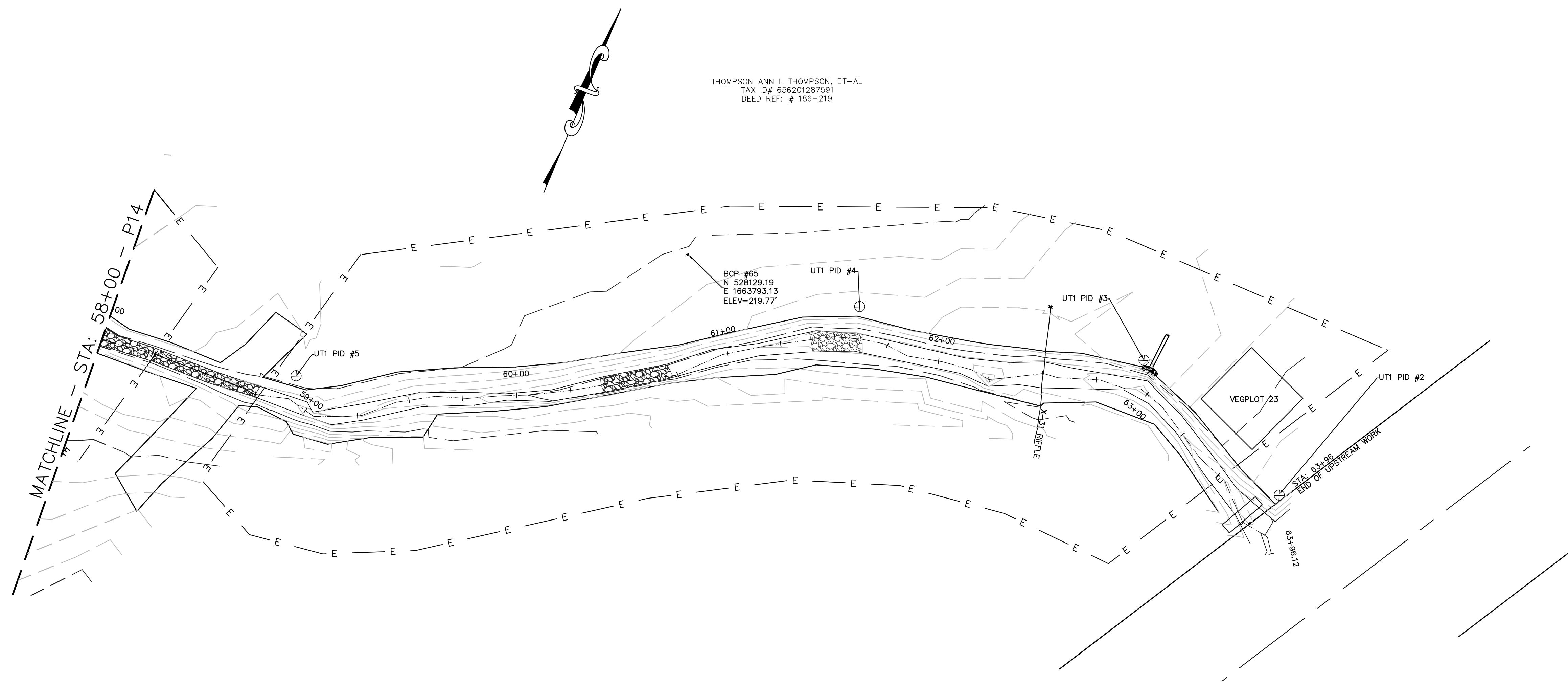
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TAX ID# 656201287591
DEED REF: # 186-219



BIG CEDAR CREEK
UT1 SITE PLAN

PROJECT REFERENCE NO. 109261	SHEET NO. 5P
	PROJECT MANAGER CDM
	APPROVED BY KLT
	DATE 02/15/08
	
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THOMPSON ANN L. THOMPSON, ET-AL
TAX ID# 656201287591
DEED REF: # 186-219



BIG CEDAR CREEK
UT1 SITE PLAN

Appendix E

Photo ID Log

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

**APPENDIX E:
PHOTO ID LOG**

Big Cedar Creek Photos



BCC PID 1– Cross Vane, BCC Reach 6 End



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



BCC PID 3 –Existing Riffle, BCC Reach 6



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



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



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



BCC PID 7 – Constructed Riffle, BCC Reach 4 End



BCC PID 8 – Constructed Riffle, BCC Reach 4



BCC PID 9 – Constructed Riffle, BCC Reach 4



BCC PID 10 – Constructed Riffle, BCC Reach 4 Start



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



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



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



BCC PID 14 – Constructed Riffle, BCC Reach 3



BCC PID 15 – Constructed Riffle, BCC Reach 3



BCC PID 16 – Constructed Riffle, BCC Reach 3



BCC PID 17 – Constructed Riffle, UT1 Reach 3



BCC PID 18 – Constructed Riffle, BCC Reach 3



BCC PID 19 – Constructed Riffle, BCC Reach 3



BCC PID 20 – Constructed Riffle, BCC Reach 3



BCC PID 21 – Constructed Riffle, BCC Reach 3



BCC PID 22 – Constructed Riffle, BCC Reach 3



BCC PID 23 – Constructed Riffle, BCC
Reach 3 Start



BCC PID 24 – Constructed Riffle, BCC
Reach 2 End



BCC PID 25 – Riffle Crossing, BCC Reach 2



BCC PID 26 – Constructed Riffle, BCC Reach 2



BCC PID 27 – Constructed Riffle, BCC Reach 2



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



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



BCC PID 30 – Constructed Riffle, BCC Reach 2



BCC PID 31 – Constructed Riffle, BCC Reach 2



BCC PID 32 – Constructed Riffle, BCC Reach 2



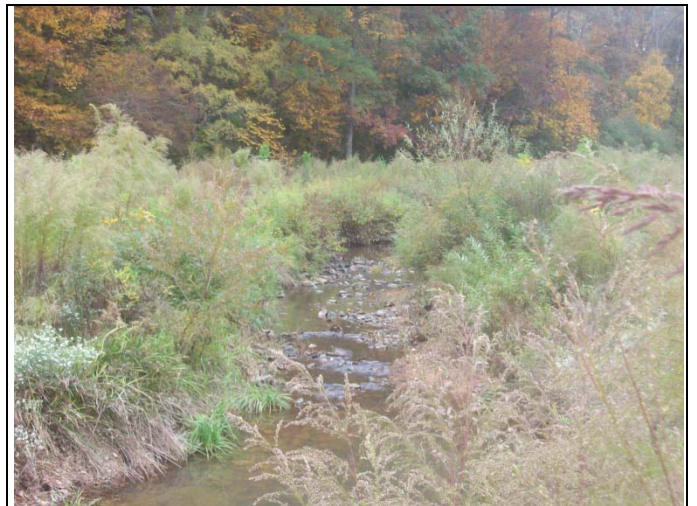
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BCC PID 35 – Constructed Riffle, BCC Reach 2



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



UT1 Crest Gauge – 10/10/10



BCC Crest Gauge – 12/8/10

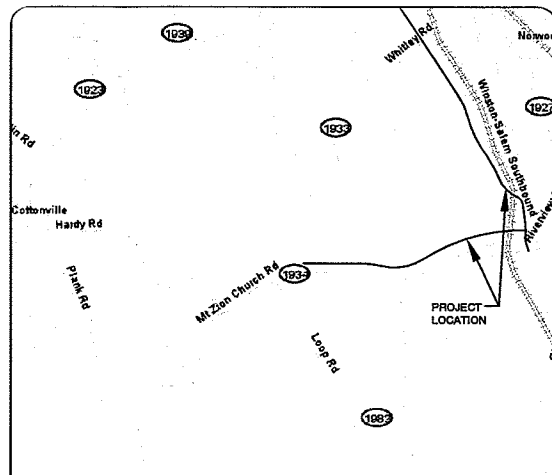
BIG CEDAR CREEK

SCO # D06054-D

NC ECOSYSTEM ENHANCEMENT PROGRAM

STANLY COUNTY

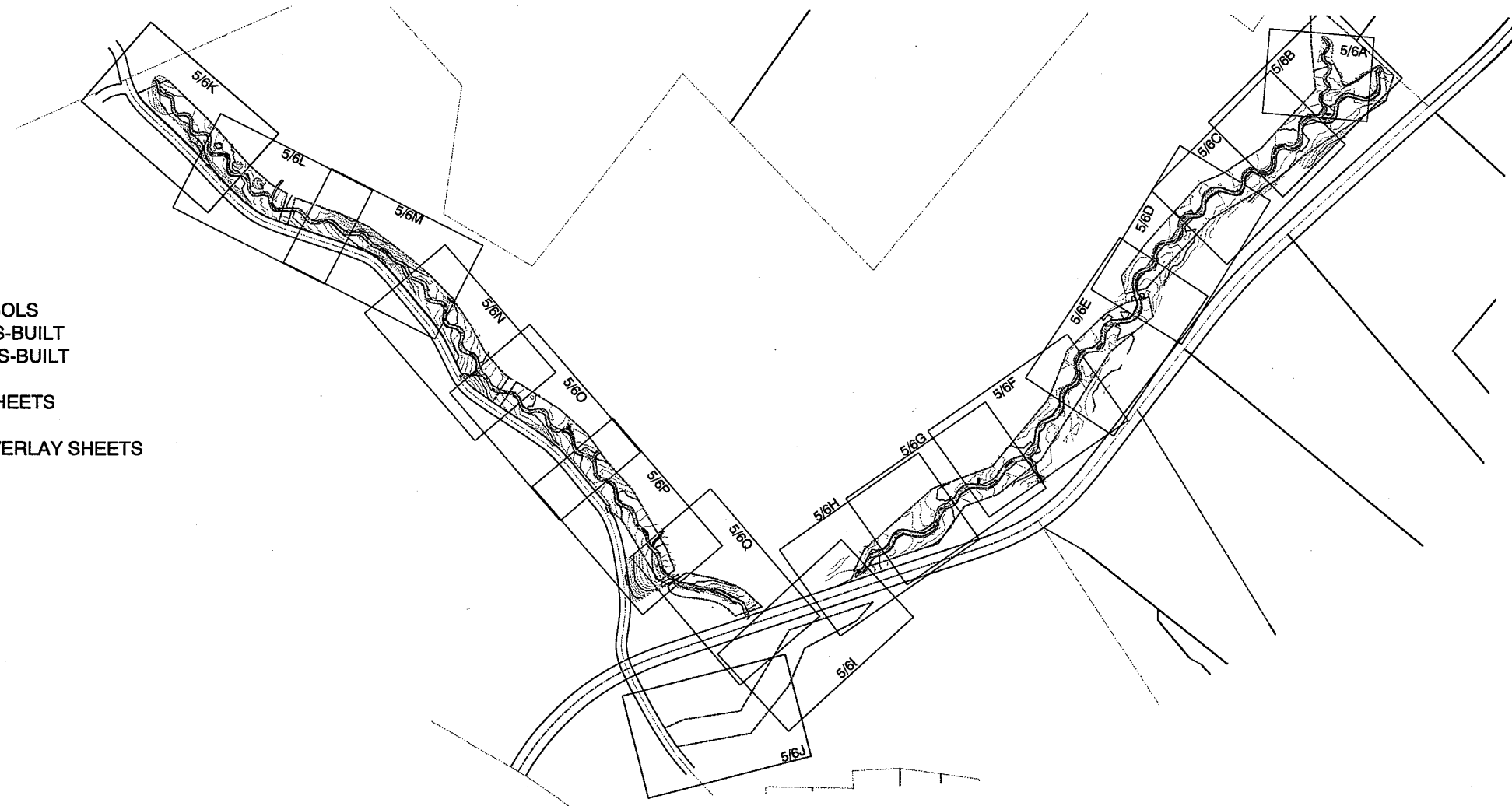
STATE	BAKER PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	109261	1	67
SCO PROJECT NO. D06054-D			



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.

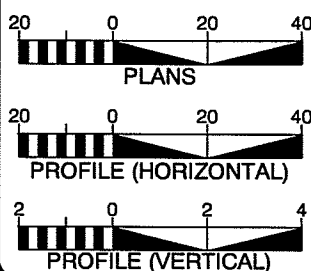
TYPE OF WORK:
 STREAM AND WETLAND RESTORATION



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

GRAPHIC SCALES



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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KEVIN TWEEDY, P.E.
 PROJECT ENGINEER

CHRISTINE D. MILLER
 PROJECT DESIGNER


PROJECT ENGINEER



8-11-09

 P.E.























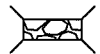




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SYMBOLOLOGY

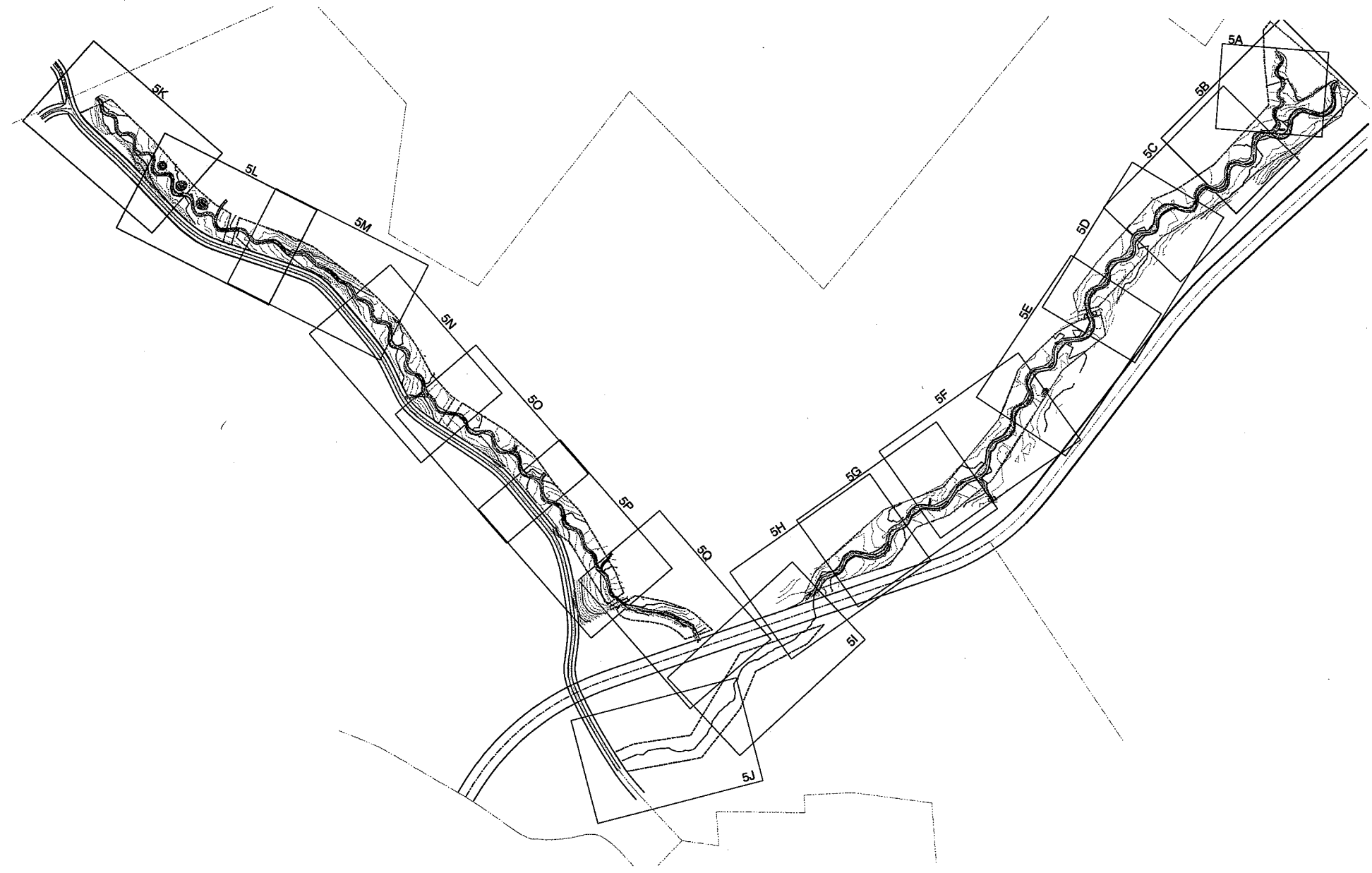
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	EXISTING MINOR CONTOUR		ROOT WAD
	EXISTING FENCE		LOG J-HOOK VANE
	CENTERLINE RAILROAD		BRUSH MATTRESS
	ROW		LOG VANE
	PARCEL BOUNDARY		LOG STEP-POOL
	EXISTING ROAD/PAVEMENT		CONSTRUCTED RIFFLE (NATIVE MATERIAL)
	EXISTING STREAM ALIGNMENT		FLOODPLAIN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



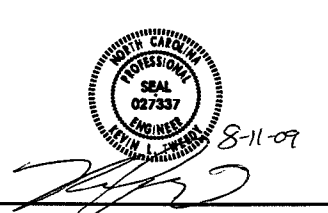
Michael L. Thayer 8-16-09

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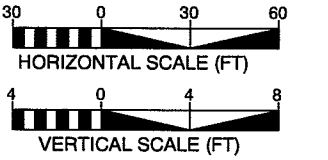
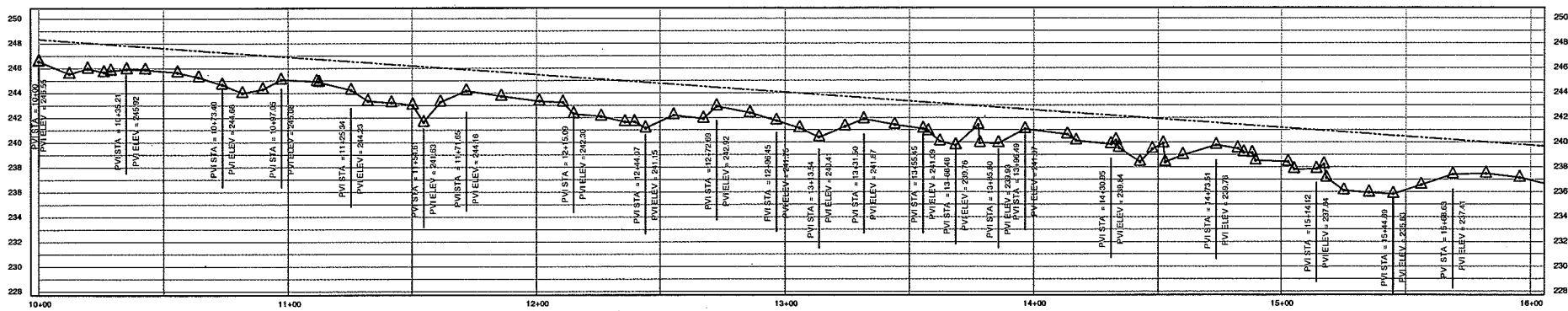
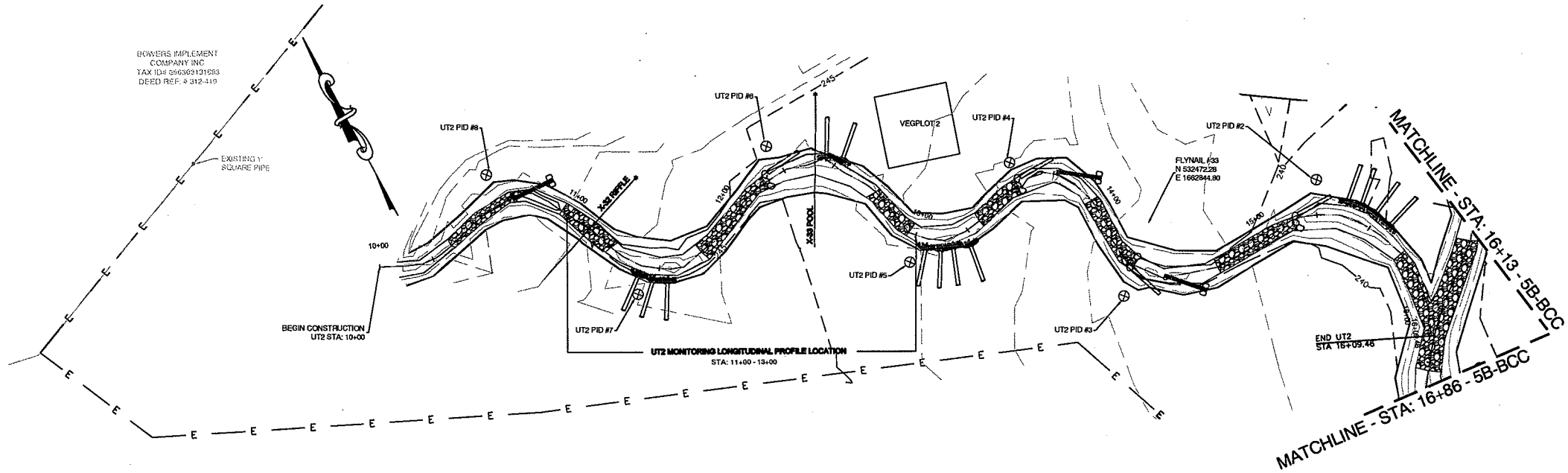
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BIG CEDAR CREEK
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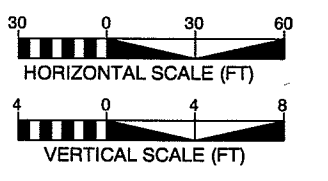
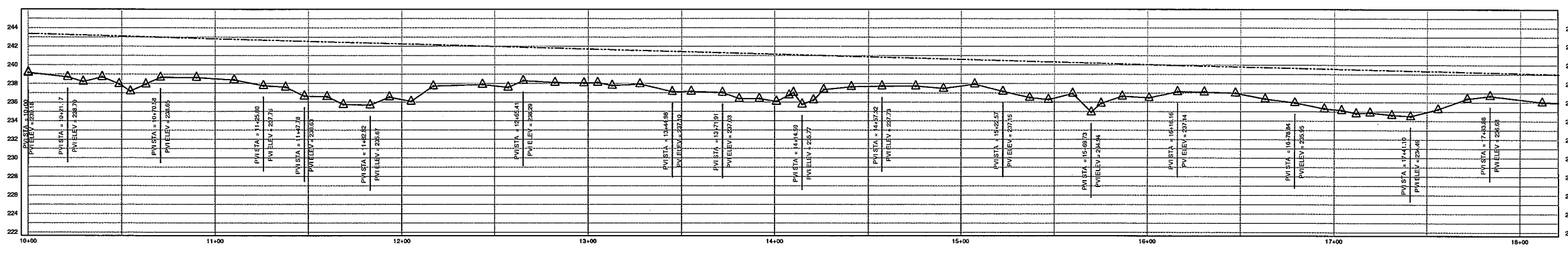
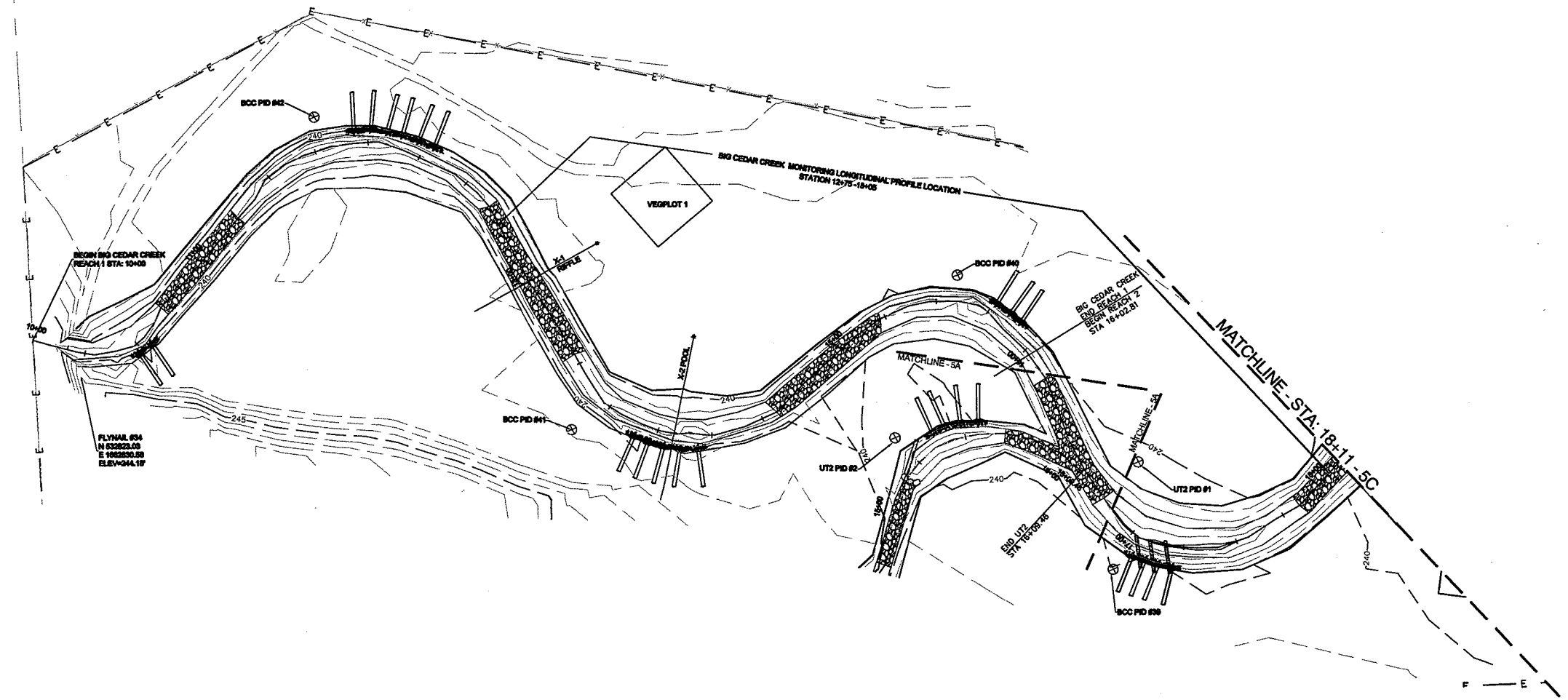


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BIG CEDAR CREEK
 UT2 AS-BUILT

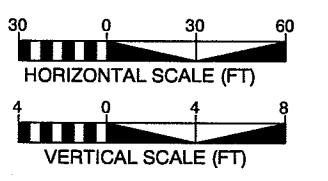
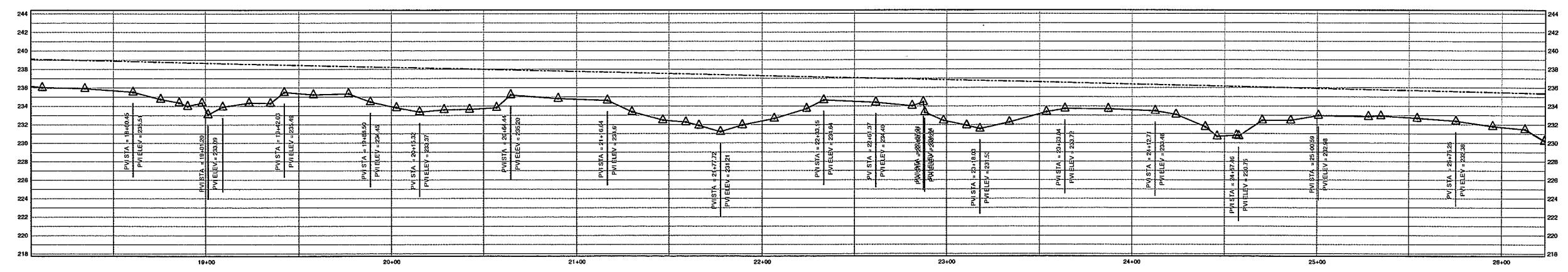
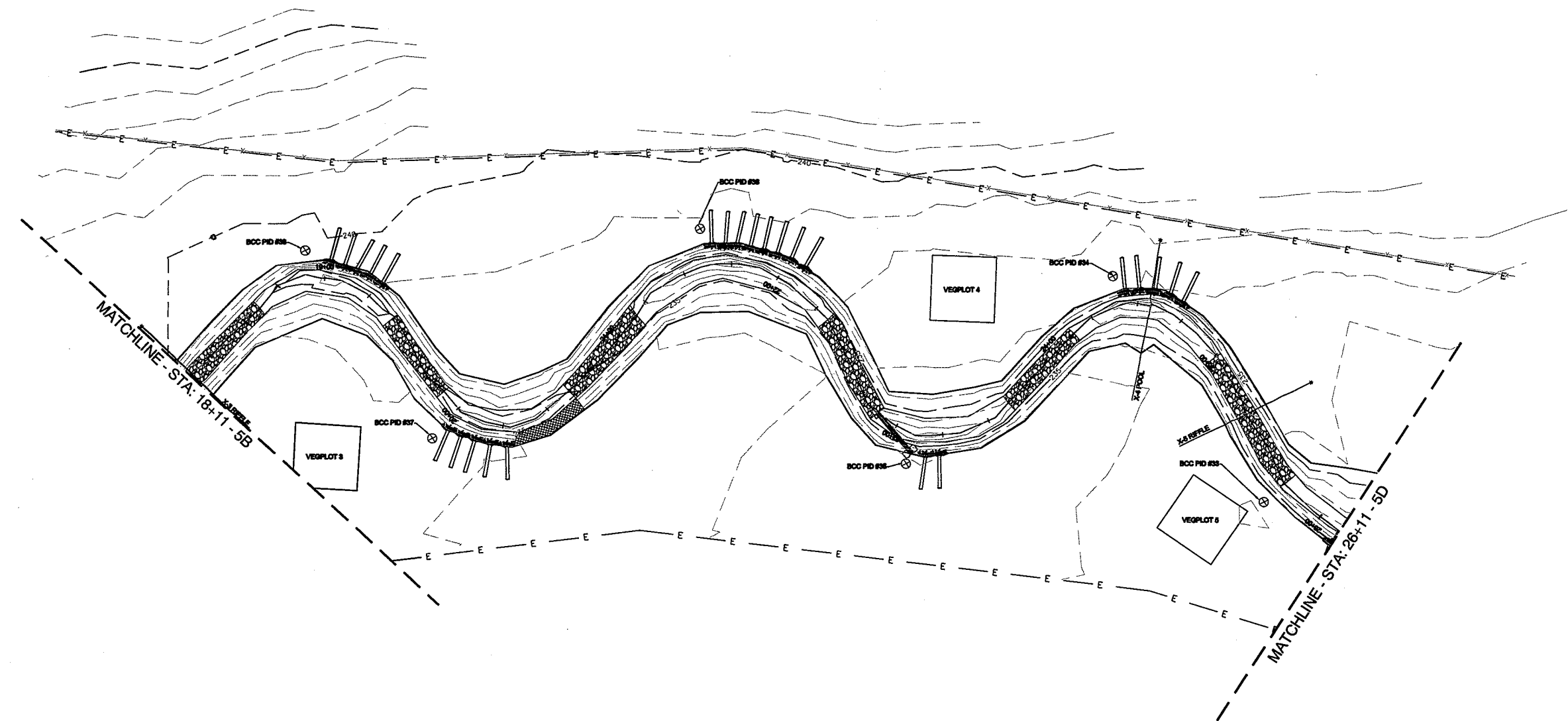
BAKER PROJECT REFERENCE NO. 109261	SHEET NO. 5B
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8-11-09	
	
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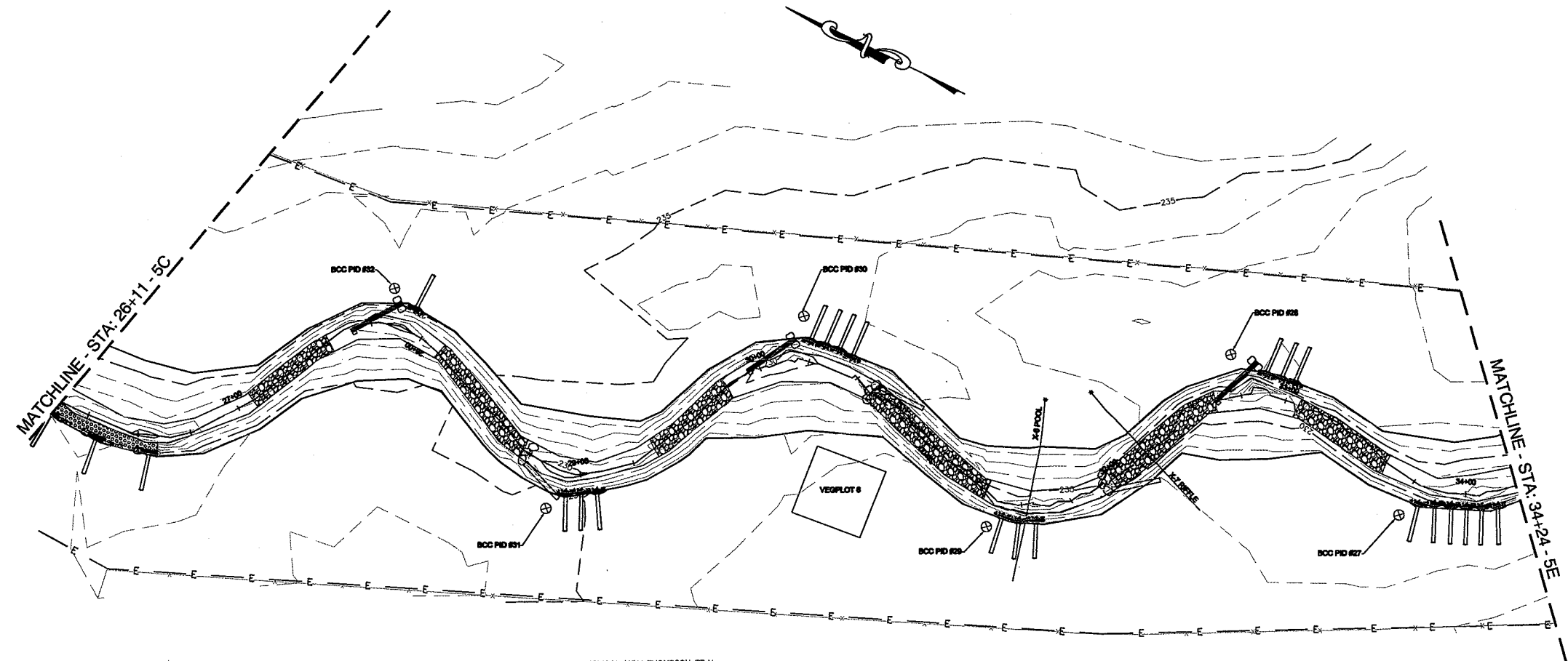


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 Michael Baker Engineering, Inc.
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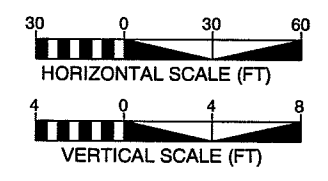
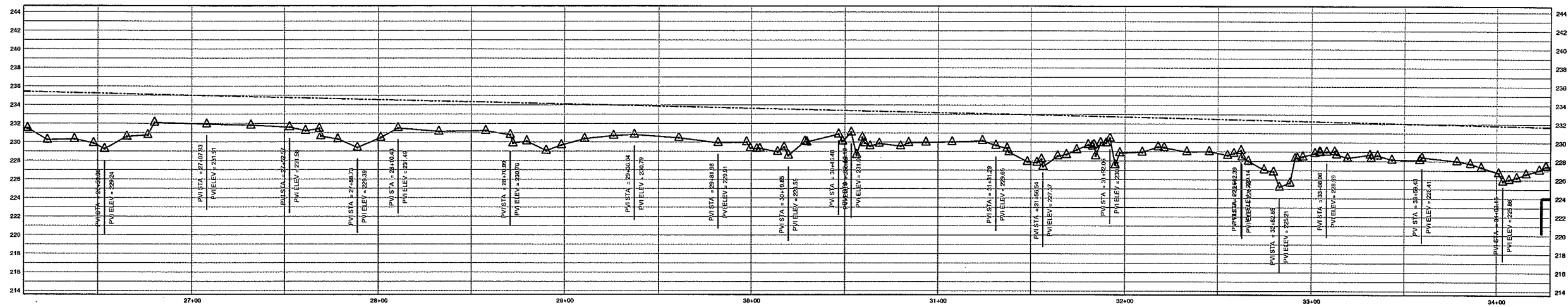


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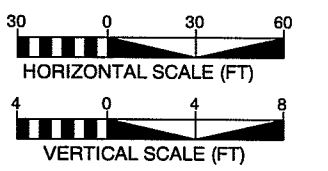
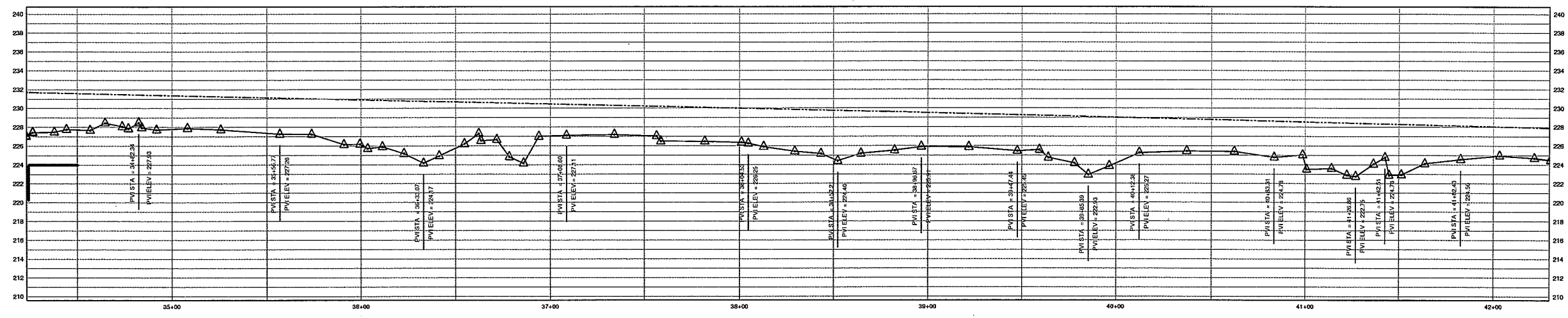
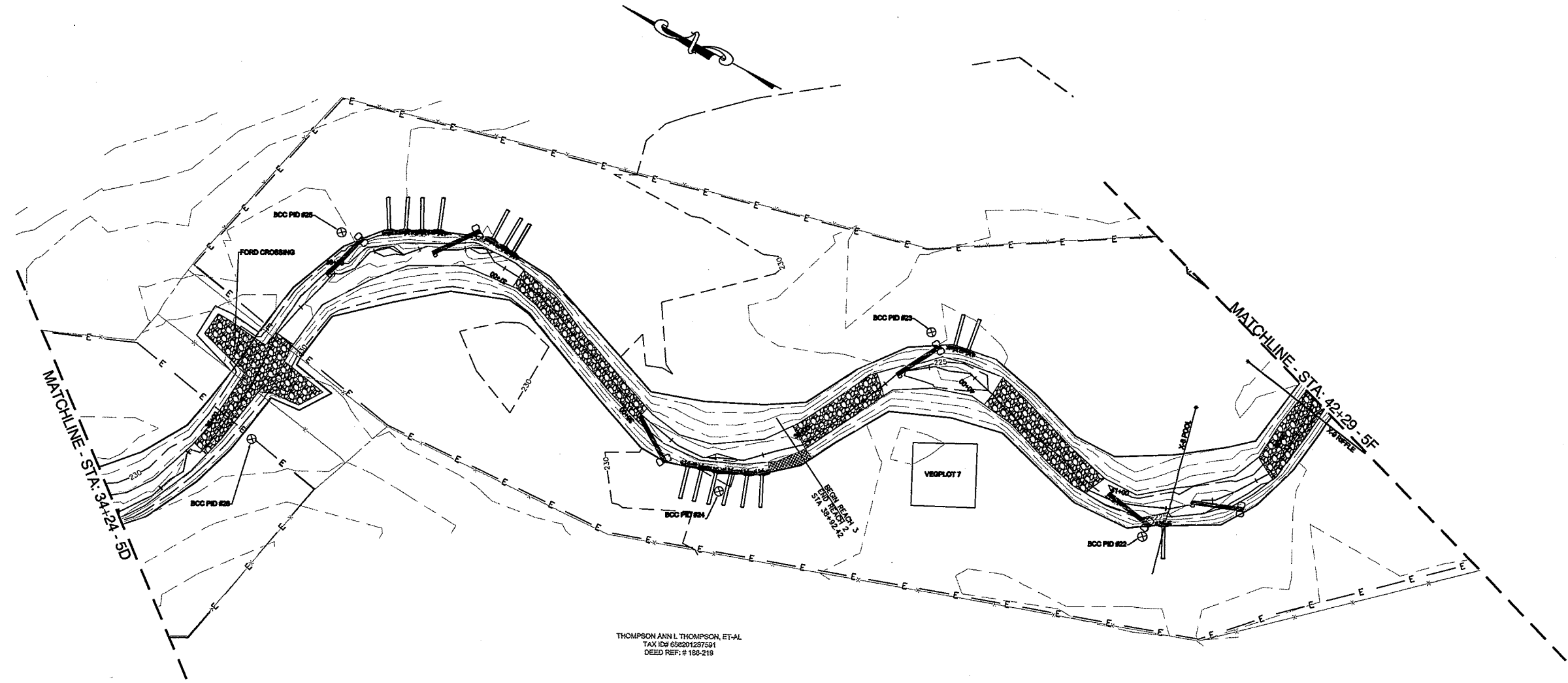


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 BIG CEDAR CREEK
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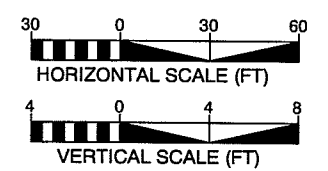
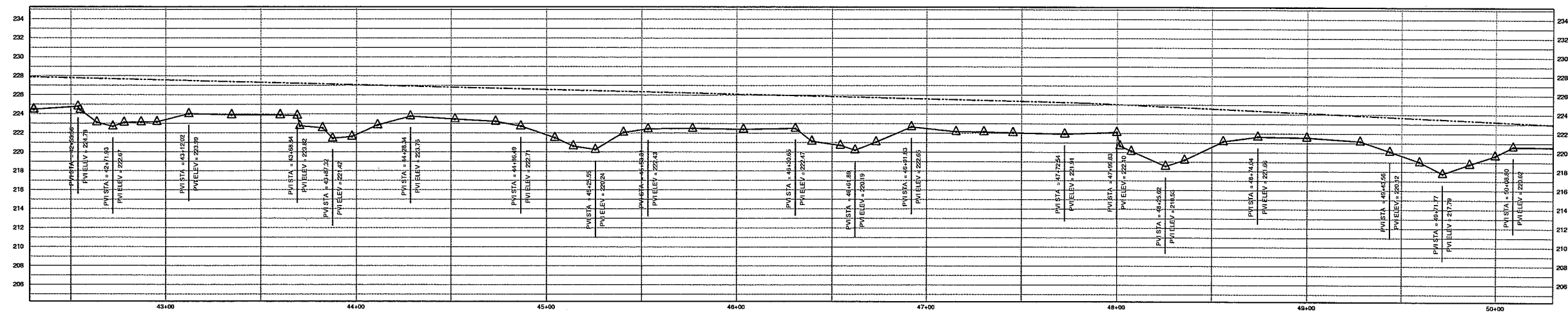
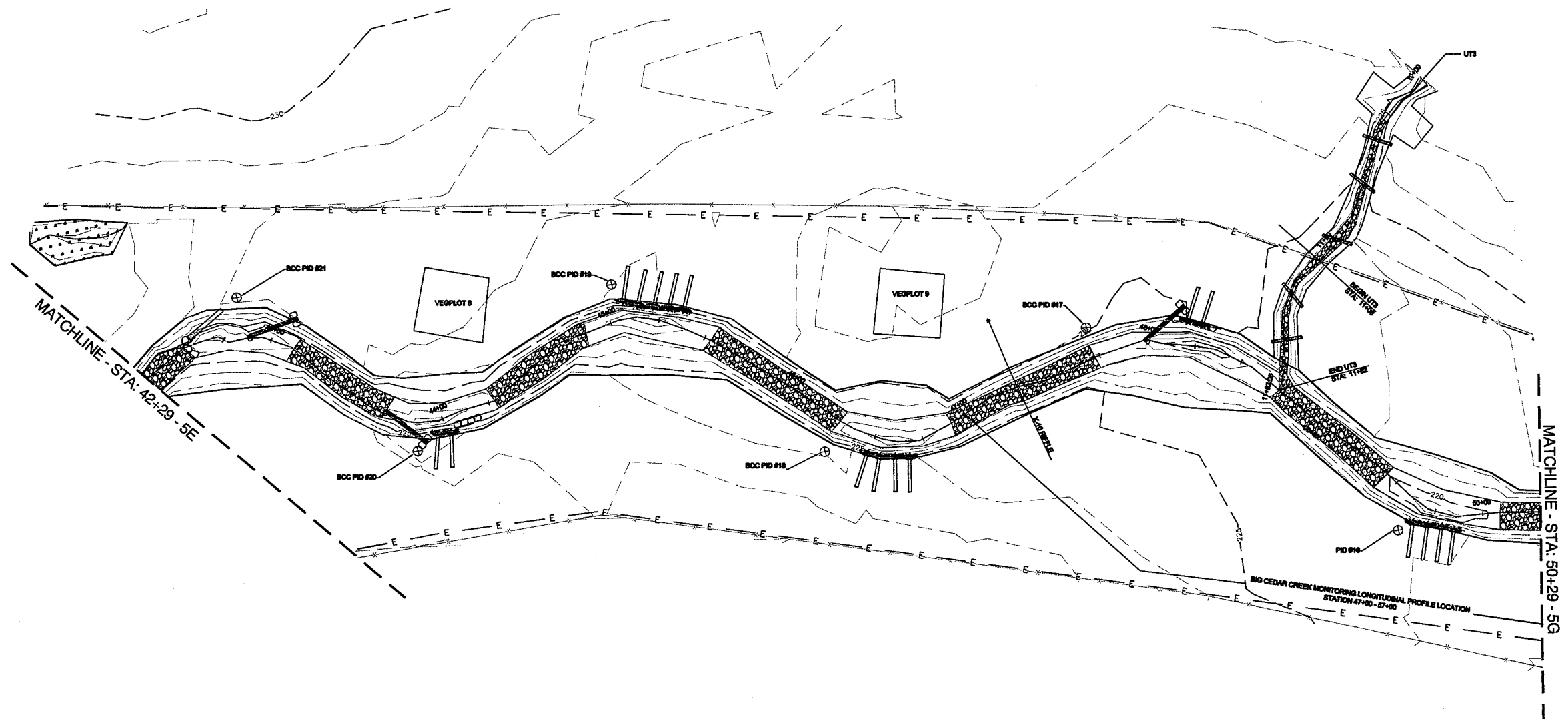
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BIG CEDAR CREEK
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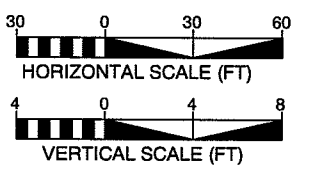
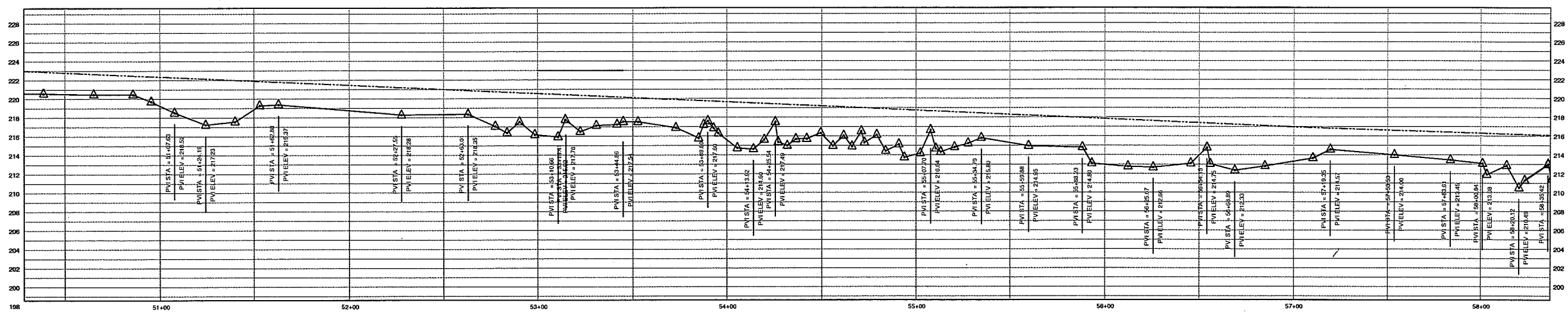
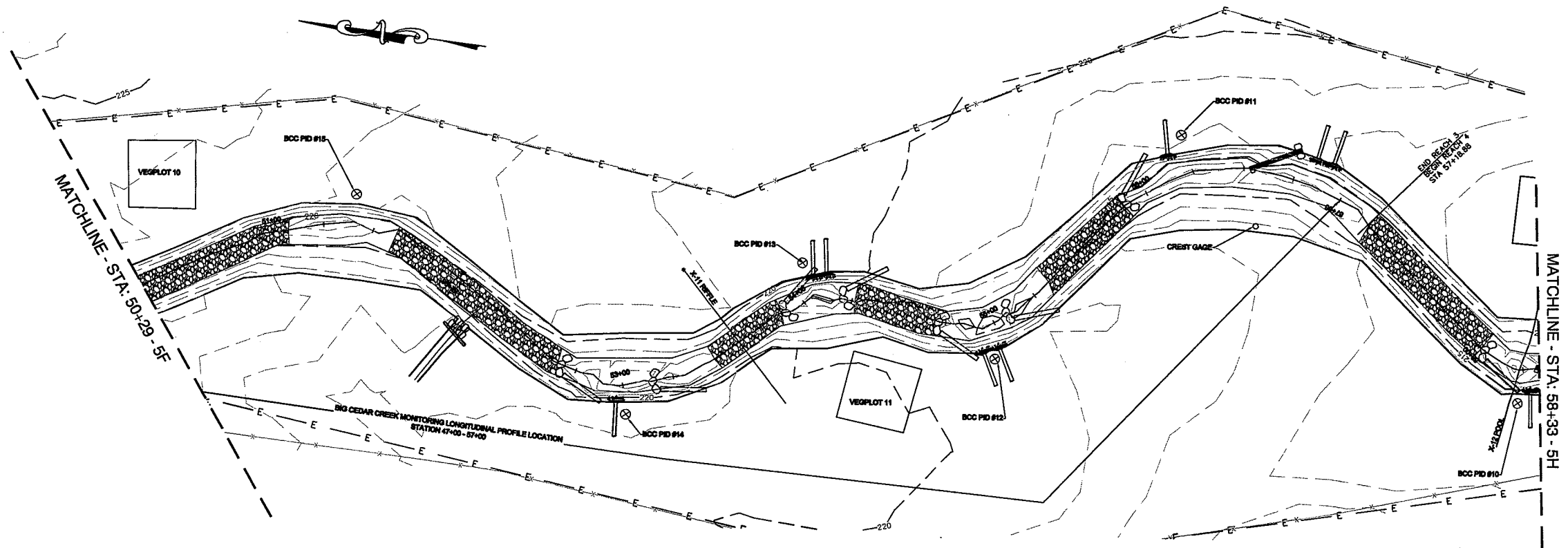
BIG CEDAR CREEK
 BIG CEDAR CREEK
 AS-BUILT



8-11-09

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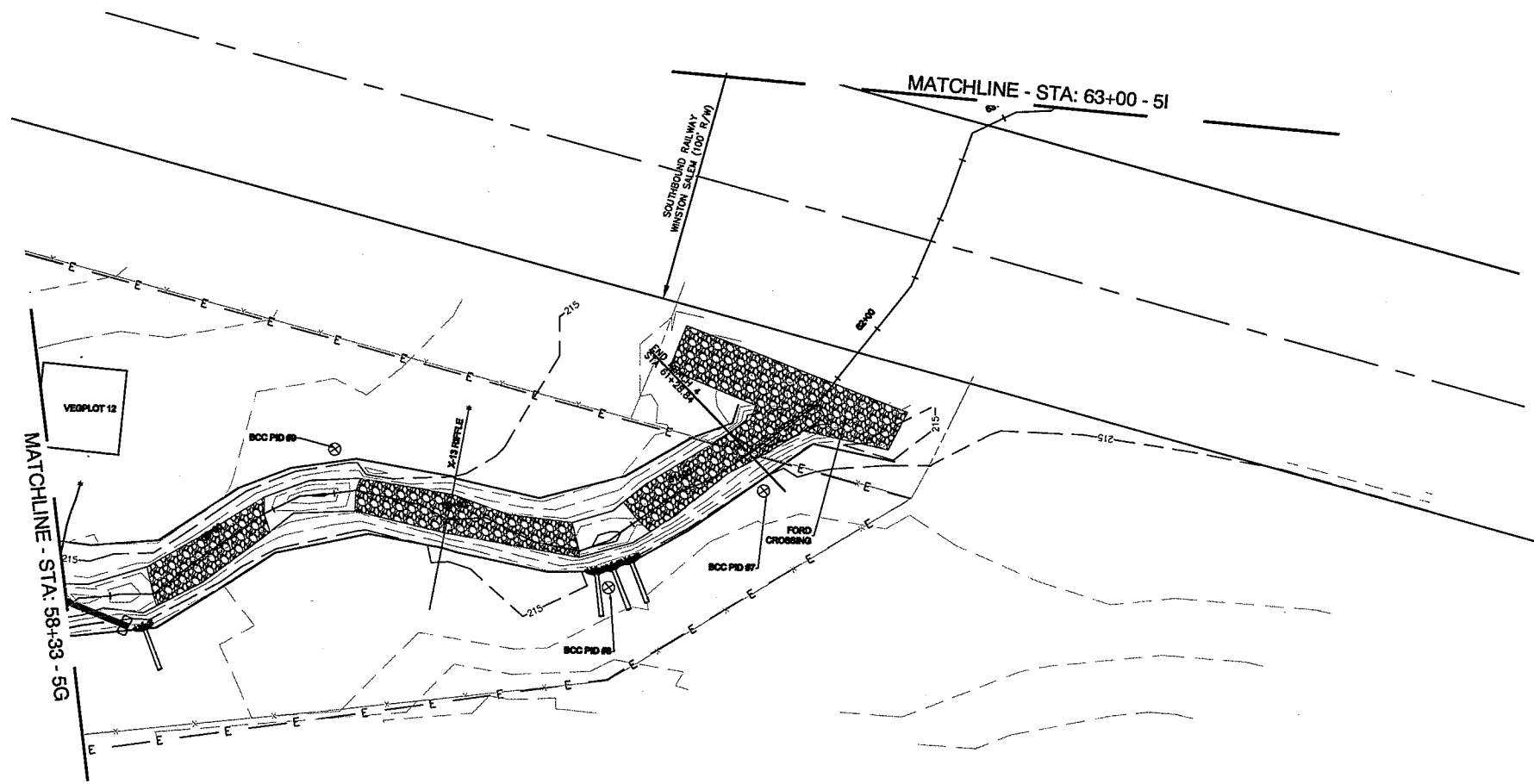


BIG CEDAR CREEK
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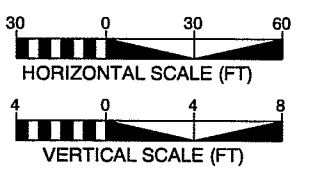
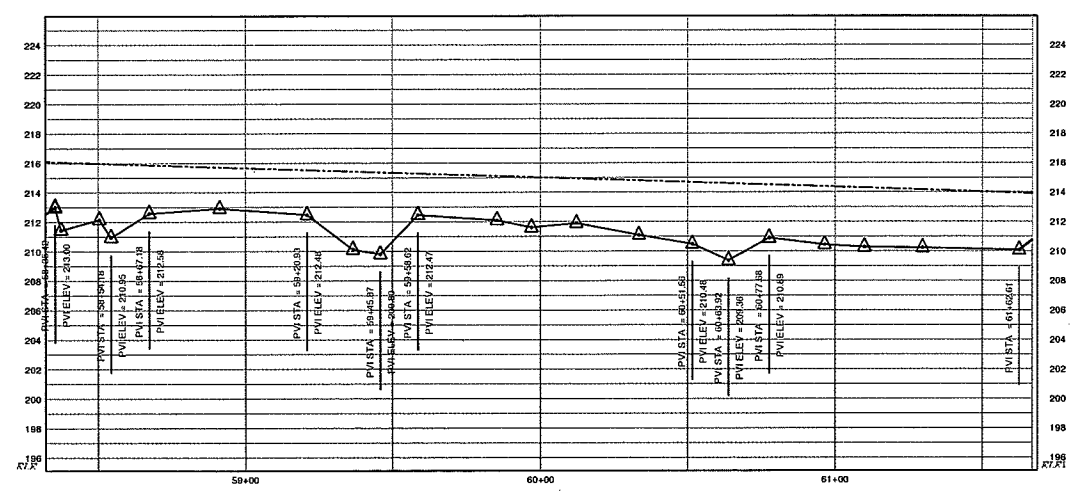


[Signature] 8/10/09

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 Michael Baker Engineering, Inc.
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 Phone: 704.334.4454
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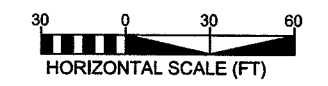
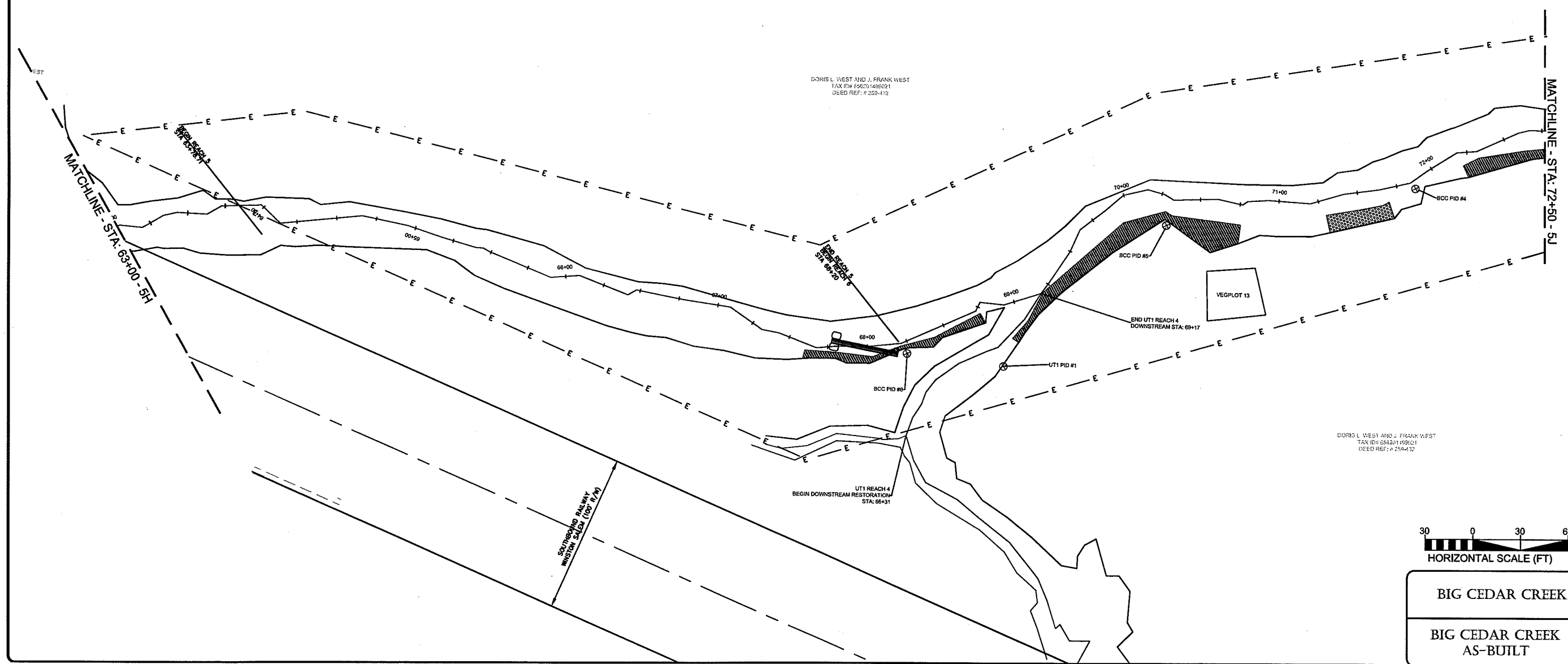


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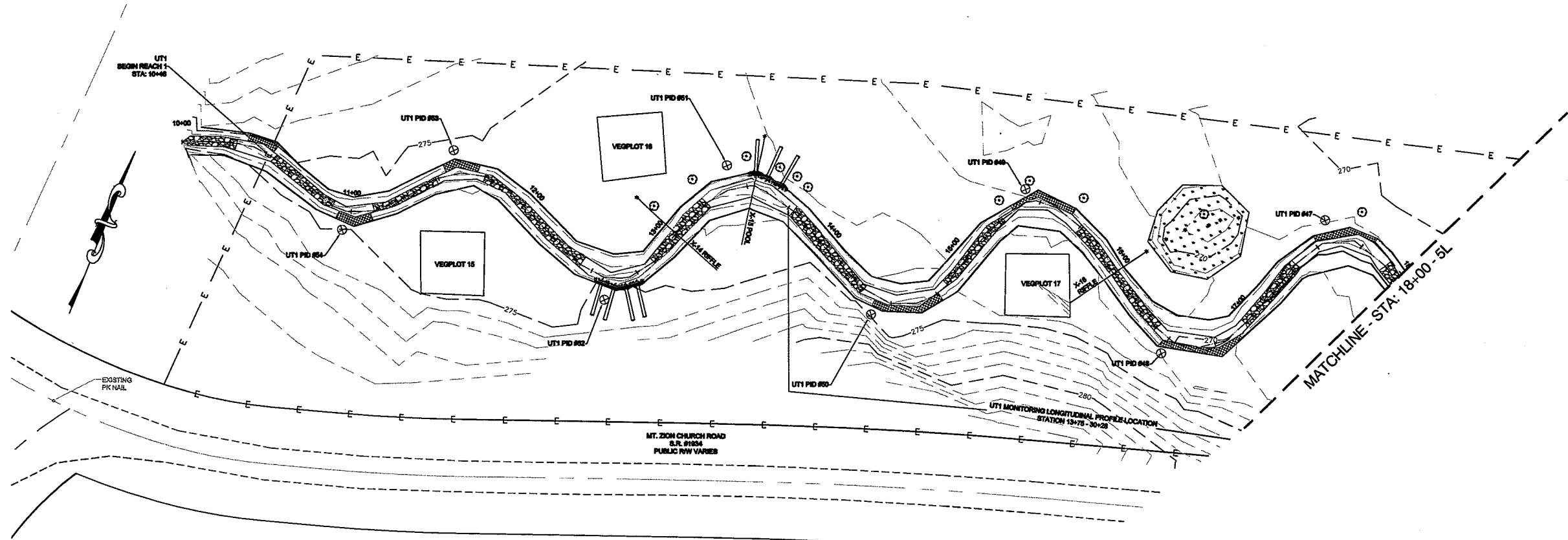
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PROJECT ENGINEER	
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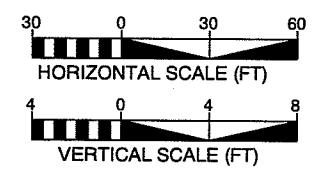
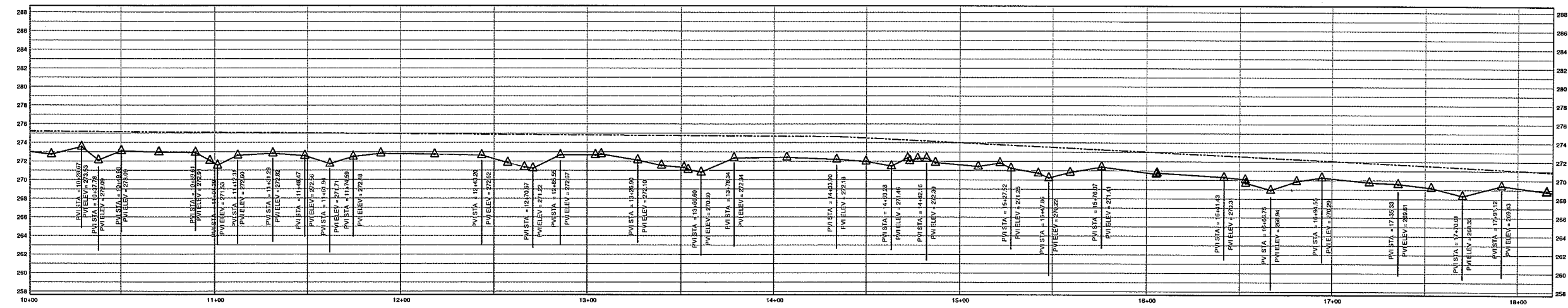


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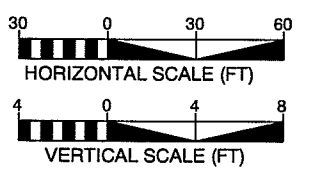
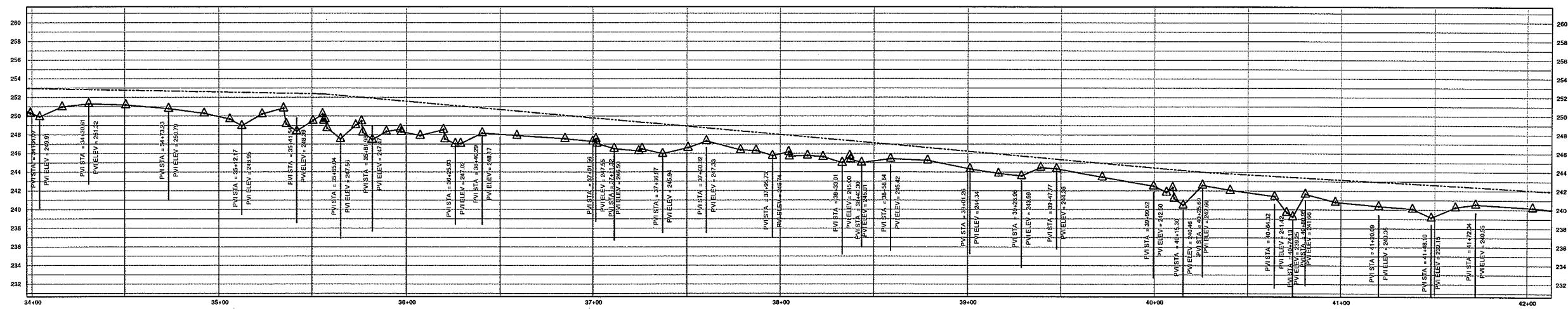
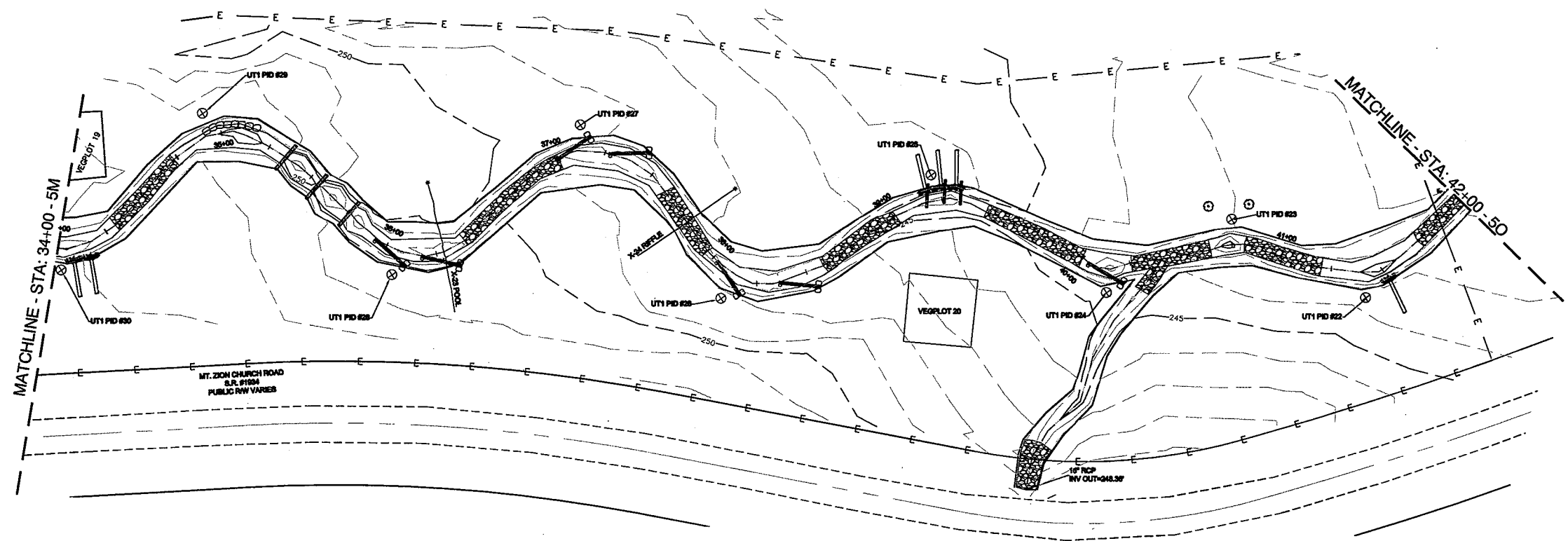
BAKER PROJECT REFERENCE NO. 109261 SHEET NO. 5K
 PROJECT ENGINEER

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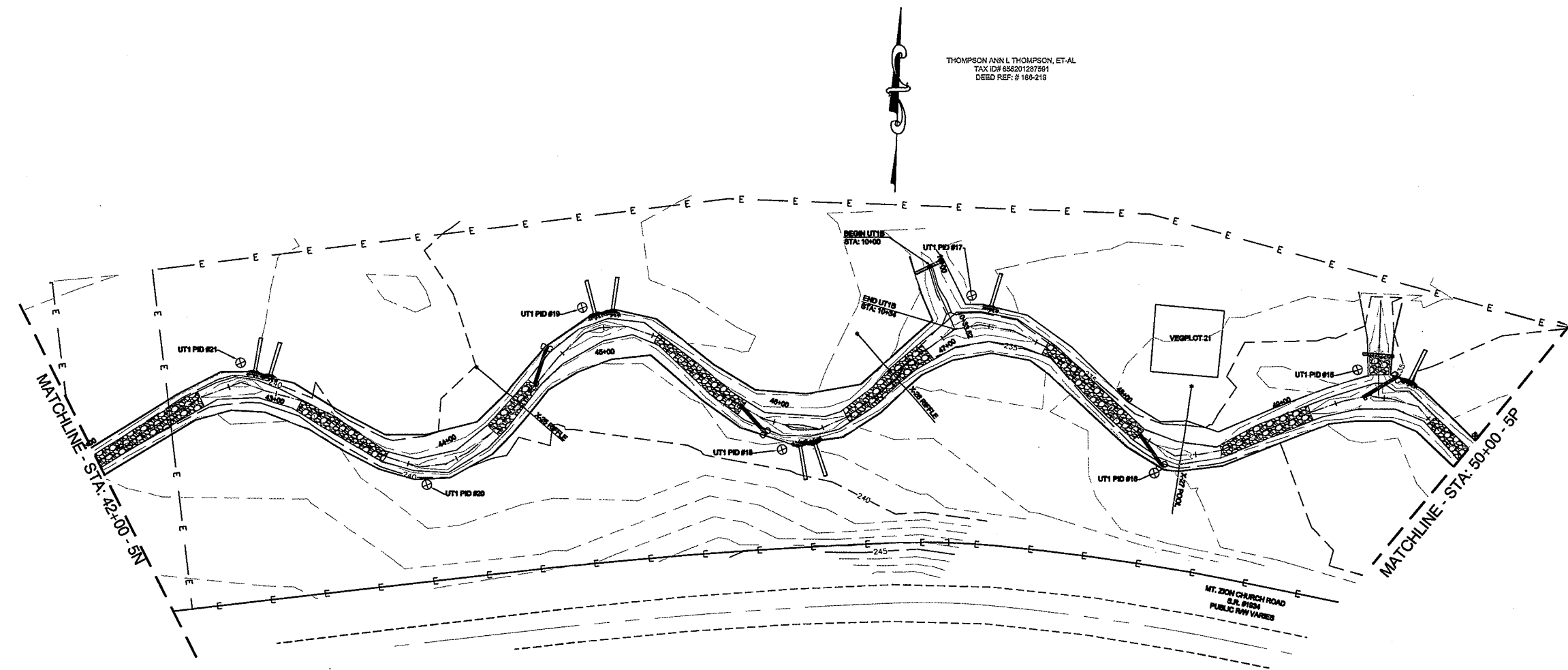
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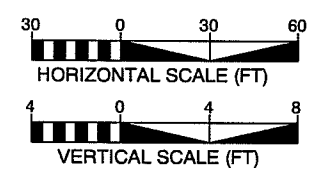
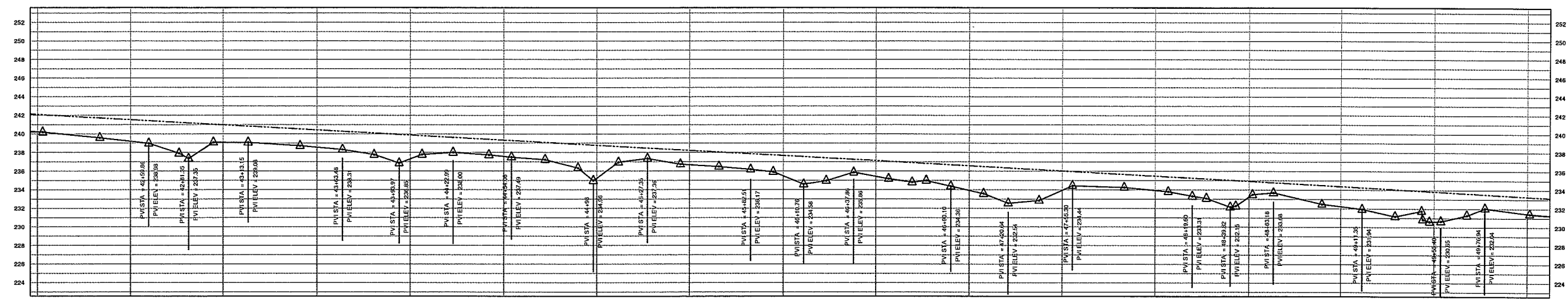
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PROJECT ENGINEER	
	
	
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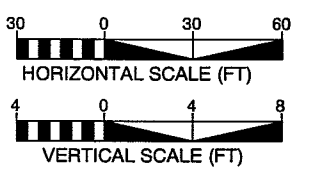
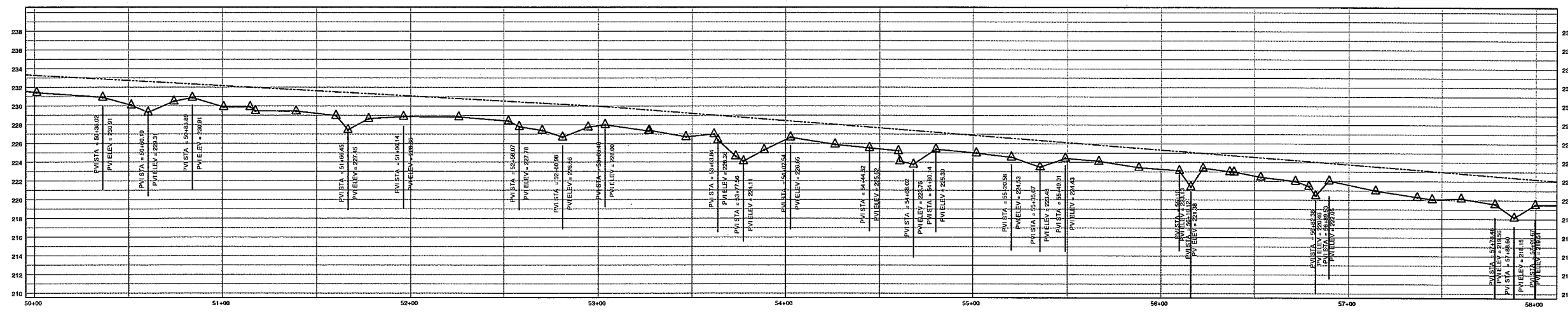
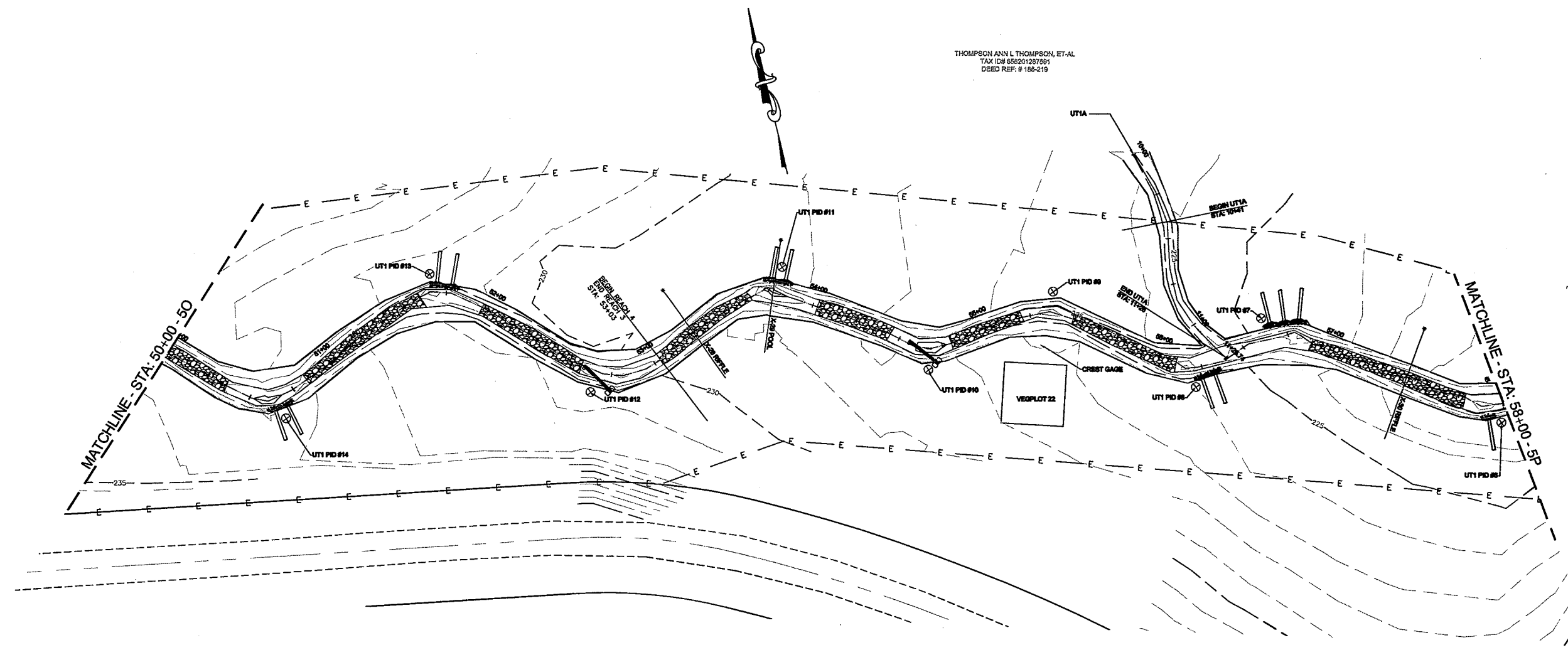


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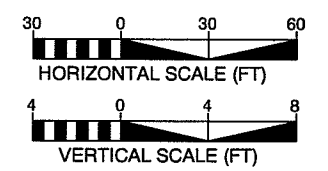
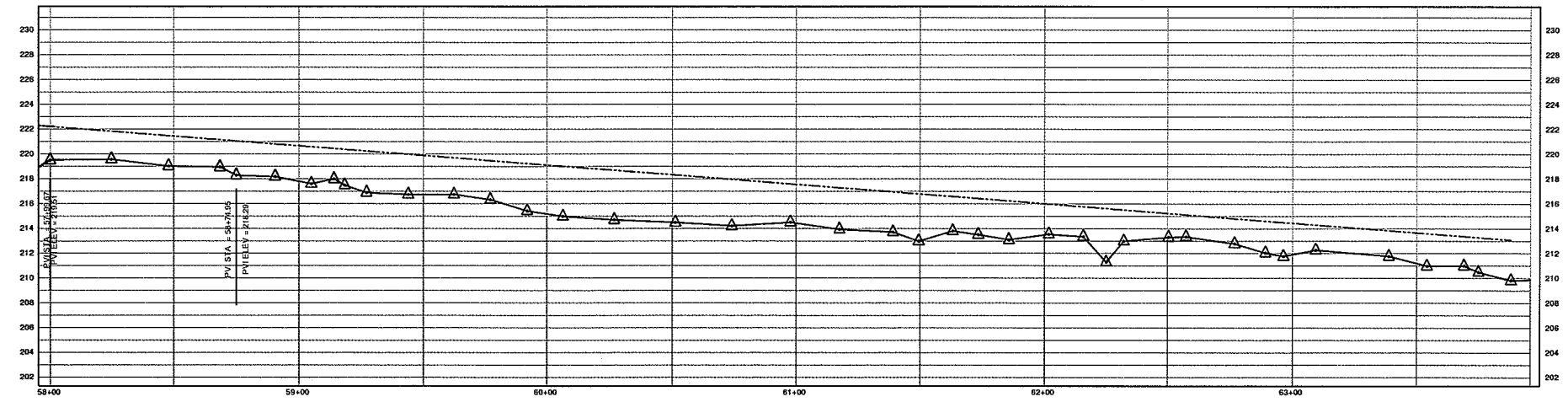
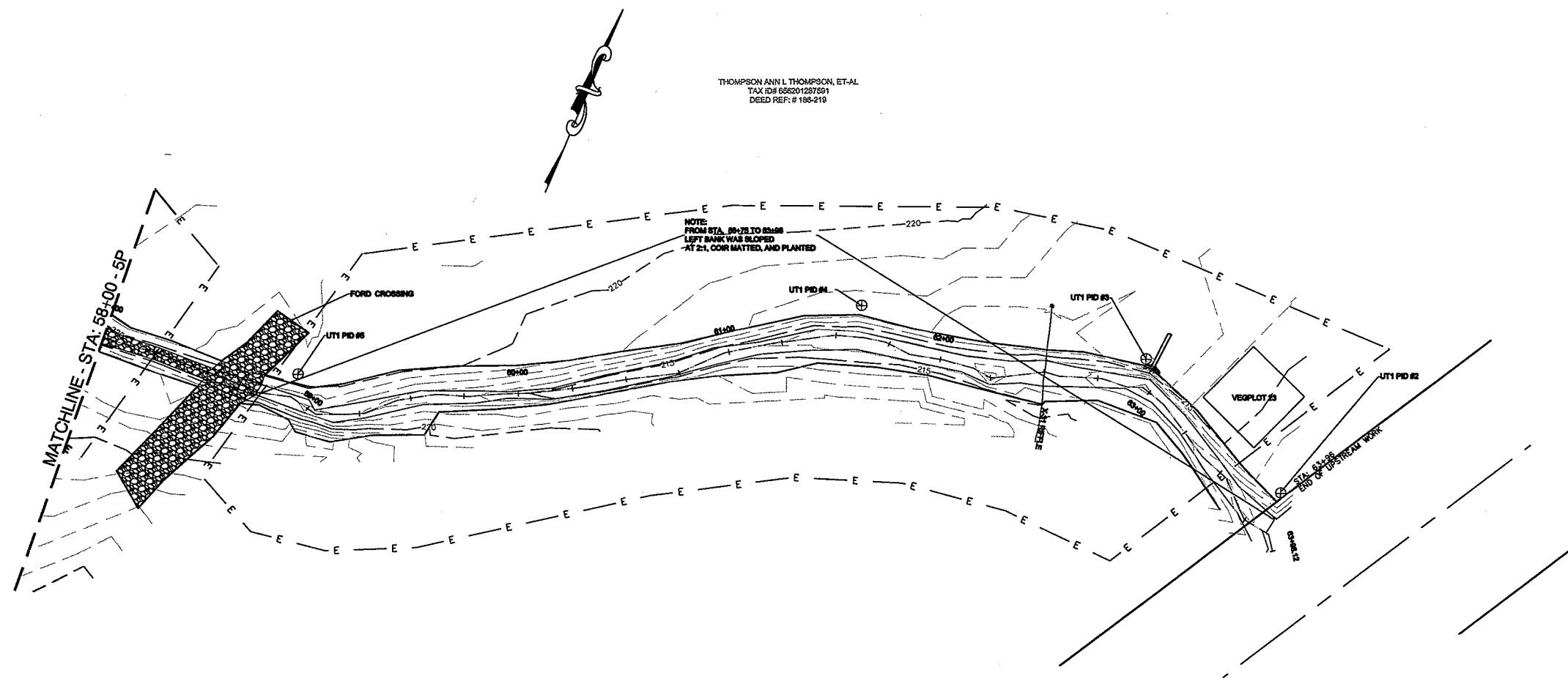
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 TAX ID# 682201287891
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PROJECT ENGINEER	
	
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