Monitoring Report
Year 1
FINAL
Little Buffalo Creek Stream Mitigation Project

NCDENR-DMS Project Number: 94147
Contract Number: 2029
USACE Action ID: 2014-0386
DWR Permit: 14-0129
Cabarrus County

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Submitted: March 2016

Prepared for:

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1.0 Executive Summary

1.1 Project Setting and Background

The Little Buffalo Creek Stream Mitigation site is located in Cabarrus County, North Carolina, two miles southwest of the Town of Gold Hill, and 12 miles east of Kannapolis. The site encompasses approximately 47 acres of former cattle pasture, crop land and riparian forest along Little Buffalo Creek and portions of seven unnamed tributaries (Figures 1 and 2). Little Buffalo Creek is located within the Yadkin River Basin (03040105; 03040105020060). Historic land use at the site had consisted primarily of ranching activities that had allowed cattle access to the stream and riparian zone. Several reaches of the stream have bedrock in their streambed and vertical migration of the stream has been confined to a small percentage of the project site.

1.2 Project Goals and Objectives

The goals of the Little Buffalo Creek Stream Restoration project include, but are not limited to, the enhancement of water quality and aquatic/terrestrial habitat, stream stability improvement, and erosion reduction. The uplift of these stream functions specifically requires:

- Protecting and improving water quality through the removal or minimization of the biological, chemical, and physical stressors:
  - Reducing sediment input into the stream from erosion;
  - Reducing non-point pollutant impacts by removing livestock access (including restoring forested buffer;
  - Protecting headwater springs.
- Improving aquatic and terrestrial wildlife habitat:
  - Moderating stream water temperatures by improving canopy coverage over the channel;
  - Restoring, enhancing, reconnecting, and protecting valuable wildlife habitat.
- Restore floodplain connectivity:
  - Reestablishing floodplain connection thereby dissipating energy associated with flood flows.

In addition to the ecological uplift that the project will provide to the Site through the improvement of the stream functions, this project establishes the following environmentally advantageous goals:

- Providing a water source for livestock removed from the stream and riparian corridor;
- Reducing the number of locations that livestock are able to cross the stream;
- Providing a safe and environmentally appropriate stream crossing points for livestock.

In order to achieve the project goals, Berger proposes to accomplish the following objectives:

- Fence the cattle out of the stream and riparian corridor;
- Remove invasive vegetative species from the riparian corridor;
- Restore and enhance unstable portions of the stream;
- Preserve the stream channel and banks through a conservation easement;
- Plant the riparian corridor with native tree and shrub vegetation.

The expected ecological benefits and goals associated with the Little Buffalo Creek site mitigation plan serve to meet objectives consistent with the resource protection objectives detailed in the Yadkin-Pee Dee River Basinwide Water Quality Plan, 2008.

1.3 Project Success Criteria

Streams
For stream hydrology, a minimum of two bankfull events must be documented within the standard 5-year monitoring period. In order for the monitoring to be considered complete, the two verification events must occur in separate monitoring years. All of the morphologic and channel stability parameters will be evaluated in the context of hydrologic events to which the system is exposed.

- Dimension – General maintenance of a stable cross-section and hydrologic access to the floodplain features over the course of the monitoring period will generally represent success in dimensional stability. For stream dimension, cross-sectional overlays and key parameters such as cross-sectional area, and the channel's width to depth ratios should demonstrate relative stability in order to be deemed successful.
- Pattern – Pattern features should show little adjustment over the standard 5 year monitoring period. Rates of lateral migration need to be moderate.
- Profile – For the channels' profile, the reach under assessment should not demonstrate any trends in thalweg aggradation or degradation over any significant continuous portion of its length. Over the monitoring period, the profile should also demonstrate the maintenance or development of bedform (facets) more in keeping with reference level diversity and distributions for the stream type in question. It should also provide a meaningful contrast in terms of bedform diversity against the pre-existing condition. Bedform distributions, riffle/pool lengths and slopes will vary, but should do so with maintenance around design distributions. This requires that the majority of pools are maintained at greater depths with lower water surface slopes and riffles are shallow with greater water surface slopes.
- Substrate and Sediment Transport – Substrate measurements should indicate progression towards, or maintenance of the known distributions from the design phase. Sediment Transport should be deemed successful in by absence of any significant trend in the aggradation or depositional potential of the channel.

Vegetation
Survival of woody species planted at mitigation sites should be at least 320 stems/acre through year three. A 10 percent mortality rate will be accepted in year four (288 stems/acre) and another 10 percent in year five resulting in a required survival rate of 260 trees/acre through year five. This is consistent with Wilmington District (1993) guidance for wetland mitigation (USACE 2003).

1.4 Mitigation Components and Design
The Little Buffalo Creek Site consists of six reaches along the mainstem and seven unnamed tributaries (UTs). The mainstem of Little Buffalo Creek as well as UT 4 and UT 7 are perennial streams. The remainders of the UTs are intermittent streams associated with groundwater seeps. This stream mitigation project includes reaches of restoration, enhancement, and preservation along the mainstem and the associated UTs. In total, the Site will provide 13,362 linear feet of restoration, enhancement, and preservation (Tables 1 & 4). A summary of restoration and enhancement activity and reporting history can be found in Table 2.

Restoration activities have established a new, stable stream channel with the appropriate dimension, pattern and profile to transport perennial flow and sediment and have re-connected the stream to its floodplain. Reestablishment of native riparian forest vegetation and installation of cattle exclusion fencing were also performed as part of the restoration activities. Enhancement activities included reestablishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor and excluding cattle with fencing. In the case of enhancement level I the activities included reshaping or relocating the bed and

banks and riparian forest planting. Preservation was conducted within portions of the stream corridors that have intact riparian forests and stable stream reaches and included excluding cattle with fencing. At a 1:1 ratio for restoration, 1.5:1 for enhancement level I, 2.5:1 for enhancement level II, and a 5:1 ratio for preservation, the DMS will receive approximately 6,411 stream mitigation units from the Site (Table 1). In addition, approximately 47 acres of riparian buffer have been protected within a conservation easement.

1.5 Monitoring Year 1 Conditions Assessment

1.5.1 Vegetation Assessment

In Year 1 of monitoring, three vegetation monitoring plots are exceeding requirements by 10% (484 to 577 stems/acre), two vegetation monitoring plots are exceeding requirements by less than 10% (each 339 stems/acre), one vegetation monitoring plot fails to meet requirements by less than 10% (290 stems/acre), and eight vegetation monitoring plots are failing to meet requirements by over 10% (145 to 282 stems/acre). Recruitment of native plant seedlings was recorded in 5 of 12 monitoring plots (Tables 6, 7, 8, and 9). The current average estimate of 282 planted stems per acre for the site is not meeting the required success criteria of 320 stems per acre, and the deficiencies are primarily associated with the areas around the eight monitoring plots. The likely cause of the poor performance has been the extended drought experienced in the region beginning as a moderate drought in June and July 2015, becoming severe in August and September 2015, and ending in October 2015 (NOAA Historical Palmer Drought Indices). Additional planting of approximately 3,000 trees within 7 riparian areas covering 7.6 acres will take place in February 2016. Tree establishment and survival will continue to be monitored.

Willow (*Salix nigra*) and silky dogwood (*Cornus amomum*) live stakes throughout the restoration areas are doing well and very few have been observed to be dead. Surviving stakes are growing quickly and are already contributing to bank stability. Soft rush (*Juncus effusus*) has become established on parts of the stream bank and is adding additional stability to sections of UT7 and UT3. Volunteer crop cover is no longer present and outcompeted by other species such as goldenrods (*Solidago*), asters (*Aster*), jimsonweed (*Datura*), and native grasses.

There are areas within the riparian buffer that have had low success in establishing herbaceous vegetation cover. These areas include approximately 300 feet along the mainstem of Reach 1, approximately 130 feet along the mainstem of Reach 4, and approximately 530 feet of UT 3 (Figure 2). The likely cause of the poor performance has been the drought mentioned above as well as sections of bank scour. These problem areas total approximately 1.8 acres and will be seeded with a riparian seed mix in February of 2016. These area will make up 53% of E1 areas and 20% of restoration areas.

The treatment and removal of privet (*Ligustrum*), multiflora rose (*Rosa multiflora*), and tree-of-heaven (*Ailanthus altissima*) from riparian areas has been mostly successful. Through site inspections, tree-of-heaven is still established at the upstream ends of both UT 2 (approx. 450ft) and UT 7 (approx. 400ft), as well as four large trees between UT4 and UT3 (Figure 2). The larger trees at UT7 have been treated with herbicide and at time of monitoring were either dead or dying. However, they still produced seeds or root sprouts and will require further control. The UT 2 area was treated but will require further treatment as well. Privet continues to be present in various areas throughout the site, particularly on the upper portion of UT2 and the lower portion of UT7. Both privet and tree-of-heaven will be treated with herbicide application again in the late spring and fall of 2016 in accordance with NC Department of Agriculture (NCDA) rules and regulations.

1.5.2 Stream Assessment

Overall, there has been very little change from the baseline conditions survey completed at the end of construction in regards to stream stability and conditions. The key observation in stream stability has been the development of a sinuous low flow channel within the areas of restoration in Reach 1, Reach 3 and UT

7. The development of this sinuous channel at base flow conditions is important to providing adequate riffle-pool systems needed at base flow to provide in-stream habitat areas for fish, amphibians, and aquatic insects. In addition, the stream bedload was observed to continue to be sorted and finer material has either moved to the stream bank edges or moved downstream and a courser bed material is present within the channel. However, due to the drought conditions experienced over the spring and summer in 2015, stretches of main channel were dry during the September monitoring and the pebble count recorded a higher percentage of silts deposited during the receding flows. This is expected to be a temporary condition.

In-stream structures have generally maintained their stability and performance within the site, with the exception of the step-pool system near the confluence of UT 7 with the mainstem. Due to the backflow conditions generated in storm events in this area and the sediment transport generated by the placed stream bed material within UT 7, bed material settlement was observed within the step-pools. The step-pool structures may require maintenance to remove the deposited bed material and reestablish the designed pool depths if subsequent flows do not scour the pools to design depths.

Routine channel maintenance and repair activities will include examination of current pool conditions and, if warranted, excavation of deposited bed load material within the step-pool structures of UT 7 to reestablish pool depths and habitat functionality. Future channel maintenance may include chinking of in-stream structures to prevent piping, securing of loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel bank. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head- cutting.

The stream restoration and enhancement areas are relatively stable and will continue to adjust somewhat in response to storm events. Gage data has not supported the bankfull event within the mainstem or UT7, though high flows have occurred based on observations of rack debris outside of the top of bank in some areas. The stream channel is beginning to develop the desired sinuosity and in-stream structures are remaining stable and functioning as designed; the exception being the step-pool system in UT-7 as noted above. No work is planned on these pools until after Year 2 to allow more time for natural development.

Due to the drought in Year 1 limited hydrological data is available at this point. Bankfull events were recorded at UT2 and UT3 but not at any of the other areas. This is more likely due to the narrow and isolated positions of these areas than it is a representation of the entire site. Two groundwater monitoring wells will be installed along UT3 in the spring of 2016 to provide additional hydrological data to demonstrate groundwater connectivity to the stream channel. The cross-section and longitudinal profiles were conducted during the drought period and water surface elevations were not distinguishable from the thalweg elevations at that time; therefore, distinct water surface elevation are not visible on these figures.

1.5.3 Site Boundary Assessment

Site boundaries have been well maintained with the exception of one corner of fence where UT 3 joins the mainstem which has been cut and reassembled, presumably by the land owner to remove escaped cattle. Additionally, the upstream electrical fence associated with the cattle crossing in Reach 5 was observed to be down and ineffective. Observations of this area during the Year 1 monitoring suggested that some cattle may have accessed this area, but the cattle are currently excluded by the gates placed on both sides of the stream. The fence through this area has subsequentially been repaired by the landowner and the fence electrified through an additional source. The exclusion fence along UT3, while still effective, will be repaired in 2016. Discussions with the landowners regarding maintenance of the crossing, fencing and encroachments into the easement is ongoing. Additional fencing will be installed along the mainstem at Old Mine Road in 2016 to prevent access to the easement at these locations. The installation of conservation easement boundary signs will be completed in 2016.

Summary information/data related to occurrence of items such as encroachment by landowners or evidence of cattle intrusion and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the As-Built Baseline Monitoring Report and in the Mitigation Plan documents available on NCDEQ's website. All raw data supporting the tables and figures in the appendices is available from NCDEQ upon request.

2.0 Methodology

Monitoring for stream stability, stream hydrology, and vegetation will be monitored annually for five years following the initial Baseline and As-Built Report. Annual monitoring requirements are based on the U.S. Army Corps of Engineers *Stream Mitigation Guidelines* document (USACE 2003) and supplemental requirements listed in the DMS *Stream and Wetland Mitigation Monitoring Guidelines* dated February 2014 (NCEEP 2014). Establishment, collection, and summarization of data collected was in accordance with the NCDEQ guidance document *EEP Annual Monitoring Report Format, Data Requirements, and Content Guidance* (April 2015).

2.1 Geomorphology

Surveys for Year 1 monitoring were conducted by Louis Berger in September 2015 using a Nikon Total Station, geo referenced to North Carolina State Plane (NAD83-State Plane Feet-FIPS3200) with vertical datum North American Vertical Datum of 1988 (Feet NAVD88).

2.2 Longitudinal Profiles

A total of approximately 2950 feet of channel along 8 longitudinal profiles is being surveyed annually. This includes 335 feet on LBC Reach 1, 225 feet on LBC Reach 3, 112 feet on LBC Reach 4, 51 feet on UT 2, 771 feet on UT 3, 411 feet on UT 4, 977 on UT 7 and 62 feet on UT 8. Data collected from annual monitoring is being compared with the as-built conditions to document the current state of the channel and any trends in the stream profile occurring throughout the monitoring period. The start and finish locations of each cross-section and longitudinal profile are collected using a Total Station.

2.3 Cross Sections & Particle Size Distribution

A total of 15 cross-sections, including 9 riffles and 6 pools, were installed upon completion of construction and are being monitored annually. The total number of cross-sections includes five on the mainstem of Little Buffalo Creek, one on UT 2, four on UT 3, two on UT 4 and three on UT 7. Two additional cross-sections will be added within the step-pool portion of UT 7 in Monitoring Year 2.

Pebble count surveys were conducted at each cross section. Moving from bank to bank, particles were picked up blindly and at random and measured in millimeters. Enough samples were taken to get a representative sample of particle size distribution for each cross section. Sample size ranged from 50 in pool areas dominated by fines to 100 in flowing riffle areas with a diversity of particle sizes.

2.4 Vegetation Monitoring

The CVS-DMS entry tool database was used to calculate the number of monitoring plots needed based on project acreage. Louis Berger established twelve vegetation monitoring plots across all reaches and tributaries of the project area based on guidance given in the *CVS-DMS Protocol for Recording Vegetation Version 4.2* (Lee et al. 2008). Each plot measures approximately 0.025 acres individually and is staked out with bright orange painted rebar and marked with an upright section of PVC pipe. Photos were taken of each plot and Year 1 monitoring data was entered into the CVS-DMS database under the Little Buffalo Creek Stream Mitigation Project (Project ID 94147).

For a monitoring event, yellow rope is tied around the four corner stakes to mark out the plot. In Year 0, a GPS was used to collect coordinates of each stem and their position was measured in relation to the X and Y axis of the plot. Additionally, each stem was marked with pink flagging to make them easy to locate and identify in Year 1. Planted stems were identified, measured, and given a vigor score ranging from 0 to 4

based on the CVS-DMS database. Naturally recruited stems were identified and tallied only if alive. These stems were not measured or given a vigor score.

2.5 Hydrological Monitoring

A total of eight water level gages were installed on site. The gages are being monitored quarterly to document highest stage for the monitoring interval and verify occurrences of bankfull and geomorphically significant flow events. In addition, observations of wrack and depositional features in the floodplain, if present, are being documented with photos.

2.6 Photo Points & Visual Assessment

Permanent photo stations were established at each cross-section to digitally document annual conditions of the left and right banks. Each vegetation monitoring plot includes a photo station taken diagonally from a plot corner towards the opposite plot corner. Additional permanent photo locations have been established throughout the project area and can be found on the CCPV maps in Appendix A. Visual stream assessments are conducted during annual monitoring to summarize performance percentages of morphological and structural features. Visual vegetation assessments are also occurring to catalog the extent and type of vegetation issue areas as compared to the total planted acreage within the project site.

3.0 References

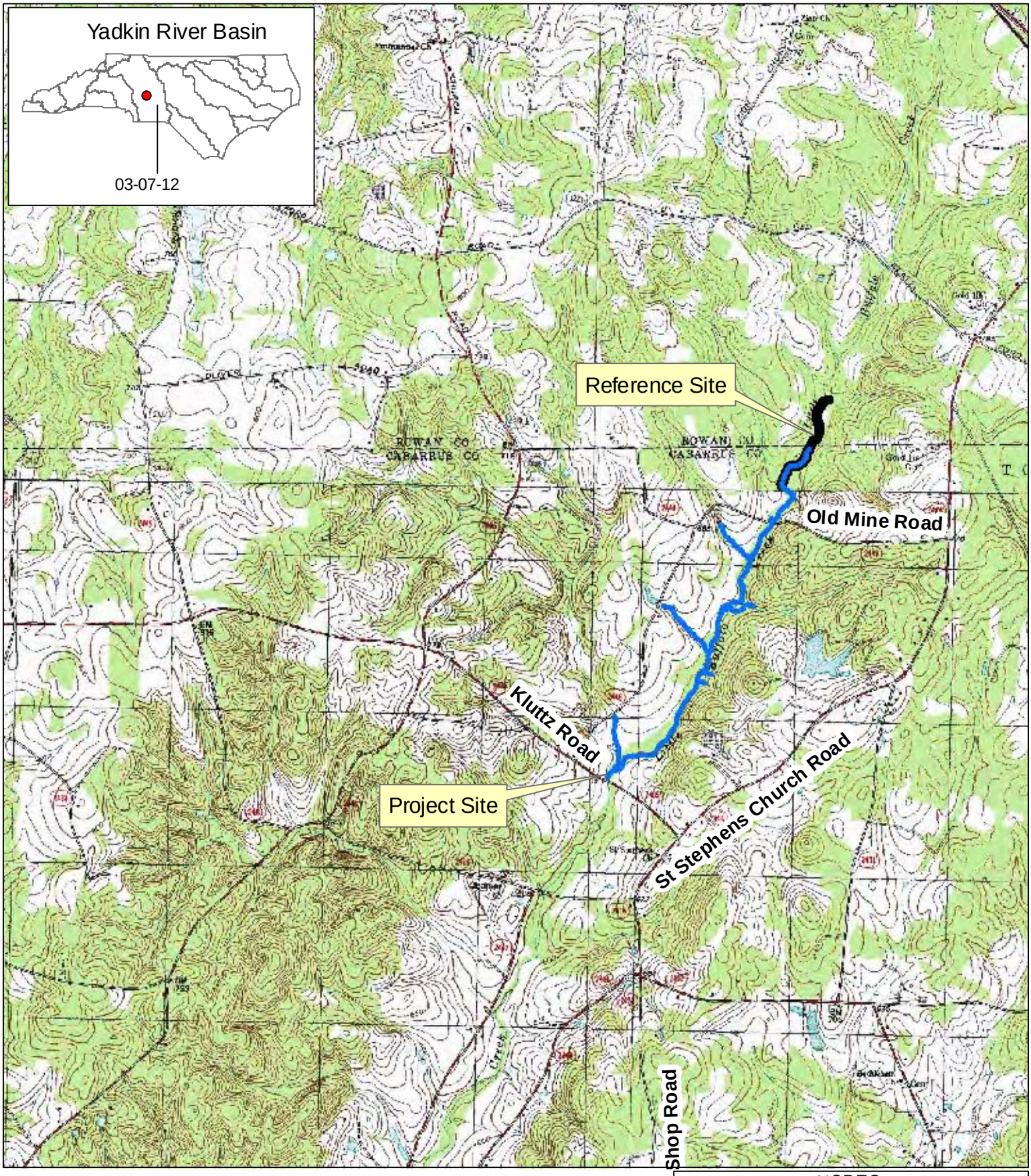
Lee, Michael T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-DMS Protocol for Recording Vegetation, Version 4.2 (http://cvs.bio.unc.edu/methods.htm).

National Oceanic and Atmospheric Administration. Historical Palmer Drought Indices. December 2014 through November 2015. http://www.ncdc.noaa.gov/temp-and-precip/drought/historical-palmers/psi/201412-201511/. Accessed on 12/18/15.

North Carolina Ecosystem Enhancement Program 2014. *Stream and Wetland Mitigation Monitoring Guidelines*. February 2014. 7pp.

USACE 2003. Stream Mitigation Guidelines. Prepared by: USACE, NCDWQ, USEPA, NCWRC.

Appendix A – Project Vicinity Map & Background Tables



Legend

- Project Stream Segments
- Reference Reach

N

0 0.5 1 Miles

Source: USGS Topographic Quads:
Gold Hill, R
and Mount Pleasant, NC

NCDEQ Division of Mitigation Services	
Little Buffalo Creek Creek Stream Restoration, Cabarrus County, NC DMS Project # 94147	
Project Location Map	
THE LOUIS BERGER GROUP Raleigh, NC 27605	Figure 1 March 2016

Table 1. Project Components and Mitigation Credits
Little Buffalo Creek Stream Mitigation Project
EEP Project No. 94147

Mitigation Credit Summations

	Stream	Riparian Wetland	Non-riparian Wetland	Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset			
Overall Mitigation Units	6,411	0	0						

Project Components

Reach ID	Stationing	Existing Feet (linear feet)	Restoration Footage or Acreage	Restoration Level	Restoration or Rest Equiv.	Mitigation Ratio	Stream Mitigation Units	Notes
Reach 1	10+00 to 33+05	2,305	377 R 1928 EII	Restoration Enhancement Level II	N/A	Restoration 1:1 Enhancement Level II 2.5:1	1148	
Reach 2	33+66 to 46+10	1,244	1244 EII	Enhancement Level II	N/A	Enhancement Level II 2.5:1	498	
Reach 3	46+10 to 56+93	1,083	244 R 839 EII	Restoration Enhancement Level II	N/A	Restoration 1:1 Enhancement Level II 2.5:1	580	
Reach 4	56+93 to 66+62	969	151 EI 818 EII	Enhancement Level I Enhancement Level II	N/A	Enhancement Level I 1.5:1 Enhancement Level II 2.5:1	428	
Reach 5	66+62 to 74+88	826	826 EII	Enhancement Level II	N/A	Enhancement Level II 2.5:1	330	
Reach 6	75+19 to 82+55; 91+89 to 104+96	2,043	2,043 P	Preservation	N/A	Preservation 5:1	409	
UT 1	10+00 to 11+11	111	111 EII	Enhancement Level II	N/A	Enhancement Level II 2.5:1	44	
UT 2	10+00 to 19+51	951	49 R 567 EII 335 P	Restoration Enhancement Level II Preservation	N/A	Restoration 1:1 Enhancement Level II 2.5:1 Preservation 5:1	343	
UT 3	10+00 to 24+75	1,475	305 R; 536 EI 634 EII	Restoration Enhancement Level I Enhancement Level II	N/A	Restoration 1:1 Enhancement Level I 1.5:1 Enhancement Level II 2.5:1	916	
UT 4	100+00 to 18+31	831	410 EI 421 EII	Enhancement Level I Enhancement Level II	N/A	Enhancement Level I 1.5:1 Enhancement Level II 2.5:1	442	
UT 5	10+00 to 11+84	184	184 EII	Enhancement Level II	N/A	Enhancement Level II 2.5:1	74	
UT 6	10+00 to 11+51	151	151 EII	Enhancement Level II	N/A	Enhancement Level II 2.5:1	60	
UT 7	10+00 to 21+27	1,127	980 R 147 EI	Restoration Enhancement Level I	N/A	Restoration 1:1 Enhancement Level I 1.5:1	1078	
UT 8	10+19 to 10+81	62	62 R	Restoration	N/A	Restoration 1:1	62	

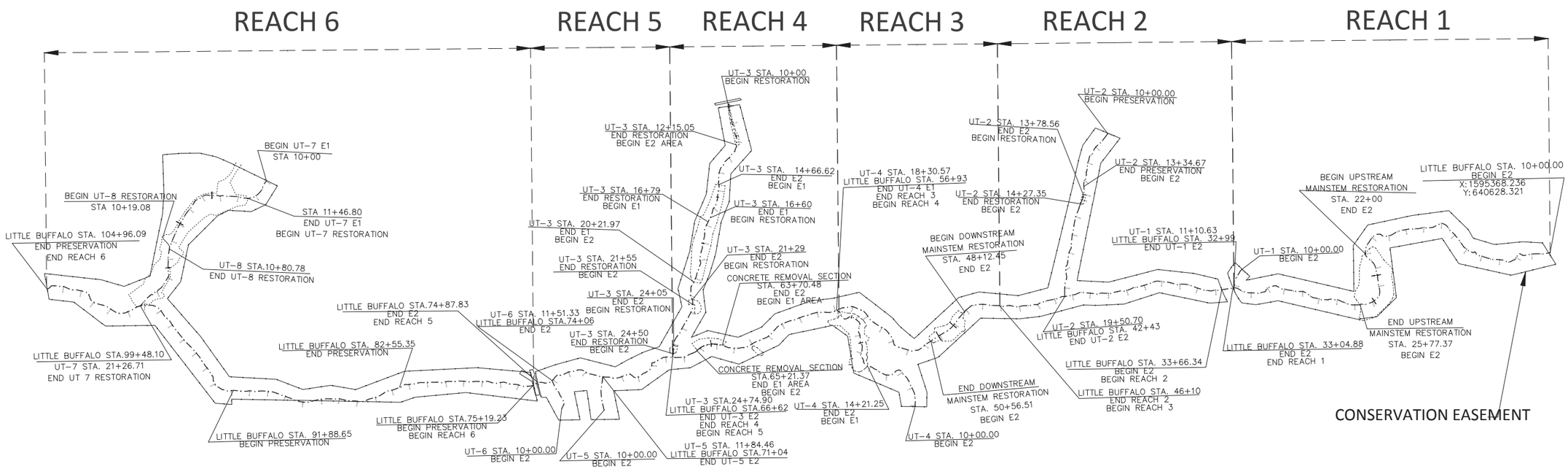
Note: Due to rounding some of the values when added may appear to be 1' short of total, this is purely a product of values being rounded to nearest linear foot

Length and Area Summations

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (acres)			
		Riverine	Non-riverine						
Restoration	2,017	N/A	N/A	N/A	201,700	N/A			
Enhancement	N/A	N/A	N/A	N/A	N/A	N/A			
Enhancement I	1,244	N/A	N/A	N/A	124,400	N/A			
Enhancement II	7,723	N/A	N/A	N/A	772,300	N/A			
Creation	N/A	N/A	N/A	N/A	N/A	N/A			
Preservation	2,378	N/A	N/A	N/A	237,800	N/A			
High Quality Preservation	N/A	N/A	N/A	N/A	N/A	N/A			

BMP Elements

Element	Location	Purpose/Function	Notes						



MAINSTEM RESTORATION PLAN INDEX

ALIGNMENT	MITIGATION ACTIVITY	START STATION	END STATION
MAINSTEM	ENHANCEMENT LEVEL 2	10+00	22+00.00
	RESTORATION	22+00.00	25+77.37
	ENHANCEMENT LEVEL 2	25+77.37	33+04.88
	ENHANCEMENT LEVEL 2	33+66.34	48+12.45
	RESTORATION	48+12.45	50+56.51
	ENHANCEMENT LEVEL 2	50+56.51	63+70.48
	ENHANCEMENT LEVEL 1	63+70.48	65+21.37
	ENHANCEMENT LEVEL 2	65+21.37	74+87.83
	PRESERVATION	75+19.23	82+55.35
	PRESERVATION	91+88.65	104+96.09

MITIGATION ACTIVITY	GENERAL DESCRIPTION
RESTORATION	CHANNEL RE-ALIGNMENT AND CREATION. DITCH PLUG INSTALLATION. IN-STREAM STRUCTURE INSTALLATION, INCLUDING LOG VANES, ROCK CROSS VANES, STEP POOLS AND ROOT WADS. STREAM BANK RE-GRADING. PLANTING AND INVASIVE PLANT REMOVAL.
ENHANCEMENT LEVEL I (E1)	STREAM BANK GRADING. MINOR CHANNEL REGRADING. CONCRETE REMOVAL FROM CHANNEL. PLANTING AND INVASIVE PLANT REMOVAL.
ENHANCEMENT LEVEL 2 (E2)	PLANTING AND INVASIVE PLANT REMOVAL.

Note: Conservation easement fencing was installed als part of the mitigation activity.

TRIBUTARY RESTORATION PLAN INDEX

ALIGNMENT	MITIGATION ACTIVITY	START STATION	END STATION
UT-1	ENHANCEMENT LEVEL 2	10+00	11+10.63
UT-2	PRESERVATION	10+00	13+34.67
UT-2	ENHANCEMENT LEVEL 2	13+34.67	13+78.56
UT-2	RESTORATION	13+78.56	14+27.35
UT-2	ENHANCEMENT LEVEL 2	14+27.35	19+50.70
UT-3	RESTORATION	10+00	12+15.05
UT-3	ENHANCEMENT LEVEL 2	12+15.05	14+66.62
UT-3	ENHANCEMENT LEVEL 1	14+66.62	16+60
UT-3	RESTORATION	16+60	16+79
UT-3	ENHANCEMENT LEVEL 1	16+79	20+21.97
UT-3	ENHANCEMENT LEVEL 2	20+21.97	21+29
UT-3	RESTORATION	21+29	21+55
UT-3	ENHANCEMENT LEVEL 2	21+55	24+05
UT-3	RESTORATION	24+05	24+50
UT-3	ENHANCEMENT LEVEL 2	24+50	24+74.90
UT-4	ENHANCEMENT LEVEL 2	10+00	14+21.25
UT-4	ENHANCEMENT LEVEL 1	14+21.25	18+30.57
UT-5	ENHANCEMENT LEVEL 2	10+00	11+84.46
UT-6	ENHANCEMENT LEVEL 2	10+00	11+51.33
UT-7	ENHANCEMENT LEVEL 1	10+00	11+46.80
UT-7	RESTORATION	11+46.80	21+26.71
UT-8	RESTORATION	10+19.08	10+80.78

NO.	REVISIONS	DRN.CHK	DATE

NCDEQ-DMS

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LITTLE BUFFALO CREEK
STREAM RESTORATION PROJECT
CABARRUS COUNTY
DIVISION OF MITIGATION SERVICES

TABLE 1 STREAM MITIGATION BY REACH

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE A1

Filename: V:\Operations\121\1008 – Little Buffalo Creek\Deliverables\Drawings\Monitoring Reports_Restoration Stationing Figure\Restoration Summary Figure.dwg

Table 2: Project Activity and Reporting History		
Little Buffalo Creek Stream Mitigation Project		
NCDENR-DMS Project No. 94147		
Activity or Report	**Data Collection Complete**	**Completion or Delivery**
Technical Proposal	June 2009	August 2008
Categorical Exclusion	February 2010	March 2010
Secure Conservation Easement	March 2010	July 2012
Mitigation Plan	August 2010	April 2014
Final Design – Construction Plans	N/A	May 2014
Construction	June 2014	December 2014
Fencing Installation	June 2014	December 2014
Native Species Planting	December 2014	December 2014
Mitigation Plan / As-built (Year 0 Monitoring – Baseline)	March 2015	July 2015
Year 1 Monitoring	September 2015	March 2016
Replanting & Reseeding	N/A	February 2016
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

Table 3: Project Contact Table Little Buffalo Creek Stream Mitigation Project NCDENR-DMS Project No. 94147	
Designer Primary Project Design POC	The Louis Berger Group, Inc. 1001 Wade Avenue, Suite 400 Raleigh, NC 27605 Edward Samanns (973) 407-1468
Construction Contractor **Construction contractor POC**	Backwater Environmental, Doug Smith P.O. Box 1107 Eden, NC 27289
Fencing Contractor Fencing Contractor POC	Strader Fencing Inc 5434 Amick Road Julian, NC 27283
Planting Contractor Planting Contract POC	Carolina Sylvics 908 Indian Trail Edenton, NC 27932
Nursery Stock Suppliers	Mellow Marsh 1312 Woody Store Rd. Siler City, NC 27344 919-742-1200 ArborGen Inc. 2011 Broadbank Court Ridgeville, SC 29472 843-851-4129 Superior Trees Inc. 12493 US-90 Lee, FL 32059 850-971-5159
Monitoring Performers	The Louis Berger Group, Inc. 1001 Wade Avenue, Suite 400 Raleigh, NC 27605
Stream Monitoring POC	Louis Berger Group, Inc., Ed Samanns, CE, PWS (973- 407-1468)
Vegetation Monitoring POC	Louis Berger Group, Inc.

Table 4 Project Information			
Project Name	Little Buffalo Creek Stream Mitigation Project		
County	Cabarrus County		
Project Area (acres)	12		
Project Coordinates (latitude and longitude)	35.491041°N, . -80.366698° W.		
Project Watershed Summary Information			
Physiographic Province	Piedmont		
River Basin	Yadkin-Pee Dee River		
USGS Hydrologic Unit 8-digit	3040105	USGS Hydrologic Unit 14-digit	3040105020060
DWQ Sub-basin	03-07-12		
Project Drainage Area (acres)	4,039		
Project Drainage Area Percentage of Impervious Area	5%		
CGIA Land Use Classification	Rural		

Reach Summary Information (Mainstem)

Parameters	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6
Length of reach (linear feet)	2,305	1,244	1,083	969	826	2,043
Valley classification	Type 8	Type 8	Type 8	Type 8	Type 8	Type 8
Drainage area (acres)	1914	2146	2446	2568	2632	4039
NCDWQ stream identification score	37.5	37.5	37.5	37.5	37.5	37.5
NCDWQ Water Quality Classification	C	C	C	C	C	C
Morphological Description (stream type)	C4/F4	C4/E4	C4/F4	C4	C4/D4b	C4
Design Rosgen Stream Type	C4	C4	C4	C4	C4	C4
Evolutionary Trend						
Design Approach (P1, P2, P3, E, etc)	R; EII	EII	R; EII	EI; EII	EII	P
Underlying mapped soils	Chewacla/ Goldston	Chewacla	Chewacla	Chewacla	Chewacla	Chewacla
Drainage class	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained
Soil Hydric status	Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric
Slope	0.48%	0.38%	0.51%	0.39%	0.47%	0.43%
FEMA classification	N/A	N/A	N/A	N/A	N/A	N/A
Native vegetation community	Pasture	Pasture	Pasture	Pasture	Pasture	Pasture
Percent composition of exotic invasive vegetation						

Reach Summary Information (Unnamed Tributaries

Parameters	UT 1	UT 2	UT 3	UT 4	UT 5	UT 6	UT 7/UT 8
Length of reach (linear feet)	111	951	1,475	831	184	151	1,127
Valley classification	N/A	Type 2	Type 2	Type 2	N/A	N/A	Type 8
Drainage area (acres)	293	193	62	254	8	16	1222
NCDWQ stream identification score	21	20	26.5	36.5	27.5	24.8	36.5
NCDWQ Water Quality Classification	C	C	C	C	C	C	C
Morphological Description (stream type)	N/A	B6	B6/G6	B4c	N/A	N/A	F4
Design Rosgen Stream Type	No Restoration	B6	B6	B4c	No Restoration	No Restoration	C4
Evolutionary Trend							
Design Approach (P1, P2, P3, E, etc)	EII	R; EII, P	R; EI; EII	EI; EII	EII	EII	R; EI
Underlying mapped soils	Chewacla	Chewacla	Badin/Georgeville	Goldston	Goldston	Goldston	Chewacla
Drainage class	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained	Mod. Well Drained - Well Drained
Soil Hydric status	Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric
Slope	N/A	2.45%	2.35%	2.17%	N/A	N/A	0.96%
FEMA classification	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Native vegetation community	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Percent composition of exaotic invasive vegetation	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Wetland Summary Information

Parameters	Wetland 1	Wetland 2	Wetland 3
Size of Wetland (acres)	N/A	N/A	N/A
Wetland Type (non-riparian, riparian riverine or riparian	N/A	N/A	N/A
Mapped Soil Series	N/A	N/A	N/A
Drainage class	N/A	N/A	N/A
Soil Hydric Status	N/A	N/A	N/A
Source of Hydrology	N/A	N/A	N/A
Hydrologic Impairment	N/A	N/A	N/A
Native vegetation community	N/A	N/A	N/A
Percent composition of exotic invasive vegetation	N/A	N/A	N/A

Regulatory Considerations

Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States – Section 404	Y	Y	Permit 2014-00386
Waters of the United States – Section 401	Y	Y	Letter from NCDENR dated February 24, 2015 Nationwide Permit Number 27
Endangered Species Act	Y	Y	Letter to USFWS dated November 16, 2009
Historic Preservation Act	Y	Y	Letter from NC SHPO dated February 2, 2010
Coastal Zone Management Act (CZMA)/ Coastal Area Management	N	N/A	N/A
FEMA Floodplain Compliance	Y	Y	FEMA Floodplain Checklist Restoration Plan Appendix 9
Essential Fisheries Habitat	N	N/A	N/A

Appendix B – Visual Assessment Data

Figures 2a-j – Integrated Current Condition Plan View-MY1

LEGEND:

- THALWEG
- AS-BUILT TOP OF BANK
- CONSERVATION EASEMENT
- CONSERVATION FENCE
- CONSTRUCTED RIFFLE
- BEDROCK
- ROOTWADS
- CONTROL POINT
- STREAM GAGE
- H VISUAL MORPHIC ASSESSMENT POOR HABITAT
- VEGPLOT – EXCEEDS REQUIREMENTS BY >10%
- VEGPLOT – EXCEEDS REQUIREMENTS BY <10%
- VEGPLOT – FAILS REQUIREMENTS BY <10%
- VEGPLOT – FAILS REQUIREMENTS BY >10%
- PHOTO LOCATION
- BANK SCOUR/ERODING
- ENCROACHMENT/COW PRINTS

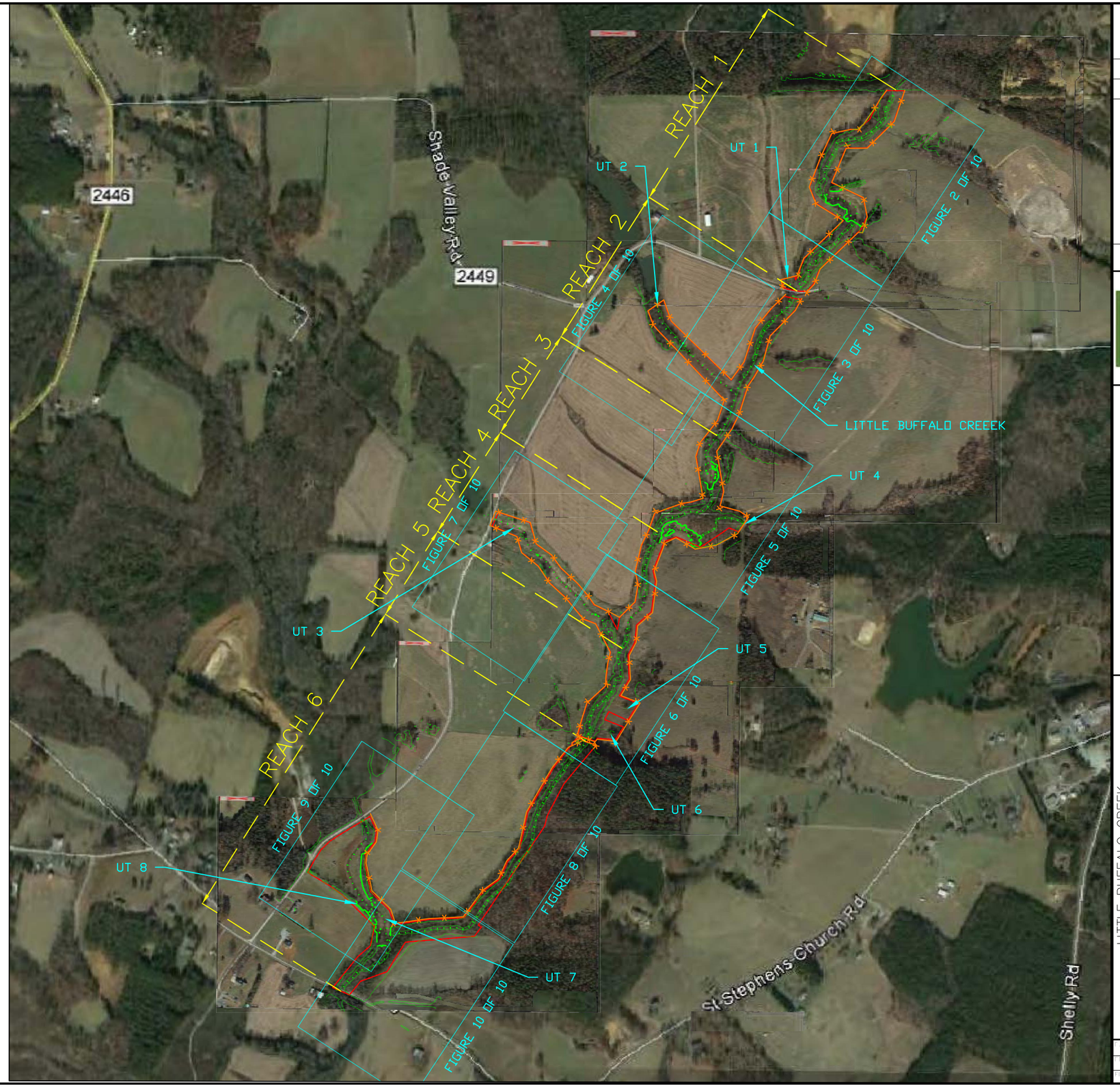
VEGETATION COVERAGE

INVASIVE SPECIES	PRESENT (>75%)	POOR (75%–40%)	ABSENT (<40%)
ABSENT	NO FILL		
PRESENT			
COMMON			

AERIAL SOURCE: GOOGLE EARTH IMAGE 11/30/14

0' 800' 1600'

SCALE: 1"= 800'



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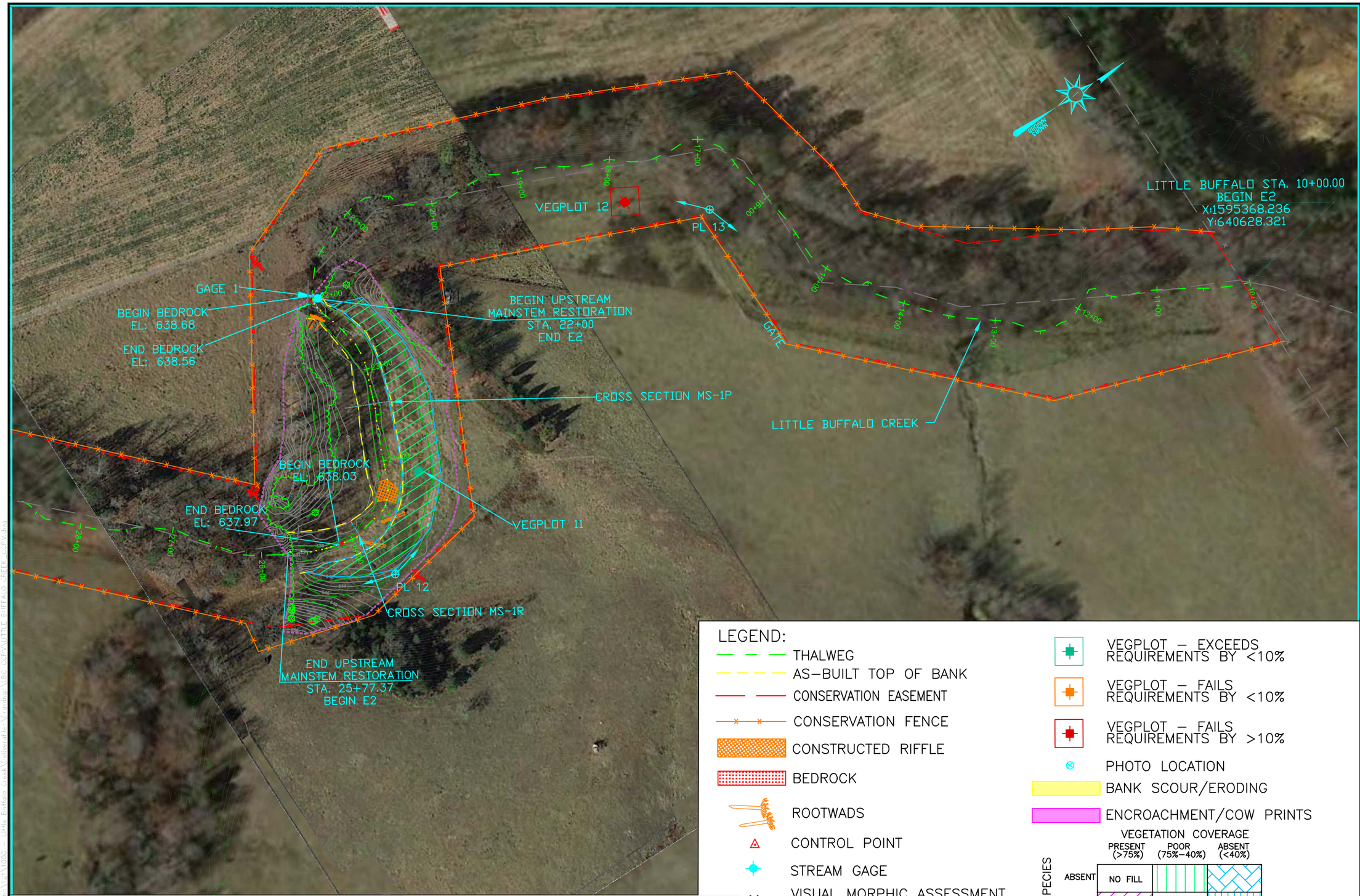
DIVISION OF MITIGATION SERVICES

CURRENT CONDITIONS PLAN VIEW –MY1–

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 1 OF 10



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CURRENT CONDITIONS PLAN VIEW -MY1-

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 2 OF 13

0’ 100’ 200’

SCALE: 1”= 100’

AERIAL SOURCE: GOOGLE EARTH IMAGE 11/30/14

LEGEND:

- THALWEG
- AS-BUILT TOP OF BANK
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VEGETATION COVERAGE

INVASIVE SPECIES	PRESENT (>75%)	POOR (75%–40%)	ABSENT (<40%)
ABSENT	NO FILL		
PRESENT			
COMMON			

RESTORATION

UT-2 STA. 13+34.67
END PRESERVATION
BEGIN E2

UT-2 STA. 14+27.35
END RESTORATION
BEGIN E2

CROSS SECTION UT2-1R

VEGPLOT 8

UT 2

UT 1

OLD MINE RD

16’ SOIL

Old Mine Rd

BEGIN UT-1 STA. 10+00.00
BEGIN E2

UT-1 STA. 11+10.63
LITTLE BUFFALO STA. 32+99
END UT-1 E2

LITTLE BUFFALO CREEK

VEGPLOT 9

BOULDERS

GAGE 3

PL 10

PL 11

GATE

VEGPLOT 10

UT-2 STA. 19+50.70
LITTLE BUFFALO STA. 42+43
END UT-2 E2

LITTLE BUFFALO STA. 33+66.34
BEGIN E2
BEGIN REACH 2

LITTLE BUFFALO STA. 33+04.88
END E2

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CURRENT CONDITIONS PLAN VIEW –MY1–

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 3 OF 10

LEGEND:

- THALWEG
- AS-BUILT TOP OF BANK
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VEGETATION COVERAGE

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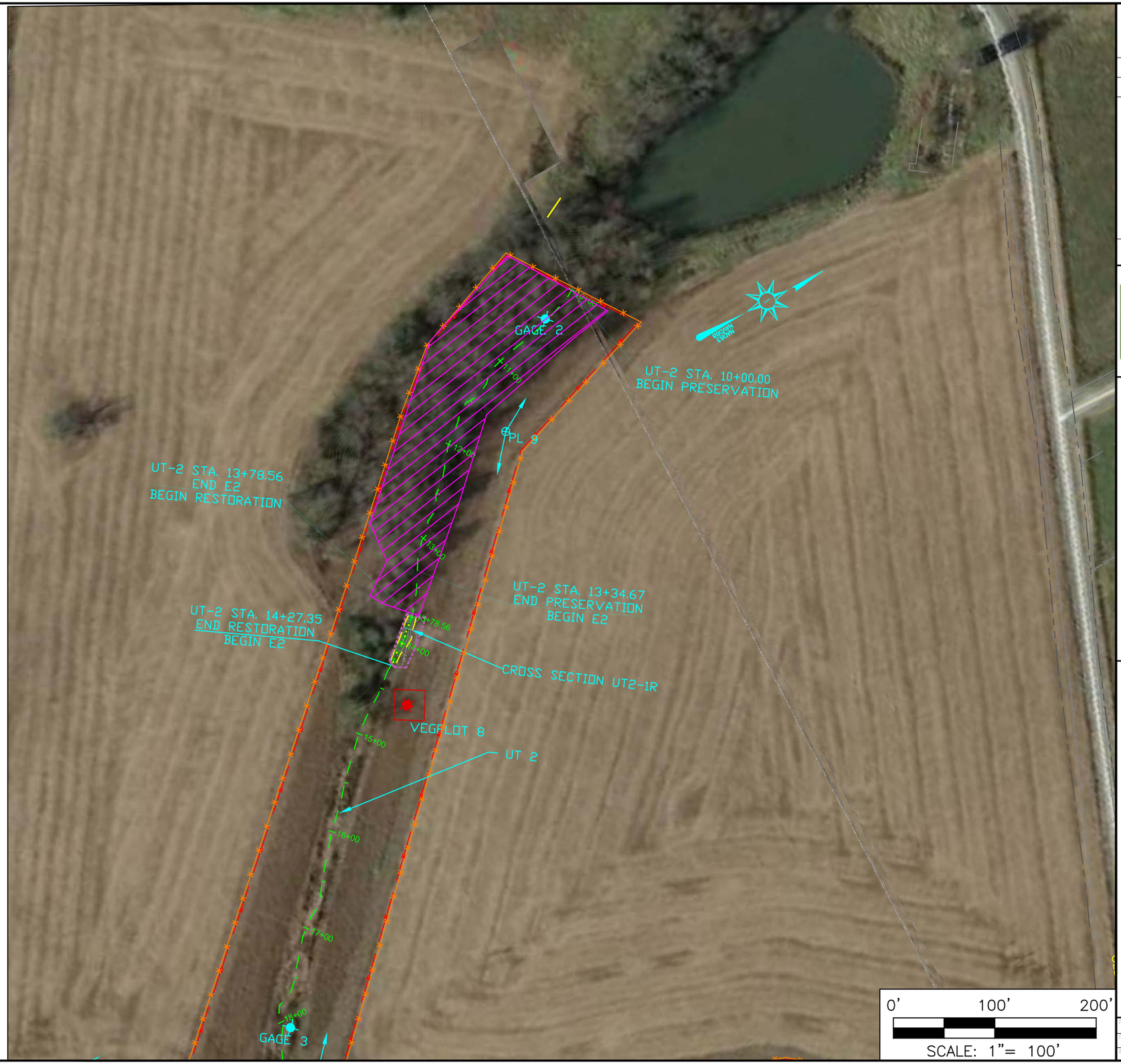
ABSENT	NO FILL		
PRESENT			
COMMON			

AERIAL SOURCE: GOOGLE EARTH IMAGE 11/30/14



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CURRENT CONDITIONS PLAN VIEW –MY1–

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 4 OF 10

UT-4 STA. 18+30.57
LITTLE BUFFALO STA. 56+93
END UT-4 E1

BEGIN BEDROCK
EL: 624.94

CROSS SECTION UT4-1R

END BEDROCK
EL: 624.30

PL 7

VEGPLOT 4

GATE

VEGPLOT 5

GAGE 4

CROSS SECTION
UT4-1P

UT 4

UT-4 STA. 14+21.25
END E2
BEGIN E1

LITTLE BUFFALO CREEK

LITTLE BUFFALO STA. 46+10
END REACH 2
BEGIN REACH 3

PL 8

VEGPLOT 7

VEGPLOT 6

BEGIN DOWNSTREAM
MAINSTEM RESTORATION
STA. 48+12.45
END E2

CROSS SECTION MS-2R

CROSS SECTION MS-2P

END DOWNSTREAM
MAINSTEM RESTORATION
STA. 50+56.51
BEGIN E2

UT-4 STA. 10+00.00
BEGIN E2

AERIAL SOURCE: GOOGLE EARTH IMAGE 11/30/14

0' 100' 200'

SCALE: 1"= 100'

BANK SCOUR/ERODING

ENCROACHMENT/COW PRINTS

VEGETATION COVERAGE

INVASIVE SPECIES	PRESENT (>75%)	POOR (75%–40%)	ABSENT (<40%)
ABSENT	NO FILL		
PRESENT			
COMMON			

LEGEND:

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- PHOTO LOCATION

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CURRENT CONDITIONS PLAN VIEW –MY1–

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 5 OF 13

LEGEND:

- THALWEG
- AS-BUILT TOP OF BANK
- CONSERVATION EASEMENT
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VEGETATION COVERAGE

INVASIVE SPECIES	PRESENT (>75%)	POOR (75%–40%)	ABSENT (<40%)
ABSENT	NO FILL		
PRESENT			
COMMON			

UT-3 STA. 20+21.97
END E1
BEGIN E2

UT 3

UT-3 STA. 21+29
END E2
BEGIN RESTORATION

UT-3 STA. 21+55
END RESTORATION
BEGIN E2

CONCRETE REMOVAL SECTION
STA.65+21.37
END E1 AREA

CONCRETE REMOVAL SECTION
STA. 63+70.48
BEGIN E1 AREA

UT-3 STA. 24+05
END E2
BEGIN RESTORATION

GAGE 7

GAGE 5

PL 6

LITTLE BUFFALO CREEK

CROSS SECTION UT3-3R

LITTLE BUFFALO STA.74+87.83
END E2

UT-6 STA. 11+51.33
LITTLE BUFFALO STA.74+06
END E2

UT-3 STA. 24+50
END RESTORATION
BEGIN E2

VEGPLOT 2

BEGIN BEDROCK
EL: 621.83

END BEDROCK
EL: 621.84

BEGIN BEDROCK
EL: 620.91

CROSS SECTION MS-3P

END BEDROCK
EL: 621.45

END BEDROCK
EL: 621.18

BEGIN BEDROCK
EL: 621.38

UT-3 STA.24+74.90
LITTLE BUFFALO STA.66+62
END UT-3 E2

GATE

CATTLE GUARD

PL 4

UT-5 STA. 11+84.46
LITTLE BUFFALO STA.71+04
END UT-5 E2

LITTLE BUFFALO STA.75+19.23
BEGIN PRESERVATION

UT-5 STA. 10+00.00
BEGIN E2

UT 6

UT-6 STA. 10+00.00
BEGIN E2

UT 5

0' 100' 200'

SCALE: 1"= 100'

AERIAL SOURCE: GOOGLE EARTH IMAGE 11/30/14

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CURRENT CONDITIONS PLAN VIEW -MY1-

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 6 OF 12

0’ 100’ 200’

SCALE: 1”= 100’

AERIAL SOURCE: GOOGLE EARTH IMAGE 11/30/14

LEGEND:

- THALWEG
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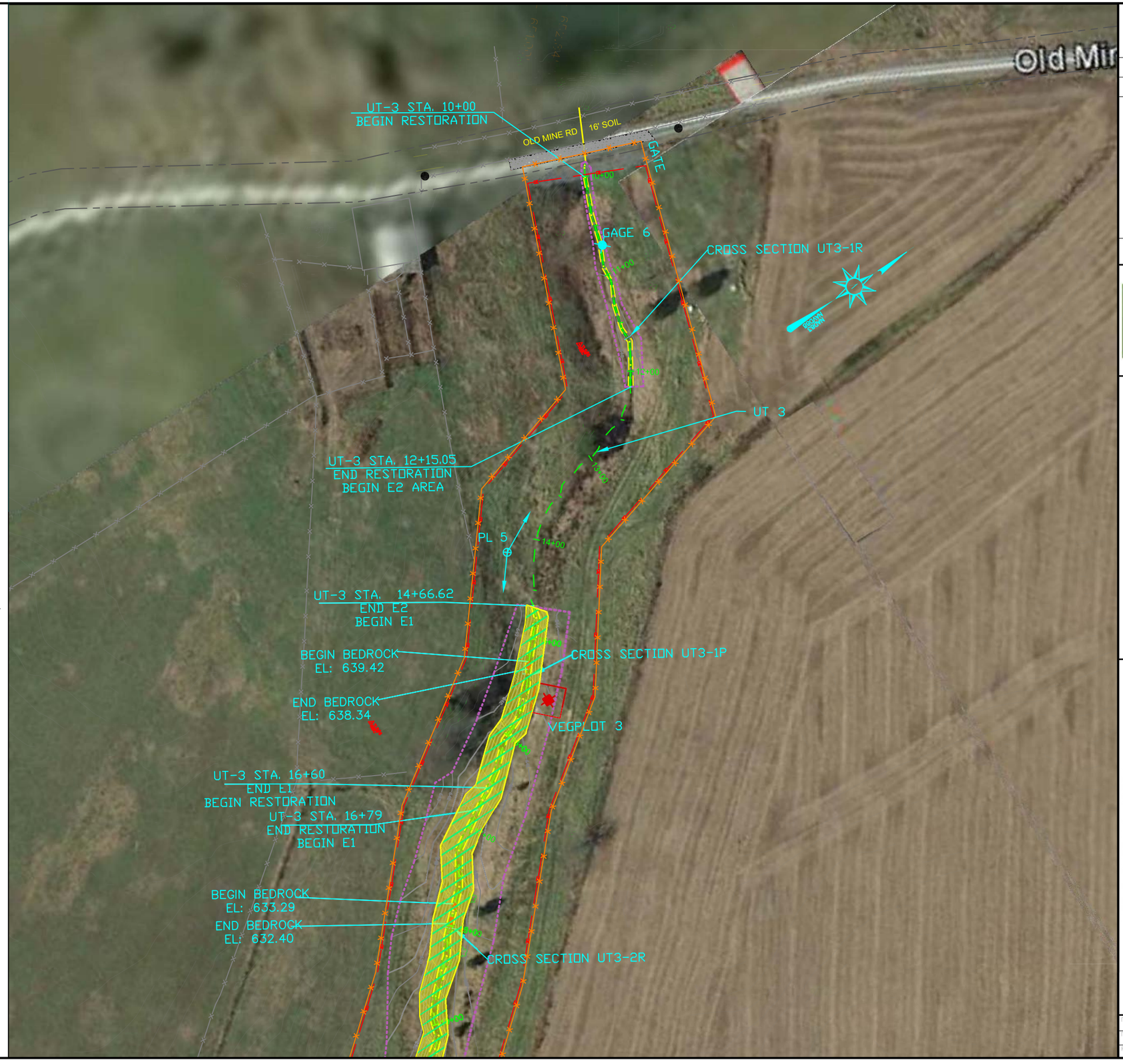
VEGETATION COVERAGE

INVASIVE SPECIES	PRESENT (>75%)	POOR (75%–40%)	ABSENT (<40%)
ABSENT	NO FILL		
PRESENT			
COMMON			



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CURRENT CONDITIONS PLAN VIEW –MY1–

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 7 OF 12

LEGEND:

- THALWEG
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VEGETATION COVERAGE

INVASIVE SPECIES	PRESENT (>75%)	POOR (75%–40%)	ABSENT (<40%)
ABSENT	NO FILL		
PRESENT			
COMMON			

0’ 100’ 200’

SCALE: 1”= 100’

AERIAL SOURCE: GOOGLE EARTH IMAGE 11/30/14

NO. REVISION DATE

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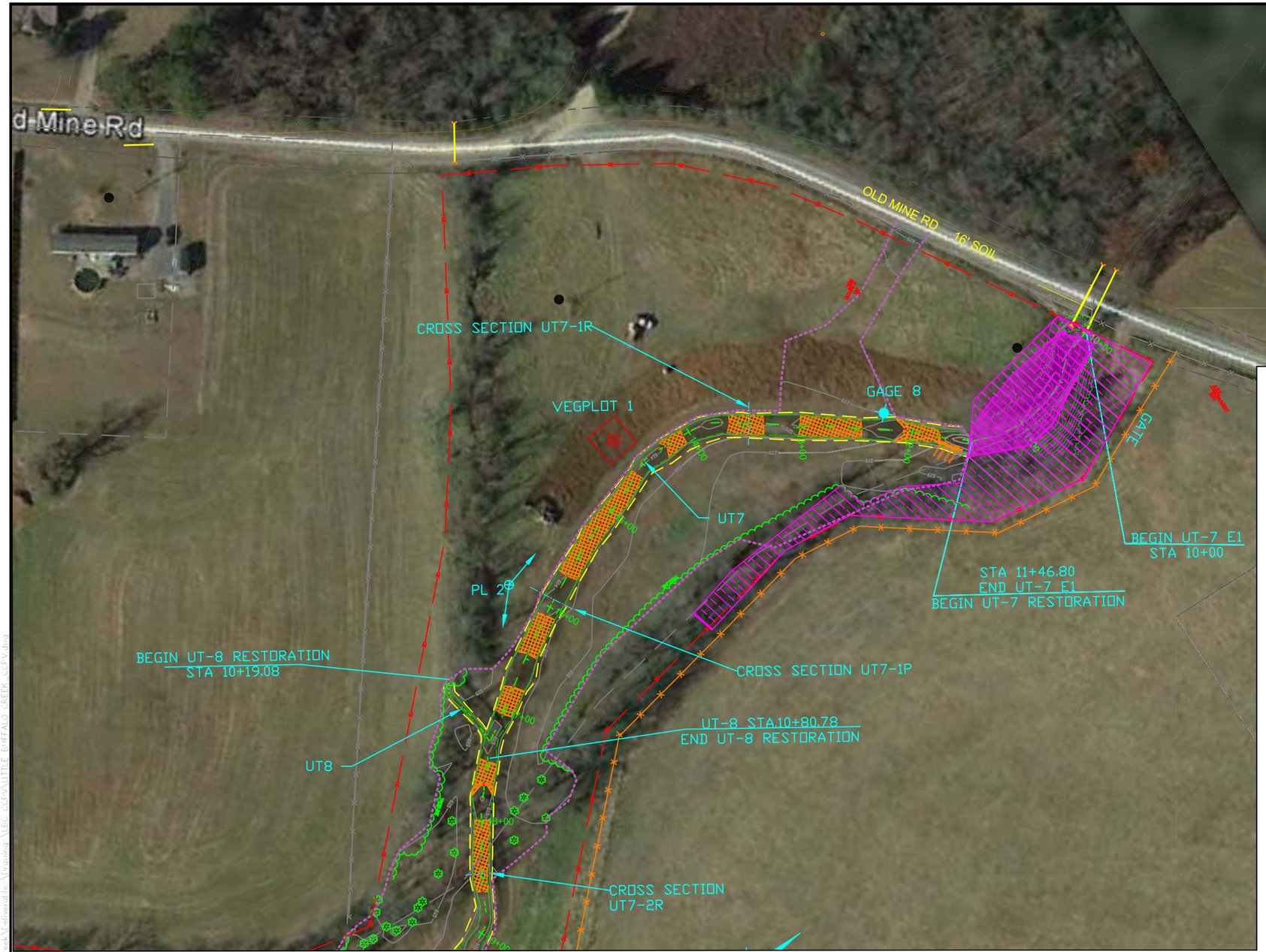
CURRENT CONDITIONS PLAN VIEW –MY1–

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 8 OF 10



LEGEND:

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VEGETATION COVERAGE

INVASIVE SPECIES	PRESENT (>75%)	POOR (75%–40%)	ABSENT (<40%)
ABSENT	NO FILL		
PRESENT			
COMMON			

0' 100' 200'

SCALE: 1"= 100'

AERIAL SOURCE: GOOGLE EARTH IMAGE 11/30/14

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STREAM RESTORATION PROJECT
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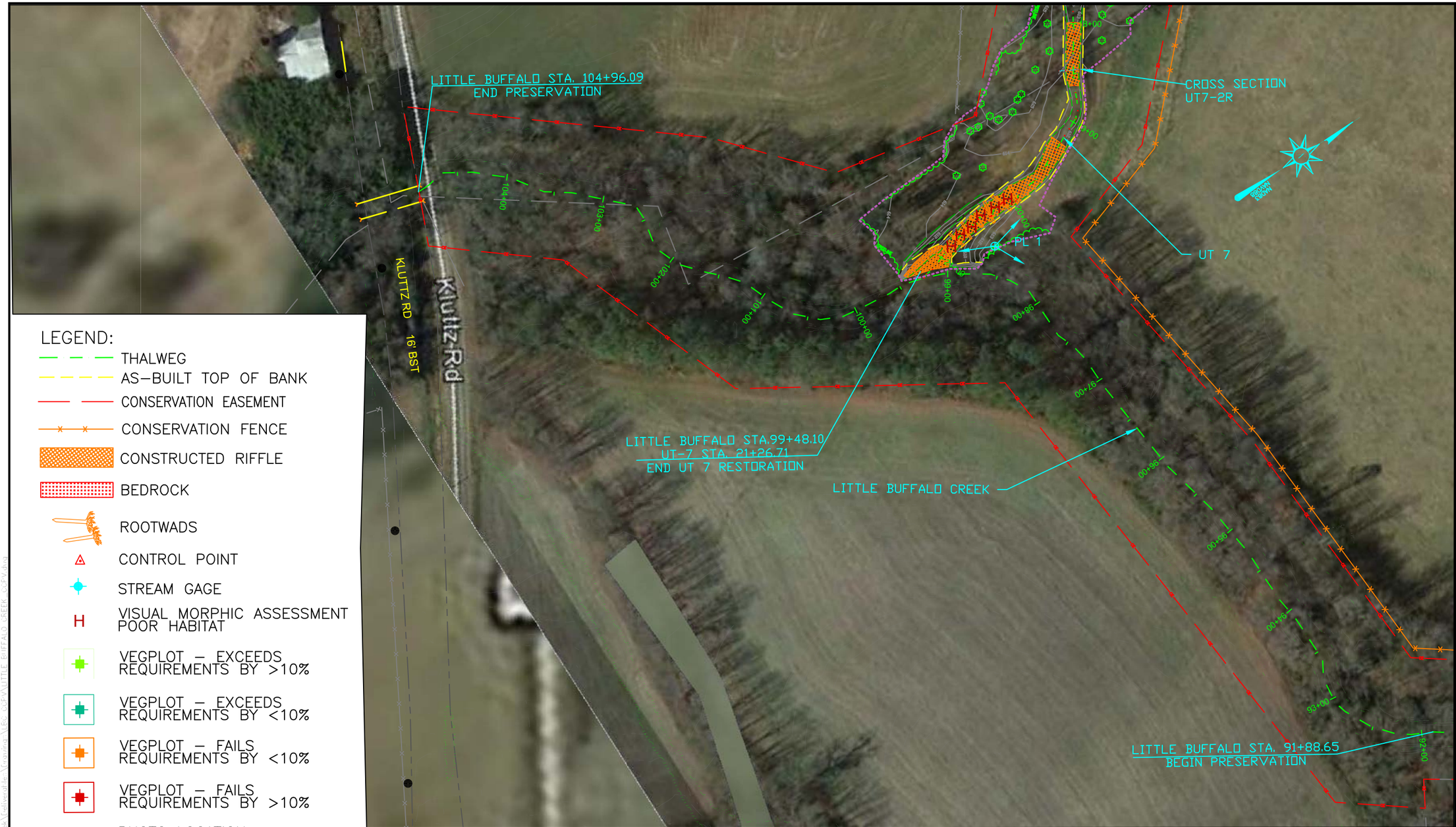
CURRENT CONDITIONS PLAN VIEW -MY1-

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 9 OF 13



LEGEND:

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VEGETATION COVERAGE

INVASIVE SPECIES	PRESENT (>75%)	POOR (75%–40%)	ABSENT (<40%)
ABSENT	NO FILL		
PRESENT			
COMMON			

AERIAL SOURCE: GOOGLE EARTH IMAGE 11/30/14

0' 100' 200'

SCALE: 1"= 100'

NO.	REVISION	BY	DATE

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LITTLE BUFFALO CREEK
STREAM RESTORATION PROJECT
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DIVISION OF MITIGATION SERVICES

CURRENT CONDITIONS PLAN VIEW –MY1–

DATE FEBRUARY 2016
PROJECT NO. 94147
FIGURE 10 OF 10

Tables 5a-g – Visual Stream Morphology Assessment

Reach ID **Reach 1**
Assessed Length **381**

Table 5a Visual Stream Morphology Stability Assessment

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability**	1. Aggradation - No visual aggradation			0	0	100%			
		2. Degradation - No visual degradation			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains as-built substrate	6	6			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth > 1.6)	3	3			100%			
		2. Length appropriate?	3	3			100%			
	4. Thalwag Position	1. Thalweg centering at upstream of meander bend (Run)?	3	3			100%			
		2. Thalweg centering at downstream of meander bend (Glide)?	3	3			100%			
1. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
2. Engineered Structures	Log Vane structures installed incorrectly during construction, final as-built developed inner berm material overtop structures to bury the log vanes and have no structures within this reach.									

Reach ID Reach 3
Assessed Length 261

Table 5b Visual Stream Morphology Stability Assessment

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability	1. Aggradation - No visual aggradation			0	0	100%			
		2. Degradation - No visual degradation			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains as-built substrate	3	3			100%			
1. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
2. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	2	2			100%			
	3. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	2	2			100%			

Reach ID Reach 4
Assessed Length 200

Table 5c Visual Stream Morphology Stability Assessment

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability	1. Aggradation - No visual aggradation			0	0	100%			
		2. Degradation - No visual degradation			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains as-built substrate	3	3			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth, no scouring occurred of bank			1	200	50%	0	0	74%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	1	200	50%	0	0	74%

Reach ID UT 2
Assessed Length 49

Table 5d Visual Stream Morphology Stability Assessment

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability	1. Aggradation - No visual aggradation			0	0	100%			
		2. Degradation - No visual degradation			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains as-built substrate	0	1			0%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%

Reach ID UT 3
Assessed Length 898

Table 5e Visual Stream Morphology Stability Assessment

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability	1. Aggradation - No visual aggradation			0	0	100%			
		2. Degradation - No visual degradation			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains as-built substrate	8	8			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	1111	38%	0	0	-46%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	1	1111	38%	0	0	-46%

Reach ID UT 4
Assessed Length 410

Table 5f Visual Stream Morphology Stability Assessment

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability	1. Aggradation - No visual aggradation			0	0	100%			
		2. Degradation - No visual degradation			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains as-built substrate	8	8			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth > 1.6)	3	3			100%			
		2. Length appropriate?	3	3			100%			
	4. Thalwag Position	1. Thalweg centering at upstream of meander bend (Run)?	3	3			100%			
		2. Thalweg centering at downstream of meander bend (Glide)?	3	3			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%

Reach ID UT 7/8
Assessed Length 1189

Table 5g Visual Stream Morphology Stability Assessment

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability	1. Aggradation - No visual aggradation			0	0	100%			
		2. Degradation - No visual degradation			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains as-built substrate	11	11			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth > 1.6)	3	4			75%			
		2. Length appropriate?	4	4			100%			
	4. Thalwag Position	1. Thalweg centering at upstream of meander bend (Run)?	4	4			100%			
		2. Thalweg centering at downstream of meander bend (Glide)?	4	4			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	9	9			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	9	9			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	9	9			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	9	9			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	3	9			33%			

Tables 6a-e – Vegetation Condition Assessment Table

Table 6a Vegetation Condition Assessment

Reach 1
Planted Acreage[1] **5.47**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	1	0.30	5.5%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	1	0.30	5.5%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	1	0.30	5.5%

Easement Acreage[2] **7.29**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	1000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas[3]	Cow prints located in easement areas and have trampled soil	none	Pattern and Color	2	0.10	1.4%

Reach 2
Planted Acreage[1] **2.85**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%

Easement Acreage[2] **3.73**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Japanese Hops Growth	1000 SF	Pattern and Color	1	0.02	0.5%
5. Easement Encroachment Areas[3]	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

Table 6b Vegetation Condition Assessment

Reach 3
Planted Acreage[1] **2.65**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%

Easement Acreage[2] **3.83**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	1000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas[3]	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

Reach 4
Planted Acreage[1] **2.26**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	1	0.10	4.4%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	1	0.10	4.4%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	1	0.10	4.4%

Easement Acreage[2] **3.1**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	1000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas[3]	Fence cut (rewoven but not secured) and barologger stolen	none	Pattern and Color	1	0.02	0.6%

Table 6c Vegetation Condition Assessment

Reach 5

Planted Acreage[1] **2.05**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%

Easement Acreage[2] **2.74**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	1000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas[3]	Cattle crossing fence down. Small area of entrusion by cattle, but clearly maintained to few feet from cattle crossing. Solar panel power source removed	none	Pattern and Color	1	0.01	0.4%

UT 2

Planted Acreage[1] **1.25**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%

Easement Acreage[2] **2.65**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Tree of Heaven growth	1000 SF	Pattern and Color	1	1.02	38.5%
5. Easement Encroachment Areas[3]	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

Table 6d Vegetation Condition Assessment

UT 3

Planted Acreage[1] **3.21**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	1	0.34	10.6%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	1	0.34	10.6%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	1	0.34	10.6%

UT 4

Planted Acreage[1] **1.43**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Unplanted and seeded area that should have been.	0.1 acres	Pattern and Color	1	1.09	76.2%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	1	1.09	76.2%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	1	1.09	76.2%

Easement Acreage[2] **2.01**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	1000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas[3]	Cow prints located in easement areas and have trampled soil	none	Pattern and Color	2	0.03	1.5%

UT 7

Table 6e Vegetation Condition Assessment

Planted Acreage[1] **2.63**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%

Easement Acreage[2] **6.07**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Tree of Heaven growth	1000 SF	Pattern and Color	1	0.54	8.9%
5. Easement Encroachment Areas[3]	Cow prints located in easement areas and have trampled soil	none	Pattern and Color	1	0.13	2.1%

Photo Appendix A: Vegetation Monitoring Plots

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

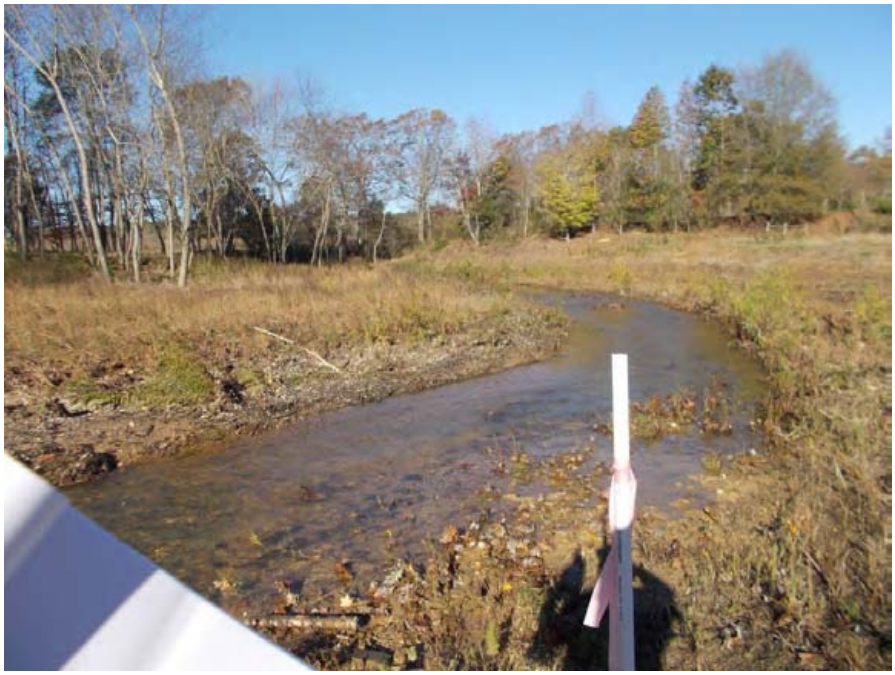
Veg Plot 12

Photo Appendix B: Cross Sections

Cross Section MS-1P Downstream (Nov 2015)

Cross Section MS-1P - Upstream

Cross Section MS-1R Downstream (Nov 2015)



Cross Section MS-1R Upstream (Nov 2015)

Cross Section MS-2P - Downstream

Cross Section MS-2P - Upstream

Cross Section MS-2R - Downstream

Cross Section MS-2R - Upstream

Cross Section MS-3P Downstream (Nov 2015)

Cross Section MS-3P Upstream (Nov 2015)

Cross Section UT2-1R Downstream (Nov 2015)

Cross Section UT2-1R Upstream (Nov 2015)

Cross Section UT3-1P Downstream (Nov 2015)

Cross Section UT3-1P Upstream (Nov 2015)

Cross Section UT3-1R - Downstream

Cross Section UT3-1R - Upstream

Cross Section UT3-2R Downstream (Nov 2015)

Cross Section UT3-2R Upstream (Nov 2015)

Cross Section UT4-1P - Downstream

Cross Section UT4-1P - Upstream

Cross Section UT4-1R - Downstream

Cross Section UT4-1R - Upstream

Cross Section UT7-1P Downstream (Nov 2015)

Cross Section UT7-1P Upstream (Nov 2015)

Cross Section UT7-1R Downstream (Nov 2015)

Cross Section UT7-1R Upstream (Nov 2015)

Cross Section UT7-2R Downstream (Nov 2015)

Cross Section UT7-2R Upstream

Photo Appendix C: Photo Stations

Photo Location 1-A - Mainstem Upstream

Photo Location 1-B - Mainstem Downstream

Photo Location 1-C - UT7 Upstream

Photo Location 2-A - UT7 Upstream

Photo Location 2-B UT7 Downstream

Photo Location 3-A - Upstream

Photo Location 3-B - Downstream

Photo Location 4-A - Upstream

Photo Location 4-A - UT3 Upstream

Photo Location 4-B - Downstream

Photo Location 4-B - UT3 Downstream

Photo Location 5-C - UT3 Upstream

Photo Location 6-A - Mainstem Downstream

Photo Location 6-B - Mainstem Upstream

Photo Location 6-C - UT4 Downstream

Photo Location 6-D - UT4 Upstream

Photo Location 7-A - Downstream

Photo Location 7-B - Upstream

Photo Location 8-A - UT2 Downstream

Photo Location 8-B - UT2 Upstream

Photo Location 9-A - Mainstem Downstream

Photo Location 9-B - Mainstem Upstream

Photo Location 9-C - UT2 Upstream

Photo Location 10-A - Mainstem Downstream

Photo Location 10-B - Mainstem Upstream

Photo Location 11-A - Mainstem Downstream

Photo Location 11-B - Mainstem Upstream

Photo Location 12-A - Mainstem Downstream

Photo Location 12-B - Mainstem Upstream

Photo Appendix D: Problem Areas

Reach 3 – UT4 - Cow prints in E1 area

Reach 4 – MS-3P – Low vegetation cover

Reach 4 - Fence cut, baro-logger missing

Reach 4 - Head cut in UT3 upstream of gage 7

Reach 5 - Cattle crossing fence broken and cows trampling bank

Reach 5 – Cattle fence down

Reach 5 – Solar cell powering cattle fence missing

Reach 6 – UT 7 – Cattle trampling on upstream bank

Reach 6 - Tree of Heaven at UT7

Appendix C – Vegetation Plot Data

Table 7 – Vegetation Plot Criteria Attainment

Plot	MY1 Success Criteria Met (Y/N)	Tract Mean
1	N	33%
2	N	
3	N	
4	Y	
5	Y	
6	N	
7	N	
8	N	
9	Y	
10	N	
11	Y	
12	N	

Table 8 - Total Planted Stems			
Species	**Type**	**Number**	**Percentage**
Salix nigra	live stake	967	64
Cornus ammomum	live stake	549	36
Alnus serrulata	bare root	1000	9
Betula nigra	bare root	600	5
Carpinus caroliniana	bare root	1200	11
Fraxinus pennsylvanica	bare root	900	8
Platanus occidentalis	bare root	1500	14
Viburnum dentatum	bare root	1500	14
Celtis leavigata	bare root	1000	9
Cercis canadensis	bare root	1000	9
Liriodendron tulipifera	bare root	1300	12
Quercus michauxii	bare root	400	4
Quercus falcata var. *pagodafolia*	bare root	600	5

Table 9 - CVS Vegetation Plot Metadata

Report Prepared By	Gregory A. Russo
Date Prepared	12/16/2015 10:52
database name	cvs-eep-entrytool-v2.3.1.mdb
database location	C:\Users\grrusso\Desktop
computer name	MTN-GRRUSSO
file size	61444096

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.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.

PROJECT SUMMARY----------

Project Code	94147
project Name	Little Buffalo Creek Stream Mitigation Project
Description	Louis Berger is restoring the Little Buffalo Creek Stream Mitigation Site in Cabarrus County, North Carolina for the North Carolina Ecosystem Enhancement Program. Berger will be planting the riparian corridor with native tree and shrub vegetation.
River Basin	Yadkin-Pee Dee
length(ft)	
stream-to-edge width (ft)	
area (sq m)	48265.23781
Required Plots (calculated)	12
Sampled Plots	12

Table 9 - Planted and Total Stem Counts

EEP Project Code 94147. Project Name: Little Buffalo Creek Stream Mitigation Project

			Current Plot Data (MY1 2015)																								Annual Means			
			94147-01-0001		94147-01-0002		94147-01-0003		94147-01-0004		94147-01-0005		94147-01-0006		94147-01-0007		94147-01-0008		94147-01-0009		94147-01-0010		94147-01-0011		94147-01-0012		MY1 (2015)		MY0 (2014)	
Scientific Name	Common Name	Species Type	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Acer rubrum	red maple	Tree																								4		4		
Alnus serrulata	hazel alder	Shrub							1	1	1	1									1	1	2	2			5	5	13	13
Carpinus caroliniana	American hornbeam	Tree									1	1	2	2	2	2	1	1	4	4	1	1	2	2	1	1	14	14	11	11
Celtis laevigata	sugarberry	Tree			1	1	2	2																	1	1	4	4	29	29
Cercis canadensis	eastern redbud	Tree			1	1					1	1					1	1			1	1					4	4	13	13
Fraxinus pennsylvanica	green ash	Tree			2	2					4	4			1	1											7	7	14	14
Juniperus virginiana	eastern redcedar	Tree																								1		1		
Liquidambar styraciflua	sweetgum	Tree										94		2										156		2		254		
Liriodendron tulipifera	tuliptree	Tree	1	1					4	4		3	1	1			1	1	2	2	1	1					10	13	19	19
Pinus virginiana	Virginia pine	Tree																								1		1		
Platanus occidentalis	American sycamore	Tree									1	30	1	2			1	1	2	2	2	2	2	14	1	1	10	52	16	16
Quercus falcata	southern red oak	Tree	1	1					1	3									1	1					1	1	4	6	7	7
Quercus michauxii	swamp chestnut oak	Tree	3	3	1	1									1	1			1	1							6	6	10	10
Viburnum dentatum	southern arrowwood	Shrub					1	1	1	1	3	3											1	1			6	6	11	11
		Stem count	5	5	5	5	3	3	7	9	11	137	4	7	4	4	4	4	10	10	6	6	7	175	4	12	70	377	143	143
		size (ares)	0.83613		0.83613		0.83613		0.83613		0.83613		0.83613		0.83613		0.83613		0.83613		0.83613		0.83613		0.83613		10.03356		10.03356	
		size (ACRES)	0.02		0.02		0.02		0.02		0.02		0.02		0.02		0.02		0.02		0.02		0.02		0.02		0.25		0.25	
		Species count	3	3	4	4	2	2	4	4	6	8	3	4	3	3	4	4	5	5	5	5	4	5	4	8	10	14	10	10
		Stems per ACRE	242	242	242	242	145	145	339	436	532	6631	194	339	194	194	194	194	484	484	290	290	339	8470	194	581	282	1521	577	577

Color for Density

Exceeds 320 Stem/acre target by 10%

Exceeds 320 Stem/acre target, but by less than 10%

Fails to meet 320 Stem/acre target, by less than 10%

Fails to meet 320 Stem/acre target by more than 10%

Appendix D – Stream Measurement & Geomorphology Data

Table 10a. Baseline Stream Data Summary
Little Buffalo Creek (94147) - Segment/Reach: Mainstem Reach 1 (2,305 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)					45.55	56.61	52.02	82.98	14.98	5	43.1	52.2	50.6	64.4	8.8	4	36	36	36	35.21	35.21	35.21	35.21		1
Floodprone Width (ft)					67.73	106.5	96.36	177.3	43.15	5	54.9	75.3	74.3	98	15.4	4	>88	>88	>88	>80	>80	>80	>80		1
Bankfull Mean Depth (ft)					0.65	1.18	1.24	1.6	0.35	5	0.98	1.16	1.1	1.38	0.18	4	0.96	0.96	0.96	1.23	1.23	1.23	1.23		1
[1]Bankfull Max Depth (ft)					2.54	3.04	2.8	3.83	0.58	5	2.17	2.41	2.5	2.5	0.14	4	1.5	1.5	1.5	1.79	1.79	1.79	1.79		1
Bankfull Cross Sectional Area (ft^2)					53.58	63.29	59.12	83.09	11.52	5	55.4	59.3	58.7	64.5	3.36	4	34.38	34.38	34.38	43.15	43.15	43.15	43.15		1
Width/Depth Ratio					32.51	56.56	40.56	127.7	40.14	5	31.3	47	46.2	64.4	14.35	4	37.5	37.5	37.5	28.73	28.73	28.73	28.73		1
Entrenchment Ratio					1.49	1.84	1.92	2.17	0.33	5	1.1	1.5	1.5	1.8	0.3	4	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2		1
[1]Bank Height Ratio					**0.91**	**1.09**		**1.37**								**4**	**1**	**1**	**1**	**1**	**1**	**1**	**1**		**1**
Profile																									
Riffle Length (ft)											7	28.8	27.5	52	13	8	35	40	50	7.73	23.71	22.04	38.44		
Riffle Slope (ft/ft)											0.009	0.02	0.018	0.422	0.01	8	0.003	0.014	0.028	0	0.026	0.022	0.076		
Pool Length (ft)											16	76.4	39.5	79	17.32	13	10	20	20	4.21	25.43	17.55	83.2		
Pool Max depth (ft)											2.9	3.2	3.3	3.5	0.24	13	1.5	1.81	1.81	1.96	2.71	2.48	3.76		
Pool Spacing (ft)											36	76.4	74	111	26.26	7	80	125	170	29.95	48.64	39.06	91.87		
Pattern																									
Channel Beltwidth (ft)																	84	84	84	59.64	105.8	92.68	165.2		
Radius of Curvature (ft)																	57.62	79.3	101	72.97	83.15	79.01	97.49		
Rc:Bankfull width (ft/ft)																	**35.24**	**36**	**69.62**	**27.95**	**35.6**	**36.13**	**46.36**		
Meander Wavelength (ft)																									
Meander Width Ratio																	1.21	2.33	2.38	1.29	3.04	2.57	5.91		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2							0.334											0.32				0.322			
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification							C4						C4					C4				C4			
Bankfull Velocity (fps)							1.82											4.36				3.48			
Bankfull Discharge (cfs)							115																		
Valley length (ft)																									
Channel Thalweg length (ft)													932					2293.33				2299.79			
Sinuosity (ft)							1.05						1.25					1.05				1.05			
Water Surface Slope (Channel) (ft/ft)													0.38												
BF slope (ft/ft)													**0.38**												
[3]Bankfull Floodplain Area (acres)																		**0.45**				**0.3959**			
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a. Baseline Stream Data Summary
Little Buffalo Creek (94147) - Segment/Reach: Mainstem Reach 3 (1,083 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)					34.42	41.48	41.54	48.48	7.03	3	43.1	52.2	50.6	64.4	8.8	4	40	40	40	38.31	38.31	38.31	38.31		1
Floodprone Width (ft)					258.2	265.4	265.4	272.6	7.21	3	54.9	75.3	74.3	98	15.4	4	>88	>88	>88	>90	>90	>90	>90		1
Bankfull Mean Depth (ft)					1.2	1.47	1.42	1.8	0.3	3	0.98	1.16	1.1	1.38	0.18	4	1.58	1.58	1.58	1.26	1.26	1.26	1.26		1
[1]Bankfull Max Depth (ft)					2.47	2.78	2.79	3.09	0.31	3	2.17	2.41	2.5	2.5	0.14	4	2	2	2	1.9	1.9	1.9	1.9		1
Bankfull Cross Sectional Area (ft^2)					58.33	59.79	58.96	62.09	2.01	3	55.4	59.3	58.7	64.5	3.36	4	63	63	63	48.23	48.23	48.23	48.23		1
Width/Depth Ratio					19.12	29.59	29.25	40.4	10.64	3	31.3	47	46.2	64.4	14.35	4	39.87	39.87	39.87	30.43	30.43	30.43	30.43		1
Entrenchment Ratio					5.33	6.53	6.56	7.71	1.19	3	1.1	1.5	1.5	1.8	0.3	4	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2		1
[1]Bank Height Ratio					**1.94**	**2.19**		**2.43**								**4**	**1**	**1**	**1**	**0.94**	**0.94**	**0.94**	**0.94**		**1**
Profile																									
Riffle Length (ft)											7	28.8	27.5	52	13	8	15	30	65	11.3	18.65	20.99	21.31		
Riffle Slope (ft/ft)											0.009	0.02	0.018	0.422	0.01	8	0.017	0.027	0.033	0.018	0.05	0.024	0.134		
Pool Length (ft)											16	76.4	39.5	79	17.32	13	10	15	20	6.32	12.33	10.63	21.53		
Pool Max depth (ft)											2.9	3.2	3.3	3.5	0.24	13	2	2.25	2.5	0.5	1.13	1.26	1.69		
Pool Spacing (ft)											36	76.4	74	111	26.26	7	70	70	70	36.04	45.42	46.77	53.33		
Pattern																									
Channel Beltwidth (ft)																				58.77	58.77	58.77	58.77		
Radius of Curvature (ft)																				83.8	83.8	83.8	83.8		
Rc:Bankfull width (ft/ft)																				**4.58**	**15.65**	**16.52**	**23.05**		
Meander Wavelength (ft)																									
Meander Width Ratio																				2.55	5.2	3.56	12.83		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2							0.619											0.516				0.199			
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification							C4						C4					C4				C4			
Bankfull Velocity (fps)							2.73											3.03				3.96			
Bankfull Discharge (cfs)							163																		
Valley length (ft)																									
Channel Thalweg length (ft)													932					1030.85				1079.45			
Sinuosity (ft)							1.13						1.25					1.05				1.01			
Water Surface Slope (Channel) (ft/ft)													0.38												
BF slope (ft/ft)													**0.38**												
[3]Bankfull Floodplain Area (acres)																		**0.49**				**0.074**			
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a. Baseline Stream Data Summary
Little Buffalo Creek (94147) - Segment/Reach: UT 2 (951 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)																	4	4	4	3.52	3.52	3.52	3.52		1
Floodprone Width (ft)																	7	7	7	8.34	8.34	8.34	8.34		1
Bankfull Mean Depth (ft)																	0.47	0.47	0.47	0.52	0.52	0.52	0.52		1
[1]Bankfull Max Depth (ft)																	0.75	0.75	0.75	0.72	0.72	0.72	0.72		1
Bankfull Cross Sectional Area (ft^2)																	1.88	1.88	1.88	1.82	1.82	1.82	1.82		1
Width/Depth Ratio																	8.51	8.51	8.51	6.82	6.82	6.82	6.82		1
Entrenchment Ratio																	1.75	1.75	1.75	2.37	2.37	2.37	2.37		1
[1]Bank Height Ratio																	**1**	**1**	**1**	**1.01**	**1.01**	**1.01**	**1.01**		**1**
Profile																									
Riffle Length (ft)																	51.74	51.74	51.74	6.98	13.52	13.52	20.07		
Riffle Slope (ft/ft)																	0.024	0.024	0.024	0.01	0.013	0.013	0.016		
Pool Length (ft)																				12.76	12.76	12.76	12.76		
Pool Max depth (ft)																				0.89	0.89	0.89	0.89		
Pool Spacing (ft)																				30.63	30.63	30.63	30.63		
Pattern																									
Channel Beltwidth (ft)																									
Radius of Curvature (ft)																									
Rc:Bankfull width (ft/ft)																									
Meander Wavelength (ft)																									
Meander Width Ratio																									
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																	0.571			0.249					
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification																	B6			B6					
Bankfull Velocity (fps)																				1.66					
Bankfull Discharge (cfs)																									
Valley length (ft)																									
Channel Thalweg length (ft)																	951			951.37					
Sinuosity (ft)																				0.96					
Water Surface Slope (Channel) (ft/ft)																									
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).
3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.
4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a. Baseline Stream Data Summary
Little Buffalo Creek (94147) - Segment/Reach: UT 3 (1,475 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)																	4	4	4	3.5	4.38	3.73	5.91		3
Floodprone Width (ft)																	7	7	7	6.35	14.65	13.14	24.45		3
Bankfull Mean Depth (ft)																	0.47	0.47	0.47	0.2	0.34	0.29	0.53		3
[1]Bankfull Max Depth (ft)																	0.75	0.75	0.75	0.31	0.58	0.61	0.82		3
Bankfull Cross Sectional Area (ft^2)																	1.88	1.88	1.88	0.75	1.43	1.69	1.84		3
Width/Depth Ratio																	8.51	8.51	8.51	6.66	15.31	18.61	20.67		3
Entrenchment Ratio																	1.75	1.75	1.75	1.7	3.64	2.22	6.99		3
[1]Bank Height Ratio																	**1**	**1**	**1**	**0.54**	**0.64**	**0.64**	**0.74**		**3**
Profile																									
Riffle Length (ft)																	197.1	355.9	514.7	57.25	107.8	89.01	215.1		
Riffle Slope (ft/ft)																	0.006	0.012	0.044	0.011	0.017	0.014	0.029		
Pool Length (ft)																				1.5	12.97	6.04	31.37		
Pool Max depth (ft)																				4.14	4.46	4.61	4.62		
Pool Spacing (ft)																				114.3	133.6	143.3	143.3		
Pattern																									
Channel Beltwidth (ft)																	50.42	59.15	61.2	13.4	34.2	42.73	46.46		
Radius of Curvature (ft)																				21.64	35.62	35.15	50.55		
Rc:Bankfull width (ft/ft)																				**2.38**	**15.62**	**14.63**	**30.84**		
Meander Wavelength (ft)																									
Meander Width Ratio																				0.43	5.37	2.44	19.52		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																	0.285			0.29					
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification																	B6			B6					
Bankfull Velocity (fps)																				1.47					
Bankfull Discharge (cfs)																									
Valley length (ft)																									
Channel Thalweg length (ft)																	1475			1469.07					
Sinuosity (ft)																				0.95					
Water Surface Slope (Channel) (ft/ft)																				0.019					
BF slope (ft/ft)																				**0.019**					
[3]Bankfull Floodplain Area (acres)																				**0.84**					
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).
3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.
4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a. Baseline Stream Data Summary
Little Buffalo Creek (94147) - Segment/Reach: UT 4 (831 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)																				13.32	13.32	13.32	13.32		1
Floodprone Width (ft)																				>50	>50	>50	>50		1
Bankfull Mean Depth (ft)																				0.91	0.91	0.91	0.91		1
[1]Bankfull Max Depth (ft)																				1.71	1.71	1.71	1.71		1
Bankfull Cross Sectional Area (ft^2)																				12.13	12.13	12.13	12.13		1
Width/Depth Ratio																				14.63	14.63	14.63	14.63		1
Entrenchment Ratio																				>2.2	>2.2	>2.2	>2.2		1
[1]Bank Height Ratio																				**0.6**	**0.6**	**0.6**	**0.6**		**1**
Profile																									
Riffle Length (ft)																				4.74	19.81	21.81	30.73		
Riffle Slope (ft/ft)																				0.012	0.027	0.018	0.074		
Pool Length (ft)																				6.99	12.56	9.1	26.02		
Pool Max depth (ft)																				1.89	2.28	2.32	2.7		
Pool Spacing (ft)																				50.06	56.72	55.31	68.08		
Pattern																									
Channel Beltwidth (ft)																				80.13	98.47	98.47	116.8		
Radius of Curvature (ft)																				36.7	47.23	49.01	56.95		
Rc:Bankfull width (ft/ft)																				**16.34**	**19.23**	**18.89**	**23.76**		
Meander Wavelength (ft)																				221.95	221.95	221.95	221.95		
Meander Width Ratio																				3.37	5.19	4.91	7.15		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																						1.35			
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification																						C4b			
Bankfull Velocity (fps)																						4.23			
Bankfull Discharge (cfs)																									
Valley length (ft)																									
Channel Thalweg length (ft)																						830.01			
Sinuosity (ft)																						0.806			
Water Surface Slope (Channel) (ft/ft)																									
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																						**0.03**			
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).
3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.
4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a. Baseline Stream Data Summary
Little Buffalo Creek (94147) - Segment/Reach: UT 7 (1,127 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)					20.47	26.07	26.81	30.18	4.06	4	43.1	52.2	50.6	64.4	8.8	4	25	25	25	18.58	19.65	19.65	20.71		2
Floodprone Width (ft)					39.2	54.4	43.82	90.77	24.57	4	54.9	75.3	74.3	98	15.4	4	>55	>55	>55	>80			>100		2
Bankfull Mean Depth (ft)					0.85	1	1	1.17	0.13	4	0.98	1.16	1.1	1.38	0.18	4	0.98	0.98	0.98	0.96	1.07	1.07	1.17		2
[1]Bankfull Max Depth (ft)					1.79	2.16	1.94	2.95	0.54	4	2.17	2.41	2.5	2.5	0.14	4	1.13	1.13	1.13	1.17	1.43	1.43	1.69		2
Bankfull Cross Sectional Area (ft^2)					19.96	26.07	26.67	31	5.47	4	55.4	59.3	58.7	64.5	3.36	4	24.44	24.44	24.44	19.93	20.81	20.81	21.68		2
Width/Depth Ratio					20.89	26.33	26.3	31.81	5.33	4	31.3	47	46.2	64.4	14.35	4	25.51	25.51	25.51	15.92	18.72	18.72	21.52		2
Entrenchment Ratio					1.45	2.07	1.92	3.01	0.75	4	1.1	1.5	1.5	1.8	0.3	4	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2		2
[1]Bank Height Ratio																**4**	**1**	**1**	**1**	**0.78**	**0.85**	**0.85**	**0.92**		**2**
Profile																									
Riffle Length (ft)											7	28.8	27.5	52	13	8	10	35	60	9.79	36.53	37.12	54.31		
Riffle Slope (ft/ft)											0.009	0.02	0.018	0.422	0.01	8	0.008	0.01	0.01	0.001	0.014	0.013	0.039		
Pool Length (ft)											16	76.4	39.5	79	17.32	13	10	10	20	8.16	15.87	13.77	28.95		
Pool Max depth (ft)											2.9	3.2	3.3	3.5	0.24	13	1.5	2	2	1	2.05	2.04	2.85		
Pool Spacing (ft)											36	76.4	74	111	26.26	7	15	55	100	13.27	54.36	56.47	130.7		
Pattern																									
Channel Beltwidth (ft)																	201	201	201	154.6	209.3	209.3	264		
Radius of Curvature (ft)																	50	137.5	686	90.88	194.3	125.7	434.9		
Rc:Bankfull width (ft/ft)																	**28**	**31.5**	**31**	**15.71**	**20.53**	**21.99**	**22.62**		
Meander Wavelength (ft)																	720	720	720	687.9	687.9	687.9	687.9		
Meander Width Ratio																	6.48	6.38	7.18	9.838	10.19	9.514	11.67		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2							0.479											0.407				0.358			
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification							F4/C4						C4					C4				C4			
Bankfull Velocity (fps)							3.7											3.93				4.61			
Bankfull Discharge (cfs)							96																		
Valley length (ft)																									
Channel Thalweg length (ft)													932					1110.53				1126.71			
Sinuosity (ft)													1.25					1.21				1.23			
Water Surface Slope (Channel) (ft/ft)													0.38					0.006				0.006			
BF slope (ft/ft)													**0.38**					**0.006**				**0.005**			
[3]Bankfull Floodplain Area (acres)																		**0.459**				**5.35**			
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).
3. Utilizing XS measurement data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.
4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Banks, and Hydrologic Containment Parameter Distribution)
Little Buffalo Creek (94147) Segment/Reach: Mainstem Reach 1 (2,305 feet)

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
[1]Ri% / Ru% / P% / G% / S%															41.8	25.4	19.4	13.4	0			30.5	14.7	36.8	18	0		
[1]SC% / Sa% / G% / C% / B% / Be%	26	22.1	51.9	0	0	0		10.2	20.4	59.2	0	0	10.2															
[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.04	0.69	2.33	10.3	21.3			0.24	2.96	6.85	26.8	bedrock																
[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																						0	0	100	0	0		
[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																						100	0	0	0			

Shaded cells indicate that these will typically not be filled in.

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2,3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary.

The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions.

ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design measurements), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-construtions distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Banks, and Hydrologic Containment Parameter Distribution)
Little Buffalo Creek (94147) Segment/Reach: Mainstem Reach 3 (1,083 feet)

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
[1]Ri% / Ru% / P% / G% / S%															41.3	13	13	32.7	0			25.8	20.2	26	28	0		
[1]SC% / Sa% / G% / C% / B% / Be%	17	20	41	22	0	0		10.2	20.4	59.2	0	0	10.2															
[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.06	0.9	12.5	94.2	159			0.24	2.96	6.85	26.8	bedrock																
[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																						0	5	95	0	0		
[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																						98	2	0	0			

Shaded cells indicate that these will typically not be filled in.

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2,3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary.

The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions.

ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design measurements), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-construtions distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Banks, and Hydrologic Containment Parameter Distribution)
Little Buffalo Creek (94147) Segment/Reach: Mainstem Reach 4 (969 feet)

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
[1]Ri% / Ru% / P% / G% / S%	40.9	28.8	11.7	18.6	0																	40.9	28.8	11.7	18.6	0		
[1]SC% / Sa% / G% / C% / B% / Be%	24.8	21	28.6	2.9	1	21.9		10.2	20.4	59.2	0	0	10.2															
[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.04	0.74	2.75	bedroc	bedrock			0.24	2.96	6.85	26.8	bedrock																
[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																						0	0	100	0	0		
[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																						100	0	0	0			

Shaded cells indicate that these will typically not be filled in.

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2,3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary.

The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions.

ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design measurements), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-constrution distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Banks, and Hydrologic Containment Parameter Distribution)
Little Buffalo Creek (94147) Segment/Reach: UT2 (951 feet)

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
[1]Ri% / Ru% / P% / G% / S%															100	0	0	0	0			90	2	6	2	0		
[1]SC% / Sa% / G% / C% / B% / Be%								10.2	20.4	59.2	0	0	10.2															
[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)								0.24	2.96	6.85	26.8	bedrock																
[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																						0	90	10	0	0		
[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																						90	10	0	0			

Shaded cells indicate that these will typically not be filled in.

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2,3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary.

The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions.

ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design measurements), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-constrution distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Banks, and Hydrologic Containment Parameter Distribution)
Little Buffalo Creek (94147) Segment/Reach: UT3 (1,475 feet)

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
[1]Ri% / Ru% / P% / G% / S%															100	0	0	0	0			83.7	3.2	5.5	7.6	0		
[1]SC% / Sa% / G% / C% / B% / Be%								10.2	20.4	59.2	0	0	10.2															
[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)								0.24	2.96	6.85	26.8	bedrock																
[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																						0	50	30	20	0		
[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																						80	18	2	0			

Shaded cells indicate that these will typically not be filled in.

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2,3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary.

The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions.

ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design measurements), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-construtions distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Banks, and Hydrologic Containment Parameter Distribution)
Little Buffalo Creek (94147) Segment/Reach: UT4 (831 feet)

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
[1]Ri% / Ru% / P% / G% / S%																						43.1	21.2	19.7	16	0		
[1]SC% / Sa% / G% / C% / B% / Be%	10.2	20.4	59.2	0	0	10.2		10.2	20.4	59.2	0	0	10.2															
[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.24	2.96	6.85	26.8	bedrock			0.24	2.96	6.85	26.8	bedrock																
[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																						0	0	100	0	0		
[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																						100	0	0	0			

Shaded cells indicate that these will typically not be filled in.

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2,3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary.

The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions.

ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design measurements), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-construtions distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Banks, and Hydrologic Containment Parameter Distribution)
Little Buffalo Creek (94147) Segment/Reach: UT7 (1,127 feet)

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
[1]Ri% / Ru% / P% / G% / S%															40.7	18.9	15.6	15.1	9.7			34.9	26.1	12.1	18.2	8.7		
[1]SC% / Sa% / G% / C% / B% / Be%	24.3	19.4	50.5	5.8	0	0		10.2	20.4	59.2	0	0	10.2															
[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.04	0.78	3.3	14.3	75.1			0.24	2.96	6.85	26.8	bedrock																
[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																						0	0	0	15	85		
[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																						95	5	0	0			

Shaded cells indicate that these will typically not be filled in.

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2,3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary.
The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions.
ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design measurements), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-constrution distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Buffalo Creek (94147) Segment/Reach: Mainstem Reach 1 (2,305 feet)

	Cross Section 1 (Riffle)-1R							Cross Section 2 (Pool)-1P						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	640.21	640.41						640.24	640.38					
Bankfull Width (ft)	35.21	36.50						35.77	36.90					
Floodprone Width (ft)	>80	106.40						>80	98.50					
Bankfull Mean Depth (ft)	1.23	1.30						1.11	1.10					
Bankfull Max Depth (ft)	1.79	1.98						2.48	2.17					
Bankfull Cross Sectional Area (ft^2)	43.15	49.20						39.80	40.50					
Bankfull Width/Depth Ratio	28.73	27.10						32.15	33.60					
Bankfull Entrenchment Ratio	>2.2	2.90						>2.2	2.70					
Bankfull Bank Height Ratio	1.00	0.88						0.73	1.00					
Cross Sectional Area between end pins (ft^2)	77.79	86.15						85.42	81.10					
d50 (mm)	15.90	21.00						5.00	16.00					

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Buffalo Creek (94147) Segment/Reach: Mainstem Reach 3 (1,083 feet)

	Cross Section 1 (Riffle)-2R							Cross Section 2 (Pool)-2P						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	630.92	630.75						629.80	629.37					
Bankfull Width (ft)	38.31	41.00						39.59	26.70					
Floodprone Width (ft)	>90	83.00						>90	122.00					
Bankfull Mean Depth (ft)	1.26	1.10						1.11	2.10					
Bankfull Max Depth (ft)	1.90	2.01						2.44	3.14					
Bankfull Cross Sectional Area (ft^2)	48.23	44.40						43.79	54.90					
Bankfull Width/Depth Ratio	30.43	37.90						35.79	13.00					
Bankfull Entrenchment Ratio	>2.2	2.00						>2.2	4.60					
Bankfull Bank Height Ratio	0.94	1.00						0.69	1.00					
Cross Sectional Area between end pins (ft^2)	116.34	104.46						89.91	77.81					
d50 (mm)	31.00	29.00						6.70	9.00					

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Buffalo Creek (94147) Segment/Reach: Mainstem Reach 4 (969 feet)

	Cross Section 1 (Pool)-3P						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	624.26	623.93					
Bankfull Width (ft)	29.35	25.90					
Floodprone Width (ft)	>65	97.00					
Bankfull Mean Depth (ft)	1.87	2.00					
Bankfull Max Depth (ft)	3.12	3.04					
Bankfull Cross Sectional Area (ft^2)	54.90	50.90					
Bankfull Width/Depth Ratio	15.69	13.20					
Bankfull Entrenchment Ratio	>2.2	3.70					
Bankfull Bank Height Ratio	0.70	0.68					
Cross Sectional Area between end pins (ft^2)	106.25	97.85					
d50 (mm)	3.40	13.00					

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Buffalo Creek (94147) Segment/Reach: UT 2 (951 feet)

	Cross Section 1 (Riffle)-1R						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	639.34	639.58					
Bankfull Width (ft)	3.52	6.20					
Floodprone Width (ft)	8.34	11.50					
Bankfull Mean Depth (ft)	0.52	0.60					
Bankfull Max Depth (ft)	0.72	1.20					
Bankfull Cross Sectional Area (ft^2)	1.82	3.50					
Bankfull Width/Depth Ratio	6.82	10.90					
Bankfull Entrenchment Ratio	2.37	1.85					
Bankfull Bank Height Ratio	1.01	0.52					
Cross Sectional Area between end pins (ft^2)	20.73	21.69					
d50 (mm)	5.00	silt/clay					

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Buffalo Creek (94147) Segment/Reach: UT3 (1,475 feet)

	Cross Section 1 (Riffle)-1R							Cross Section 2 (Riffle)-2R							Cross Section 3 (Riffle)-3R							Cross Section 4 (Pool)-1P						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	647.14	647.58						632.79	633.69						622.92	623.77						638.72	639.22					
Bankfull Width (ft)	3.50	5.20						5.91	11.90						3.73	7.20						4.06	8.50					
Floodprone Width (ft)	24.45	29.00						13.14	20.00						6.35	32.00						8.28	13.00					
Bankfull Mean Depth (ft)	0.53	0.70						0.29	1.00						0.20	0.50						0.25	0.60					
Bankfull Max Depth (ft)	0.82	1.22						0.61	1.62						0.31	1.04						0.46	1.19					
Bankfull Cross Sectional Area (ft^2)	1.84	3.70						1.69	11.80						0.75	3.40						1.01	4.90					
Bankfull Width/Depth Ratio	6.66	7.30						20.67	12.10						18.61	15.20						16.32	14.80					
Bankfull Entrenchment Ratio	6.99	5.60						2.22	1.70						1.70	4.50						2.04	1.50					
Bankfull Bank Height Ratio	0.74	0.70						0.57	0.36						0.71	1.00						0.54	0.47					
Cross Sectional Area between end pins (ft^2)	13.50	12.44						26.63	32.15						15.64	14.99						27.61	28.83					
d50 (mm)	silt/clay	silt/clay						4.50	0.19						0.11	silt/clay						silt/clay	silt/clay					

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Buffalo Creek (94147) Segment/Reach: UT 4 (831 feet)

	Cross Section 1 (Riffle)-1R							Cross Section 2 (Pool)-1P						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	627.41	627.46						629.84	629.60					
Bankfull Width (ft)	13.32	13.94						20.38	17.20					
Floodprone Width (ft)	>50	36.25						>100	43.00					
Bankfull Mean Depth (ft)	0.91	0.92						1.34	1.14					
Bankfull Max Depth (ft)	1.71	1.70						2.71	2.29					
Bankfull Cross Sectional Area (ft^2)	12.13	12.87						27.37	19.65					
Bankfull Width/Depth Ratio	14.63	15.09						15.18	15.06					
Bankfull Entrenchment Ratio	>2.2	2.60						>2.2	2.50					
Bankfull Bank Height Ratio	0.60	1.00						0.63	1.00					
Cross Sectional Area between end pins (ft^2)	29.20	24.33						54.73	49.76					
d50 (mm)	8.90	6.90						7.00	0.18					

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Buffalo Creek (94147) Segment/Reach: UT 7 (1,127 feet)

	Cross Section 1 (Riffle)-1R							Cross Section 2 (Riffle)-2R							Cross Section 3 (Pool)-1P						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	615.87	616.31						613.60	613.90						614.93	615.28					
Bankfull Width (ft)	20.71	21.76						18.58	21.20						27.10	29.90					
Floodprone Width (ft)	>100	473.00						>80	643.00						>80	285.00					
Bankfull Mean Depth (ft)	0.96	1.24						1.17	1.26						0.96	1.14					
Bankfull Max Depth (ft)	1.17	1.37						1.69	2.12						1.29	1.60					
Bankfull Cross Sectional Area (ft^2)	19.93	26.99						21.68	26.70						25.98	33.96					
Bankfull Width/Depth Ratio	21.52	17.55						15.92	16.83						28.27	26.32					
Bankfull Entrenchment Ratio	>2.2	21.74						>2.2	30.33						>2.2	9.53					
Bankfull Bank Height Ratio	0.78	0.72						0.92	1.00						0.67	0.99					
Cross Sectional Area between end pins (ft^2)	66.61	66.12						52.17	69.95						76.83	48.29					
d50 (mm)	23.00	11.00						0.50	0.50						silt/clay	silt/clay					

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Little Buffalo Creek (94147) - Segment/Reach: Mainstem Reach 1 (2,305 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	35.21	35.21	35.21	35.21		1	36.50	36.50	36.50	36.50		1																								
Floodprone Width (ft)	>80	>80	>80	>80		1	106.40	106.40	106.40	106.40		1																								
Bankfull Mean Depth (ft)	1.23	1.23	1.23	1.23		1	1.30	1.30	1.30	1.30		1																								
[1]Bankfull Max Depth (ft)	1.79	1.79	1.79	1.79		1	1.98	1.98	1.98	1.98		1																								
Bankfull Cross Sectional Area (ft^2)	43.15	43.15	43.15	43.15		1	49.20	49.20	49.20	49.20		1																								
Width/Depth Ratio	28.73	28.73	28.73	28.73		1	27.10	27.10	27.10	27.10		1																								
Entrenchment Ratio	>2.2	>2.2	>2.2	>2.2		1	2.90	2.90	2.90	2.90		1																								
[1]Bank Height Ratio	**1**	**1**	**1**	**1**		**1**	**0.88**	**0.88**	**0.88**	**0.88**		**1**																								
Profile																																				
Riffle Length (ft)	7.73	23.71	22.04	38.44			5.02	14.18	9.18	31.54																										
Riffle Slope (ft/ft)	0.00	0.026	0.022	0.076			0.001	0.015	0.007	0.044																										
Pool Length (ft)	4.21	25.43	17.55	83.2			2.96	7.07	6.1	14.54																										
Pool Max depth (ft)	1.96	2.71	2.48	3.76			1.96	2.63	2.43	3.42																										
Pool Spacing (ft)	29.95	48.64	39.06	91.87			14.66	32.47	23.01	54.64																										
Pattern																																				
Channel Beltwidth (ft)	59.64	105.83	92.68	165.18																																
Radius of Curvature (ft)	72.965	83.153	79.01	97.485																																
Rc:Bankfull width (ft/ft)	**27.95**	**35.603**	**36.13**	**46.36**																																
Meander Wavelength (ft)																																				
Meander Width Ratio	1.2865	3.037	2.5652	5.9098																																
Additional Reach Parameters																																				
Rosgen Classification	C4						C4c-																													
Channel Thalweg length (ft)	2299.79						2318.86																													
Sinuosity (ft)	1.05						1.05																													
Water Surface Slope (Channel) (ft/ft)							NA (DRY)																													
BF slope (ft/ft)							**0.0007**																													
[3]Ri% / Ru% / P% / G% / S%	**30.5**	**14.7**	**36.8**	**18**	**0**		**35.2**	**19.6**	**19.5**	**25.6**	**0**																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks							**0**																													
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Little Buffalo Creek (94147) - Segment/Reach: Mainstem Reach 3 (1,083 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	38.31	38.31	38.31	38.31		1	41.00	41.00	41.00	41.00		1																								
Floodprone Width (ft)	>90	>90	>90	>90		1	83.00	83.00	83.00	83.00		1																								
Bankfull Mean Depth (ft)	1.26	1.26	1.26	1.26		1	1.10	1.10	1.10	1.10		1																								
[1]Bankfull Max Depth (ft)	1.9	1.9	1.9	1.9		1	2.01	2.01	2.01	2.01		1																								
Bankfull Cross Sectional Area (ft^2)	48.23	48.23	48.23	48.23		1	44.40	44.40	44.40	44.40		1																								
Width/Depth Ratio	30.43	30.43	30.43	30.43		1	37.90	37.90	37.90	37.90		1																								
Entrenchment Ratio	>2.2	>2.2	>2.2	>2.2		1	2.00	2.00	2.00	2.00		1																								
[1]Bank Height Ratio	**0.94**	**0.94**	**0.94**	**0.94**		**1**	**1.00**	**1.00**	**1.00**	**1.00**		**1**																								
Profile																																				
Riffle Length (ft)	11.3	18.65	20.99	21.31			10.65	25.52	26.64	38.18																										
Riffle Slope (ft/ft)	0.0182	0.0502	0.0241	0.1345			0.007	0.013	0.008	0.027																										
Pool Length (ft)	6.32	12.33	10.63	21.53			7.42	17.75	21.33	24.51																										
Pool Max depth (ft)	0.5	1.13	1.26	1.69			1.75	2.81	1.87	4.81																										
Pool Spacing (ft)	36.04	45.42	46.77	53.33			48.94	61.06	51.44	82.8																										
Pattern																																				
Channel Beltwidth (ft)	58.77	58.77	58.77	58.77																																
Radius of Curvature (ft)	83.8	83.8	83.8	83.8																																
Rc:Bankfull width (ft/ft)	**4.58**	**15.654**	**16.52**	**23.05**																																
Meander Wavelength (ft)																																				
Meander Width Ratio	2.5497	5.1978	3.5575	12.832																																
Additional Reach Parameters																																				
Rosgen Classification	C4						C4																													
Channel Thalweg length (ft)	1079.45						1069.58																													
Sinuosity (ft)	1.01						1.01																													
Water Surface Slope (Channel) (ft/ft)							NA (DRY)																													
BF slope (ft/ft)							**0.0138**																													
[3]Ri% / Ru% / P% / G% / S%	**25.8**	**20.2**	**26**	**28**	**0**		**42**	**14.4**	**21.9**	**21.7**	**0**																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Little Buffalo Creek (94147) - Segment/Reach: UT 2 (951 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	3.52	3.52	3.52	3.52		1	6.20	6.20	6.20	6.20		1																								
Floodprone Width (ft)	8.34	8.34	8.34	8.34		1	9.00	9.00	9.00	9.00		1																								
Bankfull Mean Depth (ft)	0.52	0.52	0.52	0.52		1	0.60	0.60	0.60	0.60		1																								
[1]Bankfull Max Depth (ft)	0.72	0.72	0.72	0.72		1	1.20	1.20	1.20	1.20		1																								
Bankfull Cross Sectional Area (ft^2)	1.82	1.82	1.82	1.82		1	3.50	3.50	3.50	3.50		1																								
Width/Depth Ratio	6.82	6.82	6.82	6.82		1	10.90	10.90	10.90	10.90		1																								
Entrenchment Ratio	2.37	2.37	2.37	2.37		1	1.40	1.40	1.40	1.40		1																								
[1]Bank Height Ratio	**1.01**	**1.01**	**1.01**	**1.01**		**1**	**0.52**	**0.52**	**0.52**	**0.52**		**1**																								
Profile																																				
Riffle Length (ft)	6.98	13.52	13.52	20.07			35.95	35.95	35.95	35.95																										
Riffle Slope (ft/ft)	0.01	0.013	0.013	0.016			0.008	0.008	0.008	0.008																										
Pool Length (ft)	12.76	12.76	12.76	12.76			NA	NA	NA	NA																										
Pool Max depth (ft)	0.89	0.89	0.89	0.89			NA	NA	NA	NA																										
Pool Spacing (ft)	30.63	30.63	30.63	30.63			NA	NA	NA	NA																										
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification			B6						B6																											
Channel Thalweg length (ft)			951.37						951.54																											
Sinuosity (ft)			0.96						0.96																											
Water Surface Slope (Channel) (ft/ft)									NA (DRY)																											
BF slope (ft/ft)									**0.0482**																											
[3]Ri% / Ru% / P% / G% / S%	**90**	**2**	**6**	**2**	**0**		**100**	**0**	**0**	**0**	**0**																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Little Buffalo Creek (94147) - Segment/Reach: UT 3 (1,475 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	3.5	4.38	3.73	5.91		3	5.20	8.10	7.20	11.90		3																								
Floodprone Width (ft)	6.35	14.65	13.14	24.45		3	20.00	27.00	29.00	32.00		3																								
Bankfull Mean Depth (ft)	0.2	0.34	0.29	0.53		3	0.50	0.73	0.70	1.00		3																								
[1]Bankfull Max Depth (ft)	0.31	0.58	0.61	0.82		3	1.04	1.29	1.22	1.62		3																								
Bankfull Cross Sectional Area (ft^2)	0.75	1.43	1.69	1.84		3	3.40	6.30	3.70	11.80		3																								
Width/Depth Ratio	6.66	15.31	18.61	20.67		3	7.30	11.53	12.10	15.20		3																								
Entrenchment Ratio	1.7	3.64	2.22	6.99		3	1.70	3.93	4.50	5.60		3																								
[1]Bank Height Ratio	**0.57**	**0.67**	**0.71**	**0.74**		**3**	**0.36**	**0.69**	**0.70**	**1.00**		**3**																								
Profile																																				
Riffle Length (ft)	57.25	107.81	89.01	215.05			31.91	81.09	72.62	143.24																										
Riffle Slope (ft/ft)	0.011	0.017	0.014	0.029			0.001	0.016	0.016	0.03																										
Pool Length (ft)	1.5	12.97	6.04	31.37			6.73	16.17	12.09	33.76																										
Pool Max depth (ft)	4.14	4.46	4.61	4.62			0.63	1.48	1.48	2.31																										
Pool Spacing (ft)	114.27	133.63	143.31	143.31			125.06	186.72	186.72	248.38																										
Pattern																																				
Channel Beltwidth (ft)	13.4	34.2	42.73	46.46																																
Radius of Curvature (ft)	21.64	35.62	35.15	50.55																																
Rc:Bankfull width (ft/ft)	**2.38**	**15.62**	**14.63**	**30.84**																																
Meander Wavelength (ft)																																				
Meander Width Ratio	0.43	5.37	2.44	19.52																																
Additional Reach Parameters																																				
Rosgen Classification			B6						B6c																											
Channel Thalweg length (ft)			1469.07						1467.05																											
Sinuosity (ft)			0.95						0.95																											
Water Surface Slope (Channel) (ft/ft)			0.019						NA (DRY)																											
BF slope (ft/ft)			**0.019**						**,0198**																											
[3]Ri% / Ru% / P% / G% / S%	**83.7**	**3.2**	**5.5**	**7.6**	**0**		**83.2**	**4.2**	**7.4**	**4.9**	**0.3**																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Little Buffalo Creek (94147) - Segment/Reach: UT 4 (831 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	13.32	13.32	13.32	13.32		1	13.94	13.94	13.94	13.94		1																								
Floodprone Width (ft)	>50	>50	>50	>50		1	36.25	36.25	36.25	36.25		1																								
Bankfull Mean Depth (ft)	0.91	0.91	0.91	0.91		1	0.92	0.92	0.92	0.92		1																								
[1]Bankfull Max Depth (ft)	1.71	1.71	1.71	1.71		1	1.70	1.70	1.70	1.70		1																								
Bankfull Cross Sectional Area (ft^2)	12.13	12.13	12.13	12.13		1	12.87	12.87	12.87	12.87		1																								
Width/Depth Ratio	14.63	14.63	14.63	14.63		1	15.09	15.09	15.09	15.09		1																								
Entrenchment Ratio	>2.2	>2.2	>2.2	>2.2		1	2.60	2.60	2.60	2.60		1																								
[1]Bank Height Ratio	**0.6**	**0.6**	**0.6**	**0.6**		**1**	**1.00**	**1.00**	**1.00**	**1.00**		**1**																								
Profile																																				
Riffle Length (ft)	4.74	19.81	21.81	30.73			11.72	23.29	21.67	36.64																										
Riffle Slope (ft/ft)	0.012	0.027	0.018	0.074			0.013	0.025	0.024	0.037																										
Pool Length (ft)	6.99	12.56	9.1	26.02			6.8	9.62	8.54	15.58																										
Pool Max depth (ft)	1.89	2.28	2.32	2.7			1.71	2.42	2.52	2.88																										
Pool Spacing (ft)	50.06	56.72	55.31	68.08			22.59	37.51	42.3	46.92																										
Pattern																																				
Channel Beltwidth (ft)	80.13	98.47	98.47	116.81																																
Radius of Curvature (ft)	36.7	47.23	49.01	56.95																																
Rc:Bankfull width (ft/ft)	**16.34**	**19.23**	**18.89**	**23.76**																																
Meander Wavelength (ft)	221.95	221.95	221.95	221.95																																
Meander Width Ratio	3.37	5.19	4.91	7.15																																
Additional Reach Parameters																																				
Rosgen Classification	C4b						C4																													
Channel Thalweg length (ft)	830.01						837.13																													
Sinuosity (ft)	0.81						0.81																													
Water Surface Slope (Channel) (ft/ft)							NA (DRY)																													
BF slope (ft/ft)							**0.0123**																													
[3]Ri% / Ru% / P% / G% / S%	**43.1**	**21.2**	**19.7**	**16**	**0**		**52.2**	**9.8**	**19.2**	**18.8**	**0**																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Little Buffalo Creek (94147) - Segment/Reach: UT 7 (1,127 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	18.58	19.65	19.65	20.71		2	21.20	21.48	21.48	21.76		2																								
Floodprone Width (ft)	>80			>100		2	473	558	558	643		2																								
Bankfull Mean Depth (ft)	0.96	1.07	1.07	1.17		2	1.24	1.25	1.25	1.26		2																								
[1]Bankfull Max Depth (ft)	1.17	1.43	1.43	1.69		2	1.37	1.75	1.75	2.12		2																								
Bankfull Cross Sectional Area (ft^2)	19.93	20.81	20.81	21.68		2	26.70	26.85	26.85	26.99		2																								
Width/Depth Ratio	15.92	18.72	18.72	21.52		2	16.83	17.19	17.19	17.55		2																								
Entrenchment Ratio	>2.2	>2.2	>2.2	>2.2		2	21.74	26.04	26.04	30.33		2																								
[1]Bank Height Ratio	**0.78**	**0.85**	**0.85**	**0.92**		**2**	**0.72**	**0.86**	**0.86**	**1.00**		**2**																								
Profile																																				
Riffle Length (ft)	9.79	36.53	37.12	54.31			9.14	29.70	30.63	67.19																										
Riffle Slope (ft/ft)	0.001	0.014	0.013	0.039			0.001	0.013	0.010	0.051																										
Pool Length (ft)	8.16	15.87	13.77	28.95			4.08	13.77	14.49	22.02																										
Pool Max depth (ft)	1	2.05	2.04	2.85			1.19	1.94	2.00	2.62																										
Pool Spacing (ft)	13.27	54.36	56.47	130.67			13.50	54.60	58.53	94.06																										
Pattern																																				
Channel Beltwidth (ft)	154.56	209.27	209.27	263.98																																
Radius of Curvature (ft)	90.88	194.28	125.65	434.94																																
Rc:Bankfull width (ft/ft)	**15.71**	**20.53**	**21.99**	**22.62**																																
Meander Wavelength (ft)	687.9	687.9	687.9	687.9																																
Meander Width Ratio	9.8383	10.191	9.5145	11.67																																
Additional Reach Parameters																																				
Rosgen Classification	C4						C4																													
Channel Thalweg length (ft)	1126.71						1140.94																													
Sinuosity (ft)	1.23						1.23																													
Water Surface Slope (Channel) (ft/ft)	0.006						NA (DRY)																													
BF slope (ft/ft)	**0.005**						**0.0053**																													
[3]Ri% / Ru% / P% / G% / S%	**34.9**	**26.1**	**12.1**	**18.2**	**8.7**		**41.1**	**13.7**	**17.6**	**17.4**	**10.2**																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

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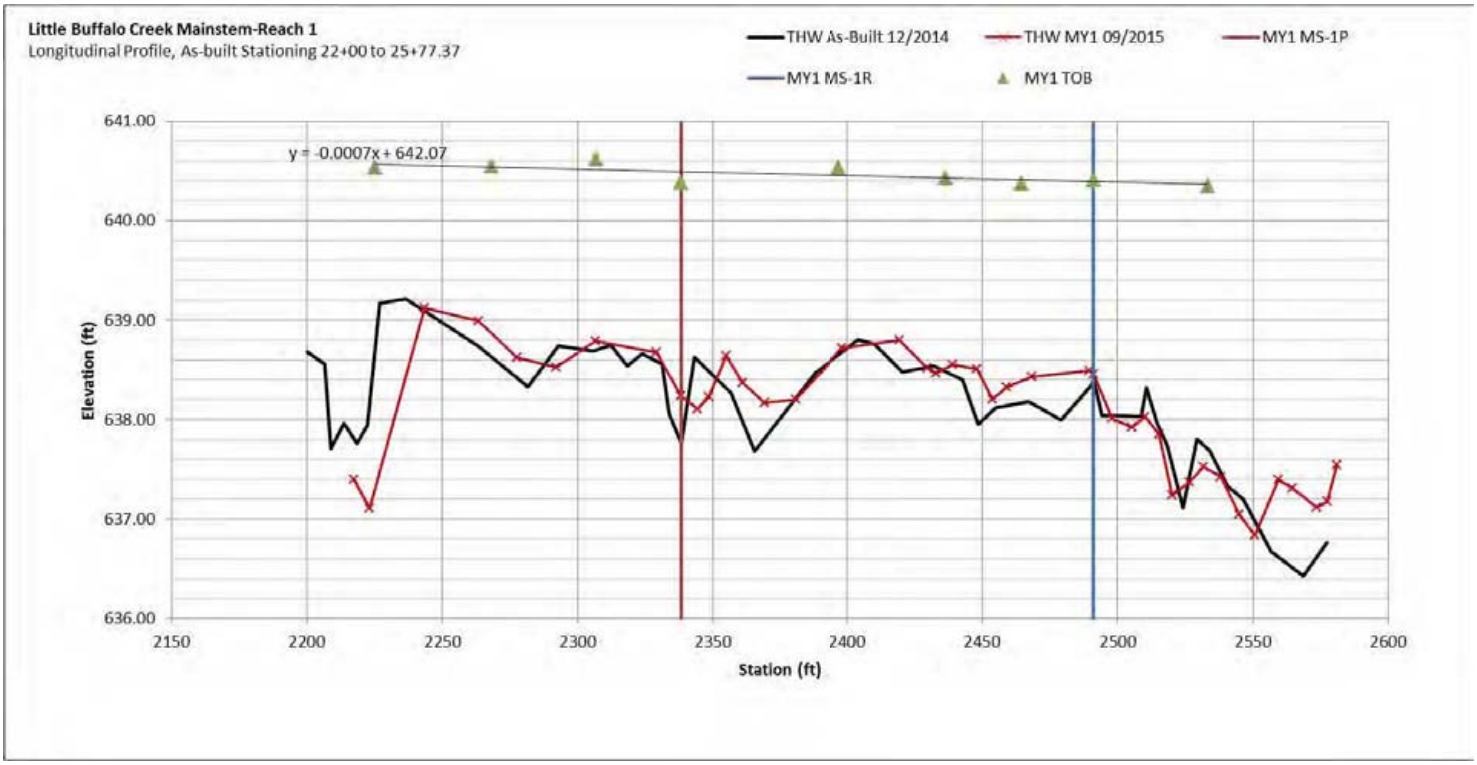
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Figures 3a-k – Longitudinal Profile Plots

Figure 3a – Longitudinal Profile for Mainstem Reach 1



Note: The long profiles were surveyed during a drought period and water surface elevations, when present, co-incided with the thalweg elevation and are not discernable on the plots.

Figure 3b – Longitudinal Profile for Mainstem Reach 3

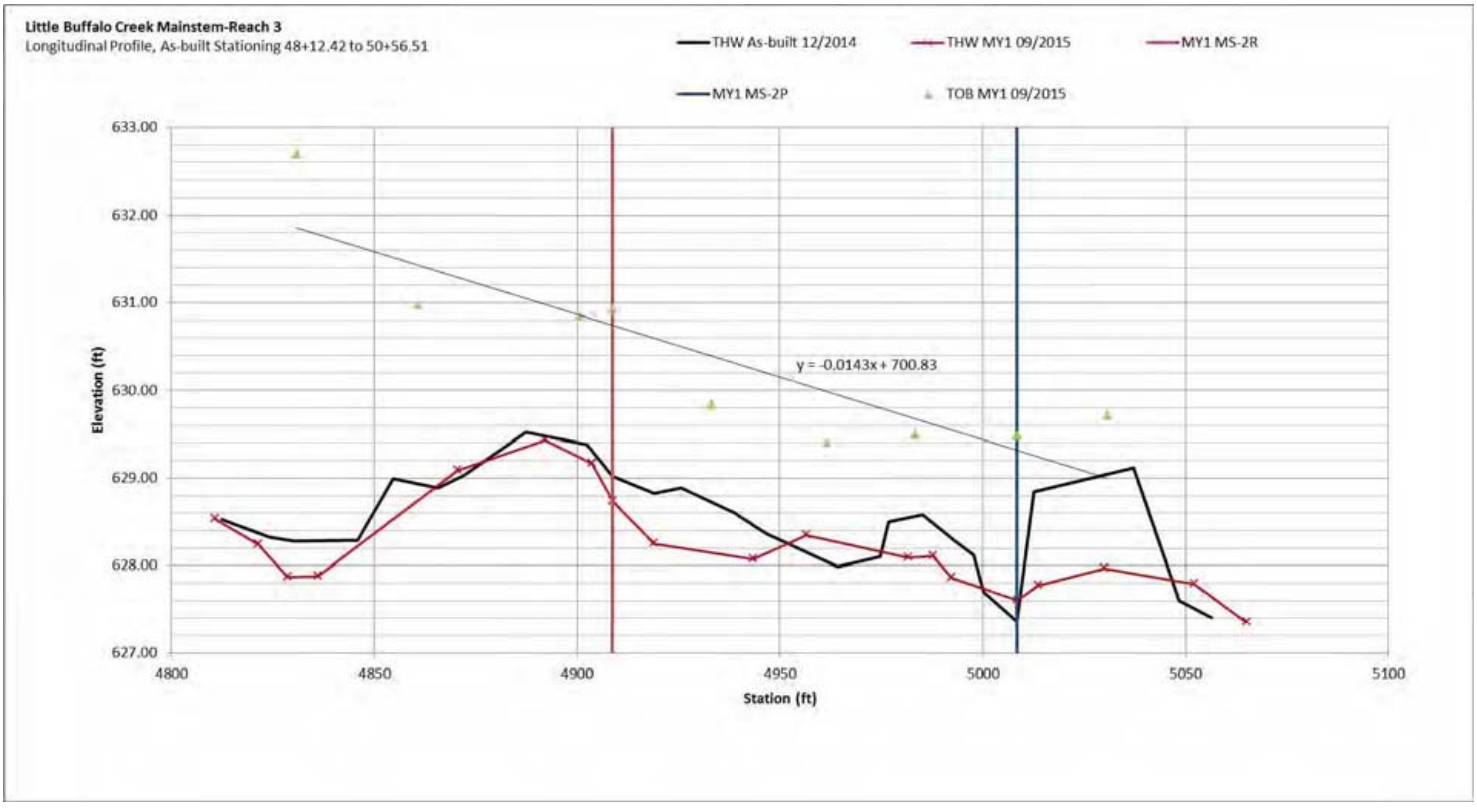


Figure 3c – Longitudinal Profile for Mainstem Reach 4

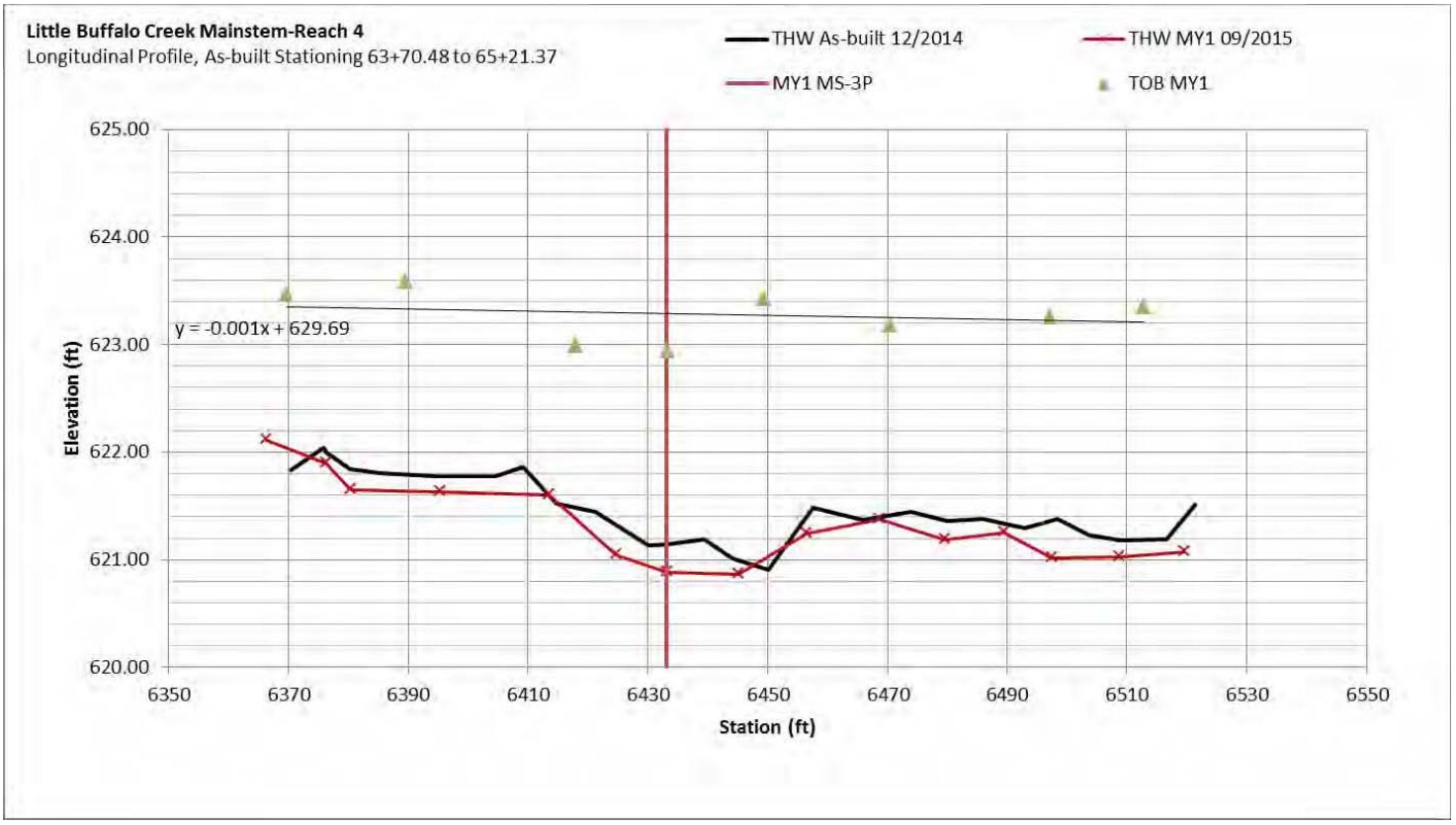


Figure 3d – Longitudinal Profile for UT2 to Mainstem

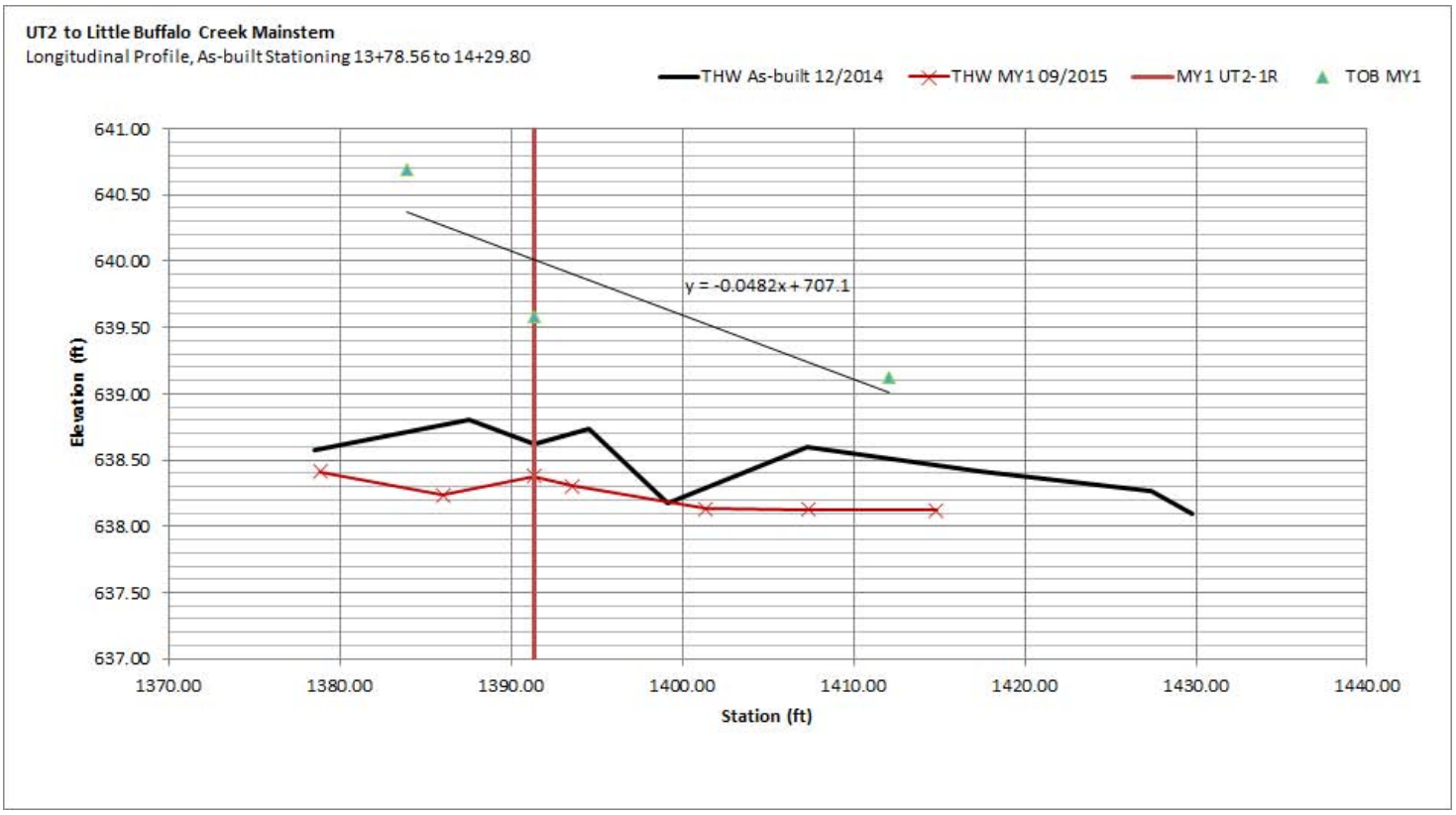


Figure 3e – Longitudinal Profile for UT3 to Mainstem

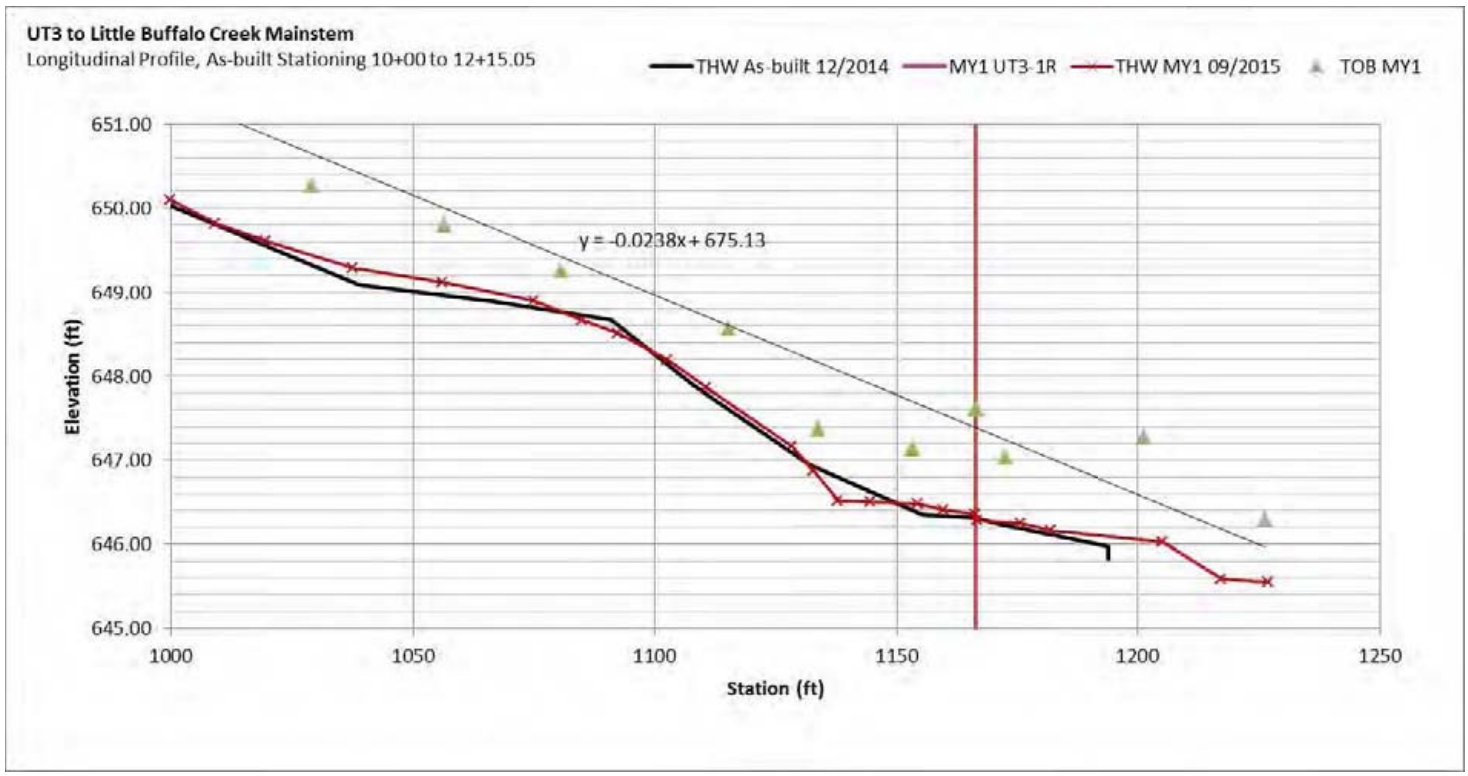


Figure 3f– Longitudinal Profile for UT3 to Mainstem

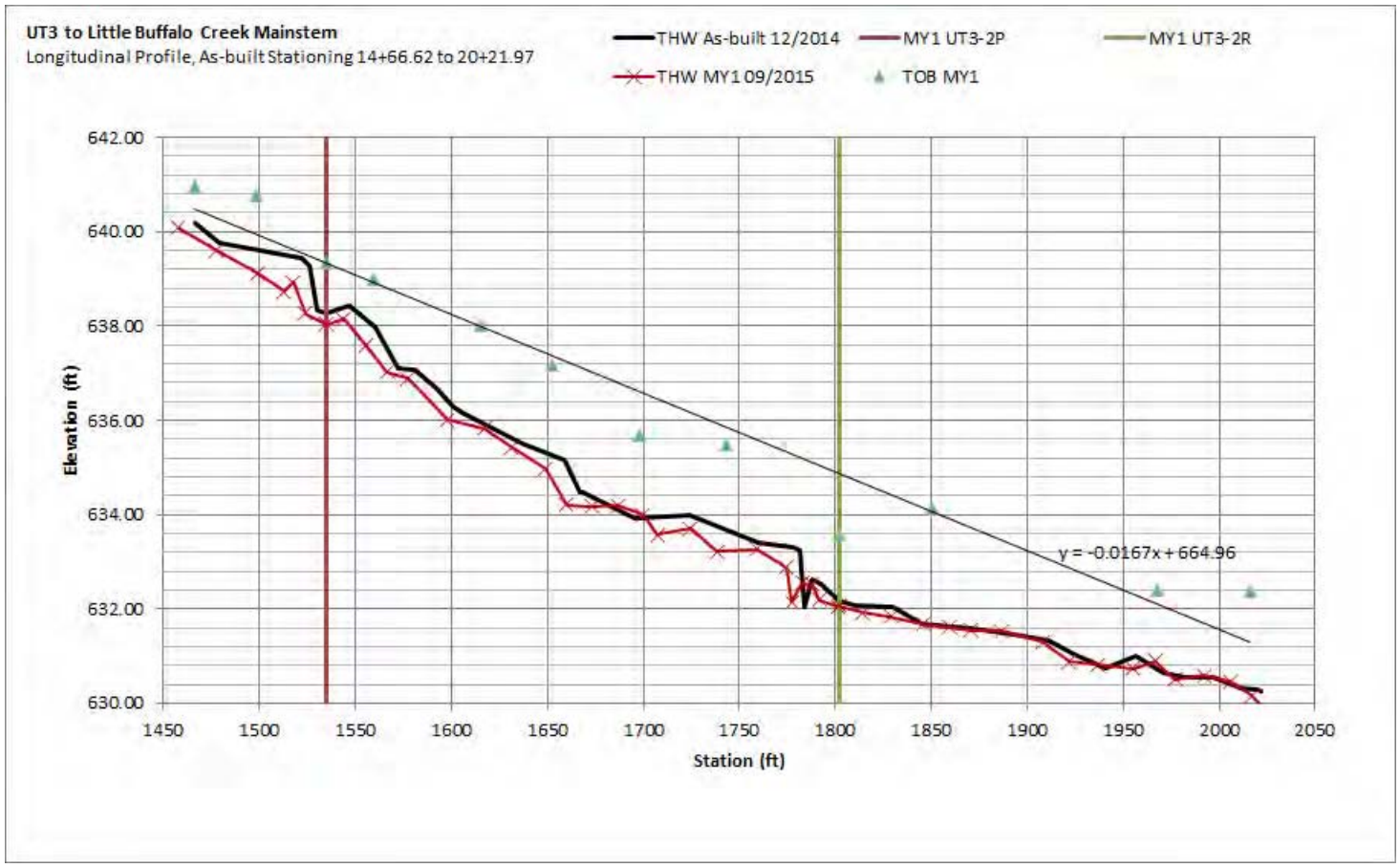


Figure 3g – Longitudinal Profile for UT3 to Mainstem

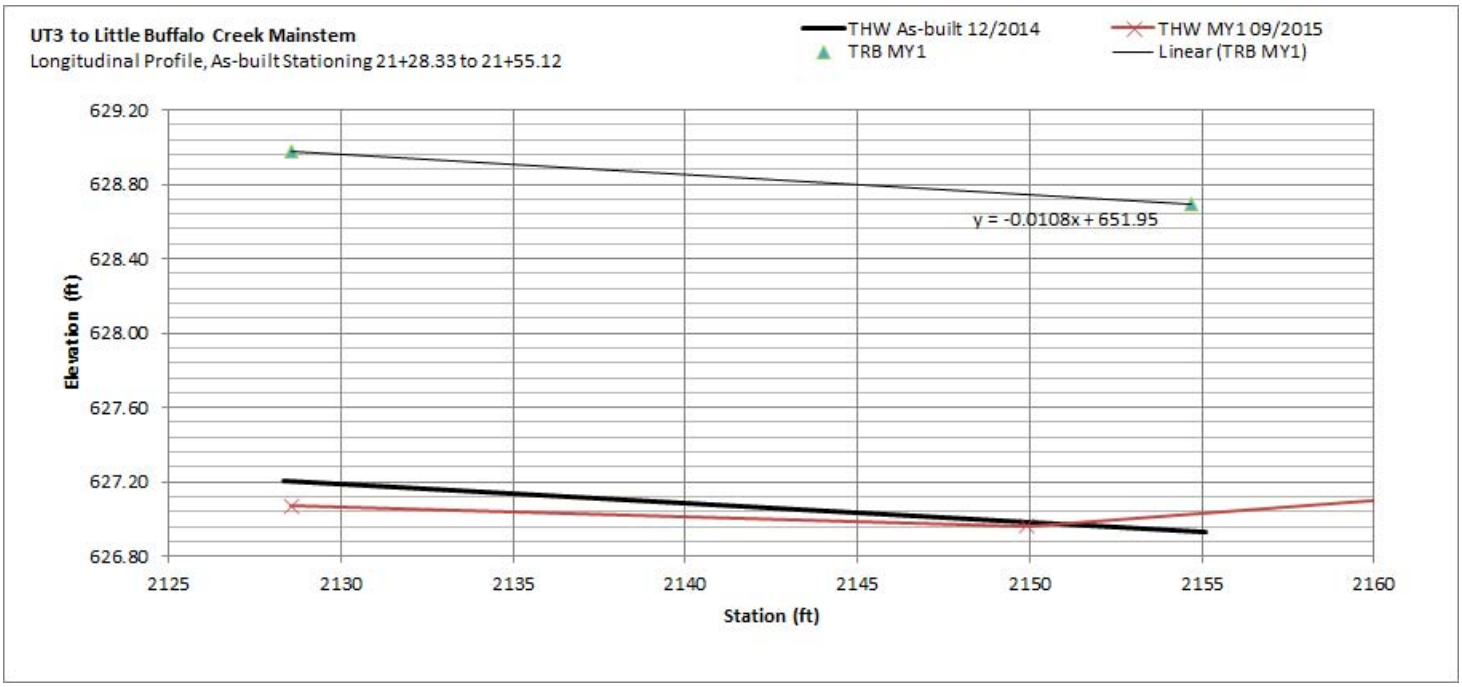


Figure 3h – Longitudinal Profile for UT3 to Mainstem

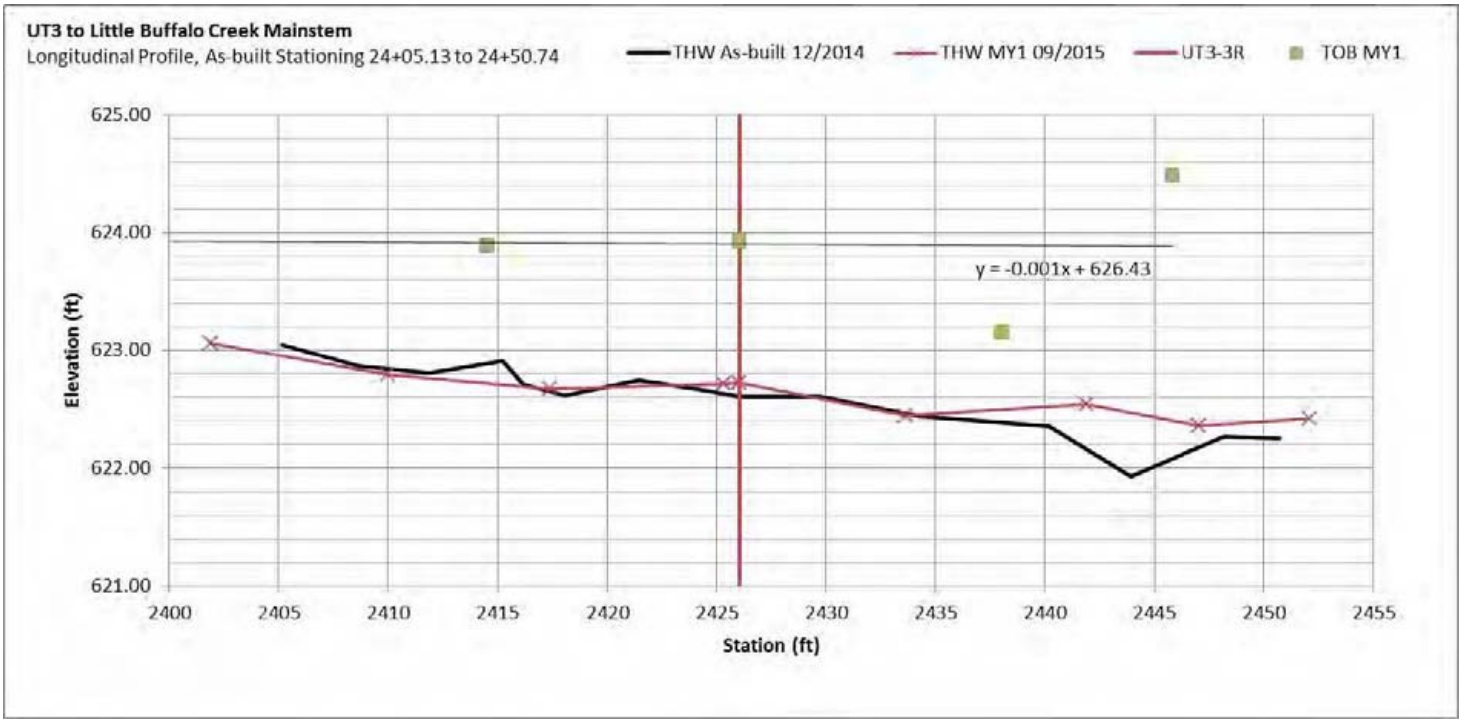


Figure 3i – Longitudinal Profile for UT4 to Mainstem

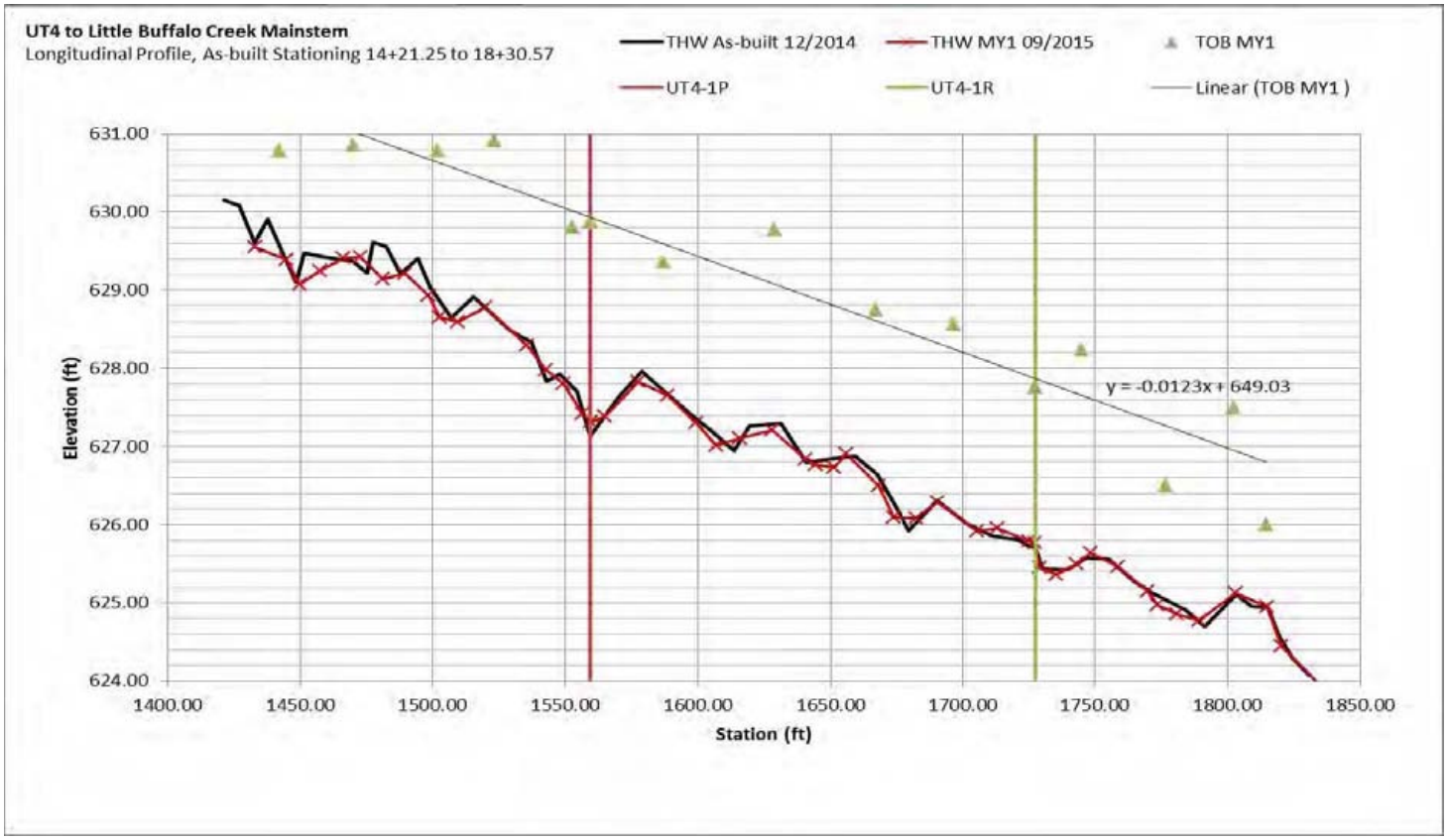


Figure 3j – Longitudinal Profile for UT7 to Mainstem

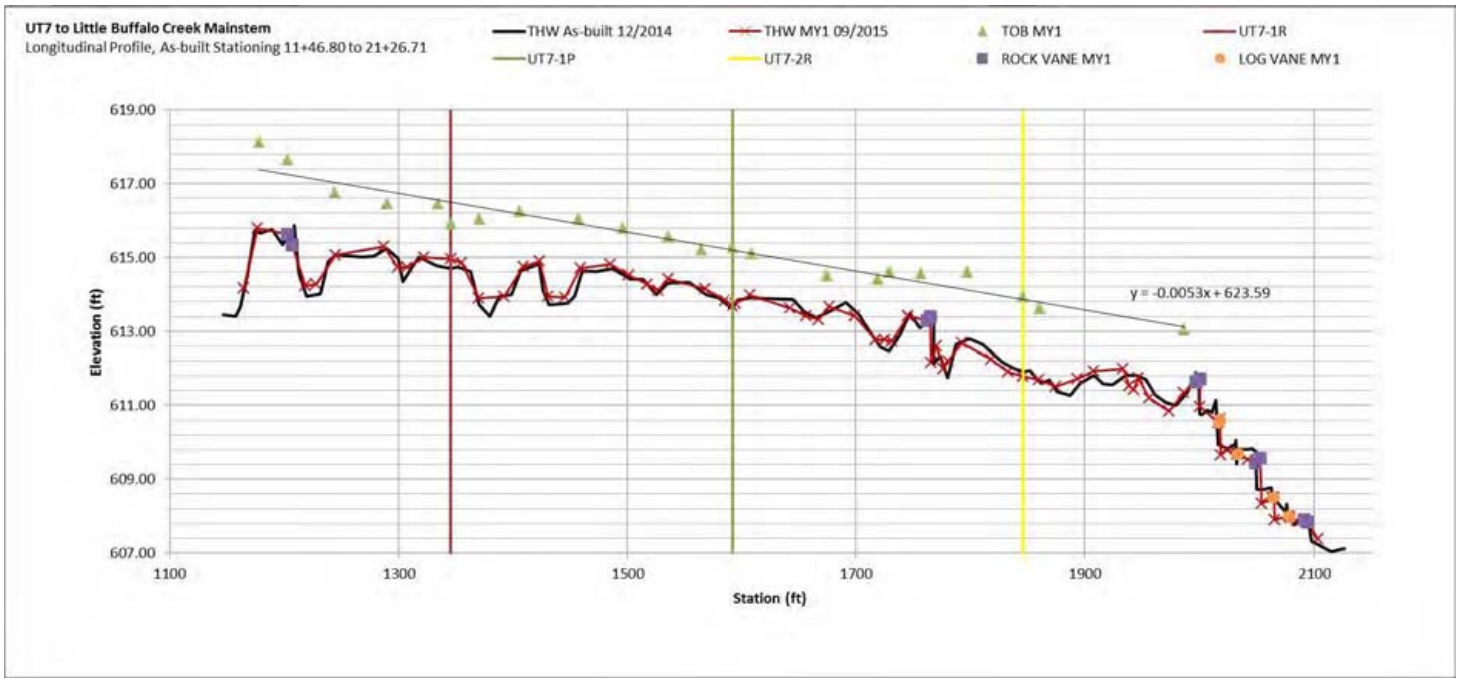
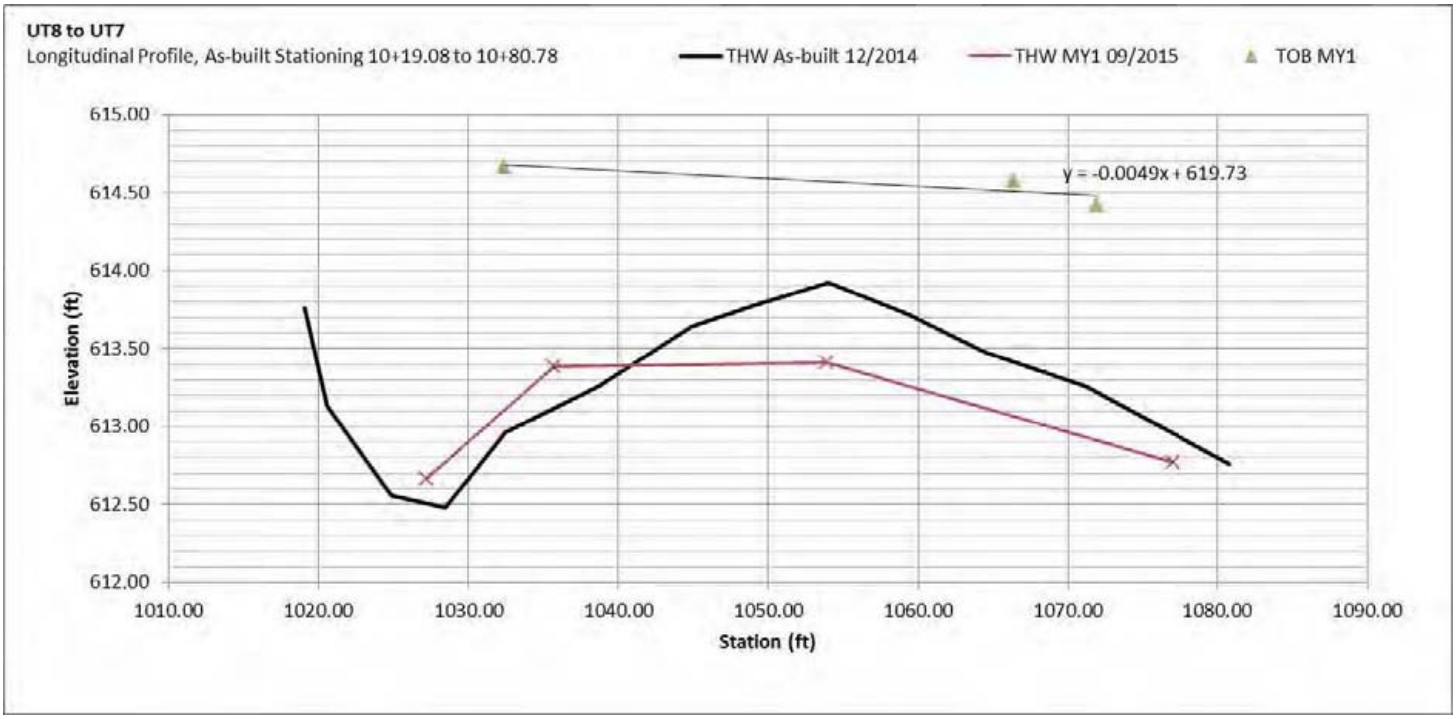


Figure 3k – Longitudinal Profile for UT8 to UT7



Figures 4a-o – Cross-section Plots

Cross Section Plot Exhibit

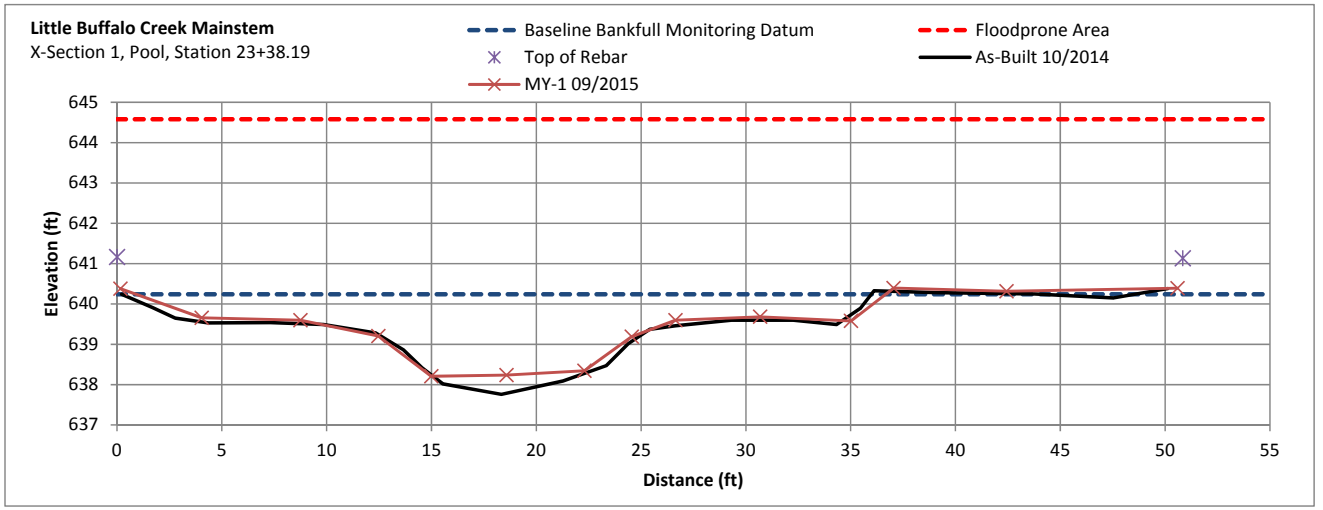
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-1P
Drainage Area (sq mi):	2.99
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	641.16
0.16	640.38
4.04	639.66
8.75	639.60
12.46	639.21
14.99	638.21
18.58	638.24
22.30	638.34
24.55	639.19
26.64	639.60
30.68	639.68
35.02	639.58
37.05	640.39
42.43	640.32
50.60	640.39
50.85	641.13

SUMMARY DATA	
Bankfull Elevation:	640.24
Bankfull Cross-Sectional Area:	40.50
Bankfull Width:	36.90
Flood Prone Area Elevation:	644.58
Flood Prone Width:	98.50
Max Depth at Bankfull:	2.17
Mean Depth at Bankful:	1.10
W/D Ratio:	33.60
Entrenchment Ratio:	2.70
Bank Height Ratio:	1.00

Stream Type	C4

Station and description	23+38.19 MS-1P Looking Upstream



Cross Section Plot Exhibit

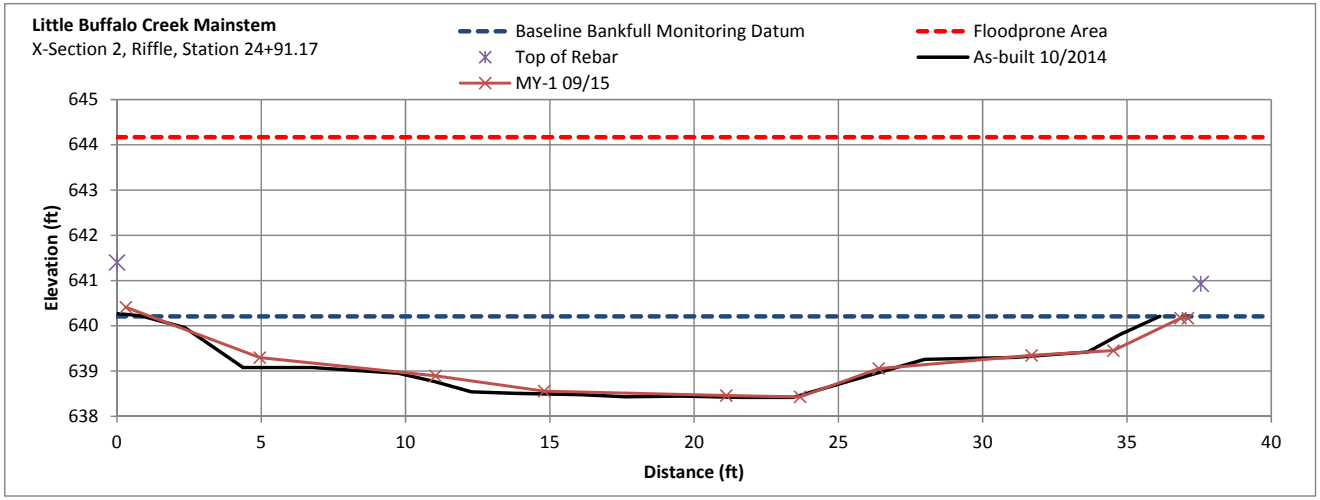
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-1R
Drainage Area (sq mi):	2.99
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	641.40
0.31	640.41
4.95	639.30
11.04	638.89
14.80	638.56
21.12	638.46
23.67	638.43
26.39	639.06
31.69	639.35
34.53	639.45
36.86	640.17
37.11	640.17
37.56	640.93

SUMMARY DATA	
Bankfull Elevation:	640.21
Bankfull Cross-Sectional Area:	49.20
Bankfull Width:	36.50
Flood Prone Area Elevation:	644.17
Flood Prone Width:	106.40
Max Depth at Bankfull:	1.98
Mean Depth at Bankful:	1.30
W/D Ratio:	27.10
Entrenchment Ratio:	2.90
Bank Height Ratio:	0.88

Stream Type	C4

Station and description	24+91.17 MS-1R Looking Upstream



Cross Section Plot Exhibit

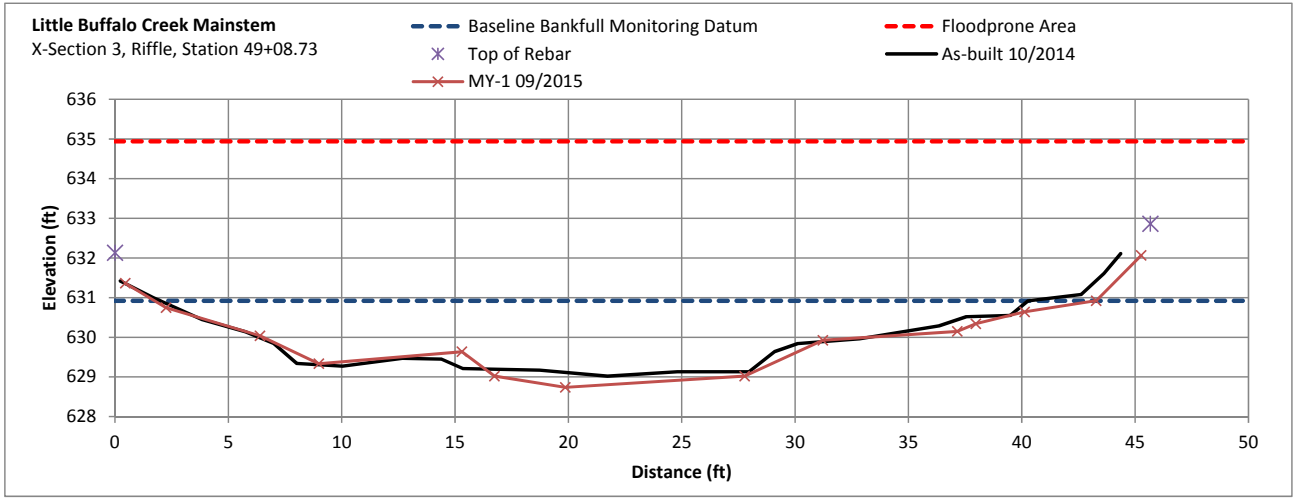
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-2R
Drainage Area (sq mi):	2.82
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	632.13
0.45	631.36
2.25	630.75
6.39	630.04
8.99	629.33
15.30	629.64
16.74	629.02
19.86	628.74
27.78	629.02
31.22	629.92
37.15	630.15
37.97	630.34
40.12	630.64
43.28	630.92
45.27	632.07
45.67	632.86

SUMMARY DATA	
Bankfull Elevation:	630.92
Bankfull Cross-Sectional Area:	44.40
Bankfull Width:	41.00
Flood Prone Area Elevation:	634.94
Flood Prone Width:	83.00
Max Depth at Bankfull:	2.01
Mean Depth at Bankful:	1.10
W/D Ratio:	37.90
Entrenchment Ratio:	2.00
Bank Height Ratio:	1.00

Stream Type	C4

Station and description	4908.73 MS-2R Looking Upstream



Cross Section Plot Exhibit

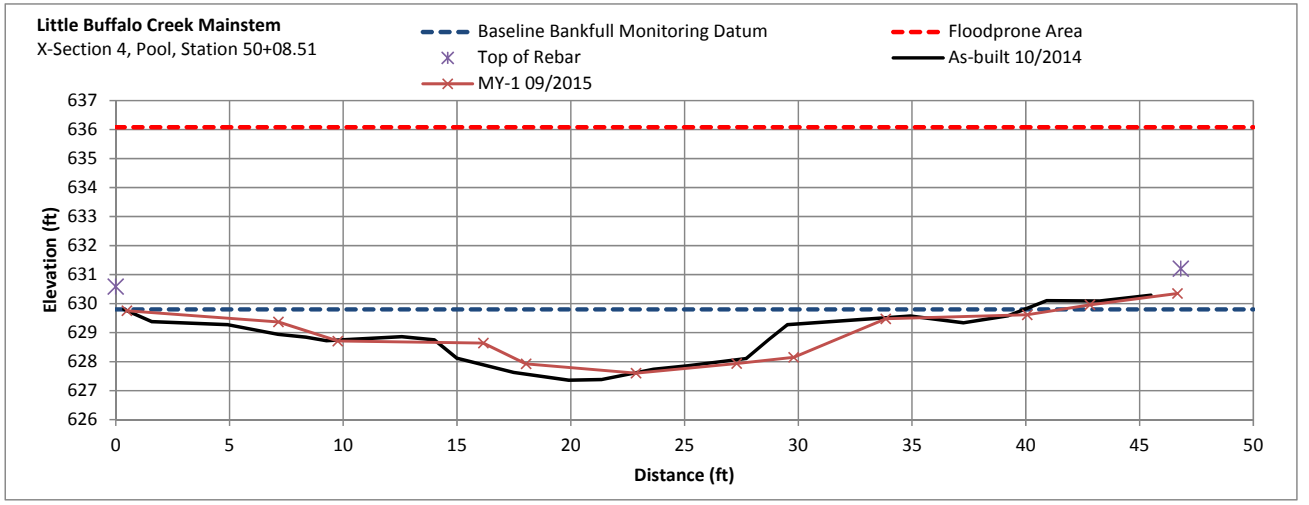
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-2P
Drainage Area (sq mi):	2.82
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	630.59
0.49	629.75
7.15	629.37
9.76	628.71
16.16	628.64
18.04	627.92
22.87	627.60
27.29	627.93
29.79	628.15
33.85	629.48
40.06	629.61
42.82	629.96
46.67	630.35
46.81	631.21

SUMMARY DATA	
Bankfull Elevation:	629.80
Bankfull Cross-Sectional Area:	54.90
Bankfull Width:	26.70
Flood Prone Area Elevation:	636.08
Flood Prone Width:	122.00
Max Depth at Bankfull:	3.14
Mean Depth at Bankful:	2.10
W/D Ratio:	13.00
Entrenchment Ratio:	4.60
Bank Height Ratio:	1.00

Stream Type	C4

Station and description	5008.51 MS-2P Looking Upstream



Cross Section Plot Exhibit

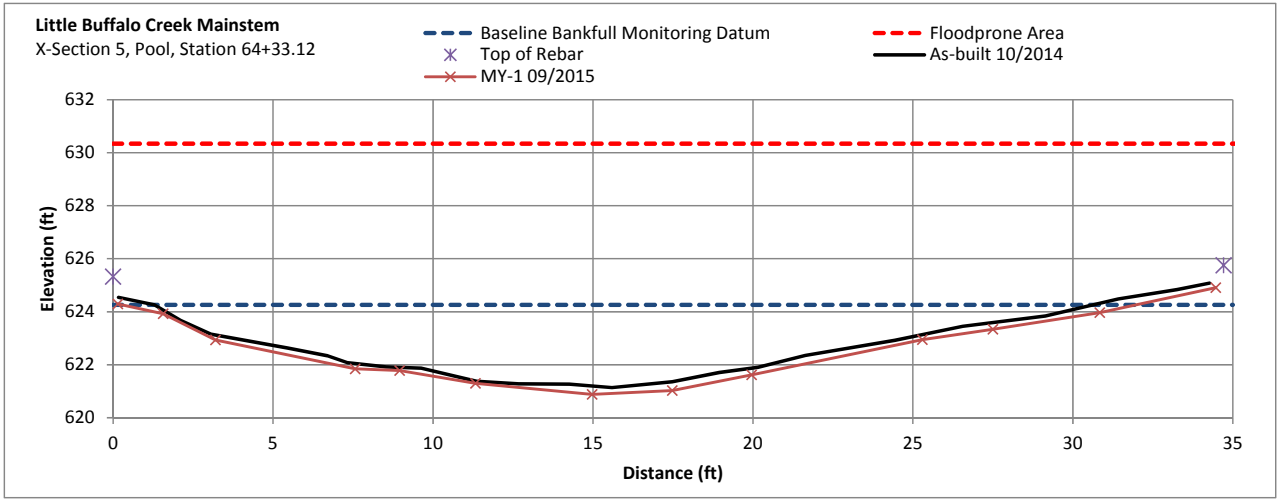
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-3P
Drainage Area (sq mi):	4.01
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	625.33
0.15	624.29
1.56	623.93
3.20	622.94
7.56	621.85
8.96	621.78
11.32	621.30
14.97	620.88
17.48	621.03
19.96	621.62
25.30	622.95
27.50	623.34
30.84	623.97
34.47	624.91
34.71	625.75

SUMMARY DATA	
Bankfull Elevation:	624.26
Bankfull Cross-Sectional Area:	50.90
Bankfull Width:	25.90
Flood Prone Area Elevation:	630.34
Flood Prone Width:	97.00
Max Depth at Bankfull:	3.04
Mean Depth at Bankful:	2.00
W/D Ratio:	13.20
Entrenchment Ratio:	3.70
Bank Height Ratio:	0.68

Stream Type	C4

Station and description	6433.12 MS-3P Looking Upstream



Cross Section Plot Exhibit

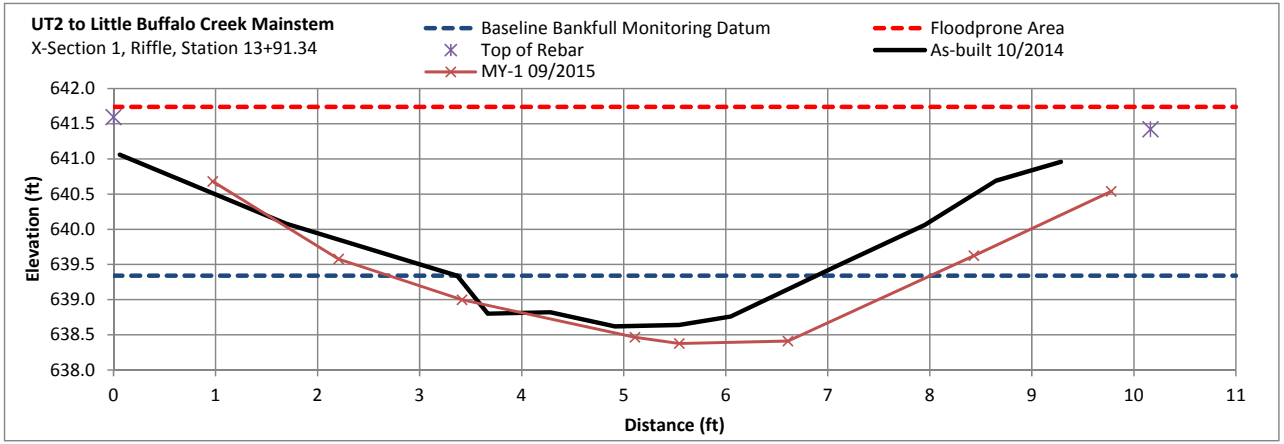
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT2-1R
Drainage Area (sq mi):	0.3
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	641.60
0.97	640.68
2.21	639.58
3.42	639.00
5.11	638.47
5.54	638.38
6.61	638.41
8.43	639.62
9.78	640.54
10.16	641.42

SUMMARY DATA	
Bankfull Elevation:	639.34
Bankfull Cross-Sectional Area:	3.50
Bankfull Width:	6.20
Flood Prone Area Elevation:	641.74
Flood Prone Width:	11.50
Max Depth at Bankfull:	1.20
Mean Depth at Bankful:	0.60
W/D Ratio:	10.90
Entrenchment Ratio:	1.85
Bank Height Ratio:	0.52

Stream Type	B6

Station and description	1391.34 UT2-1R Looking Upstream



Cross Section Plot Exhibit

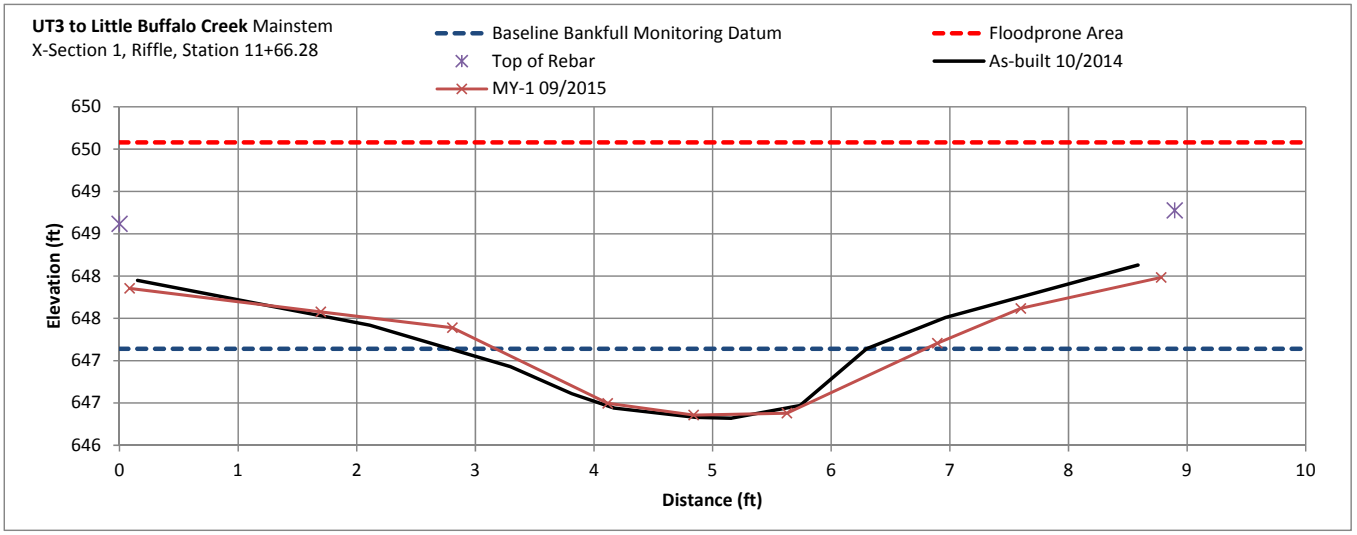
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT3-1R
Drainage Area (sq mi):	0.097
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	648.62
0.09	647.86
1.70	647.58
2.81	647.39
4.12	646.50
4.84	646.36
5.63	646.38
6.89	647.21
7.60	647.62
8.78	647.98
8.90	648.78

SUMMARY DATA	
Bankfull Elevation:	647.14
Bankfull Cross-Sectional Area:	3.70
Bankfull Width:	5.20
Flood Prone Area Elevation:	649.58
Flood Prone Width:	29.00
Max Depth at Bankfull:	1.22
Mean Depth at Bankful:	0.70
W/D Ratio:	7.30
Entrenchment Ratio:	5.60
Bank Height Ratio:	0.70

Stream Type	B6

Station and description	1166.28 UT3-1R Looking Upstream



Cross Section Plot Exhibit

River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT3-1P
Drainage Area (sq mi):	0.097
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

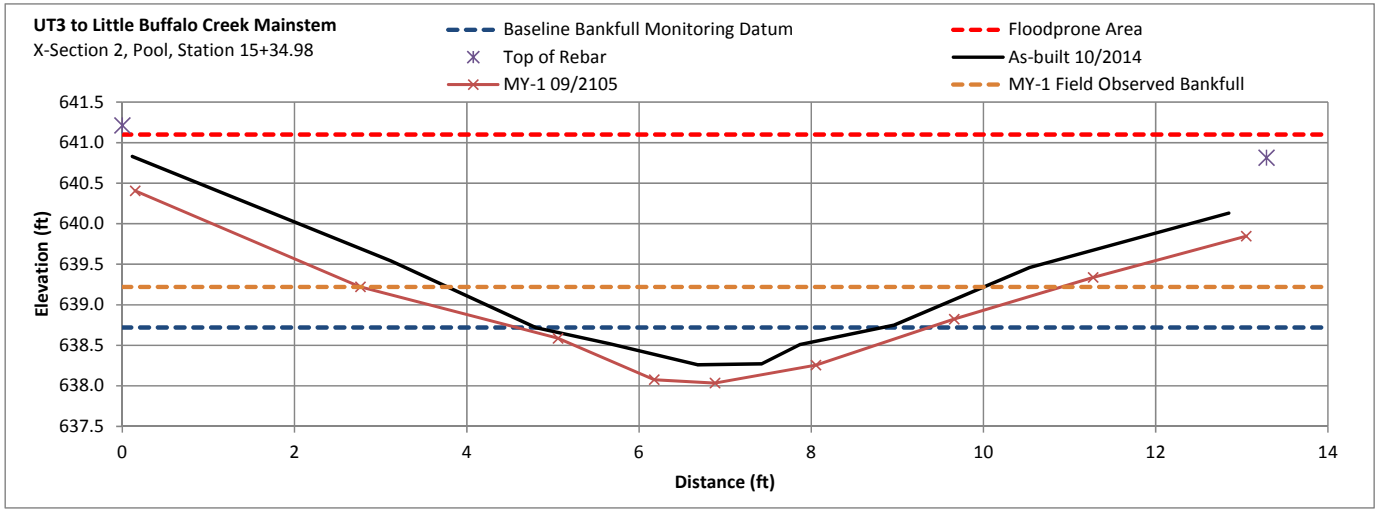
Station	Elevation
0.00	641.21
0.15	640.41
2.76	639.22
5.06	638.59
6.18	638.08
6.88	638.03
8.05	638.26
9.66	638.82
11.27	639.34
13.05	639.85
13.29	640.81

SUMMARY DATA	
Bankfull Elevation[1]:	638.72
Bankfull Cross-Sectional Area:	4.90
Bankfull Width:	8.50
Flood Prone Area Elevation:	641.10
Flood Prone Width:	13.00
Max Depth at Bankfull:	1.19
Mean Depth at Bankful:	0.60
W/D Ratio:	14.80
Entrenchment Ratio:	1.50
Bank Height Ratio:	0.47

Note:
1) Bankfull Elevation held as MY0 Baseline Elevation
MY-1 Bankfull elevation has significantly changed and is 639.22

Stream Type	B6

Station and description	1534.98 UT3-1P Looking Upstream



Cross Section Plot Exhibit

River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT3-2R
Drainage Area (sq mi):	0.097
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

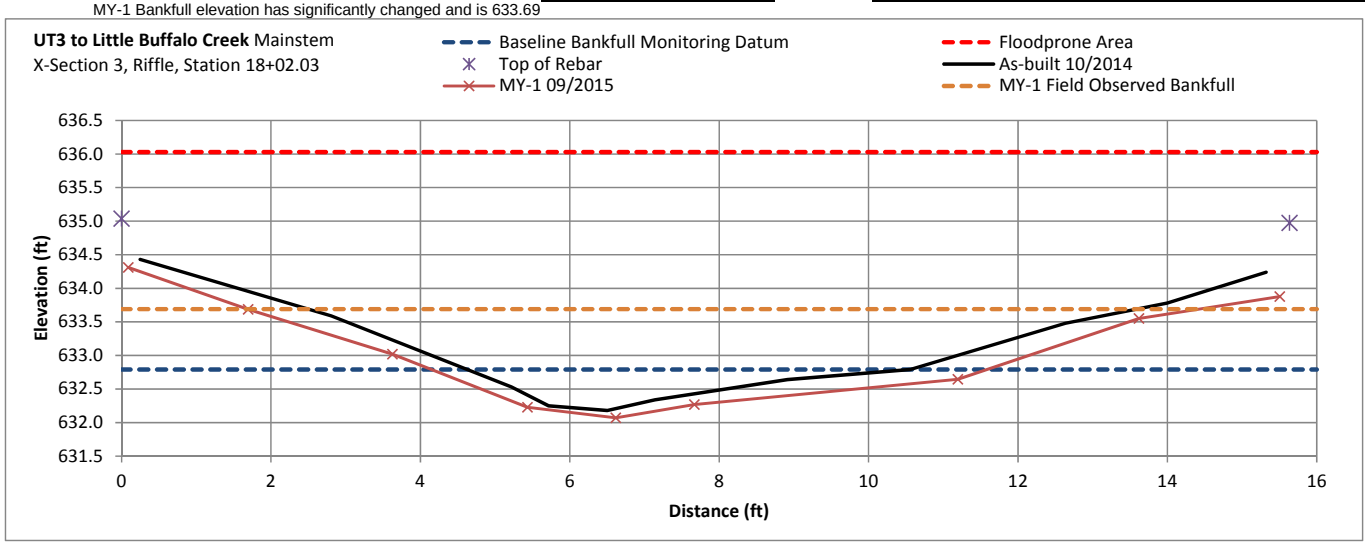
Station	Elevation
0.00	635.04
0.09	634.31
1.69	633.69
3.62	633.02
5.43	632.23
6.62	632.07
7.67	632.27
11.19	632.65
13.62	633.55
15.50	633.88
15.64	634.97

SUMMARY DATA	
Bankfull Elevation[1]:	632.79
Bankfull Cross-Sectional Area:	11.80
Bankfull Width:	11.90
Flood Prone Area Elevation:	636.03
Flood Prone Width:	20.00
Max Depth at Bankfull:	1.62
Mean Depth at Bankful:	1.00
W/D Ratio:	12.10
Entrenchment Ratio:	1.70
Bank Height Ratio:	0.36

Note:
1) Bankfull Elevation held as MY0 Baseline Elevation
MY-1 Bankfull elevation has significantly changed and is 633.69

Stream Type	B6

Station and description	1802.03 UT3-2R Looking Upstream



Cross Section Plot Exhibit

River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT3-3R
Drainage Area (sq mi):	0.097
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	624.97
0.11	624.13
1.49	623.77
3.86	622.99
4.42	622.72
6.56	622.98
8.65	623.93
9.60	624.15
9.27	624.96

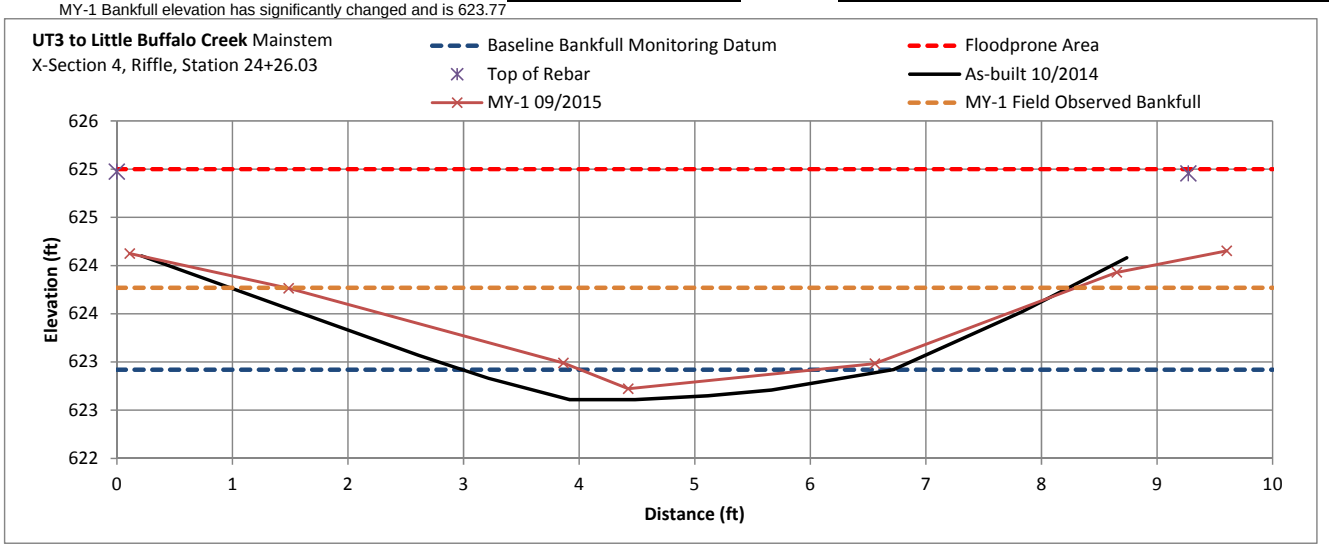
SUMMARY DATA	
Bankfull Elevation[1]:	622.92
Bankfull Cross-Sectional Area:	3.40
Bankfull Width:	7.20
Flood Prone Area Elevation:	625.00
Flood Prone Width:	32.00
Max Depth at Bankfull:	1.04
Mean Depth at Bankful:	0.50
W/D Ratio:	15.20
Entrenchment Ratio:	4.50
Bank Height Ratio:	1.00

Note:
1) Bankfull Elevation held as MY0 Baseline Elevation
MY-1 Bankfull elevation has significantly changed and is 623.77

Stream Type	B6

MY1 Photo Not Available

Station and description	2426.03 UT3-3R Looking Upstream



Cross Section Plot Exhibit

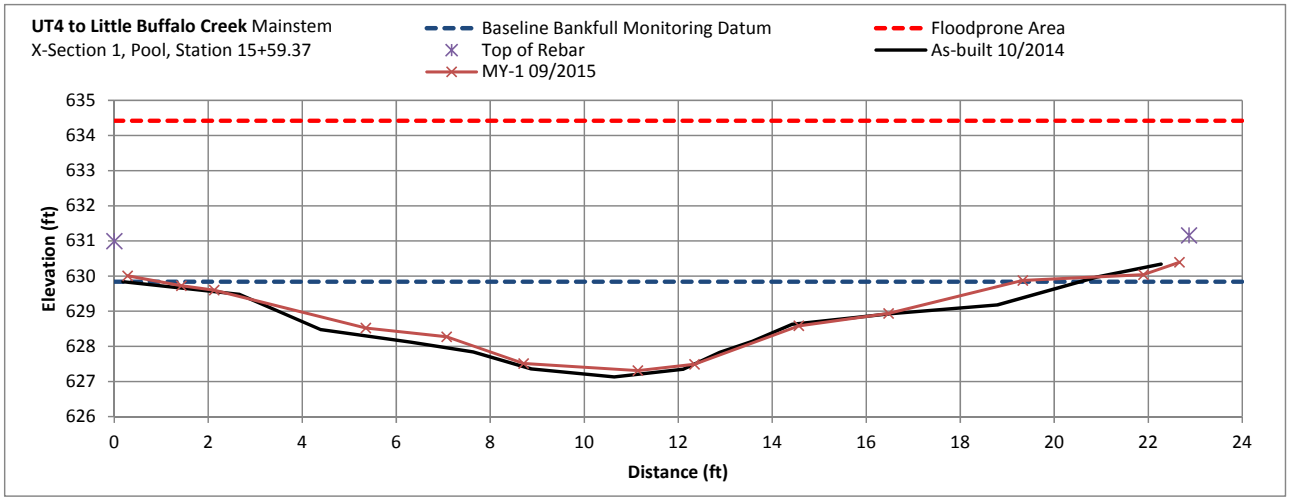
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT4-1P
Drainage Area (sq mi):	0.4
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	630.99
0.28	630.01
1.43	629.73
2.13	629.60
5.35	628.52
7.07	628.27
8.71	627.51
11.14	627.31
12.35	627.49
14.57	628.58
16.48	628.94
19.33	629.88
21.90	630.04
22.66	630.39
22.87	631.16

SUMMARY DATA	
Bankfull Elevation:	629.84
Bankfull Cross-Sectional Area:	19.65
Bankfull Width:	17.20
Flood Prone Area Elevation:	634.42
Flood Prone Width:	43.00
Max Depth at Bankfull:	2.29
Mean Depth at Bankful:	1.14
W/D Ratio:	15.06
Entrenchment Ratio:	2.50
Bank Height Ratio:	1.00

Stream Type	C4b

Station and description	1559.37 UT4-1P Looking Upstream



Cross Section Plot Exhibit

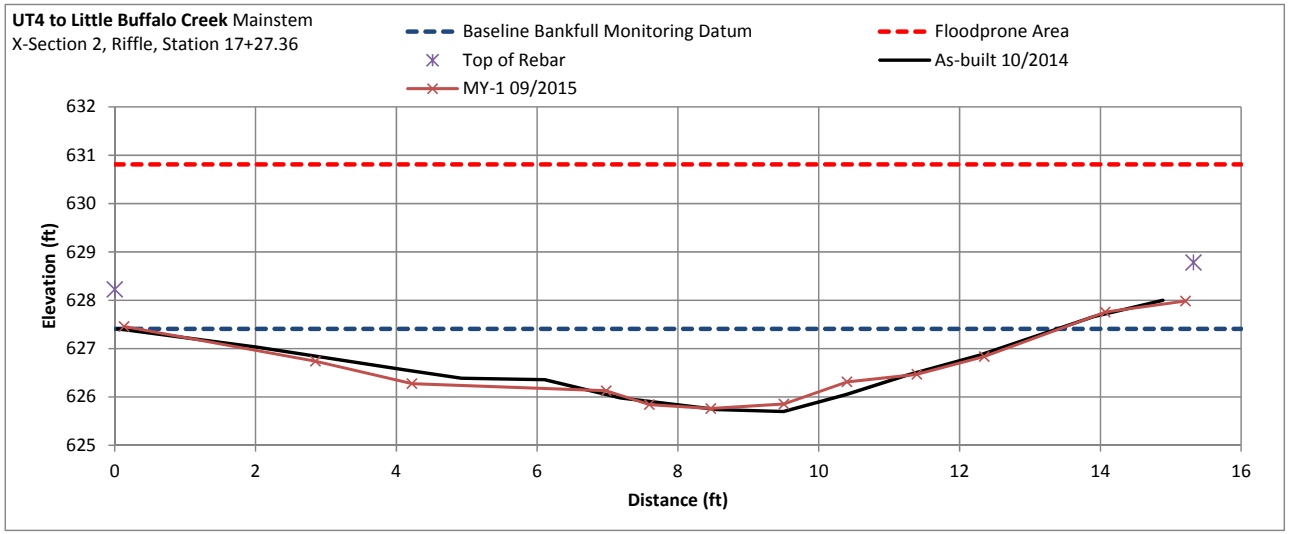
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT4-1R
Drainage Area (sq mi):	0.4
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	628.23
0.13	627.46
2.85	626.74
4.22	626.28
6.98	626.13
7.59	625.84
8.47	625.76
9.50	625.86
10.40	626.31
11.39	626.47
12.35	626.84
14.07	627.76
15.21	627.98
15.32	628.78

SUMMARY DATA	
Bankfull Elevation:	627.41
Bankfull Cross-Sectional Area:	12.87
Bankfull Width:	13.94
Flood Prone Area Elevation:	630.81
Flood Prone Width:	36.25
Max Depth at Bankfull:	1.70
Mean Depth at Bankful:	0.92
W/D Ratio:	15.09
Entrenchment Ratio:	2.60
Bank Height Ratio:	1.00

Stream Type	C4b

Station and description	1727.36 UT4-1R Looking Upstream



Cross Section Plot Exhibit

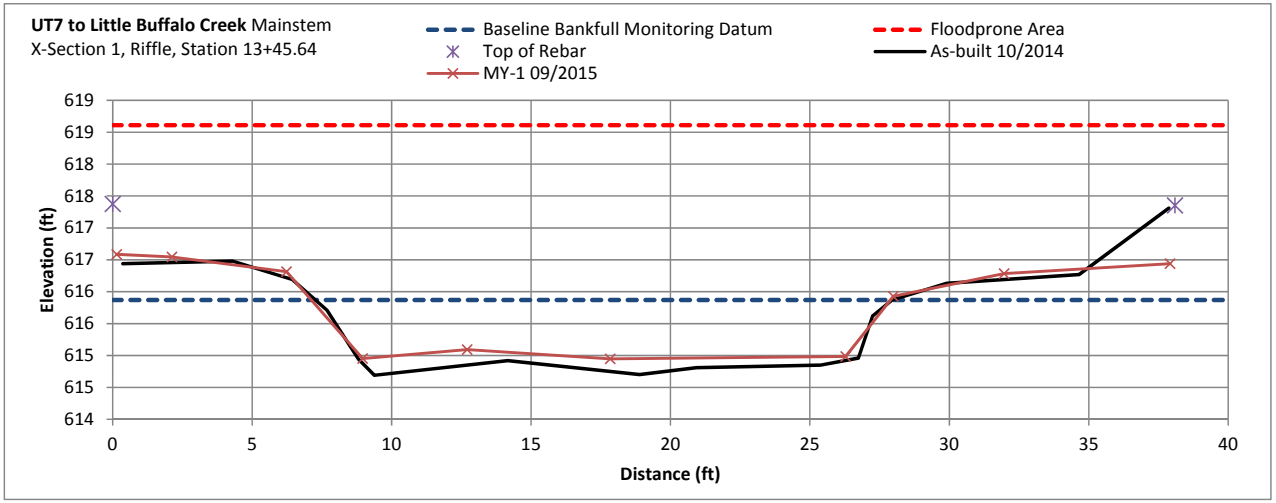
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT7-1R
Drainage Area (sq mi):	1.91
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	617.38
0.15	616.59
2.12	616.54
6.23	616.31
8.96	614.95
12.71	615.09
17.84	614.95
26.28	614.99
27.99	615.93
31.97	616.29
37.92	616.44
38.09	617.35

SUMMARY DATA	
Bankfull Elevation:	615.87
Bankfull Cross-Sectional Area:	26.99
Bankfull Width:	21.76
Flood Prone Area Elevation:	618.61
Flood Prone Width:	473.00
Max Depth at Bankfull:	1.37
Mean Depth at Bankful:	1.27
W/D Ratio:	17.55
Entrenchment Ratio:	21.74
Bank Height Ratio:	0.72

Stream Type	C4

Station and description	1345.64 UT7-1R Looking Upstream



Cross Section Plot Exhibit

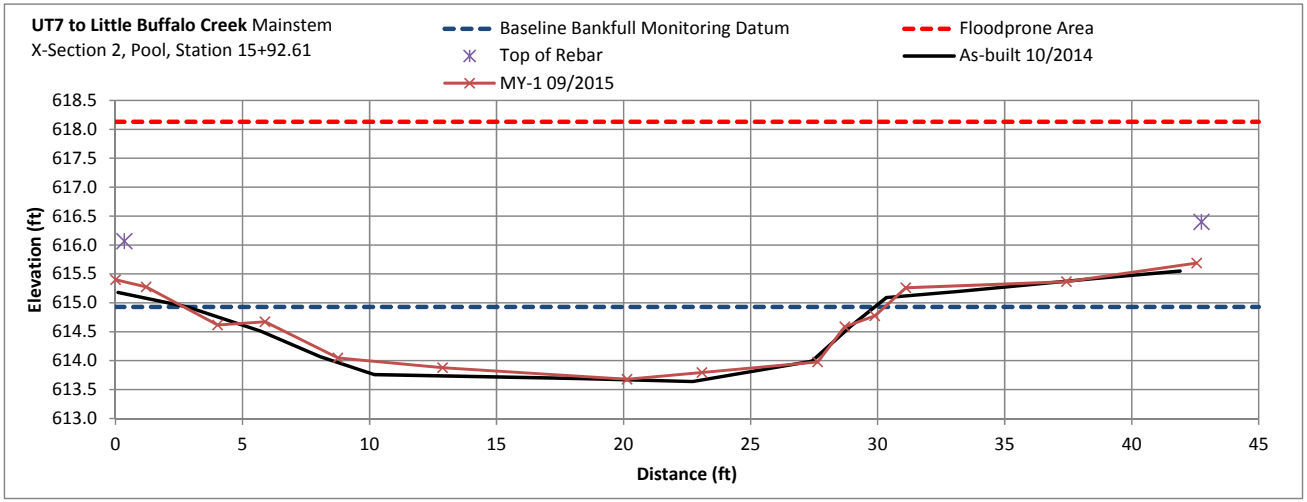
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT7-1P
Drainage Area (sq mi):	1.91
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	615.40
0.35	616.07
1.21	615.28
4.02	614.62
5.88	614.67
8.76	614.05
12.88	613.88
20.14	613.68
23.08	613.80
27.64	613.98
28.71	614.59
29.89	614.78
31.11	615.26
37.43	615.37
42.56	615.69
42.75	616.40

SUMMARY DATA	
Bankfull Elevation:	614.93
Bankfull Cross-Sectional Area:	33.96
Bankfull Width:	29.90
Flood Prone Area Elevation:	618.13
Flood Prone Width:	285.00
Max Depth at Bankfull:	1.60
Mean Depth at Bankful:	1.14
W/D Ratio:	26.32
Entrenchment Ratio:	9.53
Bank Height Ratio:	0.99

Stream Type	C4

Station and description	1592.61 UT7-1P Looking Upstream



Cross Section Plot Exhibit

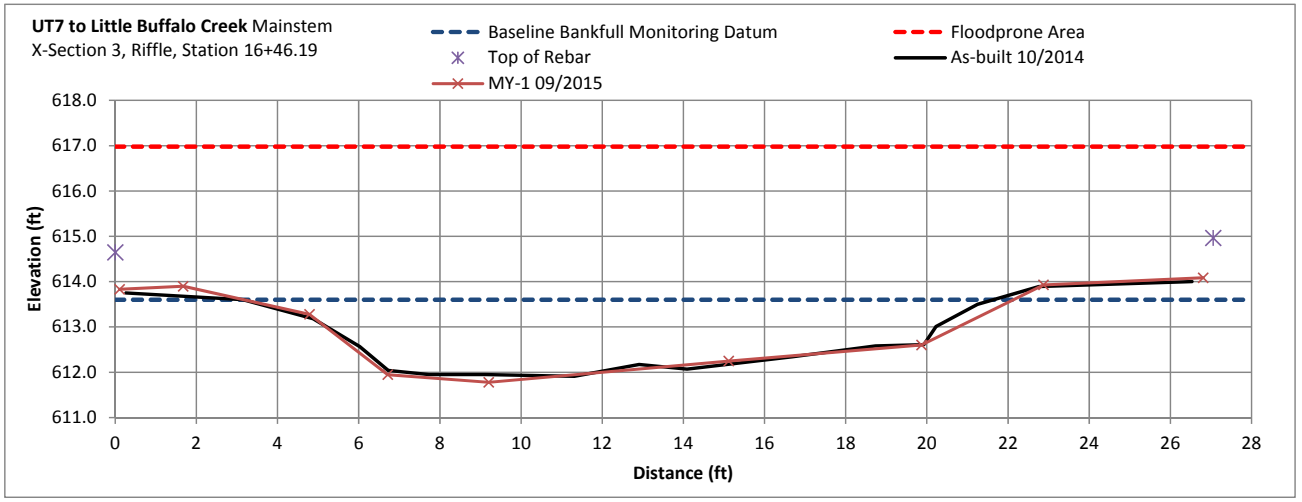
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT7-2R
Drainage Area (sq mi):	1.91
Date:	9/15/2015
Field Crew:	Matthew Holthaus, Greg Russo: Louis Berger

Station	Elevation
0.00	614.65
0.11	613.83
1.67	613.90
4.79	613.28
6.72	611.95
9.20	611.78
15.12	612.25
19.87	612.60
22.87	613.93
26.81	614.09
27.05	614.96

SUMMARY DATA	
Bankfull Elevation:	613.60
Bankfull Cross-Sectional Area:	26.70
Bankfull Width:	21.20
Flood Prone Area Elevation:	616.98
Flood Prone Width:	643.00
Max Depth at Bankfull:	2.12
Mean Depth at Bankful:	1.26
W/D Ratio:	16.83
Entrenchment Ratio:	30.33
Bank Height Ratio:	1.00

Stream Type	C4

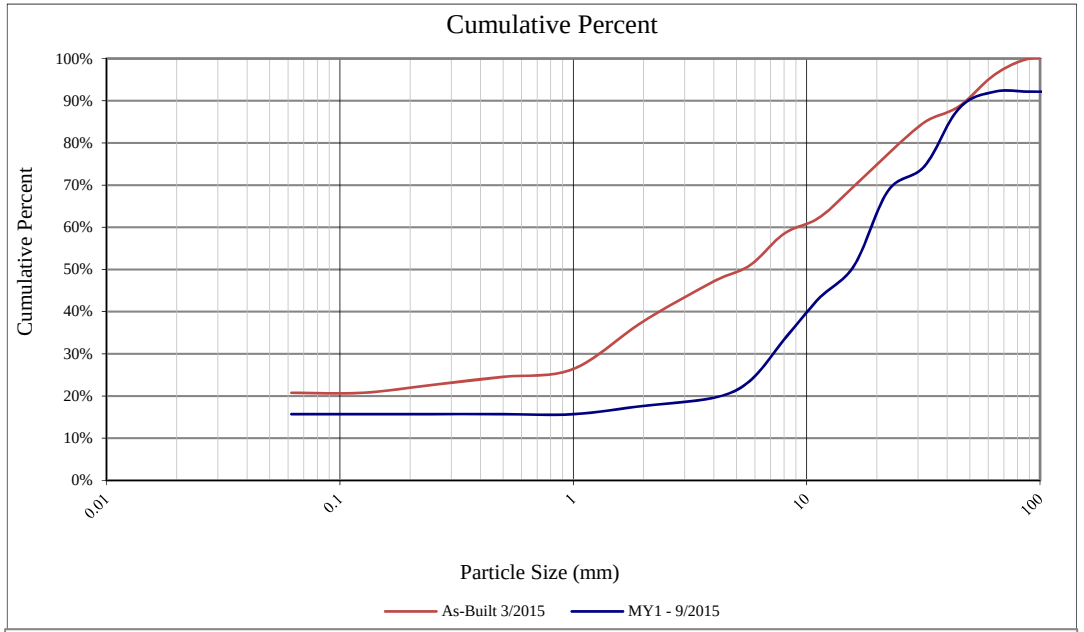
Station and description	1846.19 UT7-2R Looking Upstream

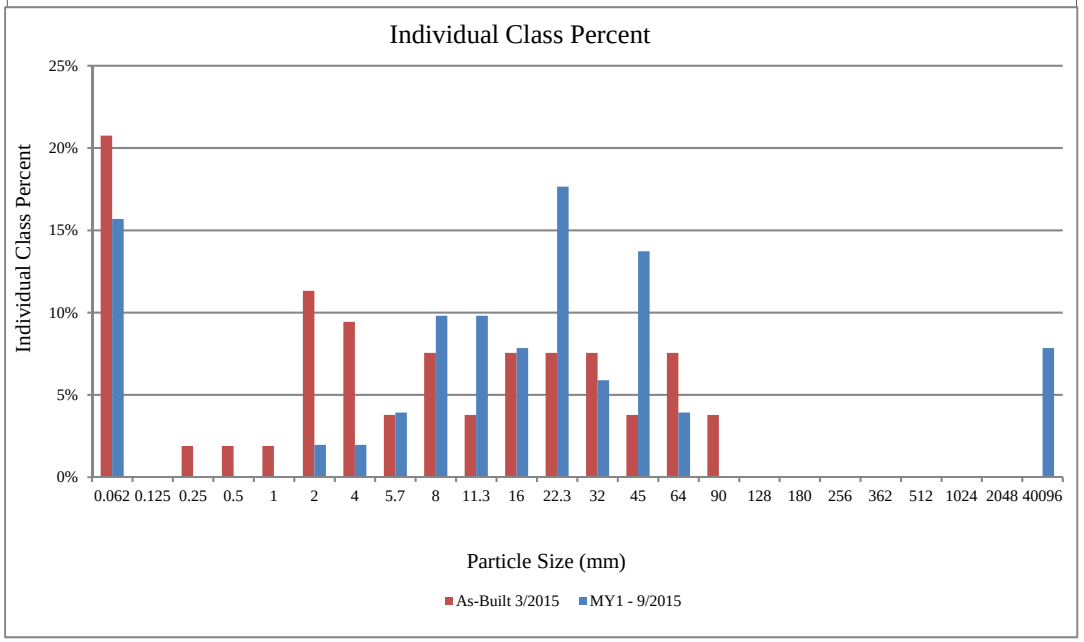


Figures 5a-o – Pebble Count Plots

Project Name: Little Buffalo Creek					
Cross-Section: MS-1P					
Feature: Pool					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	8	16%	16%
Sand	very fine sand	0.125	0	0%	16%
	fine sand	0.250	0	0%	16%
	medium sand	0.50	0	0%	16%
	coarse sand	1.00	0	0%	16%
	very coarse sand	2.0	1	2%	18%
Gravel	very fine gravel	4.0	1	2%	20%
	fine gravel	5.7	2	4%	24%
	fine gravel	8.0	5	10%	33%
	medium gravel	11.3	5	10%	43%
	medium gravel	16.0	4	8%	51%
	coarse gravel	22.3	9	18%	69%
	coarse gravel	32.0	3	6%	75%
	very coarse gravel	45	7	14%	88%
	very coarse gravel	64	2	4%	92%
Cobble	small cobble	90	0	0%	92%
	medium cobble	128	0	0%	92%
	large cobble	180	0	0%	92%
	very large cobble	256	0	0%	92%
Boulder	small boulder	362	0	0%	92%
	small boulder	512	0	0%	92%
	medium boulder	1024	0	0%	92%
	large boulder	2048	0	0%	92%
Bedrock	bedrock	40096	4	8%	100%
TOTAL % of whole count			51	100%	100%

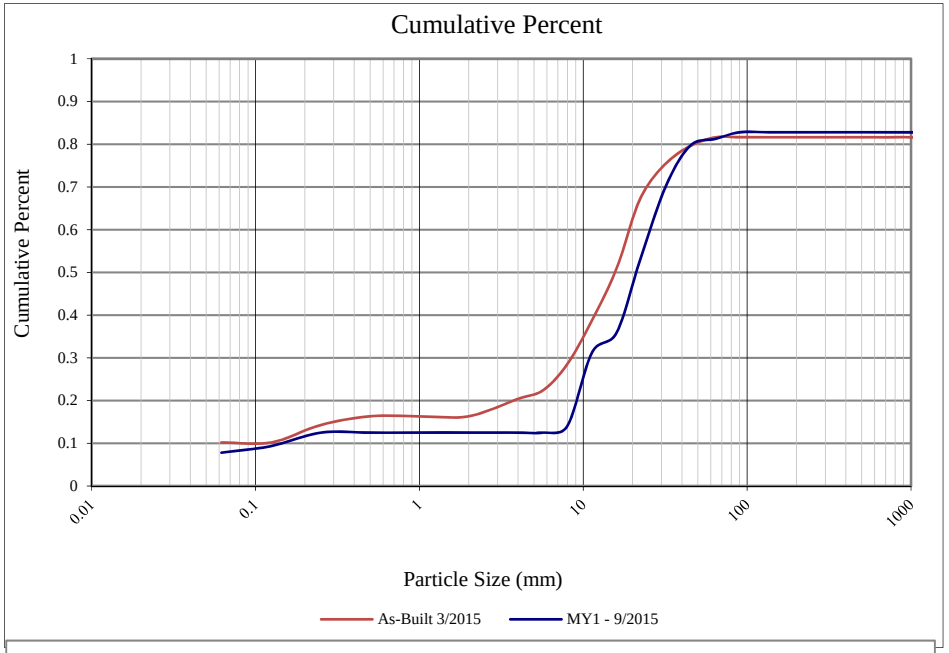
Summary Data	
D16	0.062
D35	8.5
D50	16
D84	41
D95	Bedrock
D100	Bedrock

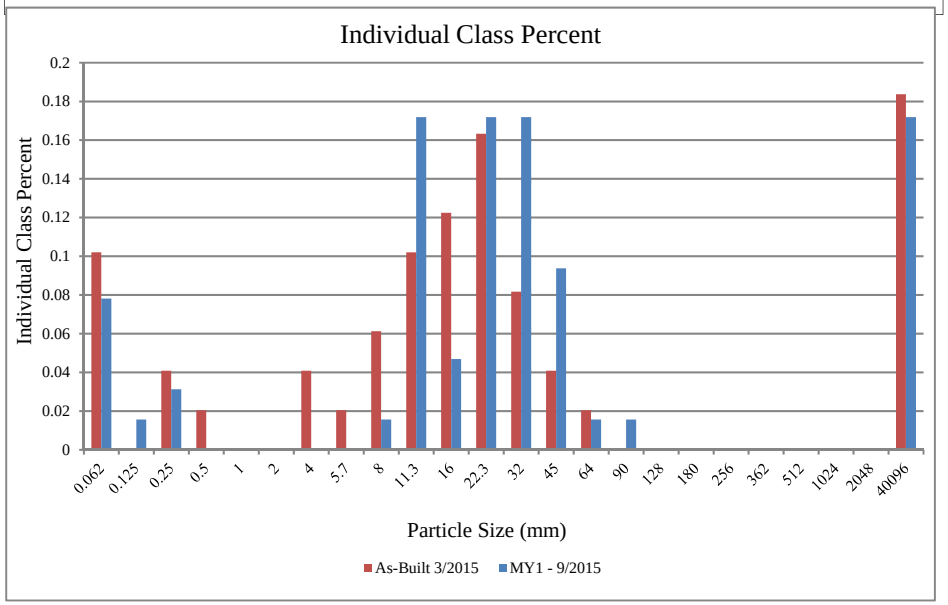




Project Name: Little Buffalo Creek					
Cross-Section: MS-1R					
Feature: Riffle					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	5	8%	8%
Sand	very fine sand	0.125	1	2%	9%
	fine sand	0.250	2	3%	13%
	medium sand	0.50	0	0%	13%
	coarse sand	1.00	0	0%	13%
	very coarse sand	2.0	0	0%	13%
Gravel	very fine gravel	4.0	0	0%	13%
	fine gravel	5.7	0	0%	13%
	fine gravel	8.0	1	2%	14%
	medium gravel	11.3	11	17%	31%
	medium gravel	16.0	3	5%	36%
	coarse gravel	22.3	11	17%	53%
	coarse gravel	32.0	11	17%	70%
	very coarse gravel	45	6	9%	80%
	very coarse gravel	64	1	2%	81%
Cobble	small cobble	90	1	2%	83%
	medium cobble	128	0	0%	83%
	large cobble	180	0	0%	83%
	very large cobble	256	0	0%	83%
Boulder	small boulder	362	0	0%	83%
	small boulder	512	0	0%	83%
	medium boulder	1024	0	0%	83%
	large boulder	2048	0	0%	83%
Bedrock	bedrock	40096	11	17%	100%
TOTAL % of whole count			64	100%	100%

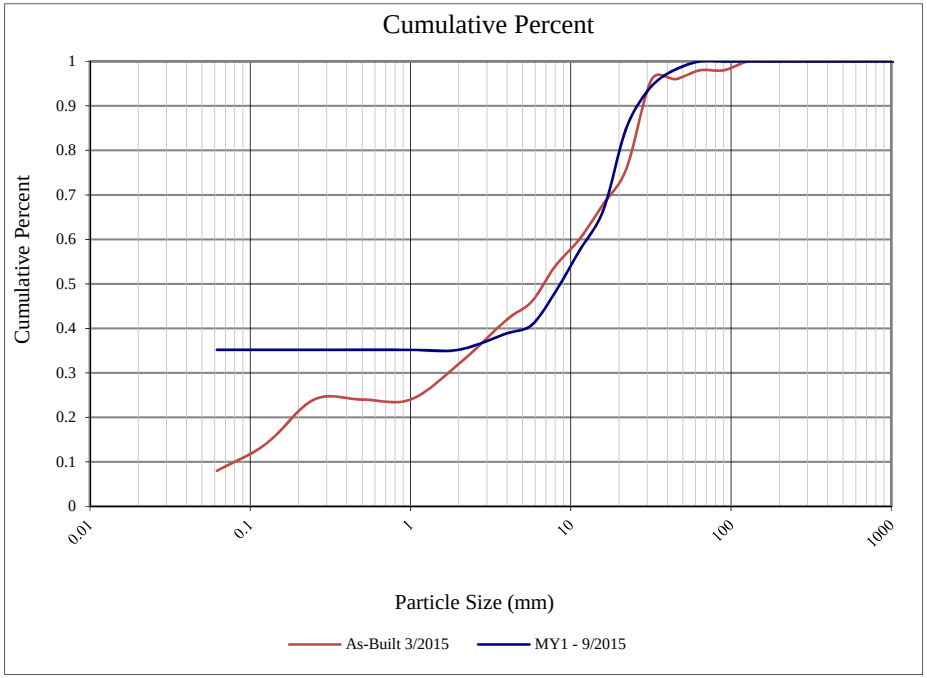
Summary Data	
D16	8.50
D35	16.00
D50	21.00
D84	Bedrock
D95	Bedrock
D100	Bedrock

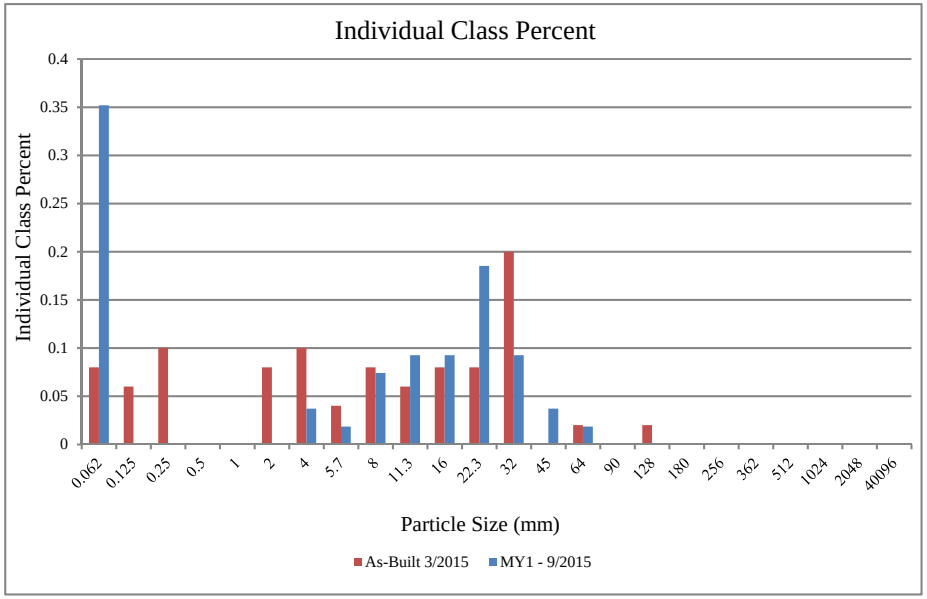




Project Name: Little Buffalo Creek					
Cross-Section: MS-2P					
Feature: Pool					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	19	35%	35%
Sand	very fine sand	0.125	0	0%	35%
	fine sand	0.250	0	0%	35%
	medium sand	0.50	0	0%	35%
	coarse sand	1.00	0	0%	35%
	very coarse sand	2.0	0	0%	35%
Gravel	very fine gravel	4.0	2	4%	39%
	fine gravel	5.7	1	2%	41%
	fine gravel	8.0	4	7%	48%
	medium gravel	11.3	5	9%	57%
	medium gravel	16.0	5	9%	67%
	coarse gravel	22.3	10	19%	85%
	coarse gravel	32.0	5	9%	94%
	very coarse gravel	45	2	4%	98%
	very coarse gravel	64	1	2%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			54	100%	100%

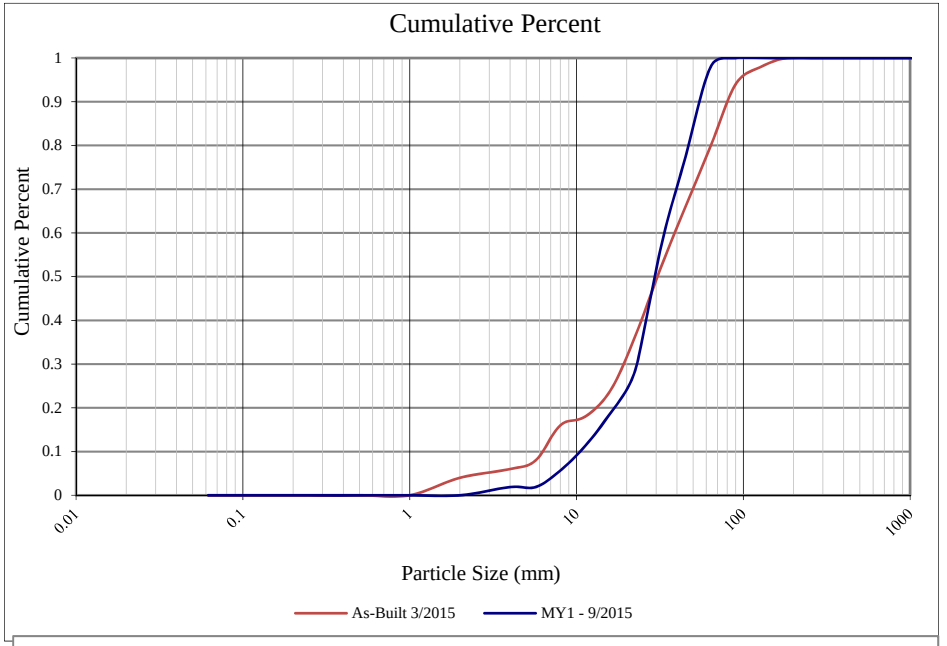
Summary Data	
D16	0.00
D35	0.13
D50	9.00
D84	22.00
D95	34.00
D100	64.00

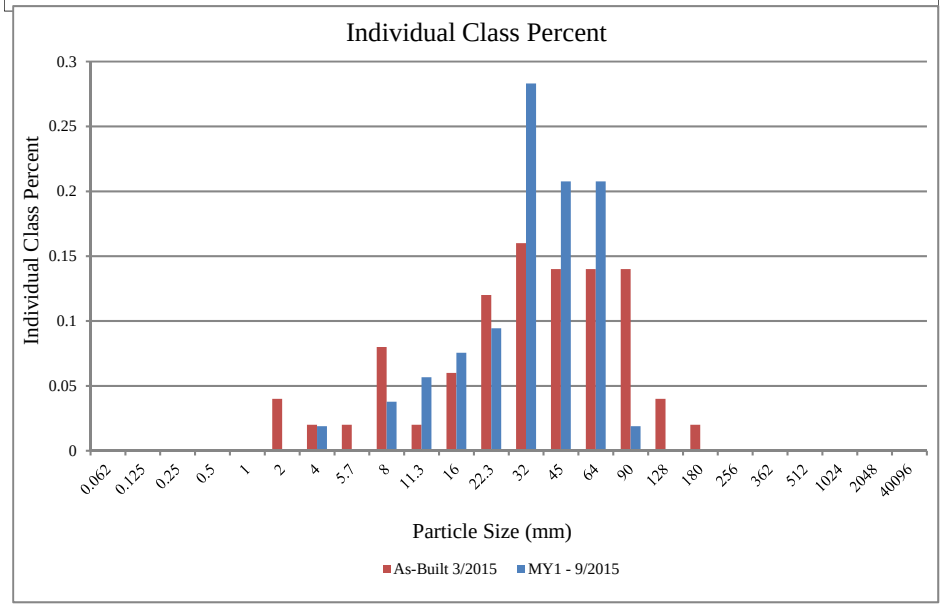




Project Name: Little Buffalo Creek					
Cross-Section: MS-2R					
Feature: Riffle					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	0	0%	0%
Sand	very fine sand	0.125	0	0%	0%
	fine sand	0.250	0	0%	0%
	medium sand	0.50	0	0%	0%
	coarse sand	1.00	0	0%	0%
	very coarse sand	2.0	0	0%	0%
Gravel	very fine gravel	4.0	1	2%	2%
	fine gravel	5.7	0	0%	2%
	fine gravel	8.0	2	4%	6%
	medium gravel	11.3	3	6%	11%
	medium gravel	16.0	4	8%	19%
	coarse gravel	22.3	5	9%	28%
	coarse gravel	32.0	15	28%	57%
	very coarse gravel	45	11	21%	77%
	very coarse gravel	64	11	21%	98%
Cobble	small cobble	90	1	2%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			53	100%	100%

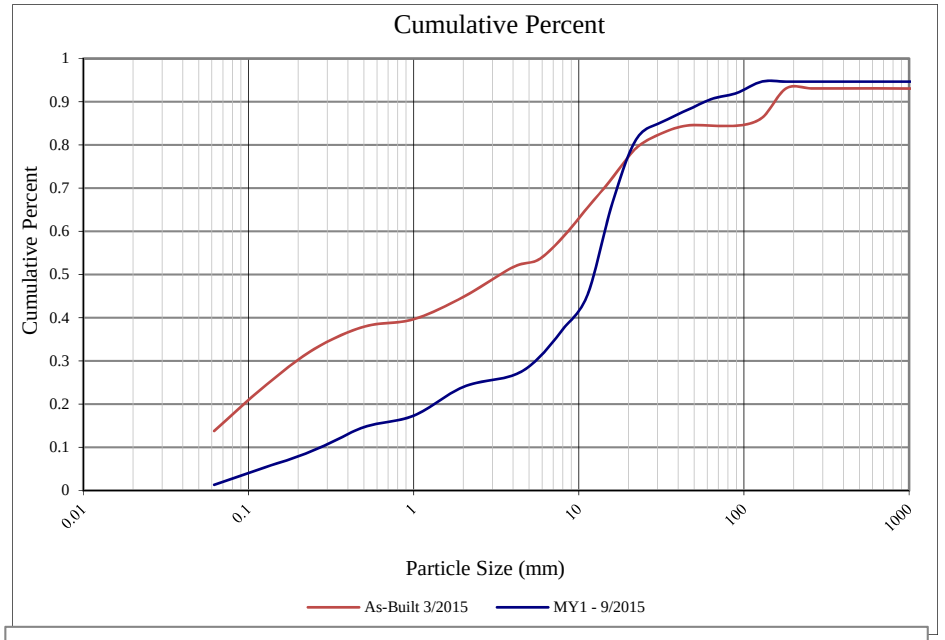
Summary Data	
D16	15
D35	25
D50	29
D84	49
D95	60
D100	90

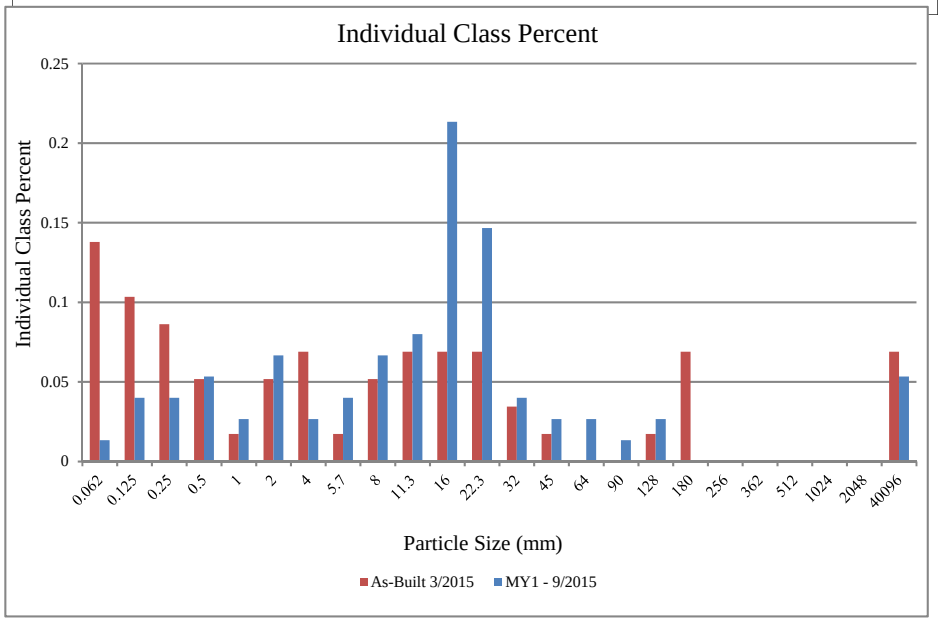




Project Name: Little Buffalo Creek					
Cross-Section: MS-3P					
Feature: Pool					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	1	1%	1%
Sand	very fine sand	0.125	3	4%	5%
	fine sand	0.250	3	4%	9%
	medium sand	0.50	4	5%	15%
	coarse sand	1.00	2	3%	17%
	very coarse sand	2.0	5	7%	24%
Gravel	very fine gravel	4.0	2	3%	27%
	fine gravel	5.7	3	4%	31%
	fine gravel	8.0	5	7%	37%
	medium gravel	11.3	6	8%	45%
	medium gravel	16.0	16	21%	67%
	coarse gravel	22.3	11	15%	81%
	coarse gravel	32.0	3	4%	85%
	very coarse gravel	45	2	3%	88%
	very coarse gravel	64	2	3%	91%
Cobble	small cobble	90	1	1%	92%
	medium cobble	128	2	3%	95%
	large cobble	180	0	0%	95%
	very large cobble	256	0	0%	95%
Boulder	small boulder	362	0	0%	95%
	small boulder	512	0	0%	95%
	medium boulder	1024	0	0%	95%
	large boulder	2048	0	0%	95%
Bedrock	bedrock	40096	4	5%	100%
TOTAL % of whole count			75	100%	100%

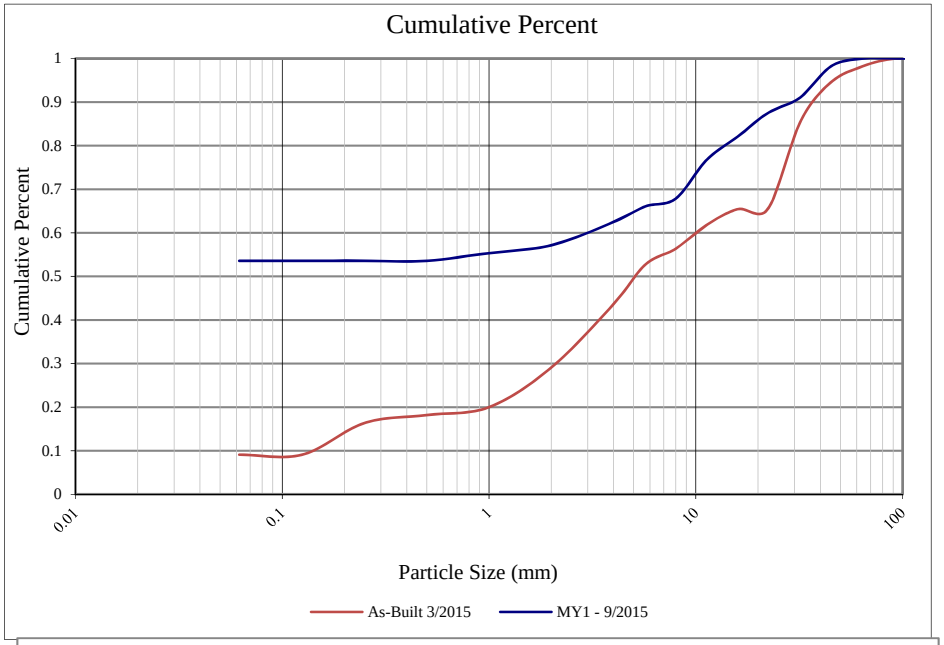
Summary Data	
D16	0.75
D35	6.5
D50	13
D84	30
D95	128
D100	Bedrock

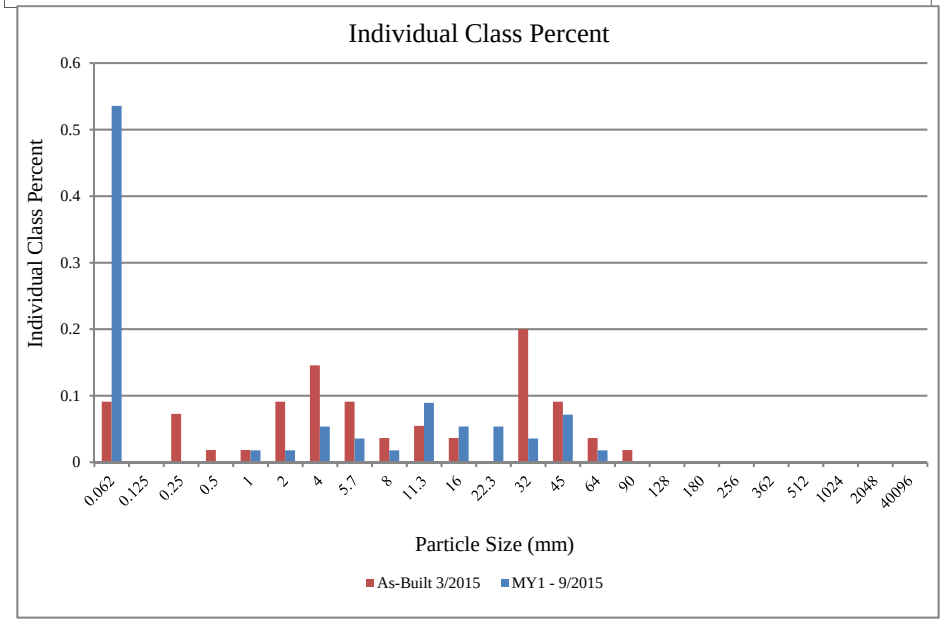




Project Name: Little Buffalo Creek					
Cross-Section: UT2-1R					
Feature: Riffle					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	30	54%	54%
Sand	very fine sand	0.125	0	0%	54%
	fine sand	0.250	0	0%	54%
	medium sand	0.50	0	0%	54%
	coarse sand	1.00	1	2%	55%
	very coarse sand	2.0	1	2%	57%
Gravel	very fine gravel	4.0	3	5%	63%
	fine gravel	5.7	2	4%	66%
	fine gravel	8.0	1	2%	68%
	medium gravel	11.3	5	9%	77%
	medium gravel	16.0	3	5%	82%
	coarse gravel	22.3	3	5%	88%
	coarse gravel	32.0	2	4%	91%
	very coarse gravel	45	4	7%	98%
	very coarse gravel	64	1	2%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			56	100%	100%

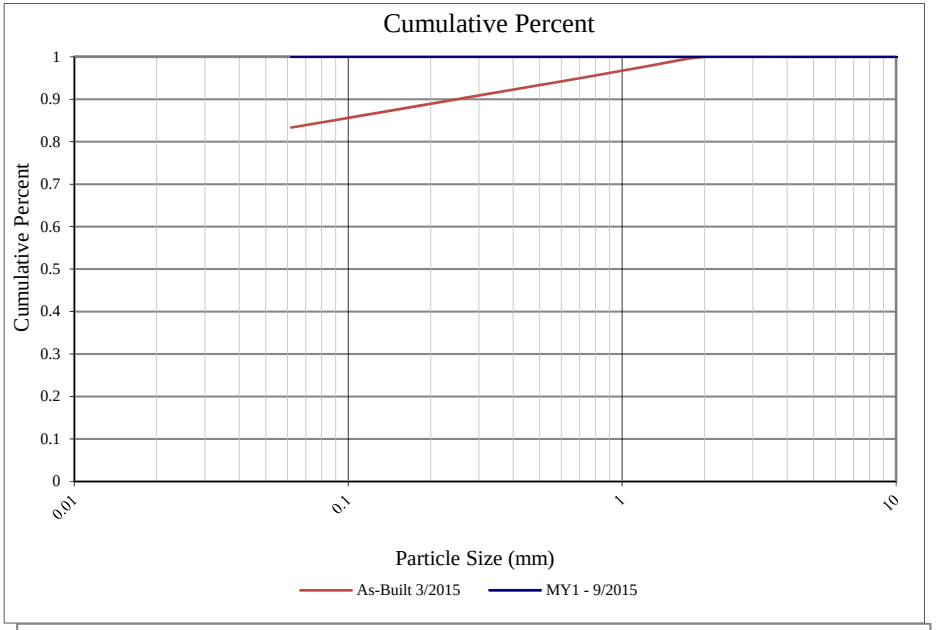
Summary Data	
D16	0
D35	0
D50	0
D84	18
D95	38
D100	64

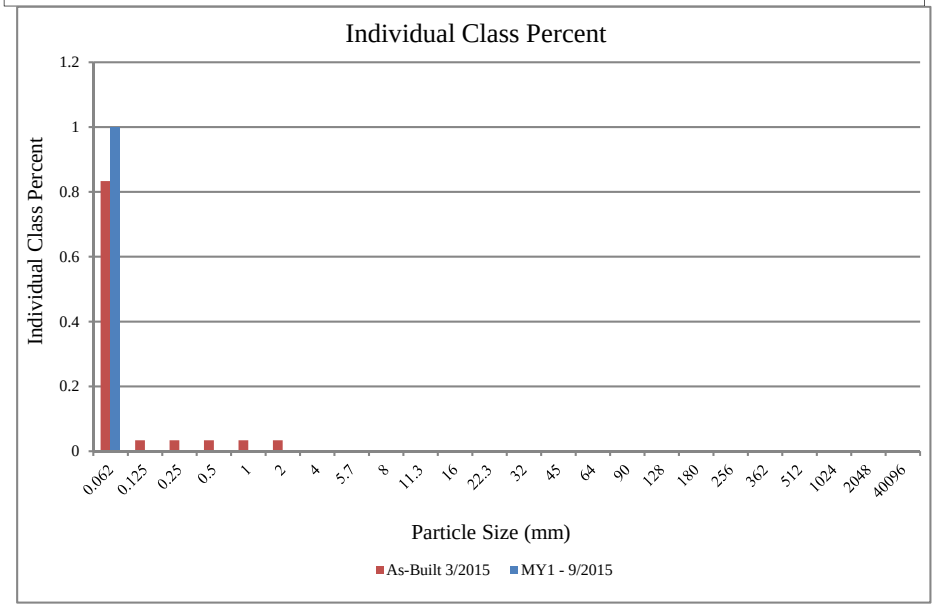




Project Name: Little Buffalo Creek					
Cross-Section: UT3-1R					
Feature: Riffle					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	30	100%	100%
Sand	very fine sand	0.125	0	0%	100%
	fine sand	0.250	0	0%	100%
	medium sand	0.50	0	0%	100%
	coarse sand	1.00	0	0%	100%
	very coarse sand	2.0	0	0%	100%
Gravel	very fine gravel	4.0	0	0%	100%
	fine gravel	5.7	0	0%	100%
	fine gravel	8.0	0	0%	100%
	medium gravel	11.3	0	0%	100%
	medium gravel	16.0	0	0%	100%
	coarse gravel	22.3	0	0%	100%
	coarse gravel	32.0	0	0%	100%
	very coarse gravel	45	0	0%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			30	100%	100%

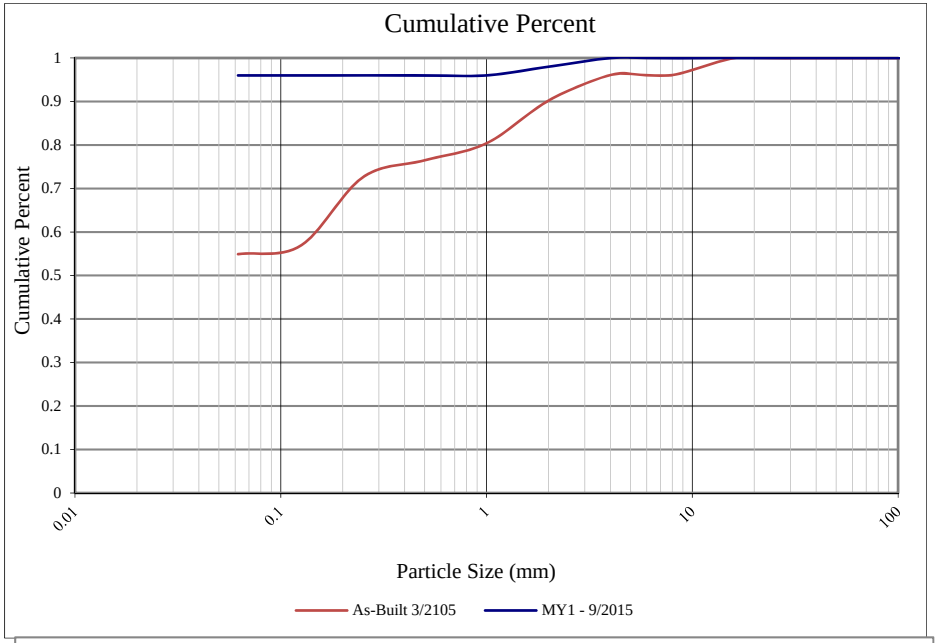
Summary Data	
D16	0.00
D35	0.00
D50	0.00
D84	0.00
D95	0.00
D100	0.06

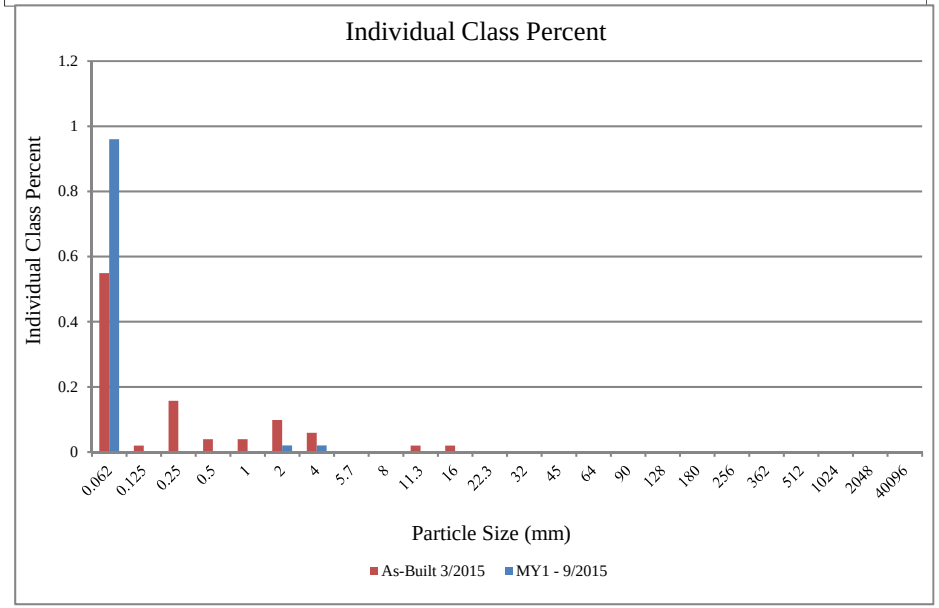




Project Name: Little Buffalo Creek					
Cross-Section: UT3-1P					
Feature: Pool					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	48	96%	96%
Sand	very fine sand	0.125	0	0%	96%
	fine sand	0.250	0	0%	96%
	medium sand	0.50	0	0%	96%
	coarse sand	1.00	0	0%	96%
	very coarse sand	2.0	1	2%	98%
Gravel	very fine gravel	4.0	1	2%	100%
	fine gravel	5.7	0	0%	100%
	fine gravel	8.0	0	0%	100%
	medium gravel	11.3	0	0%	100%
	medium gravel	16.0	0	0%	100%
	coarse gravel	22.3	0	0%	100%
	coarse gravel	32.0	0	0%	100%
	very coarse gravel	45	0	0%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			50	100%	100%

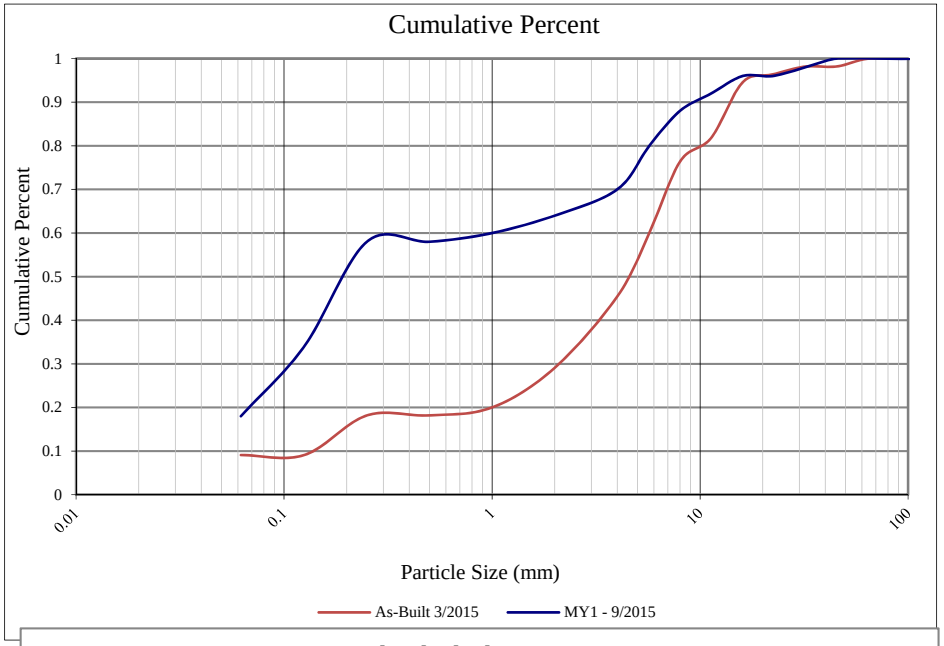
Summary Data	
D16	0.00
D35	0.00
D50	0.00
D84	0.00
D95	0.06
D100	4.00

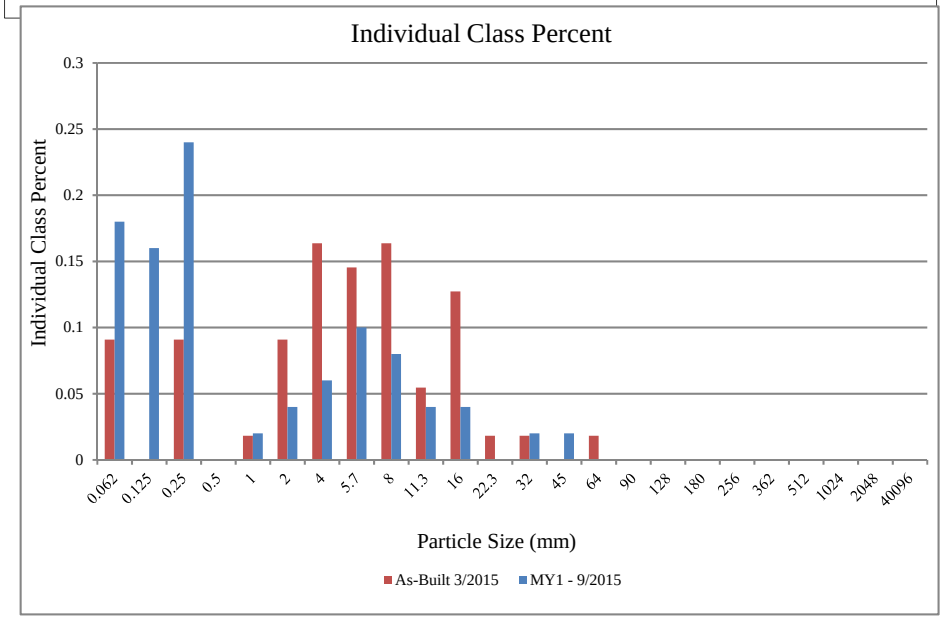




Project Name: Little Buffalo Creek					
Cross-Section: UT3-2R					
Feature: Riffle					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	9	18%	18%
Sand	very fine sand	0.125	8	16%	34%
	fine sand	0.250	12	24%	58%
	medium sand	0.50	0	0%	58%
	coarse sand	1.00	1	2%	60%
	very coarse sand	2.0	2	4%	64%
Gravel	very fine gravel	4.0	3	6%	70%
	fine gravel	5.7	5	10%	80%
	fine gravel	8.0	4	8%	88%
	medium gravel	11.3	2	4%	92%
	medium gravel	16.0	2	4%	96%
	coarse gravel	22.3	0	0%	96%
	coarse gravel	32.0	1	2%	98%
	very coarse gravel	45	1	2%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			50	100%	100%

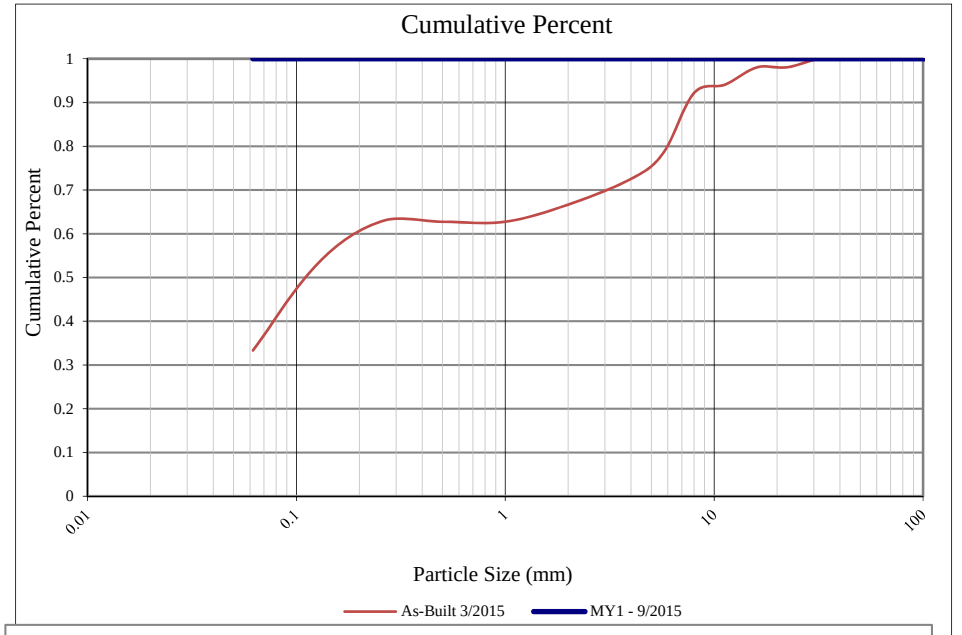
Summary Data	
D16	0.00
D35	0.14
D50	0.19
D84	6.75
D95	15.00
D100	45.00

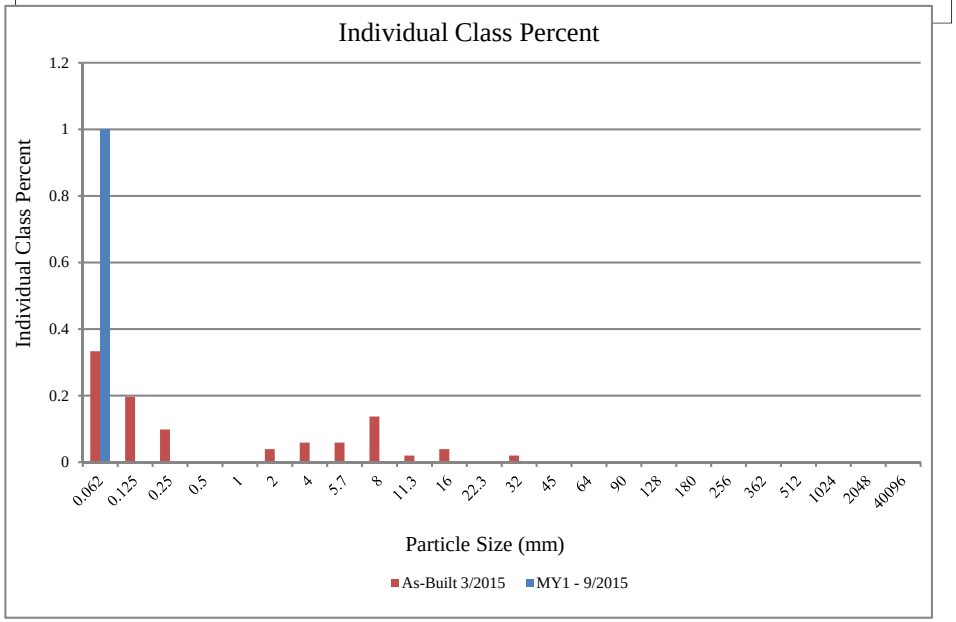




Project Name: Little Buffalo Creek					
Cross-Section: UT3-3R					
Feature: Riffle					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	50	100%	100%
Sand	very fine sand	0.125	0	0%	100%
	fine sand	0.250	0	0%	100%
	medium sand	0.50	0	0%	100%
	coarse sand	1.00	0	0%	100%
	very coarse sand	2.0	0	0%	100%
Gravel	very fine gravel	4.0	0	0%	100%
	fine gravel	5.7	0	0%	100%
	fine gravel	8.0	0	0%	100%
	medium gravel	11.3	0	0%	100%
	medium gravel	16.0	0	0%	100%
	coarse gravel	22.3	0	0%	100%
	coarse gravel	32.0	0	0%	100%
	very coarse gravel	45	0	0%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			50	100%	100%

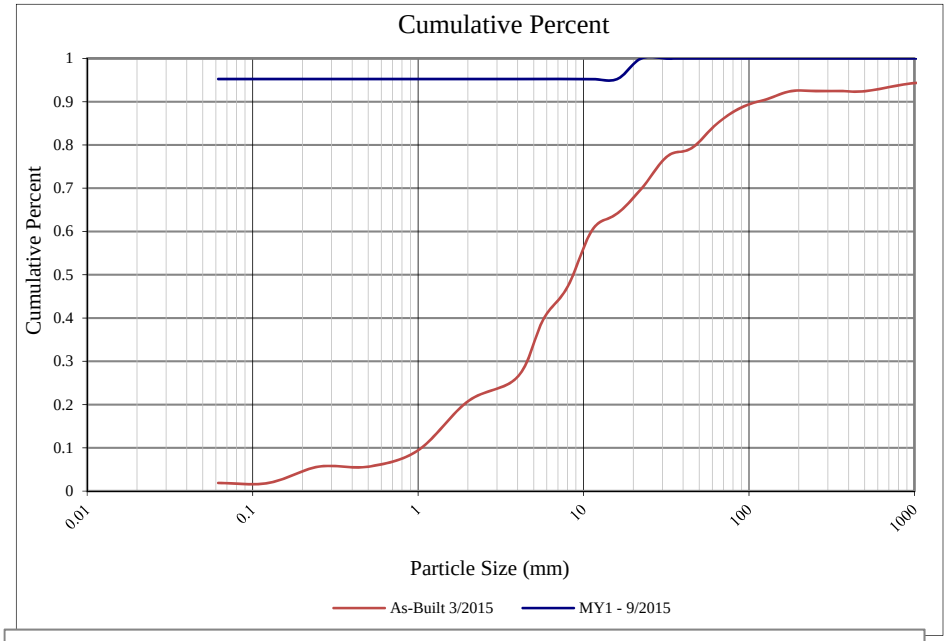
Summary Data	
D16	0.00
D35	0.00
D50	0.00
D84	0.00
D95	0.00
D100	0.06

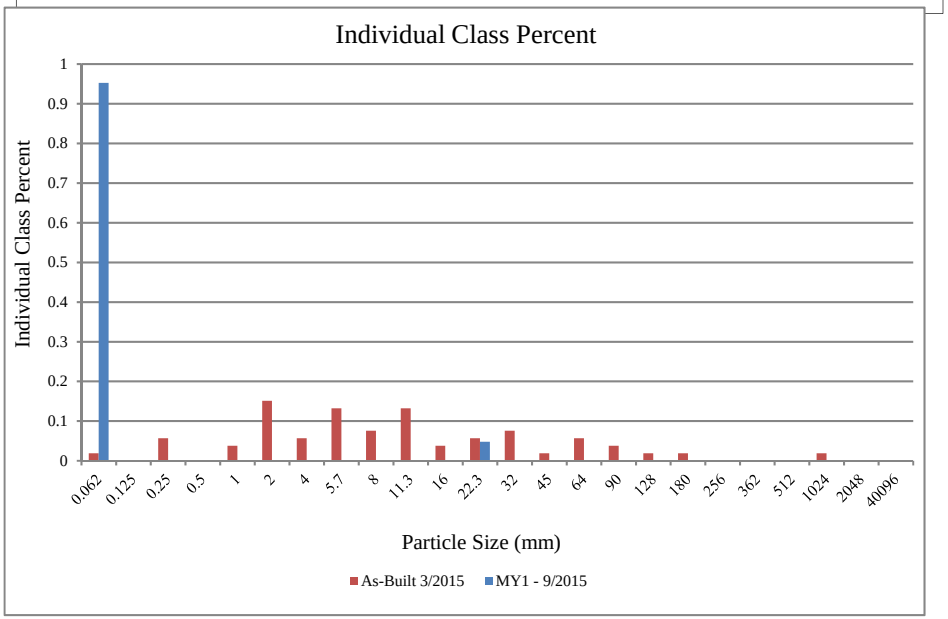




Project Name: Little Buffalo Creek					
Cross-Section: UT4-1P					
Feature: Pool					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	20	95%	95%
Sand	very fine sand	0.125	0	0%	95%
	fine sand	0.250	0	0%	95%
	medium sand	0.50	0	0%	95%
	coarse sand	1.00	0	0%	95%
	very coarse sand	2.0	0	0%	95%
Gravel	very fine gravel	4.0	0	0%	95%
	fine gravel	5.7	0	0%	95%
	fine gravel	8.0	0	0%	95%
	medium gravel	11.3	0	0%	95%
	medium gravel	16.0	0	0%	95%
	coarse gravel	22.3	1	5%	100%
	coarse gravel	32.0	0	0%	100%
	very coarse gravel	45	0	0%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			21	100%	100%

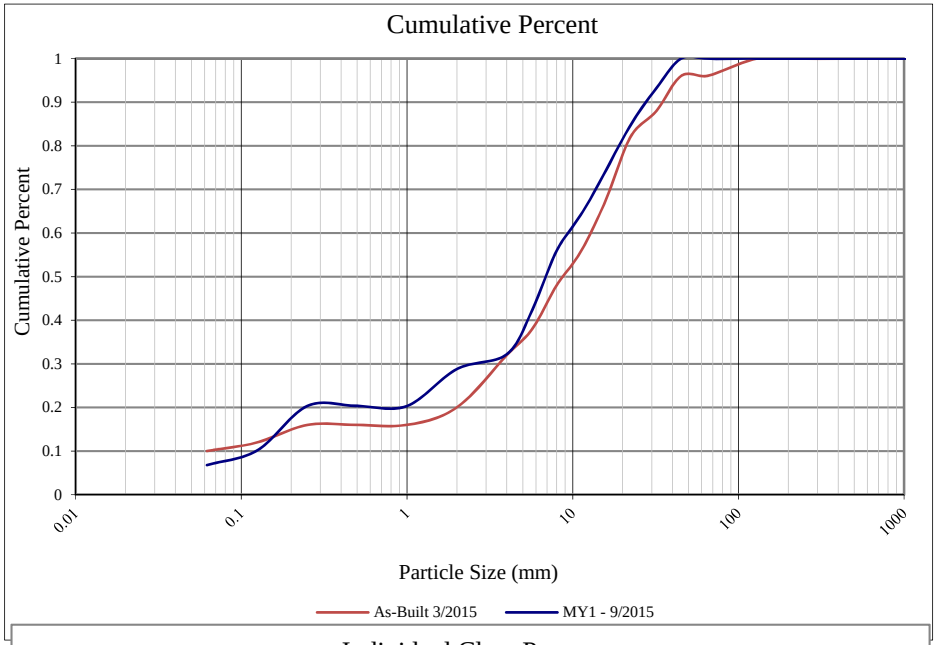
Summary Data	
D16	0.22
D35	0.19
D50	0.18
D84	0.15
D95	0.06
D100	0.00

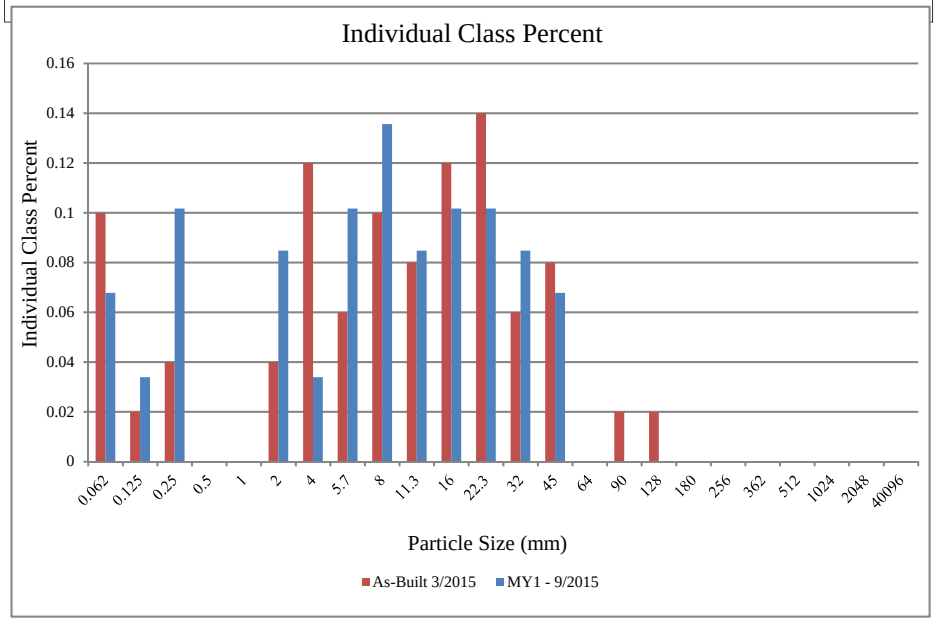




Project Name: Little Buffalo Creek					
Cross-Section: UT4-1R					
Feature: Riffle					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	4	7%	7%
Sand	very fine sand	0.125	2	3%	10%
	fine sand	0.250	6	10%	20%
	medium sand	0.50	0	0%	20%
	coarse sand	1.00	0	0%	20%
	very coarse sand	2.0	5	8%	29%
Gravel	very fine gravel	4.0	2	3%	32%
	fine gravel	5.7	6	10%	42%
	fine gravel	8.0	8	14%	56%
	medium gravel	11.3	5	8%	64%
	medium gravel	16.0	6	10%	75%
	coarse gravel	22.3	6	10%	85%
	coarse gravel	32.0	5	8%	93%
	very coarse gravel	45	4	7%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			59	100%	100%

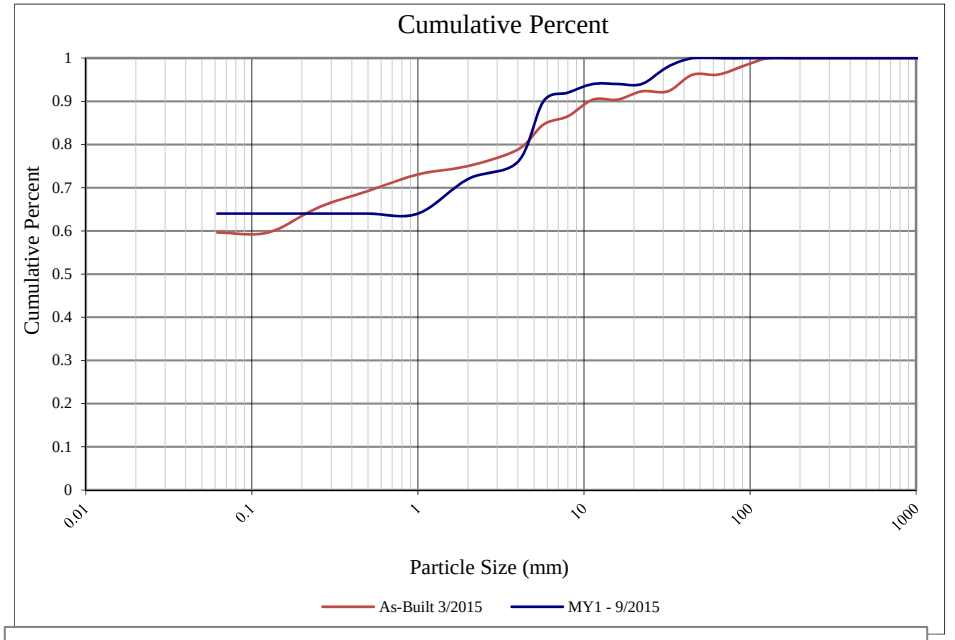
Summary Data	
D16	0.18
D35	4.90
D50	6.90
D84	21.50
D95	35.00
D100	45.00

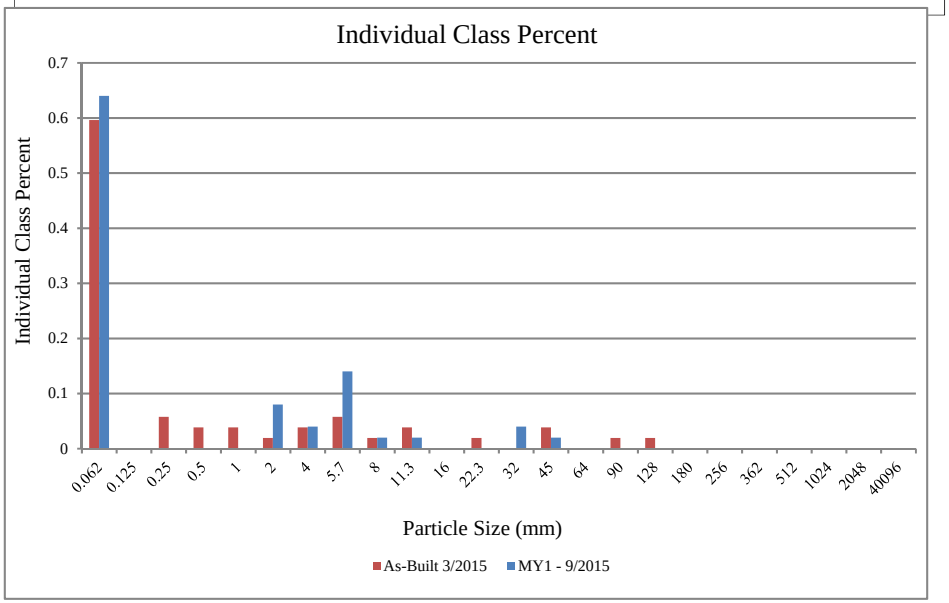




Project Name: Little Buffalo Creek					
Cross-Section: UT7-1P					
Feature: Pool					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	32	64%	64%
Sand	very fine sand	0.125	0	0%	64%
	fine sand	0.250	0	0%	64%
	medium sand	0.50	0	0%	64%
	coarse sand	1.00	0	0%	64%
	very coarse sand	2.0	4	8%	72%
Gravel	very fine gravel	4.0	2	4%	76%
	fine gravel	5.7	7	14%	90%
	fine gravel	8.0	1	2%	92%
	medium gravel	11.3	1	2%	94%
	medium gravel	16.0	0	0%	94%
	coarse gravel	22.3	0	0%	94%
	coarse gravel	32.0	2	4%	98%
	very coarse gravel	45	1	2%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			50	100%	100%

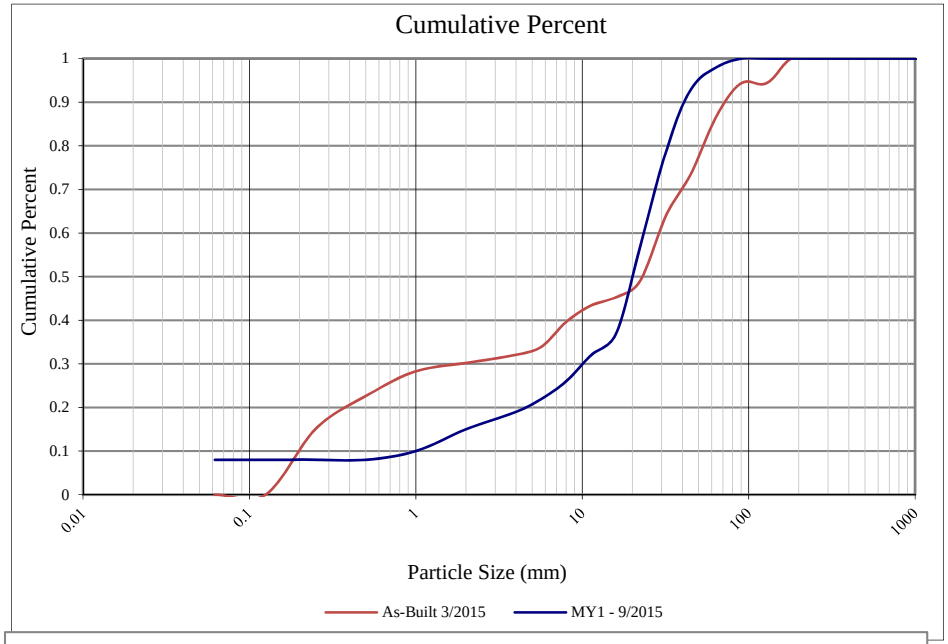
Summary Data	
D16	0.00
D35	0.00
D50	0.00
D84	4.90
D95	24.00
D100	45.00

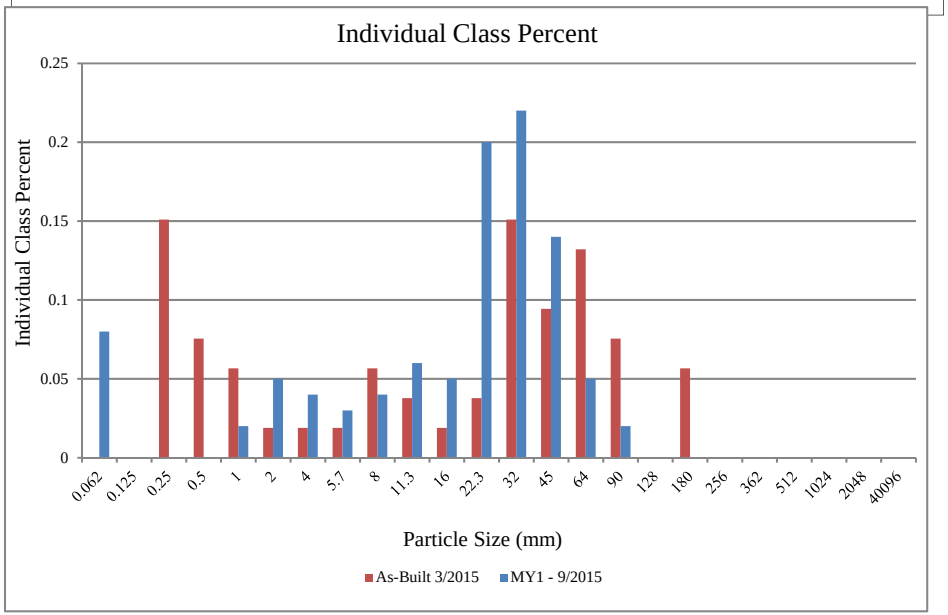




Project Name: Little Buffalo Creek					
Cross-Section: UT7-1R					
Feature: Riffle					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	8	8%	8%
Sand	very fine sand	0.125	0	0%	8%
	fine sand	0.250	0	0%	8%
	medium sand	0.50	0	0%	8%
	coarse sand	1.00	2	2%	10%
	very coarse sand	2.0	5	5%	15%
Gravel	very fine gravel	4.0	4	4%	19%
	fine gravel	5.7	3	3%	22%
	fine gravel	8.0	4	4%	26%
	medium gravel	11.3	6	6%	32%
	medium gravel	16.0	5	5%	37%
	coarse gravel	22.3	20	20%	57%
	coarse gravel	32.0	22	22%	79%
	very coarse gravel	45	14	14%	93%
	very coarse gravel	64	5	5%	98%
Cobble	small cobble	90	2	2%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

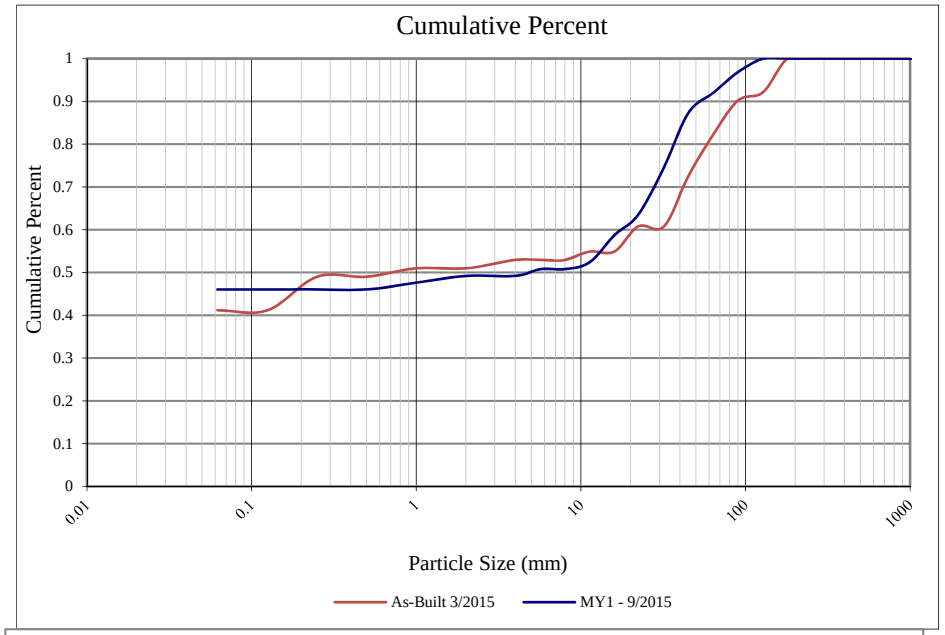
Summary Data	
D16	2.10
D35	15.50
D50	11.00
D84	33.00
D95	50.00
D100	90.00

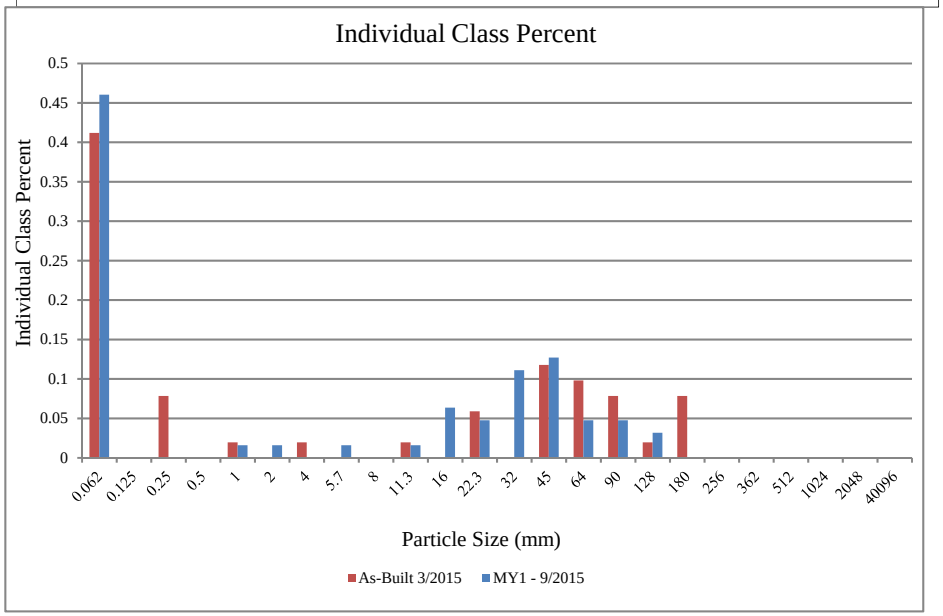




Project Name: Little Buffalo Creek					
Cross-Section: UT7-2R					
Feature: Riffle					
			2015		
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	29	46%	46%
Sand	very fine sand	0.125	0	0%	46%
	fine sand	0.250	0	0%	46%
	medium sand	0.50	0	0%	46%
	coarse sand	1.00	1	2%	48%
	very coarse sand	2.0	1	2%	49%
Gravel	very fine gravel	4.0	0	0%	49%
	fine gravel	5.7	1	2%	51%
	fine gravel	8.0	0	0%	51%
	medium gravel	11.3	1	2%	52%
	medium gravel	16.0	4	6%	59%
	coarse gravel	22.3	3	5%	63%
	coarse gravel	32.0	7	11%	75%
	very coarse gravel	45	8	13%	87%
	very coarse gravel	64	3	5%	92%
Cobble	small cobble	90	3	5%	97%
	medium cobble	128	2	3%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			63	100%	100%

Summary Data	
D16	0.00
D35	0.00
D50	0.50
D84	69.00
D95	150.00
D100	180.00

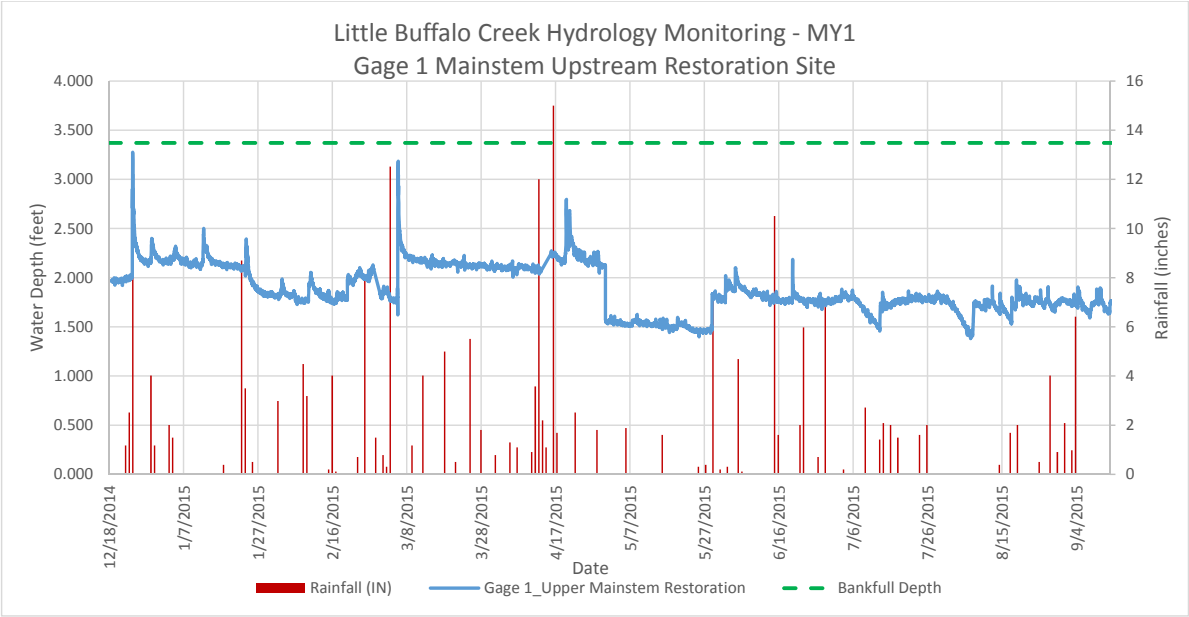


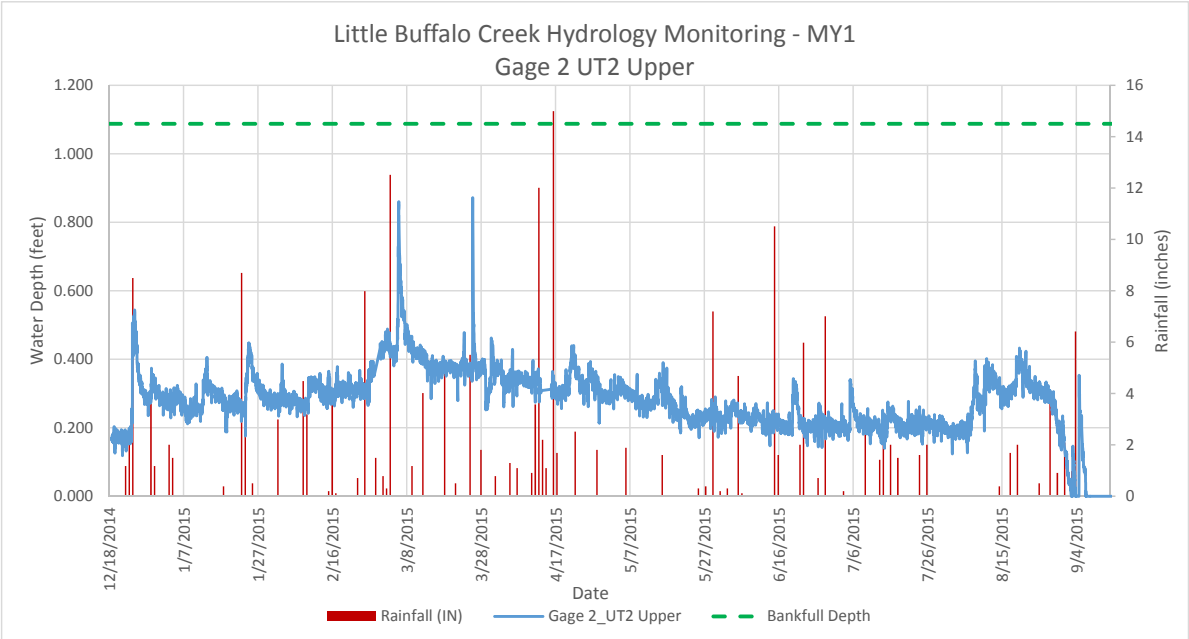


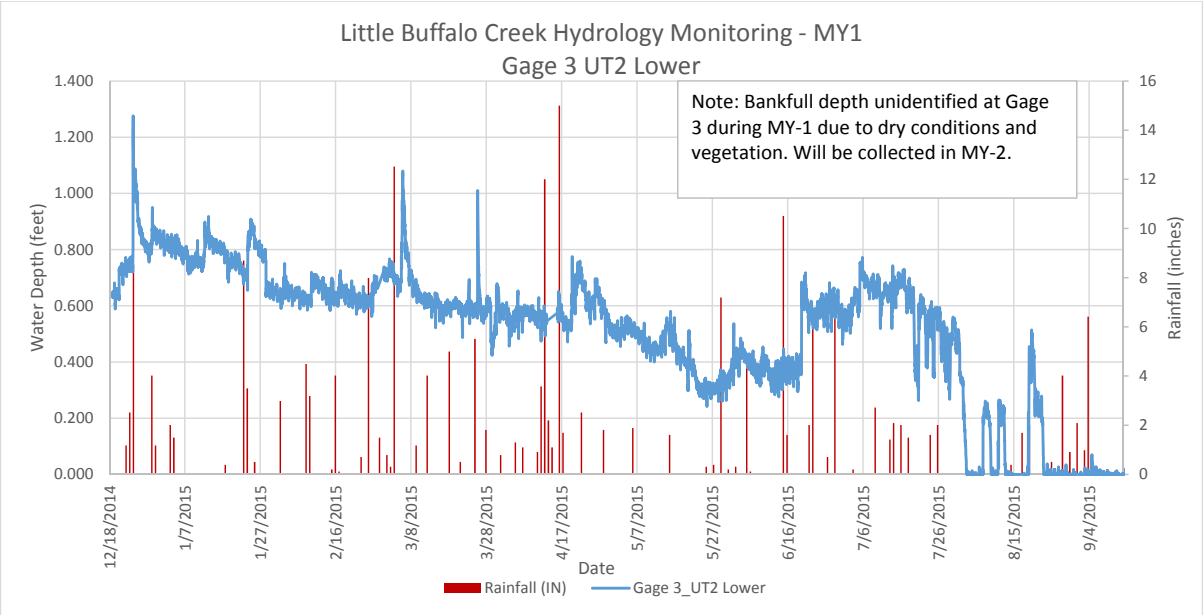
Appendix E – Hydrologic Data

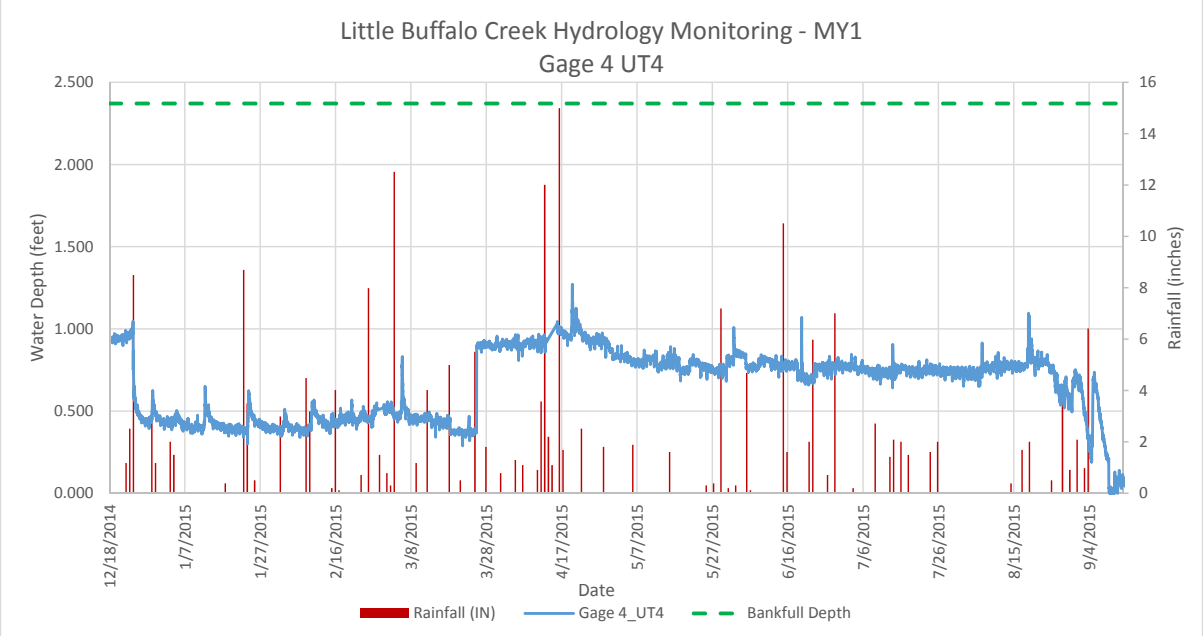
Table 12. Documentation of Geomorphologically Significant Flow Events					
Date of Observation	**Date of Occurrence**	**Method**	**Greater than Qgs = Q2*0.66 stage?**	**Greater than Qbkf Stage?**	**Notes**
No Significant flow events as of 09/2015 for MY1 Field Monitoring meeting requirements					

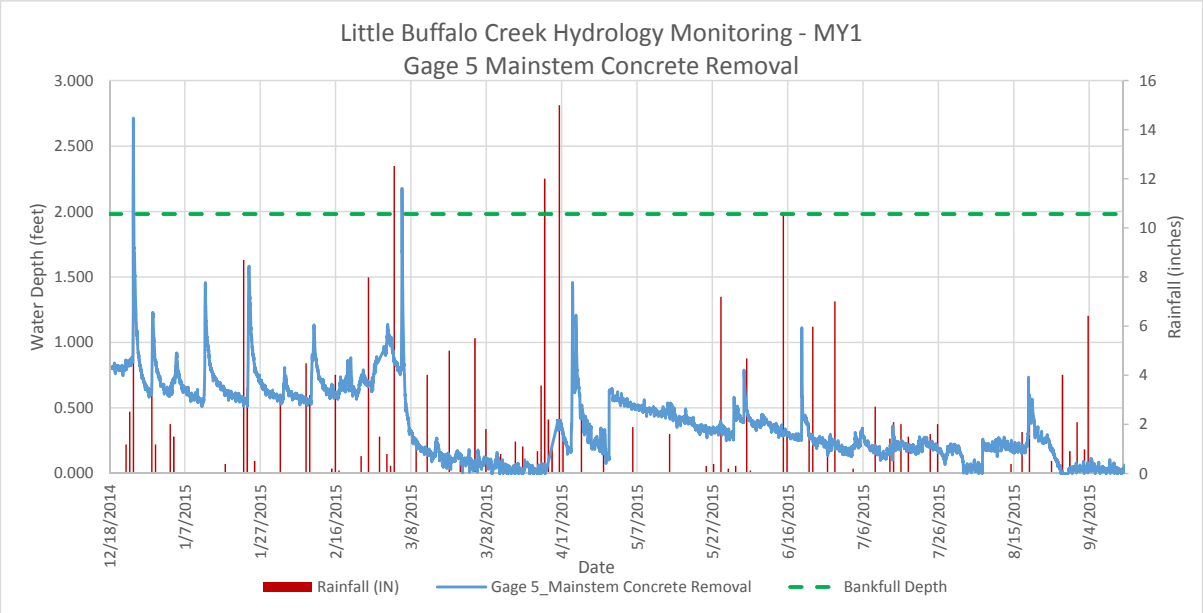
Figures 6a-h – Water Level and Rainfall Plots

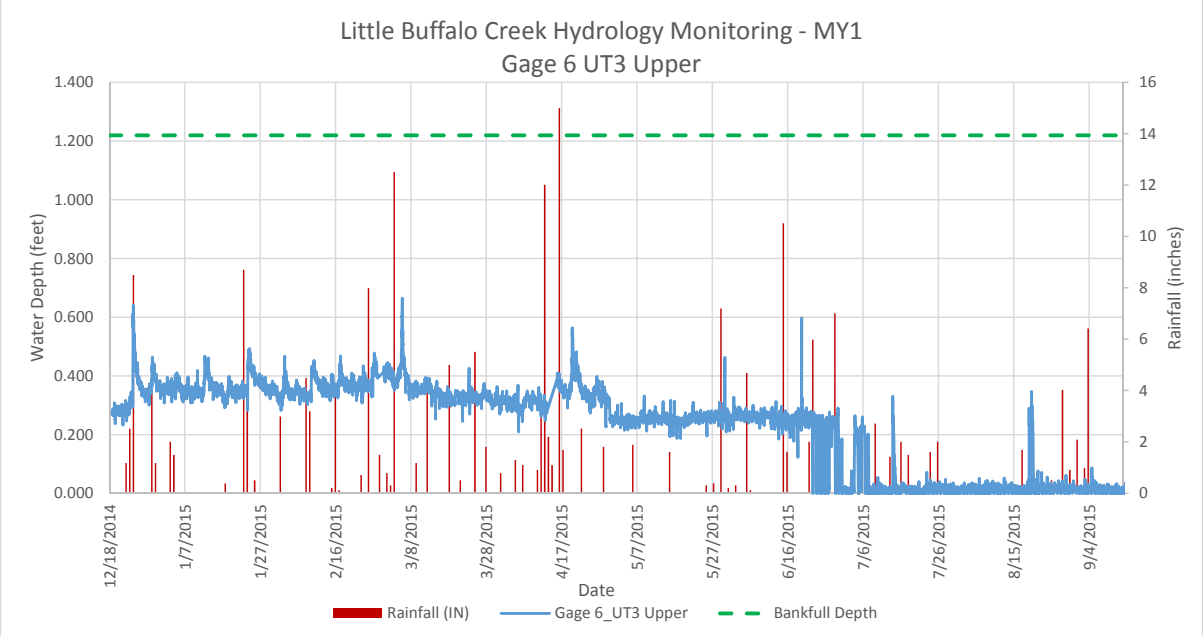

Little Buffalo Creek Hydrology Monitoring - MY1
Gage 1 Mainstem Upstream Restoration Site
Water Depth (feet)
Rainfall (inches)
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
16
14
12
10
8
6
4
2
0
12/18/2014
1/7/2015
1/27/2015
2/16/2015
3/8/2015
3/28/2015
4/17/2015
5/7/2015
5/27/2015
6/16/2015
7/6/2015
7/26/2015
8/15/2015
9/4/2015
Date
Rainfall (IN)
Gage 1_Upper Mainstem Restoration
Bankfull Depth

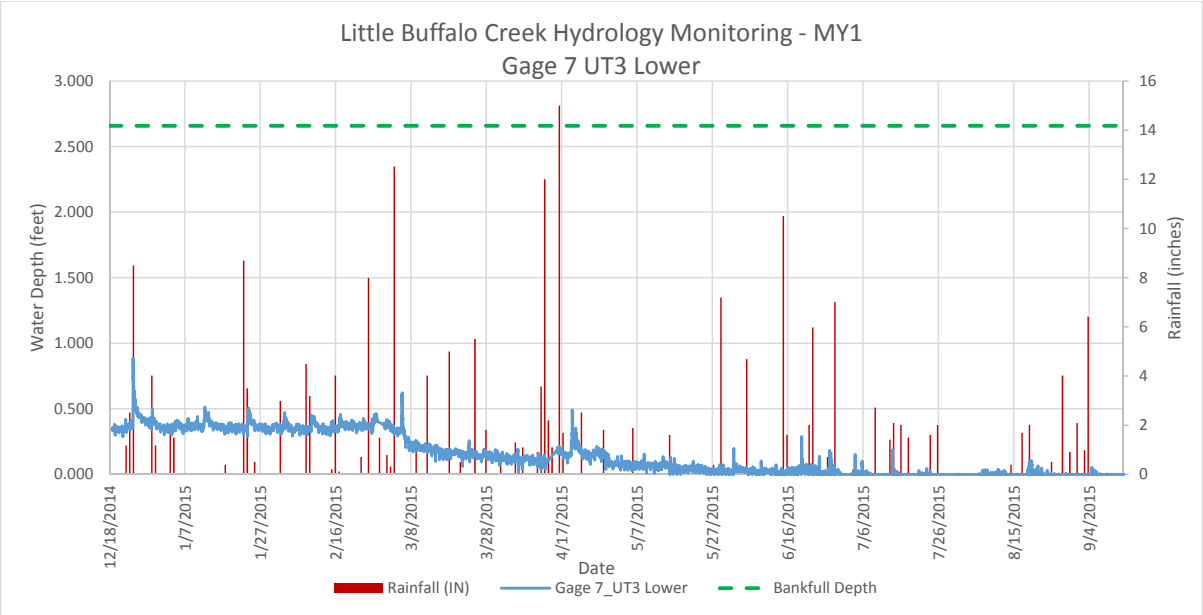

Little Buffalo Creek Hydrology Monitoring - MY1
Gage 2 UT2 Upper
Water Depth (feet)
Rainfall (inches)
1.200
1.000
0.800
0.600
0.400
0.200
0.000
16
14
12
10
8
6
4
2
0
12/18/2014
1/7/2015
1/27/2015
2/16/2015
3/8/2015
3/28/2015
4/17/2015
5/7/2015
5/27/2015
6/16/2015
7/6/2015
7/26/2015
8/15/2015
9/4/2015
Date
Rainfall (IN)
Gage 2_UT2 Upper
Bankfull Depth

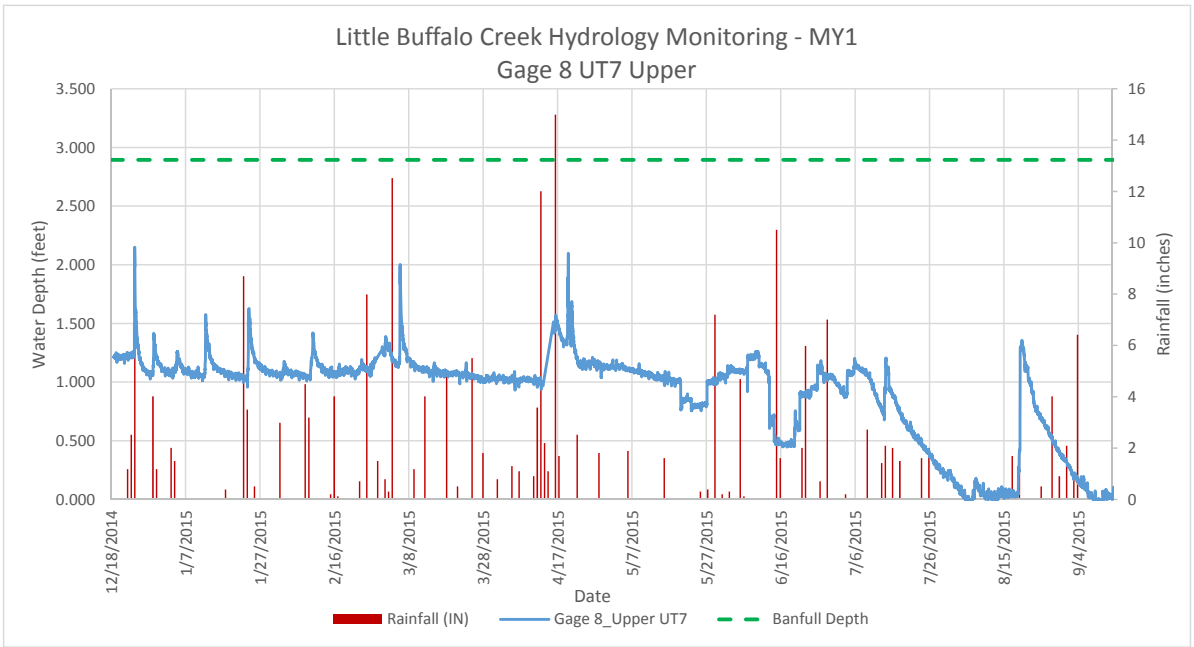

Little Buffalo Creek Hydrology Monitoring - MY1
Gage 3 UT2 Lower
Note: Bankfull depth unidentified at Gage 3 during MY-1 due to dry conditions and vegetation. Will be collected in MY-2.
Water Depth (feet)
Rainfall (inches)
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
16
14
12
10
8
6
4
2
0
12/18/2014
1/7/2015
1/27/2015
2/16/2015
3/8/2015
3/28/2015
4/17/2015
5/7/2015
5/27/2015
6/16/2015
7/6/2015
7/26/2015
8/15/2015
9/4/2015
Date
Rainfall (IN)
Gage 3_UT2 Lower


Little Buffalo Creek Hydrology Monitoring - MY1
Gage 4 UT4
Water Depth (feet)
Rainfall (inches)
2.500
2.000
1.500
1.000
0.500
0.000
16
14
12
10
8
6
4
2
0
12/18/2014
1/7/2015
1/27/2015
2/16/2015
3/8/2015
3/28/2015
4/17/2015
5/7/2015
5/27/2015
6/16/2015
7/6/2015
7/26/2015
8/15/2015
9/4/2015
Date
Rainfall (IN)
Gage 4_UT4
Bankfull Depth


Little Buffalo Creek Hydrology Monitoring - MY1
Gage 5 Mainstem Concrete Removal
Water Depth (feet)
Rainfall (inches)
3.000
2.500
2.000
1.500
1.000
0.500
0.000
16
14
12
10
8
6
4
2
0
12/18/2014
1/7/2015
1/27/2015
2/16/2015
3/8/2015
3/28/2015
4/17/2015
5/7/2015
5/27/2015
6/16/2015
7/6/2015
7/26/2015
8/15/2015
9/4/2015
Date
Rainfall (IN)
Gage 5_Mainstem Concrete Removal
Bankfull Depth


Little Buffalo Creek Hydrology Monitoring - MY1
Gage 6 UT3 Upper
Water Depth (feet)
Rainfall (inches)
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
16
14
12
10
8
6
4
2
0
12/18/2014
1/7/2015
1/27/2015
2/16/2015
3/8/2015
3/28/2015
4/17/2015
5/7/2015
5/27/2015
6/16/2015
7/6/2015
7/26/2015
8/15/2015
9/4/2015
Date
Rainfall (IN)
Gage 6_UT3 Upper
Bankfull Depth


Little Buffalo Creek Hydrology Monitoring - MY1
Gage 7 UT3 Lower
Water Depth (feet)
Rainfall (inches)
3.000
2.500
2.000
1.500
1.000
0.500
0.000
16
14
12
10
8
6
4
2
0
12/18/2014
1/7/2015
1/27/2015
2/16/2015
3/8/2015
3/28/2015
4/17/2015
5/7/2015
5/27/2015
6/16/2015
7/6/2015
7/26/2015
8/15/2015
9/4/2015
Date
Rainfall (IN)
Gage 7_UT3 Lower
Bankfull Depth


Little Buffalo Creek Hydrology Monitoring - MY1
Gage 8 UT7 Upper
Water Depth (feet)
Rainfall (inches)
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
16
14
12
10
8
6
4
2
0
12/18/2014
1/7/2015
1/27/2015
2/16/2015
3/8/2015
3/28/2015
4/17/2015
5/7/2015
5/27/2015
6/16/2015
7/6/2015
7/26/2015
8/15/2015
9/4/2015
Date
Rainfall (IN)
Gage 8_Upper UT7
Banfull Depth