



DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

November 4, 2016

Regulatory Division

Re: NCIRT Review and USACE Approval of the Big Harris Draft Mitigation Plan; SAW-2009-00475; DMS Project #739

Mr. Tim Baumgartner
North Carolina Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Mr. Baumgartner:

The purpose of this letter is to provide the North Carolina Division of Mitigation Services (NCDMS) with all comments generated by the North Carolina Interagency Review Team (NCIRT) during the 30-day comment period for the Big Harris Draft Mitigation Plan, which closed on July 20, 2016. Please note that the comment period was extended to address credit determination. All comments are attached for your review.

Based on our review of comments, and the provider's response, we have determined that all concerns with the Draft Mitigation Plan have been addressed, and the plan is hereby approved with this correspondence. Issues that were identified during the review, as described in the attached comment memos and response to comments, must be addressed in the Final Mitigation Plan.

The Final Mitigation Plan is to be submitted with the Preconstruction Notification (PCN) application for Nationwide permit approval of the project along with a copy of this letter. All changes made to the Final Mitigation Plan should be summarized in an errata sheet included at the beginning of the document. If it is determined that the project does not require a Department of the Army permit, you must still provide a copy of the Final Mitigation Plan, along with a copy of this letter, to the appropriate USACE field office at least 30 days in advance of beginning construction of the project. Please note that this approval does not preclude the inclusion of permit conditions in the permit authorization for the project, particularly if issues mentioned above are not satisfactorily addressed. Additionally, this letter provides initial approval for the Mitigation Plan, but this does not guarantee that the project will generate the requested amount of mitigation credit. As you are aware, unforeseen issues may arise during construction or monitoring of the project that may require maintenance or reconstruction that may lead to reduced credit.

Thank you for your prompt attention to this matter. If you have questions regarding this letter, the mitigation plan review process, or the requirements of the Mitigation Rule, please call me at 919-554-4884 x59.

Sincerely,

HUGHES.ANDREA.
WADE.1258339165

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Andrea Hughes
Mitigation Project Manager

Enclosures

Electronic Copies Furnished:

NCIRT Distribution List
Paul Wiesner, NCDMS



MEMORANDUM

TO: NC Interagency Review Team

FROM: Shawn Wilkerson

DATE: October 14, 2016

RE: Big Harris Creek Mitigation Site
Cleveland County, NC
Broad River Basin 06010105
Response to Mitigation Plan Comments

This memo documents the IRT's Mitigation Plan review comments (*in italics*) received via email on 9/22/2016, and the project team's responses.

From: "Hughes, Andrea W SAW" <Andrea.W.Hughes@usace.army.mil>

Date: September 22, 2016 at 5:42:37 PM EDT

To: "Wiesner, Paul" <paul.wiesner@ncdenr.gov>

Cc: Shawn Wilkerson <swilkerson@wildlandseng.com>, "Tugwell, Todd SAW" <Todd.Tugwell@usace.army.mil>, "Haupt, Mac" <mac.haupt@ncdenr.gov>, "Wicker, Henry M JR SAW" <Henry.M.Wicker.JR@usace.army.mil>, "McLendon, Scott C SAW" <Scott.C.McLendon@usace.army.mil>

Subject: **Big Harris proposed changes and comments**

We consolidated Corps and DWR comments on Big Harris and I've also attached a spreadsheet showing the proposed changes to the ratios. We recommend that the total SMUs be based on credits generated from the proposed ratios for the restoration, enhancement, and preservation reaches; additional credits based on 4% of total linear feet of stream channel for the water quality, benthic, and fish monitoring; additional credits based on 1.5% of total linear feet of stream channel for the watershed approach; and the potential for additional credits based on meeting performance metrics for water quality. The total potential credits that may be generated for the project is 26,020.9 SMUs.

Please see below for additional information and comments:

1. *We (Andrea, Todd, and Mac) agreed to take a little different approach than the way Wildlands determined the total project credits. Instead of assigning ratios for the entire project based upon the BMPs and other characteristics of the project, we focused on adjusting the ratios of the reaches that were primarily affected by the BMPs. Please see the attached table with the revised ratios highlighted.*

- *These credit ratios have been noted and will be revised in the Mitigation Credit table in the revised Final Mitigation Plan.*

2. *Also, we approached the watershed nature of the project by allowing Wildlands to have a credit adjustment based on two (three, if Wildlands is so inclined) primary factors,*

a. *The first involves a 4% credit allowance for the extra monitoring that the project will perform. The 4% will be based on the total linear footage for the project. (Please confirm that the total linear footage is 34,194.) This extra allowance takes into account the considerable pre-monitoring that has already been performed and future project monitoring to be conducted over the next 5 to 7 years. The monitoring should continue the water quality protocol that is currently in place utilizing the ISCO stations.*

- The total linear footage of the project is confirmed at 34,161 LF. The project team is committed to continuing water quality monitoring that is currently in place as well continuing with the water quality, biological, and geomorphic monitoring as detailed in the Mitigation Plan. This will be clarified in the revised Final Mitigation Plan. We will add the additional 4% credit based on total project length to the credit calculation table.

b. *Second, a 1.5 % credit allowance was granted for the watershed nature of the project. Again, the 1.5% will be based on the total linear footage for the project. Very few large projects encompass as much of the total linear footage of the watershed as Big Harris. Wildlands estimates that, of the 4 square mile watershed, they will protect over 60% of the stream footage in the watershed.*

- The total linear footage of the intermittent and perennial streams in the Big Harris Creek watershed is calculated to be 57,200 LF. The linear footage of project streams is 34,161 LF, or 60% of the project watershed. We will add 1.5% credit based on total project length to the credit calculation table.

c. *As another option to generate credits, we are willing to grant an additional 2% credit based on total project SMUs if Wildlands can show a statistically significant improvement in selected water quality metrics. The selection of metrics should be based on impairments identified in the watershed plans and the pre-monitoring results. Wildlands should specify the metrics and the level (percentage) of improvement to be achieved by the mitigation activities.*

- Wildlands is open to developing a water quality monitoring program to evaluate the effectiveness of the project at improving water quality. There are several elements of the program that will need to be determined through data review, planning, and collaboration with the IRT and potentially other resources. The most obvious of these will be described in the revised Final Mitigation Plan (per text below). It will likely take time to work out these details. Our suggestion is that the following text be added to Section 8.0- Determination of Credits in the Mitigation Plan:

In order to gain an additional 2% of the total SMUs for this mitigation site, Wildlands will collaborate with the IRT to develop and implement a water quality monitoring and evaluation program with the goal of demonstrating improvement in select water quality parameters. This water quality monitoring and evaluation program will be agreed upon at or before the MY0/Baseline Monitoring report completion. If post-construction water quality monitoring demonstrates improvements at an agreed upon level for all selected parameters, then a full 2% of total SMUs (507 SMUs) will be awarded in addition to the 25,330 SMUs already agreed upon. Some portion of the 2% of total SMUs will be awarded for demonstrating partial success for water quality improvements. The following elements must be determined and agreed upon prior to implementing the program:

- Parameters to monitor to verify success. These need to be selected based on past sampling results, project goals, and likelihood of providing meaningful results.
- Methods of sampling and evaluating results.
- Level of improvement required to demonstrate success.

If a monitoring program is not agreed upon, then the 2% of additional SMUs will not be granted.

3. *DWR and the Corps have concerns on the Scott Creek reach. A portion of this reach appears to have 370-400 linear feet that will be raised 4-7 feet. We suggest adding at least one gauge (transducer) in the channel to document a minimum 30 days of continuous flow. Also, we recommend that a gauge be installed on all intermittent restoration or enhancement reaches where Wildlands proposes to raise the bed elevation in order to document at least 30 days of continuous flow.*

- A flow gage pressure transducer will be proposed on Scott Creek and Reach 1 of Royster Creek to document a minimum of 30 days of continuous flow. This monitoring will be added to Section 12.5 of the revised Final Mitigation Plan which discusses hydrology monitoring.

4. *DWR believes that for the channel above the jurisdictional point of Scism Creek, reshaping of the area into a vegetated swale and establishment of a buffer may be sufficient future treatment. The same may be true for the BMP area above the RSC-like feature on Upper Stick Elliot.*

- Wildlands has reviewed the goals and methods for these BMP areas. We agree with the IRT's assessment and will change the treatment train at these locations to focus on vegetative stabilization. These changes will also be made in the preliminary plan set that will be submitted with the revised Final Mitigation Plan.

5. *It is DWR's understanding that the BMPs are intended only for stabilization of erosive features and reduction of flow of runoff and long term management will not be necessary. The functional uplift will be considered a "one time" improvement to the ecosystem. Initially, there were some concerns by DWR staff that the BMPs were proposed for long term nutrient reduction, or that credit was tied to nutrient reduction, and if so, there may have been significant comments/concerns regarding how those reductions are calculated and long term maintenance and management of the BMPs.*

- Wildlands has reviewed the goals and methods for the BMP areas. We agree with the IRT's assessment that these can be considered "one time" improvements to the ecosystem. We will ensure that this is clear in the revised Final Mitigation Plan.

6. *As previously discussed during our phone conversation, no credit can be generated for areas under the powerline easement. If these areas were included in the attached spreadsheet then the total SMUs for the project should be reduced accordingly.*

- Wildlands has verified that no credit is being requested under the power line easements.



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

CESAW-RG/Hughes

September 22, 2016

MEMORANDUM FOR RECORD

SUBJECT: Big Harris Creek Mitigation Site - Final Comments during Mitigation Plan Review

PURPOSE: The comments listed below were provided to NCDMS in response to additional information received from the provider on September 7, 2016.

NCDMS Project Name: Big Harris Creek Mitigation Site, Cleveland County, NC

USACE AID#: SAW-2009-00475

NCDMS #: 739

30-Day Comment Deadline (deadline extended): July 20, 2016

Corps and NCDWR Comments, September 22, 2016:

1. We have reviewed the additional information provided and determined that the best approach for determining credits associated with BMPs is to adjust the ratios for all reaches that would directly benefit from the proposed BMP structures. Please see the attached table with the revised ratios highlighted.

2. We propose a credit adjustment based on several factors associated with the watershed nature of the project:

- a. A 4% credit allowance will be allowed for the extra monitoring that will be conducted for the project. The 4% will be based on the total project linear footage. (Please confirm the total linear footage for the project.) This extra allowance takes into account the considerable pre-monitoring that has already been performed as well as future project monitoring to be conducted over the next 5 to 7 years. The monitoring should continue the water quality protocol that is currently in place utilizing the ISCO stations.
- b. A 1.5 % credit allowance will be allowed for the watershed nature of the project. The 1.5% will be based on the total linear footage for the project. This allowance takes into account that very few large projects encompass as much of the watershed as Big Harris. The project will protect over 60% of the stream footage in the watershed.

- c. Wildlands will be provided the option to generate an additional 2% of the total project SMUs if they can show a statistically significant improvement in select water quality metrics. The selection of metrics should be based on impairments identified in the watershed plans and the pre-monitoring results. Wildlands should specify the metrics and the level (percentage) of improvement to be achieved by the mitigation activities.

3. DWR and the Corps have concerns regarding the Scott Creek reach. A portion of this reach appears to have 370-400 linear feet that will be raised 4-7 feet. We suggest adding at least one gauge (transducer) in the channel to document a minimum 30 days of continuous flow. Also, we recommend that a gauge be installed on all intermittent restoration or enhancement reaches where Wildlands proposes to raise the bed elevation in order to document at least 30 days of continuous flow.

4. DWR believes that, for the channel above the jurisdictional point of Scism Creek, reshaping of the area into a vegetated swale and establishment of a buffer may be sufficient future treatment. The same may be true for the BMP area above the RSC-like feature on Upper Stick Elliot.

5. It is DWR's understanding that the BMPs are intended only for stabilization of erosive features and reduction of flow of runoff and long term management will not be necessary. The functional uplift will be considered a "one time" improvement to the ecosystem. Initially, there were some concerns by DWR staff that the BMPs were proposed for long term nutrient reduction, or that credit was tied to nutrient reduction, and if so, there may have been significant comments/concerns regarding how those reductions are calculated and long term maintenance and management of the BMPs.

6. As previously discussed, no credit can be generated for areas under a powerline easement. If these areas were included in the attached spreadsheet then the total SMUs for the project should be reduced accordingly.

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Andrea Hughes
Mitigation Project Manager
Regulatory Division

Table 11: Credit Table

Mitigation Credits										
Stream		Riparian Wetland		Non-riparian Wetland		Buffer		Nitrogen Nutrient Offset	Phosphorus Nutrient	
Type	R	RE	R	RE	R	RE				
Totals	22,915	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Project Components										
Project Area	Project Reach	Existing Footage (LF) ¹	Proposed Stationing/Location	Approach (P1, P2, etc.)	Restoration (R) or Restoration Equivalent (RE)	Restoration Footage (LF) ¹	Mitigation Ratio	Proposed Credit ²		
A	Cornwell Creek	2,430	403+44	428+06	cattle fencing; buffer planting	EI	2,446	2.5	979	
	UT1 to Cornwell Creek	78	430+27	431+05	cattle fencing; buffer planting	EI	78	2.5	31	
	Eaker Creek	135	513+16	514+51	cattle fencing, bank grading and in-stream structures	EI	135	1.0	135	
	Eaker Creek EC	N/A	N/A	N/A	headwater BMP	N/A	0	0.0	0	
	UT1 to Eaker Creek	45	N/A	N/A	roadside ditch; stabilization grading ³	N/A	45	0.0	0	
	Scism Creek	1,189	606+92	618+81	BMP, bank grading and in-stream structures	EI	1,189	1.5	793	
	Scism Creek EC	N/A	N/A	N/A	headwater BMP	N/A	0	0.0	0	
	Royster Creek R1	438	802+53	806+91	Priority 2 Restoration	R	488	1.0	488	
	Royster Creek R2	3,185	807+19	839+40	cattle fencing; buffer planting	EI	3,167	2.0	1,583	
	Royster EC2	N/A	N/A	N/A	headwater BMP	N/A	0	0.0	0	
	Royster EC3	N/A	N/A	N/A	headwater BMP	N/A	0	0.0	0	
	Royster EC4	N/A	N/A	N/A	headwater BMP	N/A	0	0.0	0	
	Royster EC5	N/A	N/A	N/A	headwater BMP	N/A	0	0.0	0	
	Lower Stick Elliott Creek	1,422	1101+13	1115+67	cattle fencing; buffer planting	EI	1,389	2.5	556	
	Scott Creek	630	1210+47	1216+77	Priority 1 Restoration	R	629	1.0	629	
	Scott Creek EC	N/A	N/A	N/A	headwater BMP	N/A	0	0.0	0	
	Carroll Creek	553	1301+68	1307+21	Priority 2 Restoration	R	595	1.0	595	
	Upper Big Harris Creek- R1	2,615	103+66	129+81	bank grading and in-stream structures; pine removal and buffer planting	EI	2,556	2.5	1,022	
	Upper Big Harris Creek- R2	990	129+81	139+71	Priority 2 Restoration	R	934	1.0	934	
	Upper Big Harris Creek- R3	880	140+03	148+83	cattle fencing; bank grading and in-stream structures	EI	870	2.0	435	
	Upper Big Harris Creek- R4	1,203	149+20	161+23	Priority 2 Restoration	R	1,039	1.0	1,039	
	Upper Big Harris Creek- R5	845	161+65	170+10	cattle fencing; bank grading and in-stream structures	EI	845	1.5	563	
	Upper Big Harris Creek- R6	2,258	170+70	193+91	cattle fencing; bank grading and in-stream structures	EI	2,258	1.5	1,505	
	Upper Big Harris EC	N/A	N/A	N/A	headwater BMP into Upper Big Harris Reach 5	N/A	0	0.0	0	
UT1 to Upper Big Harris Creek	84	197+14	197+97	bank grading and in-stream structures; pine removal and buffer planting	EI	84	2.5	34		
UT2 to Upper Big Harris Creek	97	200+42	201+39	bank grading and in-stream structures; pine removal and buffer planting	EI	97	2.5	39		
UT3 to Upper Big Harris Creek	105	202+00	203+05	preservation	P	105	10.0	11		
UT4 to Upper Big Harris Creek	84	204+00	204+84	preservation	P	84	10.0	8		
B	Elliott Creek	1,389	1400+85	1414+74	bank grading, segments of profile and bench restoration, in-stream	EI	1,121	1.0	1,121	
	UT1 to Elliott Creek	141	1415+87	1417+28	bank grading, segments of profile and bench restoration, in-stream	EI	141	1.0	141	
	Bridges Creek- R1	445	1500+92	1505+37	Priority 1 Restoration	R	376	1.0	376	
	Bridges Creek- R2	366	1505+37	1509+03	bank grading and in-stream structures	EI	317	2.0	159	
	UT1 to Bridges Creek	58	1510+46	1511+04	Priority 1 Restoration	R	55	1.0	55	
	Upper Stick Elliott Creek- R1	352	1002+19	1007+16	Priority 1 Restoration	R	409	1.0	409	
	Upper Stick Elliott Creek- R2	869	1007+16	1016+16	bank grading and in-stream structures	EI	781	2.0	391	
	Upper Stick Elliott Creek- R3	1,514	1016+16	1031+61	bank grading and in-stream structures	EI	1,204	2.0	602	
	Upper Stick Elliott Creek- R4A	428	1042+25	1046+53	bank grading and in-stream structures	EI	397	2.0	199	
	Upper Stick Elliott Creek- R4B	113	1046+53	1047+66	bank grading, benching, and in-stream structures	EI	113	1.5	75	
	Upper Stick Elliott Creek- R5	1,909	1048+25	1067+34	Priority II -> Priority I Restoration	R	1,507	1.0	1,507	
	Upper Stick Elliott Creek- R6	1,036	1067+65	1078+55	Priority I -> Priority II Restoration	R	1,069	1.0	1,069	
	Upper Stick Elliott Creek EC	N/A	N/A	N/A	headwater BMP into Upper Stick Elliott Reach 1	N/A	0	0.0	0	
	UT1 to Upper Stick Elliott Creek	50	1078+08	1078+58	bank grading and in-stream structures	EI	72	1.5	48	
	UT2 to Upper Stick Elliott Creek	56	1080+00	1080+56	reconnection; Priority I Restoration	R	154	1.0	154	
	UT3 to Upper Stick Elliott Creek	107	1082+00	1083+07	reconnection; Priority I Restoration	R	118	1.0	118	
	Upper Fletcher Creek- R1	1,493	1600+78	1615+71	isolated bank grading and in-stream structures, livestock fencing, invasives	EI	1,571	2.5	628	
	Upper Fletcher Creek- R2	1,465	1616+02	1630+67	Priority 2 Restoration	R	1,407	1.0	1,407	
	Lower Fletcher Creek- R1	574	1641+28	1647+02	bank grading, benching, and in-stream structures	EI	574	1.0	574	
	Lower Fletcher Creek- R2	467	1647+33	1652+00	bank grading, benching, and in-stream structures	EI	427	1.0	427	
	C	Lower Big Harris Creek- R1A	509	300+13	305+22	bank grading, segments of profile and bench restoration, in-stream	EI	500	1.5	333
		Lower Big Harris Creek- R1B	385	305+22	309+07	Priority 2 Restoration	R	320	1.0	320
		Lower Big Harris Creek- R2	987	309+07	318+94	Priority 2 Restoration	R	967	1.0	967
		Lower Big Harris Creek- R3	414	318+94	323+08	isolated bank grading and in-stream structures, invasives removal	EI	414	2.5	166
UT1 to Lower Big Harris Creek		229	330+68	332+97	isolated bank grading and in-stream structures, invasives removal	EI	228	2.5	91	
UT2 to Lower Big Harris Creek		511	334+20	339+31	isolated bank grading and in-stream structures, invasives removal	EI	439	2.0	220	
UT3 to Lower Big Harris Creek		99	341+69	342+68	preservation	P	118	10.0	12	
UT4 to Lower Big Harris Creek		362	343+12	346+74	preservation	P	362	10.0	36	
						34,194				
						TOTAL PROJECT CREDITS			22,982	
Component Summation										
Restoration Level	Stream (linear feet)	Riparian Wetland (acres)	Non-Riparian Wetland (acres)	Buffer (square feet)	Upland (acres)					
Restoration	10,067									
Enhancement	N/A									
Enhancement I	2,898									
Enhancement II	20,515									
Creation	N/A									
Wetland Rehabilitation	N/A									
Wetland Re-Establishment	N/A									
Preservation	669									
High Quality Preservation	N/A									

Notes:
 1. Existing and proposed lengths include only reach lengths located within the conservation easement.
 2. No direct credit for BMPs. BMP lengths not included in proposed footage. Credits reported have been adjusted based on buffer width deviations from standard 50-foot buffer width.
 3. UT1 to Eaker Creek is a roadside ditch that will be stabilized, but does not have adequate buffer. No credit is being proposed.



MEMORANDUM

TO: NC Interagency Review Team

FROM: Shawn Wilkerson

DATE: September 6, 2016

RE: Big Harris Creek Mitigation Site
Cleveland County, NC
Broad River Basin 06010105
Response to Mitigation Plan Comments

This memo documents the IRT's initial Mitigation Plan review comments (*in italics*) received in our meeting on 8/23/2016, and the project team's responses.

1. *The IRT wants to make sure the mitigation plan gives as much transparency to approach, management strategy, and credit generation on a reach by reach basis as well as concerning overall philosophy of the project. This will be done via the draft table that Wildlands presented at the meeting. This table will contain information on credits that would come from the lowest credit generating ratios from the SOP; credits as Wildlands is proposing which are at the high end of ratios from the SOP; the difference between these two amounts representing the amount of credit proposed for the watershed scale restoration level, installation of BMPs, buffers and protection from ephemeral reaches, etc.; and, the credits from utilization of the draft buffer guidance. The table will also include, for each reach, a list detailing statistics on level of intervention along that reach.*
 - Response: Please see the attached Table 11 (Expanded Credit Table). Once reviewed by the IRT and final ratios approved, Wildlands can integrate this information into the Mitigation Plan.
2. *While not looking for wholesale division of reaches into homogeneous management zones, the IRT would specifically like a couple sections as mentioned in Todd Tugwell's email split out, and for Wildlands to look for any other reaches they may meaningfully be split by management approach.*
 - Response:
 - i. Upper Big Harris Reach 6 was classified in the Mitigation Plan as EII. With this comment response memo, Reach 6 has been split into Reach 6A and 6B. Reach 6A's management approach consists of benching for over 50% of the reach length and bank grading for over 75% of the reach length; Wildlands has classified and credited this work as EII although it could be considered EI work. Reach 6B is also credited as EII and consists of isolated areas of bank grading

and structures in addition to standard EII practices of cattle exclusion, invasive vegetation treatment, and supplemental planting. This reach was divided at the request of the IRT.

- ii. Upper Stick Elliott Reach 2 from the Mitigation Plan has been split into Reach 2A and 2B, both which are categorized as a management approach of EII. This reach was divided at the request of the IRT. Reach 2A work includes bank stabilization grading for 42% of the reach length, bed structures for 29% of the reach length, invasive species treatment and supplemental planting. Reach 2B work includes bank stabilization grading for 25% of the reach length, bed structures for 25% of the reach length, invasive species treatment and supplemental planting.
- iii. Upper Stick Elliott Reach 3 from the Mitigation Plan is now split and labeled as Reach 3A and 3B. In the Mitigation Plan, Reach 3 was categorized as EII. Work on Reach 3A includes significant bank grading along outer bend banks and benching on 20% of the reach length. We have classified and credited this work as EII although it could be considered EI work. Reach 3B is proposed to include excavation of a bankfull bench for over 20% of the reach length, bank grading for 50% of the reach length, and in-stream bed structures and bank structures such as brush toe. We have classified and credited this work as EII although it could be considered EI.
- iv. Cornwell Creek was split into Reach 1 and Reach 2. Reach 1 is classified and credited as EII. Reach 2 requires restoration of dimension, plan, and profile to achieve a stable confluence with UBH. We have requested EII credit for this reach although it could be considered Restoration work.

3. *The IRT would like Wildlands to specify which reaches changed management approach between concept proposal and mitigation plan with some explanation as to why.*

- Response: Please see the attached Table 1 that details the approach by reach in the Technical Proposal, IRT Concept Plan memo, and Mitigation Plan. This table will be incorporated into the Mitigation Plan as appropriate upon final Mitigation Plan production.

4. *The IRT wants 0% credit beneath powerlines. The IRT will clarify this stance program-wide at some near point.*

- Response: The mitigation credit calculations have been revised to 0 SMU beneath the power lines. Mitigation Plan text and credit table in section 8.0 will be revised.

5. *Clarify in monitoring section the use of multiple guidances and that some guidance dictates approach, some timelines, while trying to stay generally with 2003 but incorporating best practices from more recent guidance.*

- Response: Mitigation Plan text in section 12.1 will be revised as follows:

Using the DMS Baseline Monitoring Plan Template (February 2014), a baseline monitoring document and as-built record drawings of the project will be developed within 60 days of the planting completion and monitoring installation on the restored site. Monitoring reports will be prepared in the fall of each year of monitoring and submitted to DMS. Annual monitoring data will be reported using the DMS Annual Monitoring Report Format, Data Requirements, and Content Guidance (April 2015). The monitoring report will provide project data chronology that will facilitate an understanding of project status and trends, population of DMS databases for analysis, research purposes, and assist in decision making regarding close-out.

The monitoring period will extend five years beyond completion of construction since this Site was initiated by DMS prior to the 2014 monitoring guidance. Though the RFP for the project specifies five years of post-construction monitoring, it also referenced utilizing the most recent monitoring report template which is based on a five- or seven-year monitoring program. Wildlands, DMS, and IRT members agreed to establish a five-year monitoring program for the Site that will follow the latest 2014 guidance for monitoring programs, while adhering as close as possible to the 2003 guidance requirements (with the exclusion of longitudinal profile surveys).

In addition to the required five-year monitoring program, based on the 2014 guidance and in response to IRT concerns about quantitative uplift evaluations, water quality and benthic macroinvertebrate data will be collected during monitoring years three, four, and five. Monitoring of fish will be completed in year 5. These additional monitoring parameters are described in detail below. However, it is important to note that these additional parameters are intended to provide information only to complement the pre-restoration data that have already been collected by DMS and others, and is not part of the project success criteria. No monitoring is proposed on the individual BMPs. The performance standards for the project will be based on those specified in Section 11.

6. *Wildlands should specify that maintenance needed on any BMPs will occur during 5-year monitoring period.*

- Response: Mitigation Plan text in section 10.0 and Table 17 will be revised as follows to add the underlined text:

The site shall be monitored on a regular basis and a physical inspection of the Site shall be conducted a minimum of twice per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance for stream reaches should be expected most often in the first two years following site construction. Wildlands will perform maintenance of BMPs and ephemeral reach areas as necessary during the five-year monitoring period. The need for maintenance will be evaluated annually during monitoring activities. Maintenance activities may include the following:

Table 17. Maintenance Plan - Big Harris Creek Mitigation Site

Component/ Feature	Maintenance through project close-out
Stream	Routine channel maintenance and repair activities 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. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head-cutting.
Water Quality BMPs	Routine BMP maintenance may include removal of accumulated sediment from the bottom of the BMP. Sediment and vegetation shall be removed from the stone weir or outlet channel to ensure a positive drainage pattern. Stone and boulders may need to be adjusted or re-installed to prevent scour. <u>Wildlands will maintain the BMPs during the 5-year monitoring period until close out. Wildlands will evaluate whether sediment removal is necessary based on available sediment storage volume and post-construction stabilized watershed conditions. The dry detention ponds were designed with extra volume to allow for significant accumulations to occur before maintenance would be needed.</u>

Component/ Feature	Maintenance through project close-out
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the forest. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.
Site boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis.
Ford and Culvert Crossings	Ford crossings within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restrictions, rights of way, or corridor agreements.

7. *Please provide detailed calculations, tables, and figures to back up the SMU credit adjustments based on buffer width.*

- Response: Please see the attached plan sheets and detailed credit calculation tables. These will be incorporated into the Mitigation Plan additional information in Appendix I: Mitigation Credit Calculations.

Expanded Credit Table: Big Harris Creek Mitigation Site

Mitigation Credits															
Stream		Riparian Wetland			Non-riparian Wetland		Buffer		Nitrogen Nutrient Offset			Phosphorus Nutrient Offset			
Type	R	RE	R	RE	R	RE	R	RE							
Totals	27,207	65	N/A	N/A	N/A	N/A	N/A	N/A							
Project Components															
Project Area	Project Reach	Existing Footage (LF) ¹	Proposed Stationing/Location	Description	Restoration (R) or Restoration Equivalent (RE)	Restoration Footage (LF) ¹	SOP Low End Ratio	SOP Low End Credits	Proposed Ratio	Proposed Credits	Proposed Credits - SOP Low End Credits	Buffer Width Credit Loss at Proposed Ratio	Buffer Width Credit Gain at Proposed Ratio	Total Proposed Credit ²	
A	Cornwell Creek R1	2,144	403+44	425+20	bank stabilization 2% bank structures 2% livestock exclusion 85% supplemental planting	EII	2,144	2.5	858	1.5	1430	572	-41	83	1,472
	Cornwell Creek R2	2,144	425+20	428+27	full restoration w/structures 100% supplemental planting	EII	307	2.5	123	1.5	205	82	0	0	205
	UT1 to Cornwell Creek	78	430+27	431+05	livestock exclusion 100% supplemental planting	EII	78	2.5	31	1.5	52	21	0	0	52
	Eaker Creek	135	513+11	514+45	heavy enhancement in and out of existing alignment w/structures 100% supplemental planting	EI	134	1.5	89	1.0	134	45	0	0	134
	Eaker Creek EC	N/A	500+02	513+11	BMP cascades/SPSC 70% livestock exclusion 49% supplemental planting	N/A	1,309	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Scism Creek	1,189	606+92	618+81	heavy enhancement in existing alignment w/structures 19% bank stabilization 12% bank structures 12% livestock exclusion 100% invasive species treatment supplemental planting stabilize contributing headcut with rock sills	EII	1,189	2.5	476	1.5	793	317	-12	24	805
	Scism Creek EC	N/A	603+34	606+92	BMP veg swale/SPSC 79% livestock exclusion 100% invasive species treatment supplemental planting	N/A	358	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Royster Creek R1	438	802+54	807+13	full restoration w/structures 100% livestock exclusion 100% invasive species treatment planting	R	459	1.0	459	1.0	459	0	-8	3	454
	Royster Creek R2	3,185	807+40	839+40	structures 3% bank grading 1% livestock exclusion 100% invasive species treatment supplemental planting	EII	3,170	2.5	1,268	1.5	2113	845	-33	61	2,141
	Royster EC2	N/A	850+20	855+59	SPSC/vegetated swale 100% livestock exclusion 100% invasive species treatment planting	N/A	539	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Royster EC3	N/A	861+97	865+96	SPSC 49% livestock exclusion 100% invasive species treatment planting	N/A	399	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Royster EC4	N/A	874+11	884+33	Rock cascade/SPSC 32% structures 8% livestock exclusion 100% invasive species treatment planting	N/A	1,022	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Royster EC5	N/A	890+00	896+69	SPSC/rock cascade/vegetated swale 55% livestock exclusion 100% invasive species treatment planting	N/A	669	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Lower Stick Elliott Creek	1,422	1101+13	1115+34	heavy enhancement in and out of existing alignment w/structures 14% livestock exclusion 100% supplemental planting 100%	EII	1,389	2.5	556	1.5	926	370	-80	32	878
	Scott Creek	630	1210+12	1216+74	Priority 1 restoration w/structures 100% livestock exclusion 100% supplemental planting	R	662	1.0	662	1.0	662	0	-16	35	681
	Scott Creek EC	N/A	1202+78	1210+12	SPSC 25% livestock exclusion 100% invasive species treatment supplemental planting	N/A	734	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Carroll Creek	553	1301+68	1307+63	Priority 2 restoration w/structures 100% livestock exclusion 100% supplemental planting	R	595	1.0	595	1.0	595	0	-56	0	539
	Upper Big Harris Creek- R1	2,615	104+25	129+81	bank stabilization 38% bank structures 9% bed grading 2% invasive species/pine removal supplemental planting	EII	2,556	2.5	1,022	1.5	1704	682	-22	221	1,903
	Upper Big Harris Creek- R2	990	129+81	139+15	Priority 2 restoration w/structures 100% pine removal supplemental planting	R	934	1.0	934	1.0	934	0	0	126	1,060
	Upper Big Harris Creek- R3	880	139+75	148+45	benching 63% bank stabilization 88% bed structures 55% livestock exclusion 100% invasive species treatment supplemental planting	EII	870	2.5	348	1.5	580	232	-1	101	680
	Upper Big Harris Creek- R4	1,203	148+76	159+15	Priority 2 restoration w/structures 100% livestock exclusion 100% invasive species treatment planting	R	1,039	1.0	1,039	1.0	1039	0	0	11	1,050
	Upper Big Harris Creek- R5	845	159+58	168+03	bank stabilization 16% livestock exclusion 100% invasive species treatment supplemental planting	EII	845	2.5	338	1.5	563	225	-2	43	604
	Upper Big Harris Creek- R6A	824	168+63	177+50	benching/bank stabilization 53% bank stabilization/structures 75% bed structures 16% livestock exclusion 100% invasive species treatment 45% supplemental planting 100% Stabilizing 2 concentrated flowpaths into reach	EII	855	2.5	342	1.5	570	228	-11	12	571
	Upper Big Harris Creek- R6B	1,434	177+50	191+84	bank stabilization 8% bank structures 8% livestock exclusion 100% invasive species treatment supplemental planting Stabilizing 2 concentrated flowpaths into reach	EII	1,403	2.5	561	1.5	935	374	-30	20	925
	Upper Big Harris EC	N/A	700+00	701+66	rock cascade 37% livestock exclusion 100% invasive species treatment supplemental planting	N/A	166	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	UT1 to Upper Big Harris Creek	84	197+13	197+97	invasive species treatment planting	EII	84	2.5	34	1.5	56	22	-13	0	43
	UT2 to Upper Big Harris Creek	97	200+42	201+39	planting 100%	EII	97	2.5	39	1.5	65	26	-6	0	59
	UT3 to Upper Big Harris Creek	105	202+00	203+05	invasive species treatment preservation	P	105	10.0	11	10.0	11	0	0	0	11
UT4 to Upper Big Harris Creek	84	204+00	204+84	preservation	P	84	10.0	8	10.0	8	0	-1	0	7	
Elliott Creek	1,389	1400+85	1412+06	heavy enhancement in existing alignment w/structures 53% benching and profile work 26% invasive species treatment supplemental planting	EI	1,121	1.5	747	1.0	1121	374	-10	52	1,163	
UT1 to Elliott Creek	141	1415+87	1417+28	benching and bank stabilization 100% invasive species treatment supplemental planting	EI	141	1.5	94	1.0	141	47	-19	0	122	
Bridges Creek- R1	445	1500+91	1504+67	Priority 1 restoration w/structures 100% planting	R	376	1.0	376	1.0	376	0	0	15	391	
Bridges Creek- R2	366	1504+67	1507+84	bed structures 25% supplemental planting	EII	317	2.5	127	1.5	211	84	0	12	223	
UT1 to Bridges Creek	58	1510+46	1511+01	Priority 1 restoration w/structures 100% planting	R	55	1.0	55	1.0	55	0	-28	0	27	
Upper Stick Elliott Creek- R1	352	1002+89	1006+98	Priority 1 restoration w/structures 100% invasive species treatment planting	R	409	1.0	409	1.0	409	0	-71	16	354	
Upper Stick Elliott Creek- R2A	535	1006+98	1012+00	bank stabilization 42% bed/bank structures 29% invasive species treatment supplemental planting	EII	471	2.5	188	1.5	314	126	-19	24	319	
Upper Stick Elliott Creek- R2B	334	1012+00	1015+10	bank stabilization 25% bank structures 25% invasive species treatment supplemental planting	EII	310	2.5	124	1.5	207	83	-2	2	207	
Upper Stick Elliott Creek- R3A	209	1015+10	1018+25	significant outer bank grading, benching 20%, invasive species treatment planting	EII	315	2.5	126	1.5	210	84	0	23	233	

Expanded Credit Table: Big Harris Creek Mitigation Site

Mitigation Credits															
Stream			Riparian Wetland		Non-riparian Wetland		Buffer		Nitrogen Nutrient Offset			Phosphorus Nutrient Offset			
Type	R	RE	R	RE	R	RE									
Totals	27,207	65	N/A	N/A	N/A	N/A			N/A						
Project Components															
Project Area	Project Reach	Existing Footage (LF) ¹	Proposed Stationing/Location		Description	Restoration (R) or Restoration Equivalent (RE)	Restoration Footage (LF) ¹	SOP Low End Ratio	SOP Low End Credits	Proposed Ratio	Proposed Credits	Proposed Credits - SOP Low End Credits	Buffer Width Credit Loss at Proposed Ratio	Buffer Width Credit Gain at Proposed Ratio	Total Proposed Credit ²
B	Upper Stick Elliott Creek- R3B	1,336	1018+25	1027+44	benching and bank stabilization 22% bed structures 20% bank structures 28% invasive species treatment supplemental planting	EII	889	2.5	356	1.5	593	237	0	28	621
	Upper Stick Elliott Creek- R4A	428	1038+11	1042+08	structures 55% bank grading 9% livestock exclusion 100% invasive species treatment supplemental planting	EII	397	2.5	159	1.5	265	106	-25	2	242
	Upper Stick Elliott Creek- R4B	113	1042+08	1043+21	structures 44% livestock exclusion 100% invasive species treatment supplemental planting	EII	113	2.5	45	1.5	75	30	-6	0	69
	Upper Stick Elliott Creek- R5	1,909	1043+77	1058+84	Priority 1/2 restoration w/structures 100% invasive species treatment planting	R	1,507	1.0	1,507	1.0	1507	0	0	89	1,596
	Upper Stick Elliott Creek- R6	1,036	1059+14	1069+83	Priority 1/2 restoration w/structures 100% livestock exclusion 100% invasive species treatment planting	R	1,069	1.0	1,069	1.0	1069	0	0	0	1,069
	Upper Stick Elliott Creek EC	N/A	1000+83	1002+89	SPSC 100% invasive species treatment supplemental planting	N/A	206	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	UT1 to Upper Stick Elliott Creek	50	1078+08	1078+80	benching and bank stabilization 100% structures 100% invasive species treatment supplemental planting	EII	72	2.5	29	1.5	48	19	-9	0	39
	UT2 to Upper Stick Elliott Creek	56	1080+00	1081+54	Priority 1 restoration w/structures 100% invasive species treatment planting	R	154	1.0	154	1.0	154	0	-10	0	144
	UT3 to Upper Stick Elliott Creek	107	1082+00	1083+18	Priority 1 restoration w/structures 100% invasive species treatment planting	R	118	1.0	118	1.0	118	0	0	0	118
	Upper Fletcher Creek- R1	1,493	1600+00	1615+71	benching 18% structures 18% livestock exclusion 100% invasive species treatment supplemental planting	EII	1,571	2.5	628	1.5	1047	419	-18	44	1,073
	Upper Fletcher Creek- R2	1,465	1616+02	1630+09	Priority 2 restoration w/structures 100% livestock exclusion 100% invasive species treatment planting	R	1,407	1.0	1,407	1.0	1407	0	-10	43	1,440
	Lower Fletcher Creek- R1	574	1641+28	1647+02	benching 70% structures 70% livestock exclusion 100% invasive species treatment supplemental planting	EI	574	1.5	383	1.0	574	191	-100	19	493
Lower Fletcher Creek- R2	467	1647+33	1651+60	benching 100% structures 100% livestock exclusion 100% invasive species treatment supplemental planting	EI	427	1.5	285	1.0	427	142	-1	38	464	
C	Lower Big Harris Creek- R1A	509	300+13	305+13	heavy enhancement in existing alignment w/structures and benching 100% livestock exclusion 100% supplemental planting 100%	EI	500	1.5	333	1.0	500	167	-58	15	457
	Lower Big Harris Creek- R1B	385	305+13	308+33	Priority 2 restoration w/structures 100% supplemental planting	R	320	1.0	320	1.0	320	0	0	13	333
	Lower Big Harris Creek- R2	987	308+33	318+00	Priority 2 restoration w/structures 100% supplemental planting	R	967	1.0	967	1.0	967	0	-2	127	1,092
	Lower Big Harris Creek - R3	414	318+00	322+14	structures 46% supplemental planting	EII	414	2.5	166	1.5	276	110	0	54	330
	UT1 to Lower Big Harris Creek	229	330+68	332+96	bank grading 31% structures 4% livestock exclusion 100% supplemental planting	EII	228	2.5	91	1.5	152	61	-64	0	88
	UT2 to Lower Big Harris Creek	511	334+20	338+60	heavy enhancement in and out of existing alignment w/structures 55% supplemental planting	EII	440	2.5	176	1.5	293	117	-49	0	244
	UT3 to Lower Big Harris Creek	99	341+69	342+87	channel realignment 42% bank grading 74% supplemental planting	P	118	10.0	12	10.0	12	0	-1	0	11
	UT4 to Lower Big Harris Creek	362	343+12	346+74	structures 3% supplemental planting	P	362	10.0	36	10.0	36	0	0	0	36
TOTAL EPHEMERAL STREAMS							5,402		0		0	0		0	0
TOTALS PERENNIAL AND INTERMITTENT STREAMS							34,161		20,280		26,718	6,438	-834	1,388	27,272
Component Summation															
Restoration Level	Stream (linear feet)	Wetland (sq ft)				Buffer (square feet)	Upland (acres)								
Restoration	10,071														
Enhancement	N/A														
Enhancement I	2,897														
Enhancement II	20,524														
Creation	N/A														
Wetland Rehabilitation	N/A														
Wetland Re-Establishment	N/A														
Preservation	669														
High Quality Preservation	N/A														

Notes:
 1. Existing and proposed lengths include only reach length located within the conservation easement.
 2. No direct credit for BMPs (BMP lengths reported for information only). Credits reported have been adjusted based on buffer width deviations from standard 50-foot buffer width.
 3. The sections of Royster Reach 2 and Scott Creek that are located underneath the existing overhead electric powerline have credits reduced by 100%.

Table 1: Summary of Changes to Mitigation Approach from Technical Proposal and Concept Plan to Mitigation Plan - Big Harris Creek Mitigation Site

	Technical Proposal Reach Name	Technical Proposal Approach	Stream Name	Concept Plan Reach Name	Concept Plan Proposed Management Activity	Mitigation Plan Design Reach	Mitigation Plan Management Activity	Reasons for Changes
Area A	16	R	Carroll Creek	Reach 1	R	Reach 1	Priority 2 R	no change
	30a, 30b, 30c	EII	Cornwell Creek	Reach 1	EII	Reach 1	EII	In response to the IRT's comments dated 8/2016, Cornwell Creek was divided into Reach 1 and Reach 2. The Mitigation Plan proposed the entirety of Cornwell Creek at EII. Reach 1 is proposed as EII, with no change from the Technical Proposal to the Concept Plan to the Mitigation Plan.
	30d	EII	Cornwell Creek	Reach 1	EII	Reach 2	EII	Cornwell Creek Reach 2 requires full restoration to connect the stream to UBHC. Wildlands proposes to classify and credit this work as EII, although it could be considered Restoration.
	N/A	N/A	UT1 to Cornwell Creek	-	-	Reach 1	EII	This stream was not delineated in the Technical Proposal or Concept Plan.
	24c	EI	Eaker Creek	Reach 1	EI	Reach 1	EI	no change
	17, 18	EII	Lower Stick Elliot Creek	Reach 1	EII	Reach 1	EII	no change
	5a, 5b	BMP	Royster Creek	BMP 1	BMP	Reach 1	Priority 2 R	This reach was not identified as jurisdictional in the Technical Proposal or Concept Plan. After assessment, it was determined to be intermittent and due to the perched culvert, restoration was appropriate.
	5c, 5d, 6, 7, 8	EII		Reach 1	EII	Reach 2	EII	no change
	3b, 3c	EII	Scism Creek	Reach 1	EII	Reach 1	EII	no change
	15b	R	Scott Creek	Reach 1	R	Reach 1	R	no change
	26, 27a, 27b	EII, R	Upper Big Harris Creek	Reach 1	EII	Reach 1	EII	The Technical Proposal categorized work on this reach as a combination of EII and R. The Concept Plan and Mitigation Plan consolidated this work into the conservative EII credit category.
	24, 25	EII		Reach 2	EII	Reach 2A Reach 2B	R	After a more detailed assessment walk for this reach, over 75% of the banks required treatment, the stream was incised, several torturous meanders needed to be corrected, and habitat features needed to be installed. During the Mitigation Plan development, we determined that restoration would be more prudent in encouraging recovery of this section.
	1a1, 1a2, 1b	EII, R		Reach 3	EII	Reach 3	EII	After a more detailed assessment walk for this reach, over 60% of the stream length required benching to provide floodplain access, while over 85% of the reach length required some form of bank stabilization. This work was categorized and credited as EII in the Mitigation Plan, but could qualify as EI.
	1b, 2, 2-1	EII, R		Reach 4	R	Reach 4	R	The Technical Proposal categorized work on this reach as a combination of EII and R. The Concept Plan and Mitigation Plan confirmed that Restoration would be necessary throughout the reach limits.
	2-1, 2-2, 2-3, 2-4	EII		Reach 5	EII	Reach 5	EII	no change
	13, 14a, 14a-2, 14a1, 14b	EII		Reach 6	EII	Reach 6A	EII	UBH Reach 6 was slated for EII in the Concept Plan. In the Mitigation Plan, the approach was labeled EII. As a result of the IRT's comments 8/2016, Wildlands proposes to split Reach 6 into Reach 6A and 6B. The upstream portion of Reach 6 (now Reach 6A) requires benches on over 50% of its length to provide floodplain access, and over 75% of its length requires some form of bank stabilization. Wildlands has classified and credited this work as EII in the Mitigation Plan, but this reach could be classified as EI.
						Reach 6B	EII	Wildlands proposes to split Reach 6 in Reach 6A and Reach 6B for the revised Mitigation Plan as a result of IRT comments 8/2016. No change in approach.
28b	EII	UT1 Upper Big Harris Creek		Reach 1	EII	Reach 1	EII	no change
29	EII	UT2 Upper Big Harris Creek		Reach 1	EII	Reach 1	EII	no change
25a	P	UT3 Upper Big Harris Creek		Reach 1	P	Reach 1	P	no change
25b	P	UT4 Upper Big Harris Creek	Reach 1	P	Reach 1	P	no change	
Area B	31a, 31b, 31c	EII, R	Upper Fletcher Creek	Reach 1	EII	Reach 1	EII	The Technical Proposal categorized work on this reach as a combination of EII and R. The Concept Plan and Mitigation Plan confirmed that EII is appropriate throughout the reach limits.
	31c, 31d	EII, R		Reach 2	R	Reach 2	R	The Technical Proposal categorized work on this reach as a combination of EII and R. The Concept Plan and Mitigation Plan confirmed that Restoration would be necessary throughout the reach limits.
	20	EI	Lower Fletcher Creek	Reach 1	R	Reach 1	EI	EI was proposed during the Technical Proposal and Restoration was proposed during the Concept Plan, but during Mitigation Plan development it was determined that pattern changes for the reach are not practical due to amount of excavation required (Priority 2), and are not necessary due to channel condition. Dimension and profile changes will be made to narrow the existing over widened channel and provide a floodplain bench.
	21a, 21b	EI		Reach 2	R	Reach 2	EI	EI was proposed during the Technical Proposal and Restoration was proposed during the Concept Plan, but during Mitigation Plan development it was determined that pattern changes for the reach are not practical due to amount of excavation required (Priority 2), presence of bedrock, and are not necessary due to channel condition. Dimension and profile changes will be made to narrow the existing over widened channel and provide a floodplain bench.
	36a	BMP	Upper Stick Elliott Creek			BMP	BMP	This reach was shortened due to jurisdictional limits of Reach 1 being moved upstream.
	36b	EII		BMP	BMP	Reach 1	R	A head cut is migrating upstream so the jurisdictional call is further upstream in the Mitigation Plan than in the Concept Plan, shortening the length of the BMP proposed management activity and increasing the level of intervention necessary. Restoration is feasible in the jurisdictional area and this reach is now labeled Reach 1 in the Mitigation Plan.
	36b, 36c, 34	EII, EI		Reach 1	EII	Reach 2A Reach 2B	EII	The reach labeled as Reach 1 in the Concept Plan is labeled as Reach 2 in the Mitigation Plan. Based on IRT comments from 8/2016, this Reach 2 was split into Reach 2A and Reach 2B. The approach for both Reaches 2A and 2B remains EII, same from the Concept Plan as the Mitigation Plan.
	34	EI		Reach 2	EII	Reach 3A	EII	The reach labeled as Reach 2 in the Concept Plan is labeled as Reach 3 in the Mitigation Plan. Based on IRT comments from 8/2016, this Reach 3 was split into Reach 3A and 3B. The upstream portion of Concept Plan Reach 2 (now Mitigation Plan Reach 3A) is an active head cut. During evaluation for the Mitigation Plan, enhancement with structures, outer bend bank grading, and portions of alignment adjustment was determined to be an appropriate treatment approach to encourage recovery. This work could be classified as EI but we have classified and credited as EII. No change from the Concept Plan treatment approach.
	34, 34a	EI		Reach 2	EII	Reach 3B	EII	The downstream portion of Concept Plan Reach 2 (now Mitigation Plan Reach 3B) requires benches on over 20% of its length to provide floodplain access, and requires habitat diversification and bank stabilization. This work could be classified as EI but we have classified and credited as EII. No change from the Concept Plan treatment approach.
	32a	EII		Reach 3	EI	Reach 4A Reach 4B	EII	The reach labeled as Reach 3 in the Concept Plan is labeled as Reach 4A and 4B in the Mitigation Plan. The reach was not as degraded as previously thought during the Concept Plan development, as indicated by little active bed degradation and incision, and the formation of developing lateral benches. Significant dimension and profile changes are not needed.
	32b, 22	R		Reach 4	R	Reach 5	R	The reach labeled as Reach 4 in the Concept Plan is labeled as Reach 5 in the Mitigation Plan. There is no change from the Concept Plan approach of Restoration to the Mitigation Plan approach of Restoration.
	23	R		Reach 5	R	Reach 6	R	The reach labeled as Reach 5 in the Concept Plan is labeled as Reach 6 in the Mitigation Plan. There is no change from the Concept Plan approach of Restoration to the Mitigation Plan approach of Restoration.
	N/A	N/A		UT1 Upper Stick Elliott Creek	-	-	Reach 1	EII

	Technical Proposal Reach Name	Technical Proposal Approach	Stream Name	Concept Plan Reach Name	Concept Plan Proposed Management Activity	Mitigation Plan Design Reach	Mitigation Plan Management Activity	Reasons for Changes
	37b	R	UT2 Upper Stick Elliott Creek	Reach 1	R	Reach 1	R	no change
	N/A	N/A	UT3 Upper Stick Elliott Creek	-	-	Reach 1	R	This stream was not delineated in the Technical Proposal or Concept Plan.
	38a	R	Bridges Creek	Reach 1	R	Reach 1	R	Bridges Creek was proposed as one reach, all Restoration in the Concept Plan. For the Mitigation Plan, Bridges Creek was divided into Reach 1 and Reach 2. In the Mitigation Plan, Reach 1 has a treatment approach of Restoration, same as the Concept Plan.
	38b	R				Reach 2	EII	The downstream portion of Bridges Creek is less incised, floodplain connection is moderate, and the valley is confined. Therefore, significant pattern changes are neither required or practical. Efforts will focus on providing grade control and bank sloping. Reach 2 was proposed as Restoration with all of Bridges Creek in the Technical Proposal and Concept Plan and is proposed as EII in the Mitigation Plan.
	N/A	N/A	UT1 to Bridges Creek	-	-	Reach 1	R	UT1 to Bridges Creek was not delineated in the Technical Proposal or Concept Plan.
	35a, 35b	R	Elliott Creek	Reach 1	R	Reach 1	EI	While the reach is rather degraded, significant pattern changes are not practical due to the valley confinement, and are not considered needed due to the development of bankfull bench and floodplain features within the larger eroded channel. Therefore, efforts will focus on localized pattern changes to address tight radii of curvature, and to pull the stream away from severely eroding banks to form stable bench features. This work was categorized as EI in the Mitigation Plan.
	39	BMP	UT1 to Elliott Creek	BMP	BMP	Reach 1	EI	The reach was not originally considered jurisdictional during the Technical Proposal and Concept Plan, but was confirmed as a jurisdictional stream during the site delineation. Efforts will focus on stabilization in the current alignment, bank grading, and creating a stable profile tie-in to Elliott Creek.
Area C	40a	EI	Lower Big Harris Creek	Reach 1	R	Reach 1A	EI	In the Concept Plan, all of Reach 1 was classified as Restoration. In the Mitigation Plan, this reach was divided into Reach 1A, 1B, and 2. On Reach 1A of the Mitigation Plan, an easement constraint on the left bank prevented full Restoration and so the approach was categorized as EI.
	40a	EI				Reach 1B	R	In the Technical Proposal, this reach was proposed for EI due to adjacent constraints that might prevent full Restoration. In the Concept Plan, all of Reach 1 was classified as Restoration. In the Mitigation Plan, this reach was divided into Reach 1A, 1B, and 2. Restoration is the approach on Mitigation Plan Reach 1B, same as for the Concept Plan.
	40a, 40b, 44	EII, EI, R				Reach 2	R	In the Concept Plan, all of Reach 1 was classified as Restoration. In the Mitigation Plan, this reach was divided into Reach 1A, 1B, and 2. Restoration is the approach on Mitigation Plan Reach 2, same as for the Concept Plan.
	44	EII				Reach 2	EII	Reach 3
	41	EII	UT1 Lower Big Harris Creek	Reach 1	EII	Reach 1	EII	no change
	42	EII	UT2 Lower Big Harris Creek	Reach 1	EII	Reach 1	EII	no change
	43	EII	UT3 Lower Big Harris Creek	Reach 1	EII	Reach 1	P	This reach was expected to require EII stabilization in the Technical Proposal and Concept Plan, but upon further investigation during the development of the Mitigation Plan, no significant intervention is necessary and minor grading will be used to tie the reach into LBH in a stable manner. This work is classified as Preservation in the Mitigation Plan.
	N/A	N/A	UT4 Lower Big Harris Creek	-	-	Reach 1	P	The reach was not originally identified as a jurisdictional feature, but was confirmed as a jurisdictional stream during the site delineation. No intervention needed. This reach is classified as Preservation in the Mitigation Plan.

9/6/2016

Upper Big Harris Creek

Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	E2	2,556	1.5	1704	-32.6	331.1	298.5	199.0
Reach 2	R	934	1.0	934	0.0	126.4	126.4	126.4
Reach 3	E2	870	1.5	580	-1.2	151.4	150.1	100.1
Reach 4	R	1,039	1.0	1039	0.0	11.2	11.2	11.2
Reach 5	E2	845	1.5	563	-2.9	64.2	61.3	40.9
Reach 6A	E2	855	1.5	570	-16.3	18.4	2.2	1.5
Reach 6B	E2	1,403	1.5	935	-44.3	29.7	-14.6	-9.7
UT1	E2	84	1.5	56	-20.0	0.0	-20.0	-13.3
UT2	E2	97	1.5	65	-9.0	0.0	-9.0	-6.0
UT3	P	105	10.0	11	0.0	0.0	0.0	0.0
UT4	P	84	10.0	8	-6.9	0.0	-6.9	-0.7

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	2556	104+25	105+72	-20.0%	147		-29.4	-32.6	172.4	139.8	
	2556	105+72	108+13	6.0%	241		14.5				
		108+13	109+07	8.0%	94		7.5				
		109+07	123+29	10.0%	1422		142.2				
		123+29	123+90	6.0%	61		3.7				
		123+90	125+21	3.5%	131		4.6				
		125+21	127+74	0.0%	253		0.0				
		127+74	128+17	-7.5%	43		-3.2				
		128+17	129+81	0.0%	164		0.0				
		Reach 2	934	129+81	131+82	3.5%	201		7.0	0.0	62.2
934	131+82		132+85	6.0%	103		6.2				
	132+85		133+75	8.0%	90		7.2				
	133+75		137+93	10.0%	418		41.8				
	137+93		139+15	0.0%	122		0.0				
Easement Break											
Reach 3	870	139+75	140+54	3.5%	79		2.8	0.0	37.4	37.4	
	870	140+54	144+17	6.0%	363		21.8				
		144+17	144+92	3.5%	75		2.6				
		144+92	145+53	0.0%	61		0.0				
		145+53	148+45	3.5%	292		10.2				
Easement Break											
Reach 4	1039	148+76	156+64	0.0%	788		0.0	0.0	4.8	4.8	
	1039	156+64	158+02	3.5%	138		4.8				
		158+02	159+15	0.0%	113		0.0				
Easement Break											
Reach 5	845	159+58	160+25	0.0%	67		0.0	-2.9	19.0	16.1	
	845	160+25	160+67	-2.5%	42		-1.1				
		160+67	161+18	0.0%	51		0.0				
		161+18	163+25	6.0%	207		12.4				
		163+25	164+26	0.0%	101		0.0				
		164+26	164+98	-2.5%	72		-1.8				
		164+98	165+37	0.0%	39		0.0				
		165+37	167+24	3.5%	187		6.5				
		167+24	168+03	0.0%	79		0.0				
Easement Break											
Reach 6A	855	168+63	169+97	0.0%	134		0.0	-5.3	8.3	3.0	
	855										
Easement Break											
Reach 6B	1403	170+29	172+66	3.5%	237		8.3				
		172+66	173+29	0.0%	63		0.0				
		173+29	174+00	-7.5%	71		-5.3				
		174+00	177+50	0.0%	350		0.0				
Easement Break											
Reach 6B	1403	183+71	186+37	0.0%	266		0.0				
		186+37	188+78	10.0%	241		24.1				Outside of CE
		188+78	189+72	6.0%	94		5.6				
		189+72	190+53	0.0%	81		0.0				
		190+53	191+84	-15.0%	131		-19.7				

Upper Big Harris Creek, UT1-UT4
Detailed Credit Calculation

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost			Total Credits Gained/Lost	Notes
Reach 1	2556	104+25	105+33	6.0%		108	6.5	0.0	158.7	158.7	
	2556	105+33	110+54	10.0%		521	52.1				
		110+54	116+30	6.0%		576	34.6				
		116+30	120+82	3.5%		452	15.8				
		120+82	122+56	6.0%		174	10.4				
		122+56	123+42	3.5%		86	3.0				
		123+42	126+66	6.0%		324	19.4				
		126+66	127+49	3.5%		83	2.9				
127+49	129+81	6.0%		232	13.9						
Reach 2	934	129+81	130+23	6.0%		42	2.5	0.0	64.2	64.2	
	934	130+23	132+96	10.0%		273	27.3				
		132+96	133+38	6.0%		42	2.5				
		133+38	135+97	8.0%		259	20.7				
		135+97	139+15	3.5%		318	11.1				
Easement Break											
Reach 3	870	139+75	140+72	0.0%		97	0.0	-1.2	114.0	112.7	
	870	140+72	171+63	3.5%		3091	108.2				
		171+63	144+10	0.0%		-2753	0.0				
		144+10	145+75	3.5%		165	5.8				
		145+75	146+67	0.0%		92	0.0				
		146+67	147+16	-2.5%		49	-1.2				
		147+16	148+45	0.0%		129	0.0				
Easement Break											
Reach 4	1039	148+76	157+32	0.0%		856	0.0	0.0	6.4	6.4	
	1039	157+32	159+15	3.5%		183	6.4				
Easement Break											
Reach 5	845	159+58	160+65	3.5%		107	3.7	0.0	45.2	45.2	
	845	160+65	161+69	6.0%		104	6.2				
		161+69	163+01	3.5%		132	4.6				
		163+01	163+75	6.0%		74	4.4				
		163+75	165+65	10.0%		190	19.0				
		165+65	166+46	6.0%		81	4.9				
		166+46	167+12	3.5%		66	2.3				
		167+12	168+03	0.0%		91	0.0				
Easement Break											
Reach 6A	855	168+63	169+97	0.0%		134	0.0	-10.9	10.2	-0.8	
	855	Easement Break									
		170+29	171+06	0.0%		77	0.0				
		171+06	171+35	-2.5%		29	-0.7				
		171+35	172+58	0.0%		123	0.0				
		172+58	175+48	3.5%		290	10.2				
175+48	176+14	0.0%		66	0.0						
176+14	177+50	-7.5%		136	-10.2						
Reach 6B	1403	177+50	177+63	-7.5%		13	-1.0	-24.7	0.0	-24.7	
	1403	177+63	179+59	0.0%		196	0.0				
		179+59	180+39	-2.5%		80	-2.0				
		180+39	181+73	0.0%		134	0.0				
		181+73	182+25	-5.0%		52	-2.6				
		182+25	183+40	0.0%		115	0.0				
Easement Break											
		183+71	187+76	0.0%		405	0.0				
		187+76	188+31	-5.0%		55	-2.8				
		188+31	189+53	-10.0%		122	-12.2				
		189+53	190+36	-5.0%		83	-4.2				
		190+36	191+84	0.0%		148	0.0				
UT1	84	197+13	197+97	0.0%	84		0.0	-20.0	0.0	-20.0	
		197+13	197+53	-50.0%		40	-20.0				
		197+53	197+97	0.0%		44	0.0				
UT2	97	200+42	200+60	-50.0%	18		-9.0	-9.0	0.0	-9.0	
		200+60	201+39	0.0%	79		0.0				
		200+42	201+39	0.0%		97	0.0				
UT3	105	202+00	203+05	0.0%	105		0.0	0.0	0.0	0.0	
		202+00	203+05	0.0%		105	0.0				
UT4	84	204+00	204+46	-15.0%	46		-6.9	-6.9	0.0	-6.9	
		204+46	204+84	0.0%	38		0.0				
		204+00	204+84	0.0%		84	0.0				

Cornwell Creek, UT1
Detailed Credit Calculation

Cornwell Creek								
Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	E2	2,144	1.5	1430	-60.8	123.9	63.2	42.1
Reach 2	R			#DIV/0!	0.0	0.0	0.0	
UT1	E2	78	1.5	52	0.0	0.0	0.0	0.0

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes		
Reach 1	2144	403+44	404+13	0.0%	69		0.0	-15.0	60.0	45.0			
	2560		404+13	404+74	3.5%	61		2.1					
			404+74	405+71	8.0%	97		7.8					
			405+71	406+35	3.5%	64		2.2					
			406+35	407+24	0.0%	89		0.0					
			407+24	410+79	3.5%	355		12.4					
			410+79	412+15	6.0%	136		8.2					
			412+15	413+13	10.0%	98		9.8					
			413+13	414+49	8.0%	136		10.9					
			414+49	415+29	3.5%	80		2.8					
			415+29	415+59	-50.0%	30		-15.0					
			415+59	419+52	0.0%	393		0.0					
		Easement Break											
				419+84	423+49	0.0%	365		0.0				
		423+49	424+58	3.5%	109		3.8						
		423+49	425+20	0.0%	171		0.0						
Reach 2		425+20	428+27	0.0%	307		0.0	0.0	0.0	0.0			
Reach 1	2144	403+44	405+17	-25.0%		173	-43.3	-45.8	63.9	18.1			
	2451		405+17	407+47	0.0%		230	0.0					
			407+47	407+88	-5.0%		41	-2.1					
			407+88	408+43	0.0%		55	0.0					
			408+43	412+52	3.5%		409	14.3					
			412+52	412+70	-2.5%		18	-0.5					
			412+70	414+31	3.5%		161	5.6					
			414+31	414+83	6.0%		52	3.1					
			414+83	415+90	10.0%		107	10.7					
			415+90	417+39	8.0%		149	11.9					
			417+39	419+52	6.0%		213	12.8					
		Easement Break											
				419+84	421+39	3.5%		155	5.4				
		421+39	425+20	0.0%		381	0.0						
Reach 2		425+20	428+27	0.0%		307	0.0	0.0	0.0	0.0			
UT1		430+27	431+05	0.0%	78	78	0	0.0	0.0	0.0			

Eaker Creek, UT1
Detailed Credit Calculation

Eaker Creek

Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	E1	134	1	134	0.0	0.0	0.0	0.00

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	134	513+11	514+45	0.0%	134		0.0	0.0	0.0	0.0	
Reach 1	134	513+11	514+45	0.0%		134	0.0	0.0	0.0	0.0	

Scism Creek
Detailed Credit Calculation

Scism Creek								
Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	E2	1,189	1.5	793	-17.7	35.6	18.0	12.0

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	1189	606+92	609+56	3.5%	264		9.2	0.0	31.0	31.0	
	1189	609+56	610+94	6.0%	138		8.3				
		610+94	612+20	3.5%	126		4.4				
		612+20	614+36	0.0%	216		0.0				
		614+36	615+75	3.5%	139		4.9				
		615+75	616+81	0.0%	106		0.0				
		616+81	618+02	3.5%	121		4.2				
		618+02	618+81	0.0%	79		0.0				
	Reach 1	1189	606+92	608+42	0.0%		150	0.0	-17.7	4.6	-13.1
Reach 1	1189	608+42	609+73	3.5%		131	4.6				
		609+73	612+00	-5.0%		227	-11.4				
		612+00	614+40	0.0%		240	0.0				
		614+40	615+28	-2.5%		88	-2.2				
		615+28	617+20	0.0%		192	0.0				
		617+20	618+02	-5.0%		82	-4.1				
		618+02	618+81	0.0%		79	0.0				

Royster Creek
Detailed Credit Calculation

Royster Creek

Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	R	459	1	459	-8.2	3.4	-4.8	-4.8
Reach 2	E2	3,170	1.5	2113	-49.0	91.0	42.0	28.0

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	459	802+54	806+16	0.0%	362		0.0	0.0	3.4	3.4	
	459	806+16	807+13	3.5%	97		3.4				
Easement Break											
Reach 2	3170	807+40	809+91	3.5%	251		8.8	-26.9	44.2	17.3	
	3170	809+91	810+96	6.0%	105		6.3				
		810+96	812+49	3.5%	153		5.4				
		812+49	820+86	0.0%	837		0.0				
		820+86	821+79	-5.0%	93		-4.7				
		821+79	825+97	0.0%	418		0.0				
		825+97	827+39	3.5%	142		5.0				
		827+39	828+48	0.0%	109		0.0				
		828+48	829+67	3.5%	119		4.2				
		829+67	829+99	0.0%	32		0.0				
		829+99	830+28	-5.0%	29		-1.5				
		830+28	830+39	0.0%	11		0.0				
		830+39	830+55	-50.0%	16		-8.0				Maintenance Corridor
		830+55	830+78	0.0%	23		0.0				
		830+78	832+96	3.5%	218		7.6				
Easement Break											
		833+26	833+97	-15.0%	71		-10.7				
		833+97	835+94	0.0%	197		0.0				
		835+94	836+37	-5.0%	43		-2.2				
		836+37	836+94	0.0%	57		0.0				
		836+94	837+95	3.5%	101		3.5				
		837+95	838+53	6.0%	58		3.5				
		838+53	839+40	0.0%	87		0.0				
Reach 1	459	802+54	806+31	0.0%		377	0.0	-8.2	0.0	-8.2	
	459	806+31	807+13	-10.0%		82	-8.2				
Easement Break											
Reach 2	3170	807+40	810+79	0.0%		339	0.0	-22.1	46.4	24.3	
	3170	810+79	815+81	3.5%		502	17.6				
		815+81	820+46	0.0%		465	0.0				
		820+46	824+58	3.5%		412	14.4				
		824+58	824+90	-5.0%		32	-1.6				
		824+90	827+96	3.5%		306	10.7				
		827+96	830+39	0.0%		243	0.0				
		830+39	830+55	-50.0%		16	-8.0				Maintenance Corridor
		830+55	831+09	0.0%		54	0.0				
		831+09	832+34	-10.0%		125	-12.5				
		832+34	832+96	0.0%		62	0.0				
Easement Break											
		833+26	834+33	3.5%		107	3.7				
		834+33	839+40	0.0%		507	0.0				

Lower Stick Elliott Creek
Detailed Credit Calculation

Lower Stick Elliott Creek								
Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	E2	1,389	1.5	926	-119.8	47.8	-72.0	-48.0

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits	Notes
Reach 1	1389	1101+13	1102+48	-25.0%	135		-33.8	-33.8	22.9	-10.9	
	1389	1102+48	1103+67	0.0%	119		0.0				
		1103+67	1105+95	6.0%	228		13.7				
		1105+95	1108+57	3.5%	262		9.2				
		1108+57	1113+09	0.0%	452		0.0				
Easement Break											
		1113+41	1115+34	0.0%	193		0.0				
Reach 1	1389	1101+13	1102+85	-50.0%		172	-86.0	-86.0	24.9	-61.1	
	1389	1102+85	1103+99	6.0%		114	6.8				
		1103+99	1107+92	0.0%		393	0.0				
		1107+92	1110+93	6.0%		301	18.1				
		1110+93	1113+09	0.0%		216	0.0				
Easement Break											
		1113+41	1115+34	0.0%		193	0.0				

Scott Creek
Detailed Credit Calculation

Scott Creek								
Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	R	662	1	662	-16.0	35.4	19.4	19.4

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	662	1210+12	1210+86	3.5%	74		2.6	-8.0	19.7	11.7	
	662	1210+86	1211+02	-50.0%	16		-8.0				Maintenance Corridor
		1211+02	1213+42	6.0%	240		14.4				
		1213+42	1214+20	3.5%	78		2.7				
		1214+20	1216+74	0.0%	254		0.0				
Reach 1	662	1210+12	1210+86	3.5%		74	2.6	-8.0	15.7	7.7	
	662	1210+86	1211+02	-50.0%		16	-8.0				Maintenance Corridor
		1211+02	1211+94	0.0%		92	0.0				
		1211+94	1212+80	3.5%		86	3.0				
		1212+80	1213+67	0.0%		87	0.0				
		1213+67	1215+29	3.5%		162	5.7				
		1215+29	1216+02	6%		73	4.4				
		1216+02	1216+74	0%		72	0.0				

Carroll Creek
Detailed Credit Calculation

Carroll Creek								
Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	R	595	1	595	-56.2	0.0	-56.2	-56.2

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	595	1301+68	1303+64	-15.0%	196		-29.4	-31.0	0.0	-31.0	
	595	1303+64	1304+51	0.0%	87		0.0				
		1304+51	1304+83	-5.0%	32		-1.6				
		1304+83	1307+63	0.0%	280		0.0				
Reach 1	595	1301+68	1302+87	-15.0%		119	-17.9	-25.2	0.0	-25.2	
	595	1302+87	1303+59	0.0%		72	0.0				
		1303+59	1304+32	-10.0%		73	-7.3				
		1304+32	1307+63	0.0%		331	0.0				

Lower Big Harris Creek

Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1a	E1	500	1	500	-58.3	14.9	-43.3	-43.3
	R	320	1	320	0.0	13.0	13.0	13.0
Reach 1b	R	967	1	967	-1.9	126.6	124.7	124.7
Reach 2	E2	414	1.5	276	0.0	80.9	80.9	53.9
UT1	E2	228	1.5	152	-96.3	0.0	-96.3	-64.2
UT2	E2	440	1.5	293	-74.0	0.0	-74.0	-49.3
UT3	P	118	10	12	-11.8	0.0	-11.8	-1.2
UT4	P	362	10	36	0.0	0.0	0.0	0.0

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1a	500	300+13	302+31	-25.0%	218		-54.5	-54.5	5.9	-48.6	
	500		302+31	302+95	0.0%	64		0.0			
			302+95	304+64	3.5%	169		5.9			
			304+64	305+13	0.0%	49		0.0			
Reach 1b	320	305+13	306+17	0.0%	104		0.0	0.0	13.0	13.0	
	320	306+17	308+33	6.0%	216		13.0				
Reach 2	967	308+33	310+53	0.0%	220		0.0	0.0	72.5	72.5	
	967		310+53	311+09	6.0%	56		3.4			
		311+09	318+00	10.0%	691		69.1				
		318+00	321+18	10.0%	318		31.8	0.0	39.5	39.5	
Reach 3	414	321+18	322+14	8.0%	96		7.7				
	500	300+13	301+37	0.0%		124	0.0	-3.8	9.0	5.3	
301+37		302+87	6.0%		150	9.0					
302+87		303+44	0.0%		57	0.0					
303+44		304+19	-5.0%		75	-3.8					
304+19		305+13	0.0%		94	0.0					
Reach 1b	320	305+13	308+33	0.0%		320	0.0	0.0	0.0	0.0	
Reach 2	967	308+33	309+24	0.0%		91	0.0	-1.9	54.2	52.3	
	967		309+24	309+62	-5.0%		38	-1.9			
			309+62	310+40	0.0%		78	0.0			
			310+40	311+82	6.0%		142	8.5			
			311+82	313+00	0.0%		118	0.0			
			313+00	313+67	3.5%		67	2.3			
			313+67	318+00	10.0%		433	43.3			
Reach 3	414	318+00	322+14	10.0%		414	41.4	0.0	41.4	41.4	
UT1	228	330+68	331+29	-50.0%	61		-30.5	-96.3	0.0	-96.3	
	228		331+29	332+07	-25.0%	78		-19.5			
			332+07	332+96	0.0%	89		0.0			
			330+68	332+53	-25.0%		185	-46.3			
			332+53	332+96	0.0%		43	0.0			
UT2	440	334+20	335+98	-25.0%	178		-44.5	-74.0	0.0	-74.0	
	440		335+98	338+60	0.0%	262		0.0			
			334+20	335+38	-25.0%		118	-29.5			
			335+38	338+60	0.0%		322	0.0			
UT3	118	341+69	342+87	-10.0%	118		-11.8	-11.8	0.0	-11.8	
		341+69	342+87	0.0%		118	0.0				
UT4	362	343+12	346+74	0.0%	362		0.0	0.0	0.0	0.0	
		343+12	346+74	0.0%		362	0.0				

Upper Fletcher Creek
Detailed Credit Calculation

Upper Fletcher Creek								
Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	E2	1571	1.5	1047	-26.5	65.7	39.1	26.1
Reach 2	R	1407	1	1407	-10.0	43.0	33.0	33.0

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	1571	1600+00	1602+31	0.0%	231		0.0	0.0	65.7	65.7	
	1571	1602+31	1606+10	6.0%	379		22.7				
		1606+10	1608+94	3.5%	284		9.9				
		1608+94	1611+28	0.0%	234		0.0				
		1611+28	1612+93	6.0%	165		9.9				
		1612+93	1614+53	10.0%	160		16.0				
		1614+53	1615+71	6.0%	118		7.1				
Easement Break											
Reach 2	1407	1616+02	1618+18	0.0%	216		0.0	0.0	22.0	22.0	
	1407	1618+18	1619+27	3.5%	109		3.8				
		1619+27	1620+39	0.0%	112		0.0				
		1620+39	1623+70	3.5%	331		11.6				
		1623+70	1628+31	0.0%	461		0.0				
		1628+31	1630+09	3.5%	178		6.2				
Reach 1	1571	1600+00	1601+32	-10.0%		132	-13.2	-26.5	0.0	-26.5	
1571	1601+32	1602+79	0.0%			147	0.0				
	1602+79	1603+72	-7.5%			93	-7.0				
	1603+72	1605+15	0.0%			143	0.0				
	1605+15	1605+51	-2.5%			36	-0.9				
	1605+51	1612+02	0.0%			651	0.0				
	1612+02	1612+54	-5.0%			52	-2.6				
	1612+54	1613+88	0.0%			134	0.0				
	1613+88	1614+26	-7.5%			38	-2.9				
	1614+26	1615+71	0.0%			145	0.0				
Easement Break											
Reach 2	1407	1616+02	1619+22	0.0%		320	0.0	-10.0	21.0	11.0	
	1407	1619+22	1620+79	6.0%		157	9.4				
		1620+79	1621+60	0.0%		81	0.0				
		1621+60	1624+97	3.5%		337	11.8				
		1624+97	1629+05	0.0%		408	0.0				
		1629+05	1630+09	-10.0%		104	-10.4				

Upper Stick Elliott Creek
Detailed Credit Calculation

Upper Stick Elliott Creek								
Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	R	409	1	409	-71.4	16.1	-55.3	-55.3
Reach 2a	E2	471	1.5	314	-28.9	36.0	7.1	4.7
Reach 2b	E2		1.5	0	-3.5	3.4	0.0	0.0
Reach 3a	E2	315	1.5	210	0.0	34.9	34.9	23.2
Reach 3b	E2	889	1.5	593	0.0	42.6	42.6	28.4
Reach 4a	E2	397	1.5	265	-37.3	3.6	-34.0	-22.7
Reach 4b	E2	113	1.5	75	-8.5	0.0	-8.5	-5.7
Reach 5	R	1507	1	1507	0.0	89.1	89.1	89.1
Reach 6	R	1069	1	1069	0.0	0.0	0.0	0.0
UT1	E2	72	1.5	48	-13.0	0.0	-13.0	-8.7
UT2	R	154	1	154	-10.3	0.0	-10.3	-10.3
UT3	R	118	1	118	0.0	0.0	0.0	0.0

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	409	1002+89	1004+53	-15.0%	164		-24.6	-63.8	0.0	-63.8	
	409	1004+53	1005+14	-50.0%	61		-30.5				
		1005+14	1005+72	-10.0%	58		-5.8				
		1005+72	1006+40	0.0%	68		0.0				
		1006+40	1006+98	-5.0%	58		-2.9				
Reach 2a	471	1006+98	1008+15	-5.0%	117		-5.9	-28.9	0.0	-28.9	
	471	1008+15	1009+05	0.0%	90		0.0				
		1009+05	1010+84	-10.0%	179		-17.9				
Easement Break											
		1011+15	1011+84	-7.5%	69		-5.2				
		1011+84	1012+00	0.0%	16		0.0				
Reach 2b	310	1012+00	1013+22	0.0%	122		0.0	-2.8	0.0	-2.8	
	310	1013+22	1014+34	-2.5%	112		-2.8				
		1014+34	1015+10	0.0%	76		0.0				
Reach 3a	315	1015+10	1018+25	3.5%	315		11.0	0.0	11.0	11.0	
Reach 3b	889	1018+25	1019+47	3.5%	122.00		4.3	0.0	23.6	23.6	
	889	1019+47	1022+29	0.0%	282		0.0				
Easement Break											
		1022+59	1024+43	3.5%	184		6.4				
		1024+43	1025+92	0.0%	149		0.0				
		1025+92	1026+86	10.0%	94		9.4				
		1026+86	1027+44	6.0%	58		3.5				
Easement Break											
Reach 4a	397	1038+11	1039+36	0.0%	125		0.0	-27.2	0.0	-27.0	
	397	1039+36	1042+08	-10.0%	272		-27.2				
Reach 4b	113	1042+08	1043+21	-7.5%	113		-8.5	-8.5	0.0	-8.5	
Easement Break											
Reach 5	1507	1043+77	1044+42	0.0%	65		0.0	0.0	89.1	89.1	
	1507	1044+42	1052+57	10.0%	815		81.5				
		1052+57	1054+73	3.5%	216		7.6				
		1054+73	1058+84	0.0%	411		0.0				
Easement Break											
Reach 6	1069	1059+14	1069+83	0.0%	1069		0.0	0.0	0.0	0.0	
Reach 1	409	1002+89	1003+90	-7.5%		101	-7.6	-7.6	16.1	8.5	
	409	1003+90	1004+66	0.0%		76	0.0				
		1004+66	1006+44	6.0%		178	10.7				
		1006+44	1006+98	10.0%		54	5.4				
Reach 2a	471	1006+98	1008+04	10.0%		106	10.6	0.0	36.0	36.0	
	471	1008+04	1010+84	8.0%		280	22.4				
Easement Break											
		1011+15	1012+00	3.5%		85	3.0				
Reach 2b	310	1012+00	1012+13	3.5%		+13	0.5	-0.7	3.4	2.8	
	310	1012+13	1012+51	0.0%		38	0.0				
		1012+51	1012+77	-2.5%		26	-0.7				
		1012+77	1014+25	0.0%		148	0.0				
		1014+25	1015+10	3.5%		85	3.0				
Reach 3a	315	1015+10	1016+40	3.5%		130	4.6	0.0	23.8	23.8	
	315	1016+40	1018+18	0.0%		178	0.0				
		1018+18	1018+25	3.5%		7	0.2				
Reach 3b	889	1018+25	1022+29	3.5%		404	14.1	0.0	19.0	19.0	
Easement Break											
	889	1022+59	1026+04	0.0%		345	0.0				
		1026+04	1027+44	3.5%		140	4.9				
Easement Break											
Reach 4a	397	1038+11	1039+12	-10.0%		101	-10.1	-10.1	3.6	-7.0	
	397	1039+12	1041+06	0.0%		194	0.0				
		1041+06	1042+08	3.5%		102	3.6				
Reach 4b	113	1042+08	1043+21	0.0%		113	0.0	0.0	0.0	0.0	
Easement Break											
Reach 5	1507	1043+77	1058+84	0.0%		1507	0.0	0.0	0.0	0.0	
Easement Break											
Reach 6	1069	1059+14	1069+83	0.0%		1069	0.0	0.0	0.0	0.0	

Upper Stick Elliott Creek
Detailed Credit Calculation

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost			Total Credits Gained/Lost	Notes
UT1	72	1078+08	1078+33	-50.0%	25	72	-13.0	-13.0	0.0	-13.0	
		1078+33	1078+80	0.0%	47		0.0				
		1078+08	1078+80	0.0%		72	0.0				
UT2	154	1080+00	1081+54	0.0%	154		0.0	-10.3	0.0	-10.3	
		1080+00	1081+03	-10.0%		103	-10.3				
		1081+03	1081+54	0.0%		51	0.0				
UT3	118	1082+00	1083+18	0.0%	118		0.0	0.0	0.0	0.0	
		1082+00	1083+18	0.0%		118	0.0				

Elliott Creek
Detailed Credit Calculation

Elliott Creek

Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	E1	1121	1	1121	-9.8	51.7	41.9	41.9
UT1	E1	141	1	141	-19.4	0.0	-19.4	-19.4

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	1121	1400+85	1401+26	-15.0%	41		-6.2	-7.5	29.3	21.8	
	1121	1401+26	1402+77	0.0%	151		0.0				
		1402+77	1405+06	3.5%	229		8.0				
		1405+06	1406+89	6.0%	183		11.0				
		1406+89	1409+84	3.5%	295		10.3				
		1409+84	1411+00	0.0%	116		0.0				
		1411+00	1411+55	-2.5%	55		-1.4				
		1411+55	1412+06	0.0%	51		0.0				
Reach 1	1121	1400+85	1401+74	-2.5%		89	-2.2	-2.2	22.3	20.1	
	1121	1401+74	1402+47	0.0%		73	0.0				
		1402+47	1403+33	3.5%		86	3.0				
		1403+33	1405+24	6.0%		191	11.5				
		1405+24	1407+49	3.5%		225	7.9				
		1407+49	1412+06	0.0%		457	0.0				
UT1	141	1415+87	1416+84	-20.0%	97		-19.4	-19.4	0.0	-19.4	
	141	1416+84	1417+28	0.0%	44		0.0				
		1415+87	1417+28	0.0%		141	0.0				

Bridges Creek
Detailed Credit Calculation

Bridges Creek

Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	R	376	1	376	0.0	15.4	15.4	15.4
Reach 2	E2	317	1.5	211	0.0	18.6	18.6	12.4
UT1	R	55	1	55	-28.0	0.0	-28.0	-28.0

Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	376	1500+91	1503+28	0.0%	237		0.0	0.0	4.9	4.9	
	376	1503+28	1504+67	3.5%	139		4.9				
Reach 2	317	1504+67	1505+60	6.0%	93		5.6	0.0	15.4	15.4	
	317	1505+60	1506+58	10.0%	98		9.8				
		1506+58	1507+84	0.0%	126		0.0				
Reach 1	376	1500+91	1501+66	0.0%		75	0.0	0.0	10.5	10.5	
	376	1501+66	1504+67	3.5%		301	10.5				
Reach 2	317	1504+67	1505+60	3.5%		93	3.3	0.0	3.3	3.3	
	317	1505+60	1507+84	0.0%		224	0.0				
UT1	55	1510+46	1511+01	-25%	55		-13.8	-28.0	0.0	-28.0	
		1510+46	1511+01	-25%		55	-13.8				

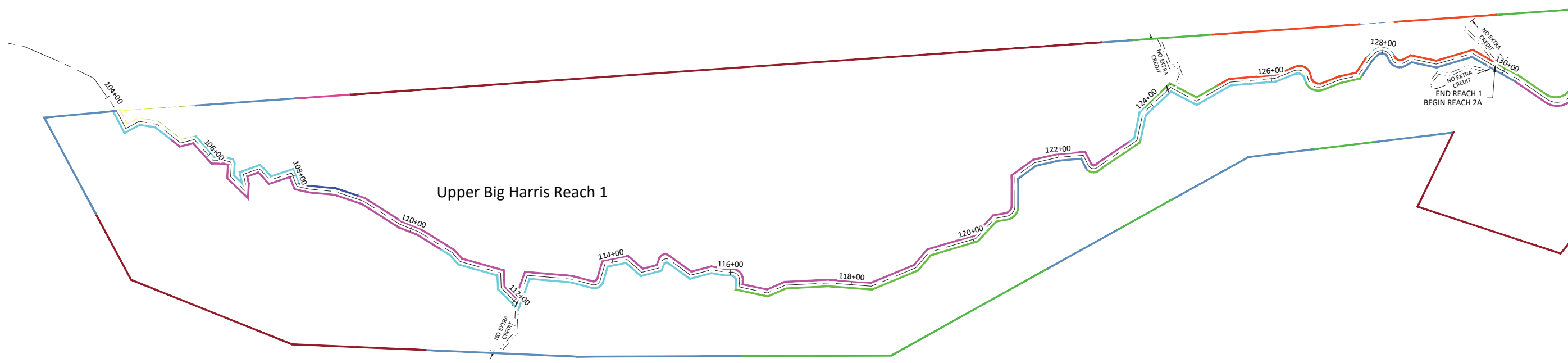
Lower Fletcher Creek
Detailed Credit Calculation

Lower Fletcher Creek								
Reach	Treatment	Total Length	Ratio	Total Credits	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Net Credits
Reach 1	E1	574	1	574	-100.0	19.0	-81.0	-81.0
Reach 2	E1	427	1	427	-0.8	38.0	37.2	37.2

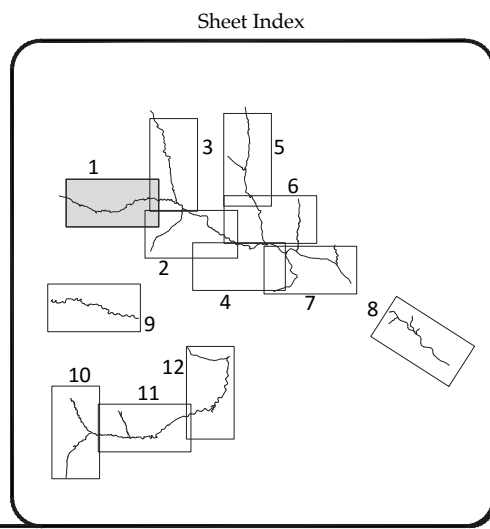
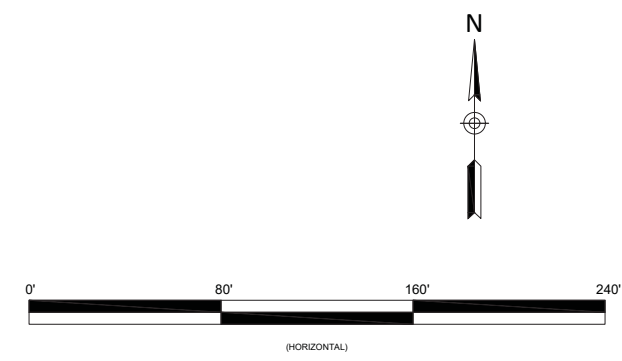
Reach	Total Length	Start Sta	End Sta	Credit Addition/Reduction	Left Bank (ft)	Right Bank (ft)	Credits Gained/Lost (at 1:1)	Credits Lost (at 1:1)	Credits Gained (at 1:1)	Total Credits Gained/Lost (at 1:1)	Notes
Reach 1	574	1641+28	1641+61	-50.0%	33		-16.5	-17.0	5.0	-12.0	
	574	1641+61	1643+04	3.5%	143		5.0				
		1643+04	1647+02	0.0%	398		0.0				
Easement Break											
Reach 2	427	1647+33	1647+65	-2.5%	32		-0.8	-0.8	6.2	5.4	
	427	1647+65	1649+84	0.0%	219		0.0				
		1649+84	1651+60	3.5%	176		6.2				
Reach 1	574	1641+28	1642+94	-50.0%		166	-83.0	-83.0	14.0	-69.0	
	574	1642+94	1647+02	3.5%		408	14.3				
Easement Break											
Reach 2	427	1647+33	1648+20	3.5%		87	3.0	0.0	31.8	31.8	
	427	1648+20	1648+99	6.0%		79	4.7				
		1648+99	1650+01	8.0%		102	8.2				
		1650+01	1651+60	10.0%		159	15.9				

PRELIMINARY
 DO NOT
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 CONSTRUCTION

Big Harris Creek Mitigation Site
Cleveland County, North Carolina
 Easement Width Exhibit



Line Style	Description
--- (dashed)	No Credit Applied
--- (dashed)	0' - 15'
--- (dashed)	16' - 20'
--- (dashed)	21' - 25'
--- (dashed)	26' - 30'
--- (dashed)	31' - 35'
--- (dashed)	36' - 40'
--- (dashed)	41' - 45'
--- (dashed)	46' - 50'
--- (dashed)	51' - 75'
--- (dashed)	76' - 100'
--- (dashed)	101' - 125'
--- (dashed)	126' - 150'
--- (dashed)	151'+



Revisions:

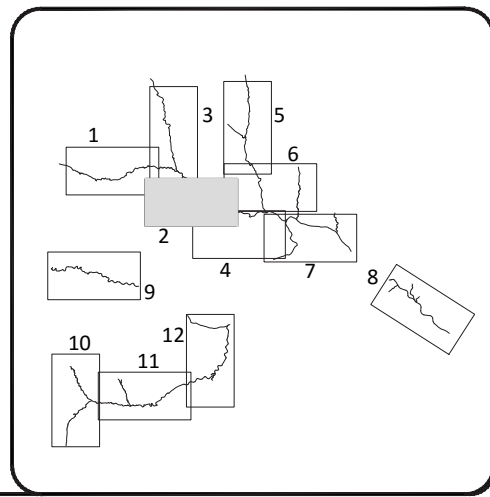
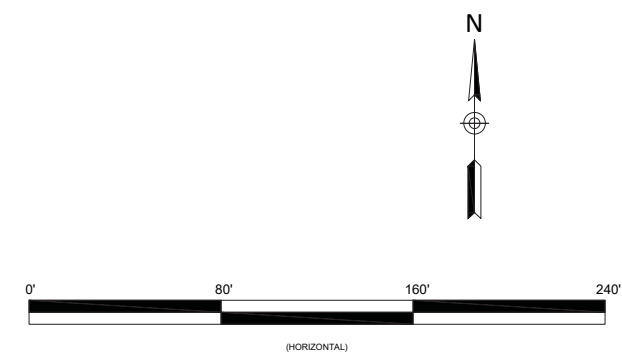
Date:	August 26, 2016
Job Number:	005-02149
Project Engineer:	ECR
Drawn By:	JCK
Checked By:	SDW

1

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 August 31, 2016



Line Style	Description
--- (dotted)	No Credit Applied
--- (dashed)	0' - 15'
--- (dash-dot)	16' - 20'
--- (long-dash)	21' - 25'
--- (short-dash)	26' - 30'
--- (dash-dot-dot)	31' - 35'
--- (long-dash-dot)	36' - 40'
--- (dash-dot-dot-dot)	41' - 45'
--- (dash-dot-dot-dot-dot)	46' - 50'
--- (solid)	51' - 75'
--- (solid)	76' - 100'
--- (solid)	101' - 125'
--- (solid)	126' - 150'
--- (solid)	151'+



WILDLANDS
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 CHARLOTTE, NC 28203
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**Big Harris Creek Mitigation Site
Cleveland County, North Carolina**

Easement Width Exhibit

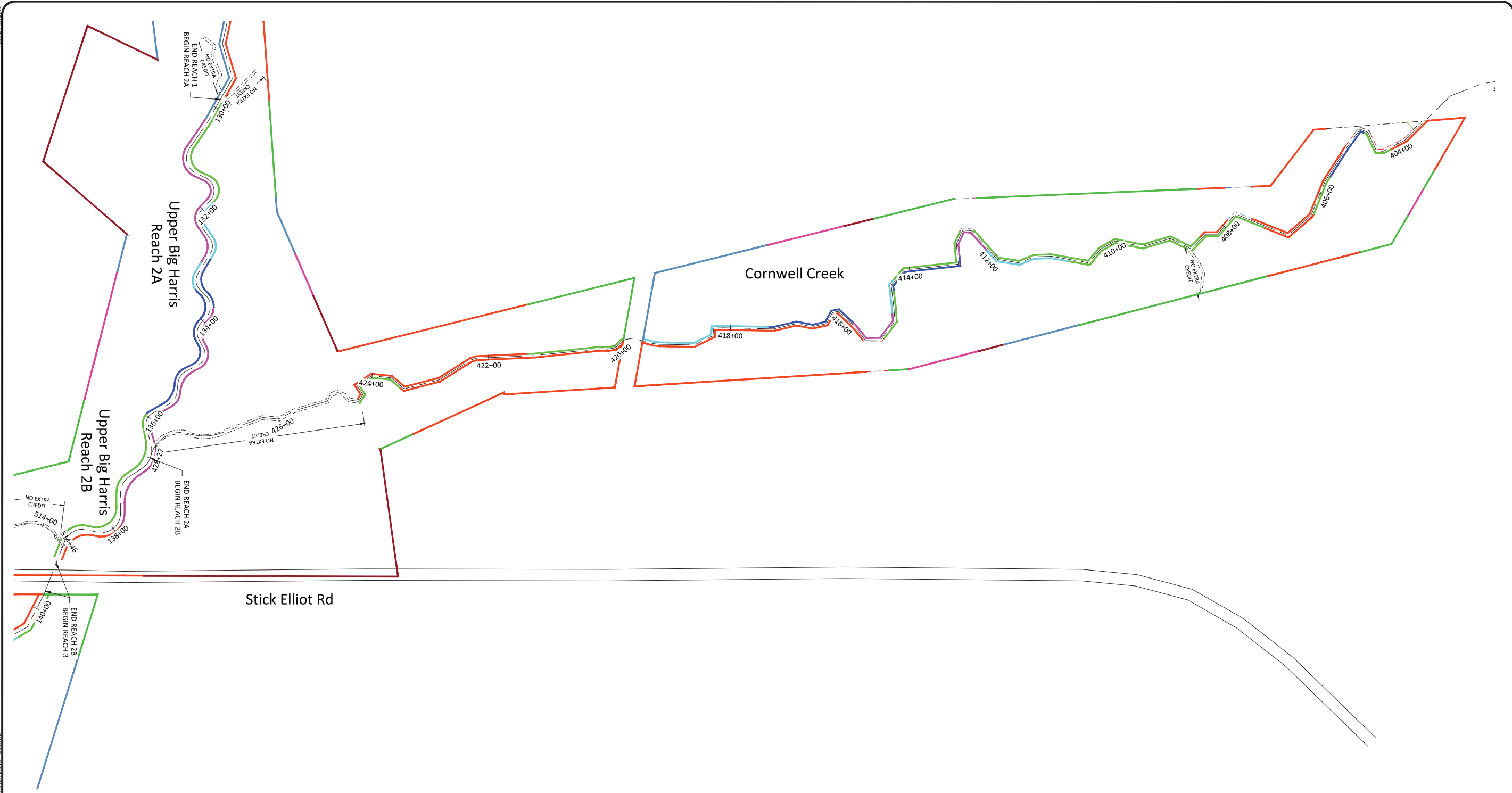
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Date:	August 26, 2016
Job Number:	005-02149
Project Engineer:	ECR
Drawn By:	JCK
Checked By:	SDW

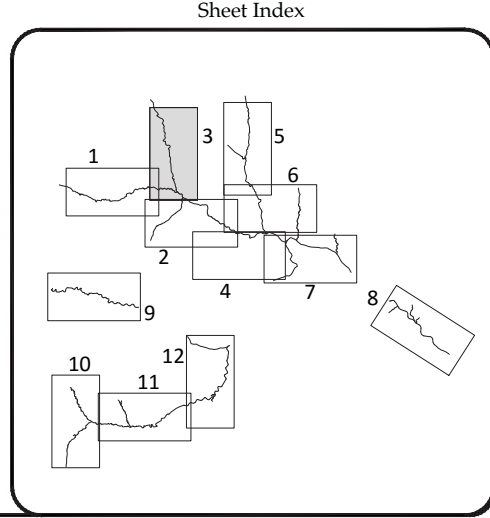
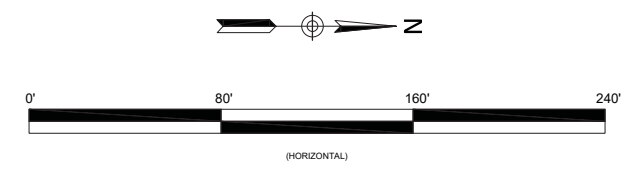
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Sheet

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No Credit Applied	
--- (dashed black)	0' - 15'
--- (dashed red)	16' - 20'
--- (dashed yellow)	21' - 25'
--- (dashed green)	26' - 30'
--- (dashed cyan)	31' - 35'
--- (dashed blue)	36' - 40'
--- (dashed magenta)	41' - 45'
--- (dashed purple)	46' - 50'
--- (dashed orange)	51' - 75'
--- (dashed brown)	76' - 100'
--- (dashed grey)	101' - 125'
--- (dashed light blue)	126' - 150'
--- (dashed dark blue)	151'+



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Easement Width Exhibit

Revisions:	

Date:	August 26, 2016
Job Number:	005-02149
Project Engineer:	ECR
Drawn By:	JCK
Checked By:	SDW

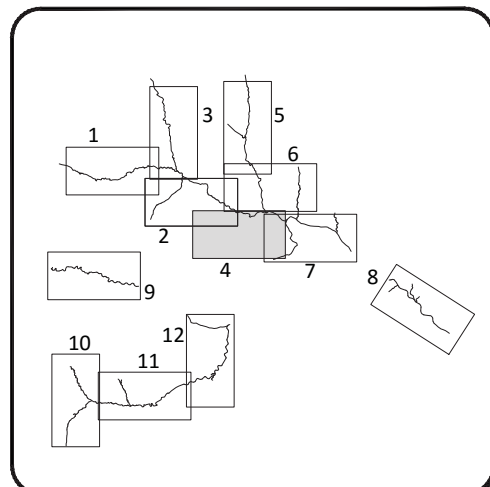
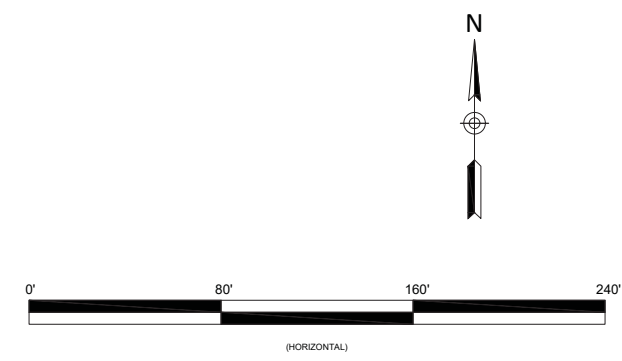
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Sheet

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 August 26, 2016



Easement Width	Color
No Credit Applied	Black Dashed
0' - 15'	Red Dashed
16' - 20'	Yellow Dashed
21' - 25'	Green Dashed
26' - 30'	Light Blue Dashed
31' - 35'	Blue Dashed
36' - 40'	Dark Blue Dashed
41' - 45'	Purple Dashed
46' - 50'	Pink Dashed
51' - 75'	Orange Solid
76' - 100'	Green Solid
101' - 125'	Blue Solid
126' - 150'	Purple Solid
151'+	Red Solid



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 Easement Width Exhibit

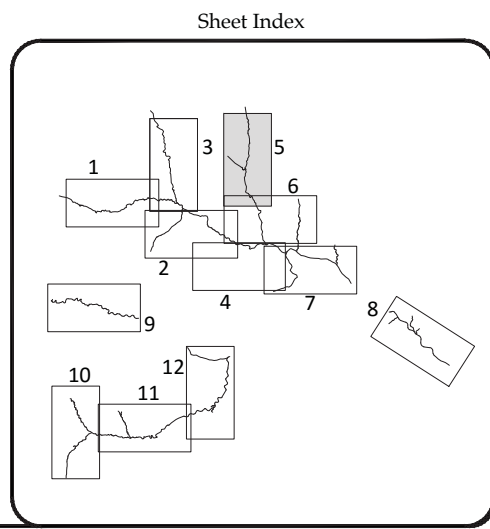
Revisions:

Date: August 26, 2016
 Job Number: 005-02149
 Project Engineer: ECR
 Drawn By: JCK
 Checked By: SDW

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No Credit Applied	
0' - 15'	
16' - 20'	
21' - 25'	
26' - 30'	
31' - 35'	
36' - 40'	
41' - 45'	
46' - 50'	
51' - 75'	
76' - 100'	
101' - 125'	
126' - 150'	
151'+	



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**Big Harris Creek Mitigation Site
Cleveland County, North Carolina**

Easement Width Exhibit

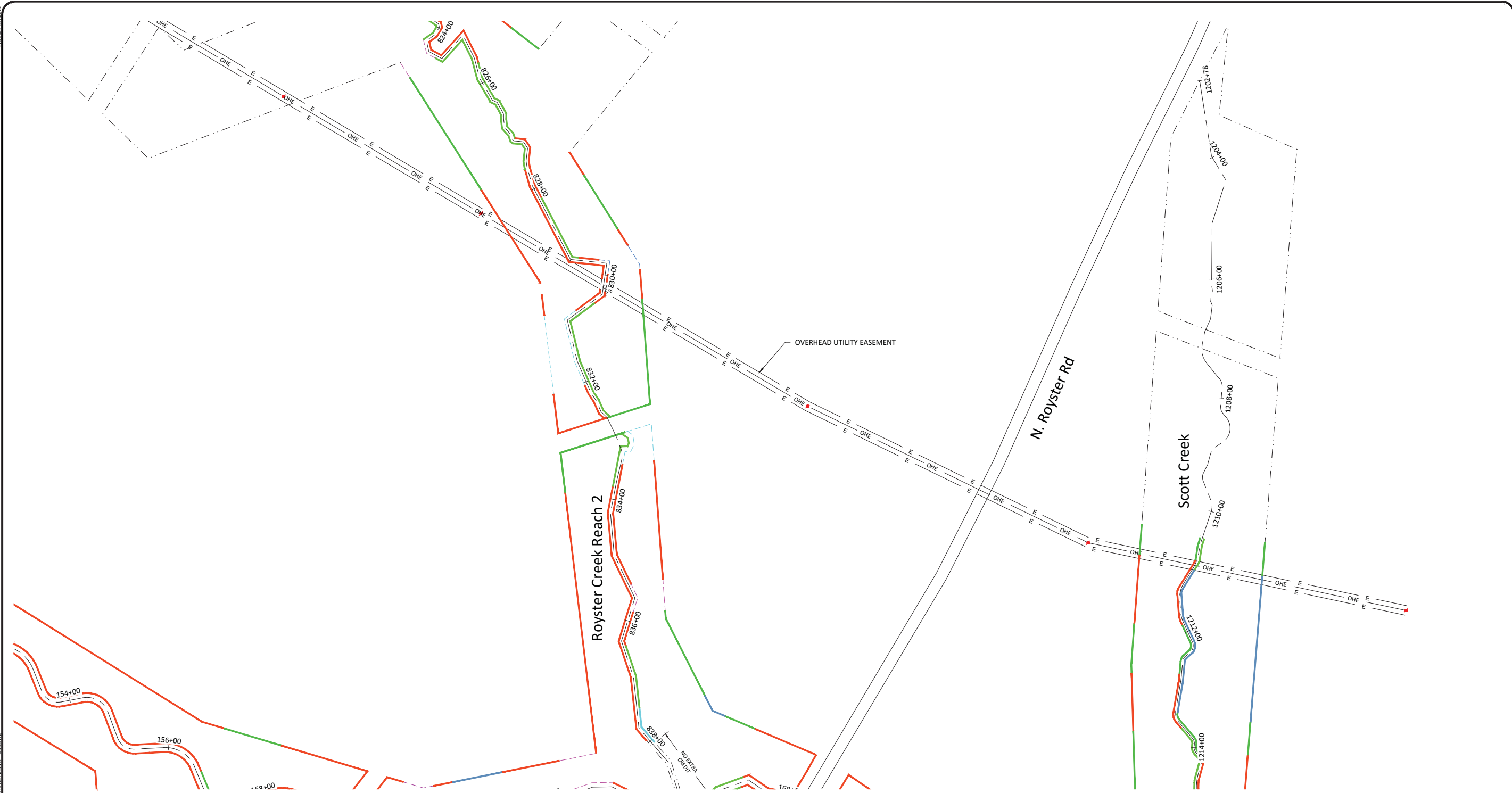
Revisions:	Description:

Date: August 26, 2016
 Job Number: 005-02149
 Project Engineer: ECR
 Drawn By: JCK
 Checked By: SDW

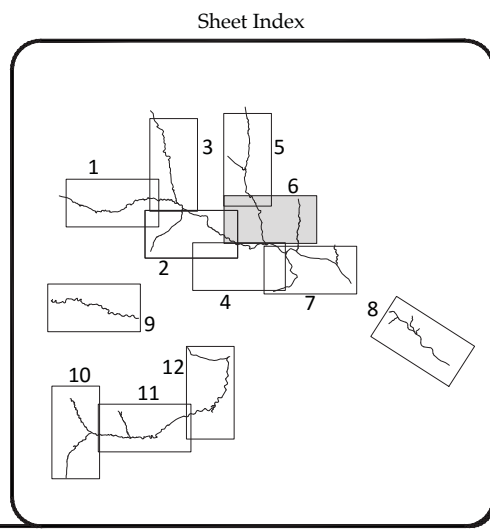
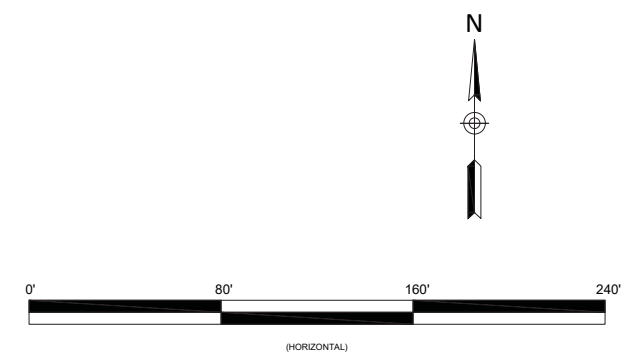
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Line Style	Description
--- (Black)	No Credit Applied
--- (Red)	0' - 15'
--- (Orange)	16' - 20'
--- (Yellow)	21' - 25'
--- (Light Green)	26' - 30'
--- (Light Blue)	31' - 35'
--- (Blue)	36' - 40'
--- (Purple)	41' - 45'
--- (Pink)	46' - 50'
--- (Red)	51' - 75'
--- (Green)	76' - 100'
--- (Blue)	101' - 125'
--- (Purple)	126' - 150'
--- (Red)	151'+



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Big Harris Creek Mitigation Site

Cleveland County, North Carolina

Easement Width Exhibit

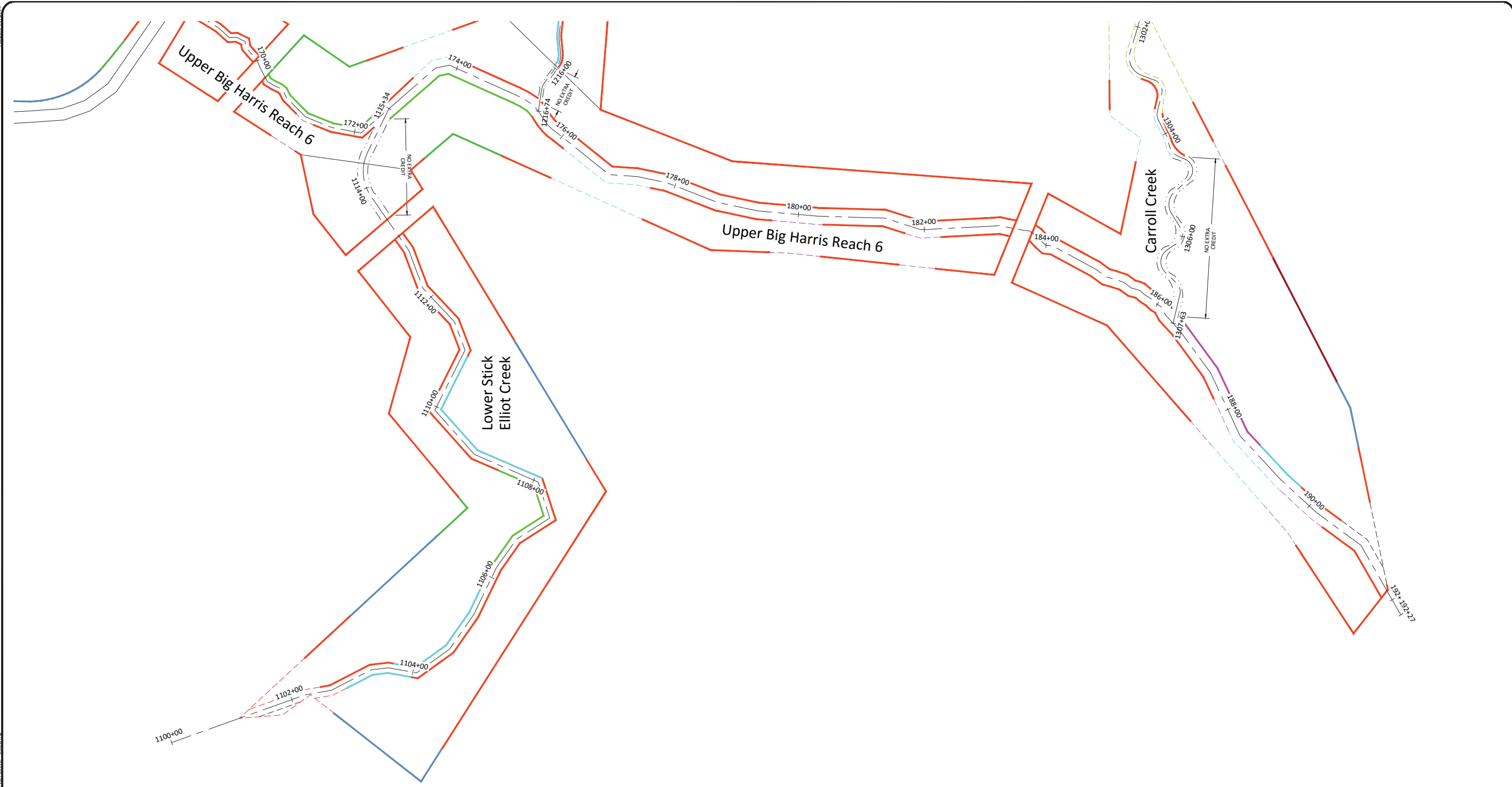
Revisions:

Date:	August 26, 2016
Job Number:	005-02189
Project Engineer:	ECR
Drawn By:	JCK
Checked By:	SDW

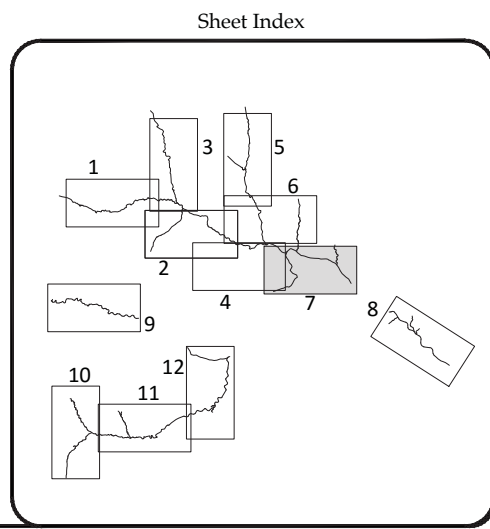
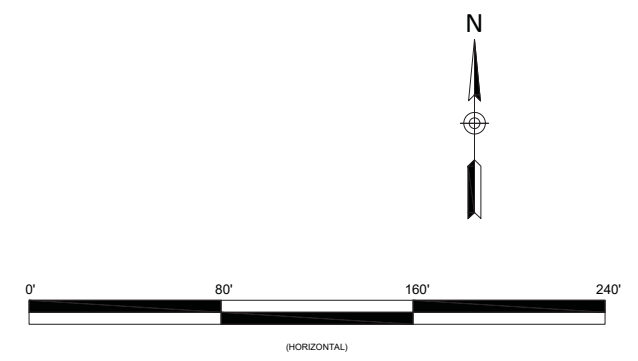
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No Credit Applied	
---	0' - 15'
- - -	16' - 20'
- - -	21' - 25'
- - -	26' - 30'
- - -	31' - 35'
- - -	36' - 40'
- - -	41' - 45'
- - -	46' - 50'
---	51' - 75'
---	76' - 100'
---	101' - 125'
---	126' - 150'
---	151'+



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Big Harris Creek Mitigation Site
 Cleveland County, North Carolina

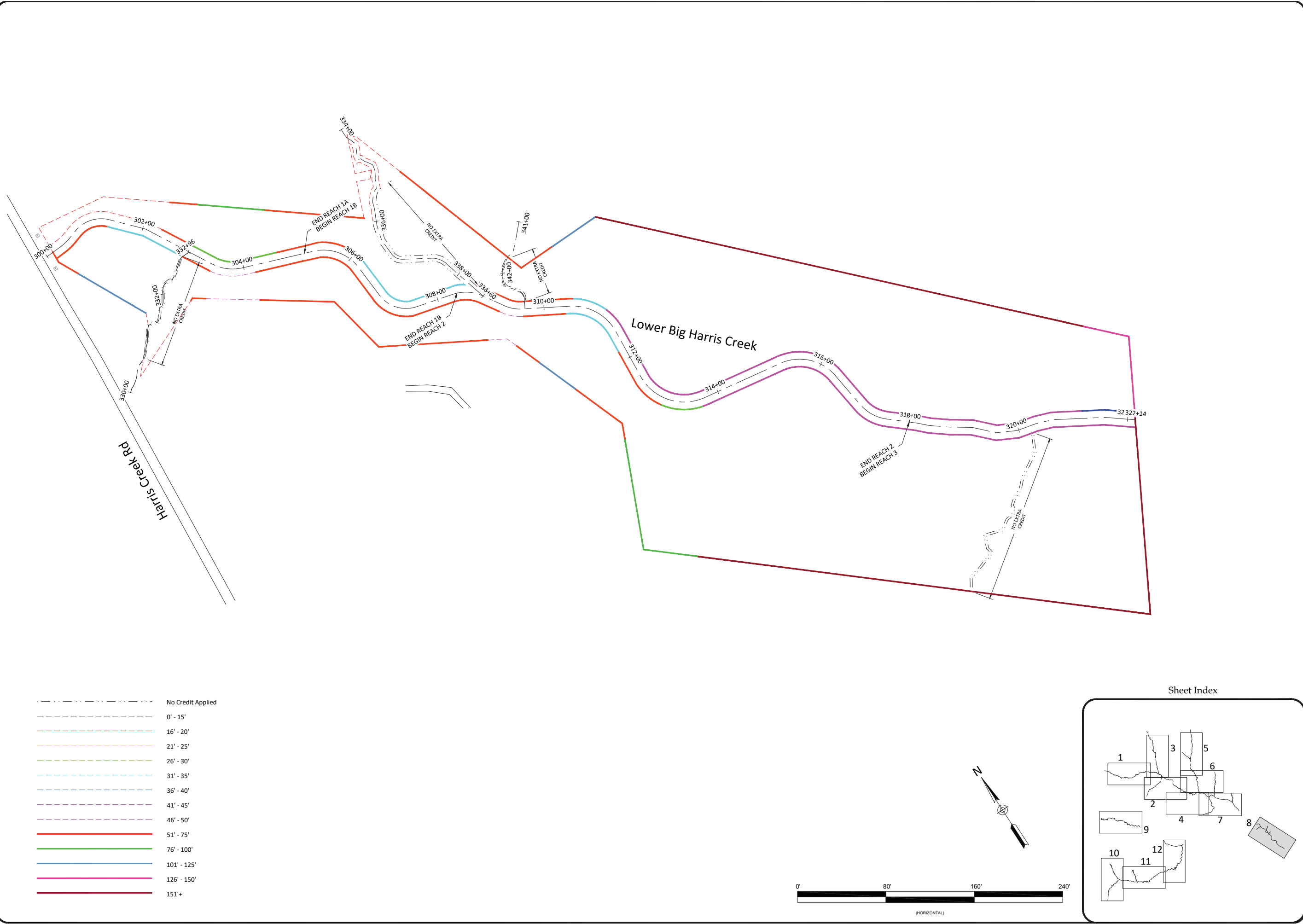
Easement Width Exhibit

Revisions:

Date: August 26, 2016
 Job Number: 005-02149
 Project Engineer: ECR
 Drawn By: JCK
 Checked By: SDW

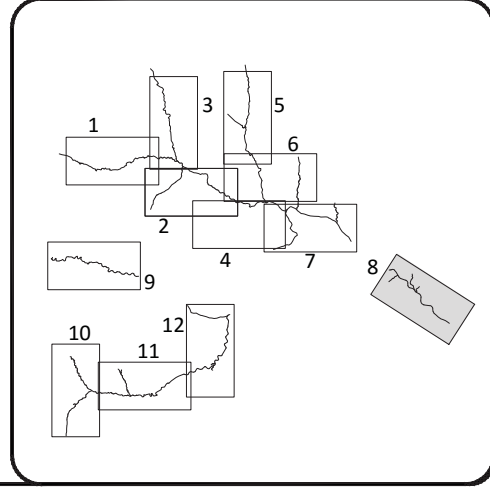
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Sheet



Line Style	Description
--- (dashed)	No Credit Applied
--- (dashed)	0' - 15'
--- (dashed)	16' - 20'
--- (dashed)	21' - 25'
--- (dashed)	26' - 30'
--- (dashed)	31' - 35'
--- (dashed)	36' - 40'
--- (dashed)	41' - 45'
--- (dashed)	46' - 50'
--- (dashed)	51' - 75'
--- (dashed)	76' - 100'
--- (dashed)	101' - 125'
--- (dashed)	126' - 150'
--- (dashed)	151'+

Sheet Index



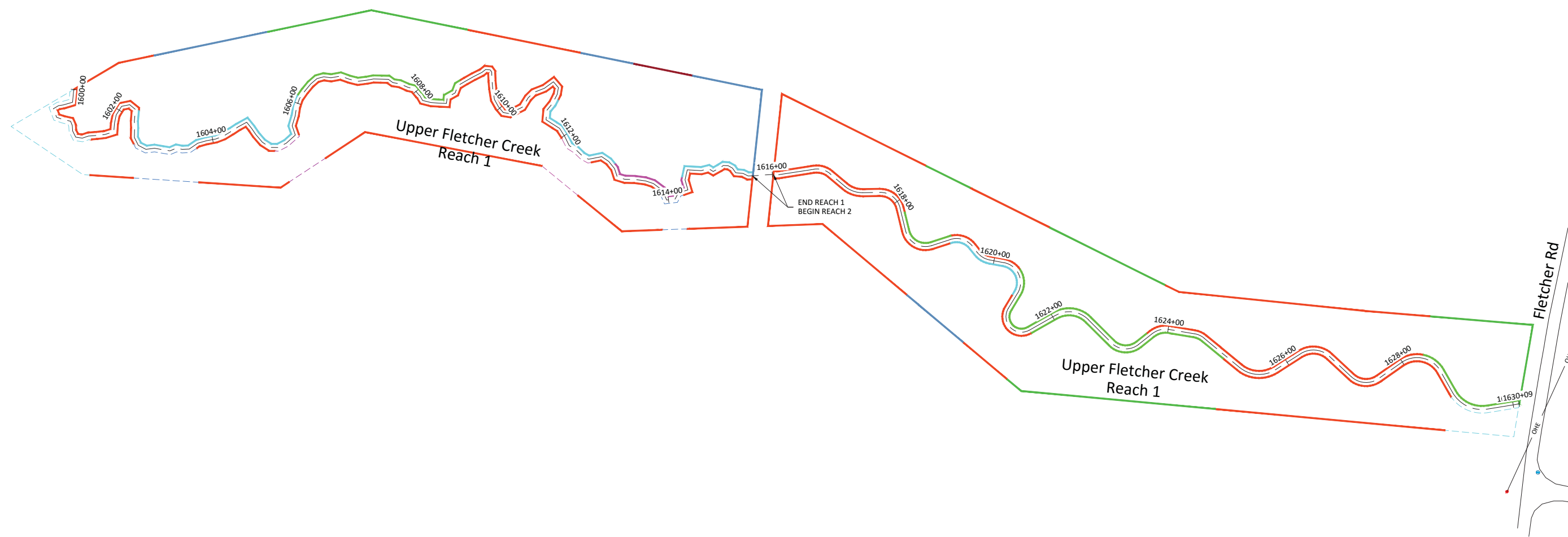
PRELIMINARY
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Big Harris Creek Mitigation Site
Cleveland County, North Carolina
 Easement Width Exhibit

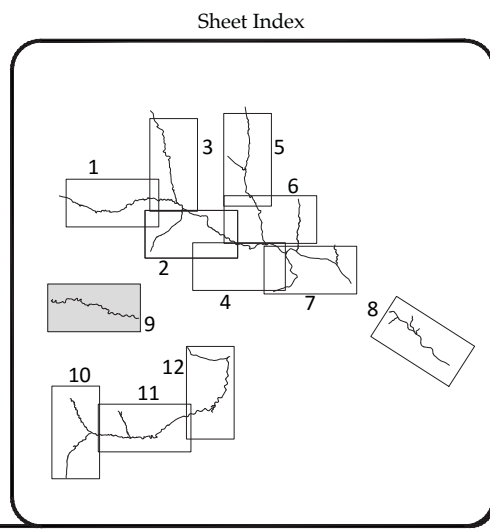
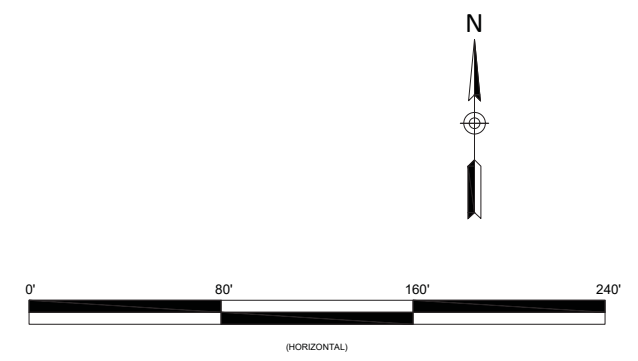
Revisions:

Date:	August 26, 2016
Job Number:	005-02149
Project Engineer:	ECR
Drawn By:	JCK
Checked By:	SDW

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Easement Width	Line Style
No Credit Applied	Dashed black line
0' - 15'	Dashed red line
16' - 20'	Dashed orange line
21' - 25'	Dashed yellow line
26' - 30'	Dashed light green line
31' - 35'	Dashed light blue line
36' - 40'	Dashed blue line
41' - 45'	Dashed purple line
46' - 50'	Dashed pink line
51' - 75'	Solid red line
76' - 100'	Solid green line
101' - 125'	Solid blue line
126' - 150'	Solid purple line
151'+	Solid dark red line



Date:	August 26, 2016
Job Number:	005-02149
Project Engineer:	ECR
Drawn By:	JCK
Checked By:	SDW

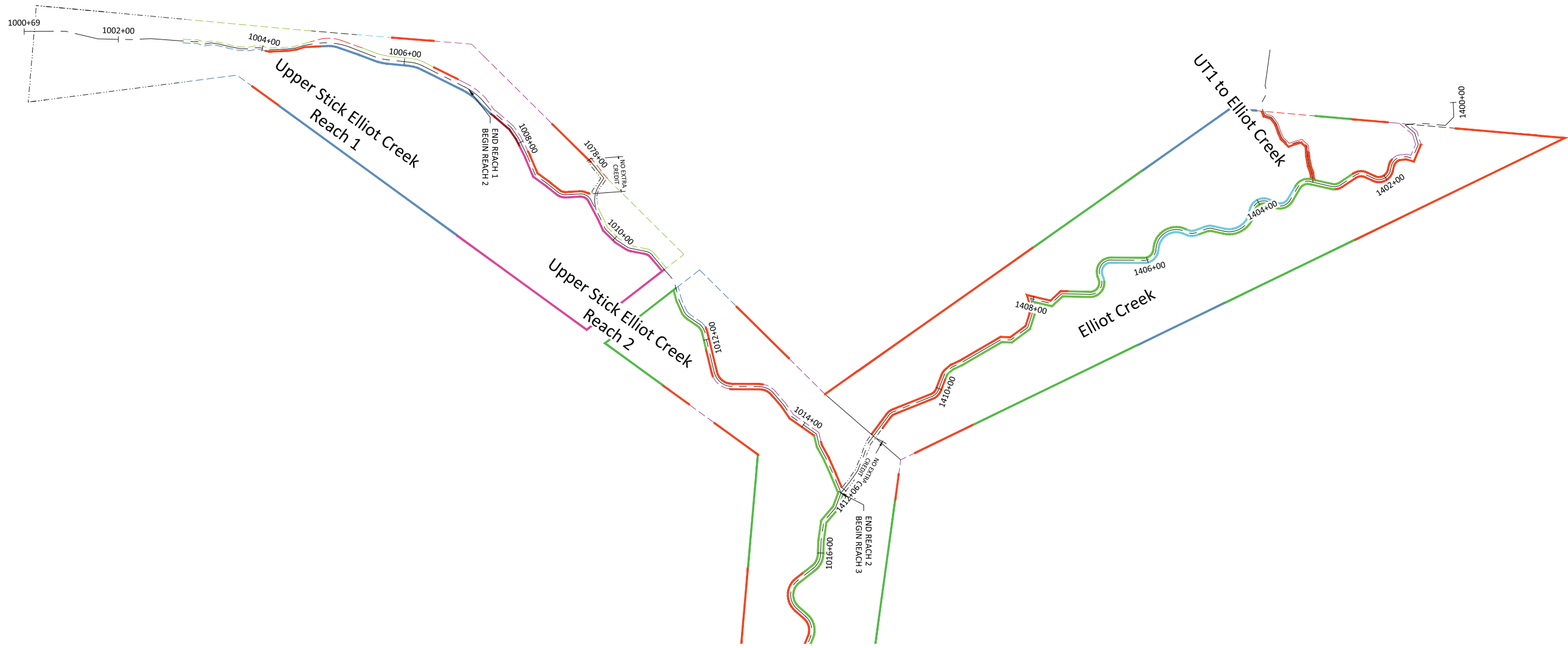
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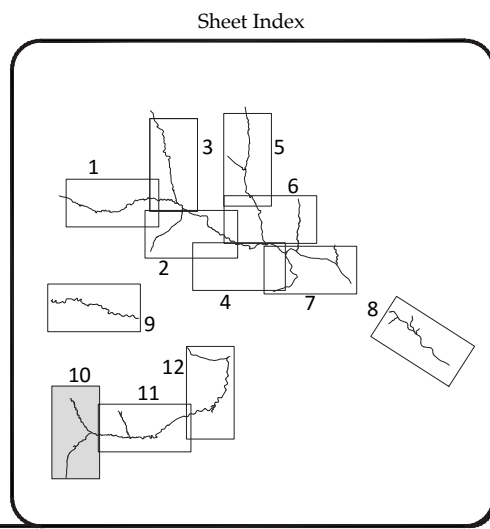
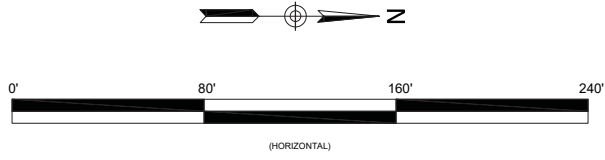
Big Harris Creek Mitigation Site
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 Easement Width Exhibit

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O:\ActiveProjects\005-02149 Big Harris Creek Credit, Credits and Buffers\02149 Easement\02149 Easement - Buffers - Revisions - 8/16.dwg August 31, 2016



Line Style	Easement Width
--- (dotted)	No Credit Applied
--- (dashed)	0' - 15'
--- (dash-dot)	16' - 20'
--- (long-dash)	21' - 25'
--- (short-dash)	26' - 30'
--- (medium-dash)	31' - 35'
--- (wide-dash)	36' - 40'
--- (narrow-dash)	41' - 45'
--- (thin-dash)	46' - 50'
--- (medium-thick)	51' - 75'
--- (thick)	76' - 100'
--- (very thick)	101' - 125'
--- (extra thick)	126' - 150'
--- (thick solid)	151'+



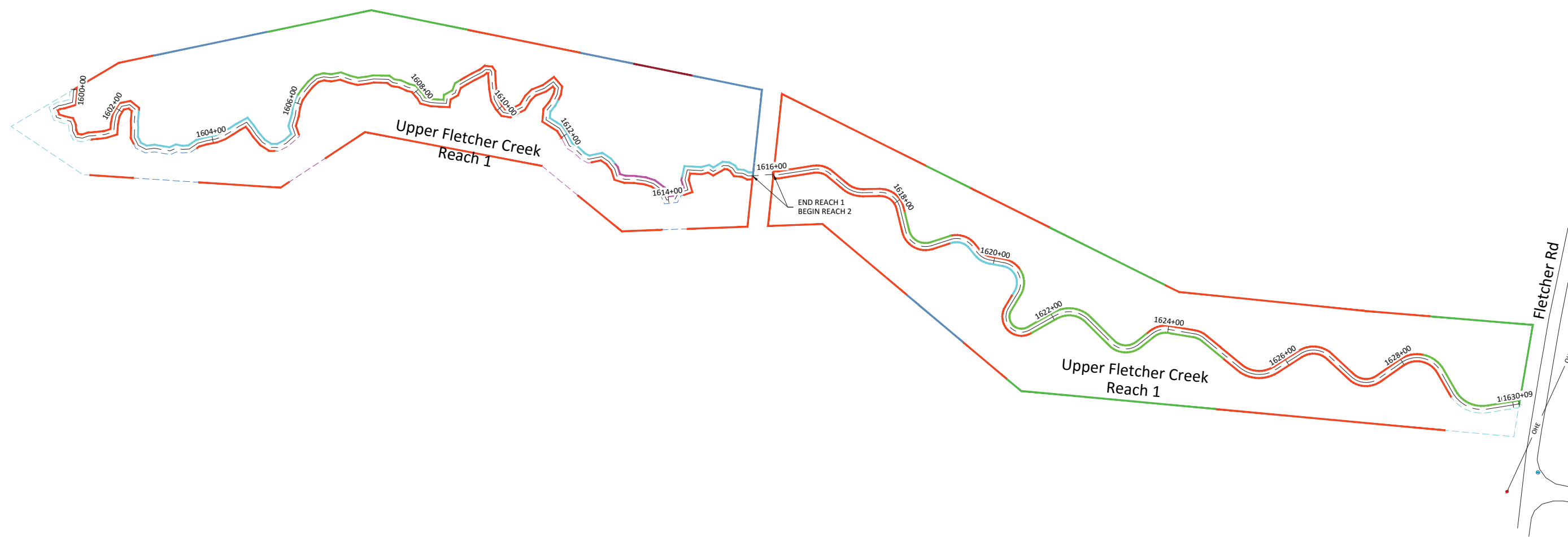
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Checked By:	SDW

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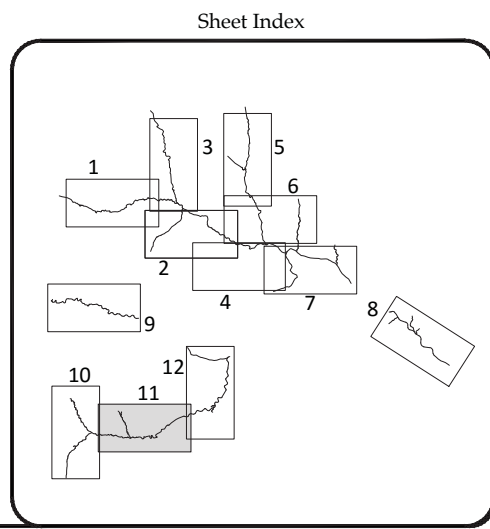
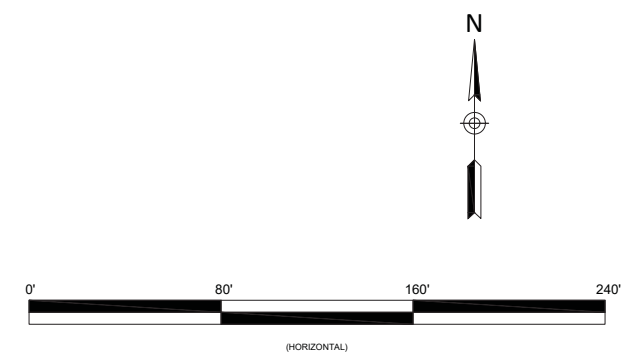
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---	No Credit Applied
- - - -	0' - 15'
- . - . - .	16' - 20'
- . . - . . - .	21' - 25'
- . . . - . . .	26' - 30'
- -	31' - 35'
- -	36' - 40'
- -	41' - 45'
- -	46' - 50'
- -	51' - 75'
- -	76' - 100'
- -	101' - 125'
- -	126' - 150'
- -	151'+

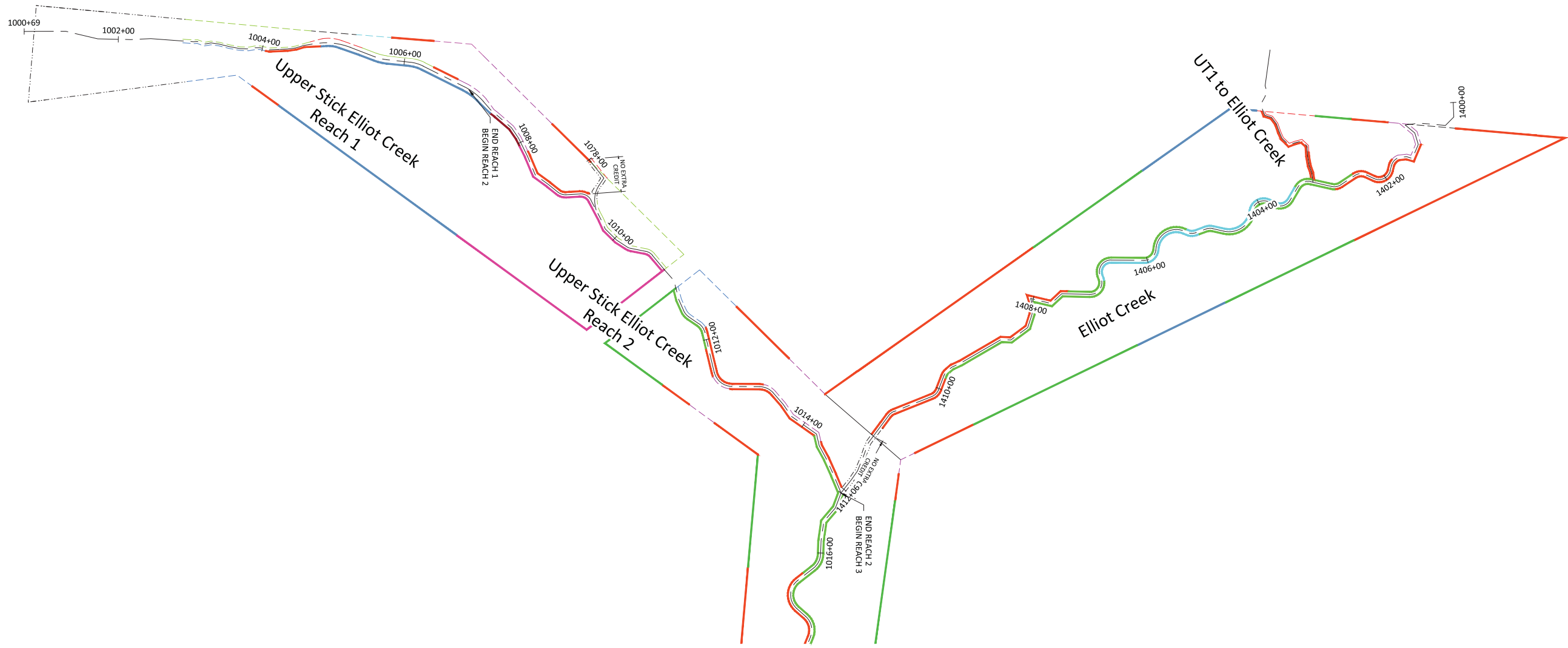


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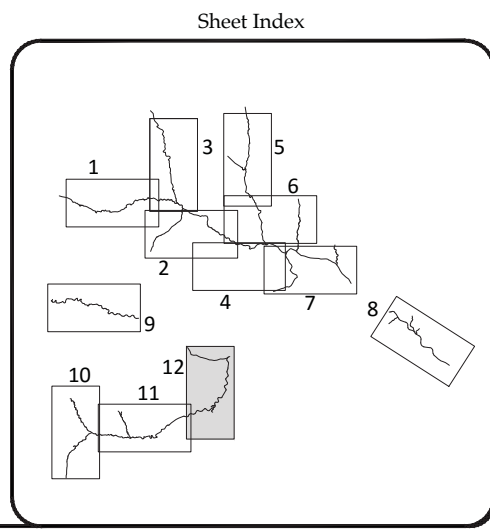
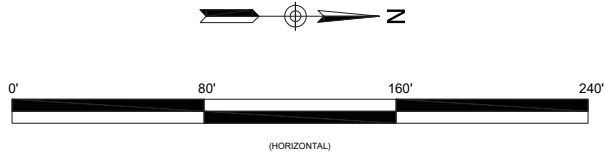
Big Harris Creek Mitigation Site
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Revisions:

Date:	August 26, 2016
Job Number:	005-02149
Project Engineer:	ECR
Drawn By:	JCK
Checked By:	SDW



--- (dotted)	No Credit Applied
--- (dashed)	0' - 15'
--- (dash-dot)	16' - 20'
--- (long-dash)	21' - 25'
--- (short-dash)	26' - 30'
--- (dotted)	31' - 35'
--- (dash-dot)	36' - 40'
--- (long-dash)	41' - 45'
--- (short-dash)	46' - 50'
--- (dotted)	51' - 75'
--- (dash-dot)	76' - 100'
--- (long-dash)	101' - 125'
--- (short-dash)	126' - 150'
--- (dotted)	151'+



Date:	August 26, 2016
Job Number:	005-02149
Project Engineer:	ECR
Drawn By:	JCK
Checked By:	SDW

Revisions:	

Big Harris Creek Mitigation Site
Cleveland County, North Carolina
Easement Width Exhibit

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REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

CESAW-RG/Hughes

August 18, 2016

MEMORANDUM FOR RECORD

SUBJECT: Big Harris Creek Mitigation Site - NCIRT Comments during Mitigation Plan Review

PURPOSE: The comments listed below were provided to NCDMS during the (extended) Mitigation Plan review period.

NCDMS Project Name: Big Harris Creek Mitigation Site, Cleveland County, NC

USACE AID#: SAW-2009-00475

NCDMS #: 739

30-Day Comment Deadline: July 20, 2016

Corps and NCDWR Comments, August 18, 2016:

Please separate the credit generation into sections that show uplift based on the channel work, proposed BMPs/watershed approach, and buffers, as described below:

- a. In order to determine the amount of credit that would be generated by each reach strictly based on the proposed activities using the standard ratios, please describe the proposed activities (% of bank work, structures, planting, fencing, etc.) and associated ratios, but do not include any increase for BMPs. Currently, the plan lumps many reaches together that appear to have very different levels of intervention. As an example, on Reach 6 on the main stem of Big Harris, there are sections that are several hundred feet long where it appears that no channel work will be done (including everything below the stream crossing) but this section is lumped in with upstream reaches shown as EII. The same is true on some sections of Upper Stick Elliot, Reach 2. We are not suggesting that every foot has to be parsed out, but it appears there are some reaches that can be separated out.
- b. Please check the reach stationing and measurements generated - we noted some possible errors in the descriptions in Table 11 that do not appear to match the stationing in the plan sheet. We also noted that there are reaches where the proposed ratio does not appear to match the listed approach. For instance, on Reach 5, you show a 1.5:1 ratio for restoration.

- c. Please show the increase on a reach by reach basis that will result from the addition of the BMPs and the use of a watershed approach, so that we can determine the amount of credits that will be generated by the addition of BMPs versus the traditional ratios associated with the channel work.
- d. Please provide a breakdown of the additional credits associated with the wider buffers. This must include a map that shows the buffer widths on the project and a table that shows the calculations on a reach by reach basis.
- e. The plan appears to ask for credits within utility lines, which we would not concur with. Please provide more detail to show that credit is not proposed on reaches within utility corridors.
- f. Please clarify the guidance used in the monitoring sections.
- g. Please provide a maintenance/monitoring plan for the BMPS during the 5-year monitoring period.

HUGHES.ANDREA.
WADE.1258339165

Digitally signed by
HUGHES.ANDREA.WADE.1258339165
DN: c=US, o=U.S. Government, ou=DoD,
ou=PKI, ou=USA,
cn=HUGHES.ANDREA.WADE.1258339165
Date: 2016.10.18 13:48:14 -04'00'

Andrea Hughes
Mitigation Project Manager
Regulatory Division



FINAL MITIGATION PLAN

November 18, 2016

BIG HARRIS CREEK MITIGATION SITE

Cleveland County, NC
DEQ Contract No. 006256
DMS ID No. 739

Broad River Basin
HUC 03050105

USACE Action ID No. SAW-2009-0475

PREPARED FOR:



Department of Environmental Quality (DEQ)
Division of Mitigation Services (DMS)

1652 Mail Service Center
Raleigh, NC 27699-1652

FINAL MITIGATION PLAN

BIG HARRIS CREEK MITIGATION SITE

Cleveland County, NC
DEQ Contract No. 006256
DMS ID No. 739

Broad River Basin
HUC 03050105

USACE Action ID No. SAW-2009-0475

PREPARED FOR:

**Department of Environmental Quality
Division of Mitigation Services**
1652 Mail Service Center
Raleigh, NC 27699-1652

PREPARED BY:



Wildlands Engineering, Inc.
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Phone: (704) 332-7754



Ecosystem Planning & Restoration
559 Jones Franklin Road, Suite 150
Raleigh, NC 27606
Phone: (919) 388-0787

November 18, 2016

EXECUTIVE SUMMARY

Wildlands Engineering, Inc. (Wildlands) is completing a design-build project for the North Carolina Department of Environmental Quality (DEQ) Division of Mitigation Services (DMS) to restore 10,067 linear feet (LF) of streams, enhance 23,413 LF of streams, preserve 669 LF of streams, and provide water quality treatment for 171 acres of drainage area in Cleveland County, NC. The streams proposed for mitigation credit include Big Harris Creek and 25 tributaries. Buffer restoration will also take place but is not proposed for buffer mitigation credit. The project is proposed to provide 25,836 stream mitigation units (SMUs) in the Broad River Basin.

The Big Harris Creek Mitigation Site (Site) is located within the DMS targeted watershed for the Broad River Basin Hydrologic Unit Code (HUC) 03050105080060 and the North Carolina Division of Water Resources (NCDWR) Subbasin 03-08-04. The Big Harris Creek and Magness Creek HUC 03050105080060 was identified as a Targeted Local Watershed (TLW) in DMS's 2009 Broad River Basin Restoration Priority (RBRP) Plan. The Cleveland County Natural Resources Conservation Service has also identified this watershed as a priority area.

The watershed has a long history of agricultural activity and most of the stressors to stream functions are related to this historic and current land use. The major stream stressors for the project are cattle access, erosion from lateral instability, and gully headcutting in the headwater ephemeral reaches. The effects of these stressors have resulted in degraded water quality and habitat throughout the watershed when compared to reference conditions. Using the Functional Pyramid evaluation approach (Harman et al., 2012), 62% of the site reaches rated as functioning at risk; 30% as not functioning; and 8% as functioning at risk/functioning (See Section 5.0 for more on existing stream function). The project approach for the Site focuses on evaluating the Site's existing functional condition and evaluating its potential for recovery and need for intervention.

The primary goals of the project, which are in alignment with the overall goals of the Broad River Basin RBRP, are to reduce sediment and nutrient inputs, reduce fecal coliform inputs through cattle exclusion, and reestablish native riparian corridors while preserving existing headwater aquatic habitats and riparian corridors.

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ACRONYMS

BMP	Best Management Practice
DA	Department of the Army
DE	Army Corps of Engineers District Engineer
DMS	North Carolina Division of Mitigation Services
DEQ	North Carolina Department of Environmental Quality
EPA	United States Environmental Protection Agency
ERTR	Environmental Resources Technical Report
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HUC	Hydrologic Unit Code
IRT	Interagency Review Team
LIDAR	Light Detection and Ranging
LOMR	Letter of Map Revision
NHP	North Carolina Natural Heritage Program
NRCS	Natural Resources Conservation Service
NCDWR	North Carolina Division of Water Resources
NCWRC	North Carolina Wildlife Resources Commission
RBRP	River Basin Restoration Priorities
SHPO	North Carolina State Historic Preservation Office
SMU	Stream Mitigation Unit
THPO	North Carolina Tribal Historic Preservation Office
TLW	Targeted Local Watershed
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WCU	Western Carolina University



1.0 Restoration Project Goals and Objectives

The Big Harris Creek Mitigation Site (Site) is a stream mitigation project located in Cleveland County between Lawndale and Polkville (Figure 1). The Site is located in the Broad River Basin HUC 03050105080060 and NCDWR Subbasin 03-08-04 and is being submitted for mitigation credit in the Broad River Basin HUC 03050105.

DMS develops River Basin Restoration Priorities to guide its restoration activities within each of the state's 54 cataloging units. RBRPs identify specific watersheds that exhibit both the need and opportunity for wetland, stream, and riparian buffer restoration. These watersheds are called Targeted Local Watersheds (TLWs) and receive priority for DMS planning and restoration project funds. The Big Harris Creek Site is located within HUC 03050105080060 (Big Harris Creek and Magness Creek), a TLW identified in DMS's 2009 Broad River Basin RBRP. Many streams in the Big Harris Creek watershed are highly unstable with eroding banks and poor quality in-stream habitat. High turbidity and high fecal coliform bacteria counts are also cited as problems throughout the watershed (NCDWR, 2013c). NCDWR's 2008 Broad River Basinwide Water Quality Plan and the Cleveland County Natural Resources Conservation Service (NRCS) have also identified this TLW as an impaired watershed.

The project's watershed is characterized by 48% agricultural land usage and most of the stressors to stream functions are related to the historic, and current, agricultural land use. The Big Harris Creek Site was identified by DMS to address these major agricultural stressors within the watershed with specific focus on gully erosion, streambank erosion, and livestock access to streams. Restoration and enhancement of streams and buffers on the Site will address those identified stressors and thereby improve water quality in the Big Harris Creek watershed.

The major goals of this stream mitigation project are to reduce sediment and nutrient sources, reduce fecal coliform sources through cattle exclusion, and reestablish healthy riparian corridors while preserving existing, high quality headwater aquatic habitats. These goals will primarily be achieved by creating functional and stable stream channels by: 1) increasing and improving the interaction of stream hydrology with the riparian zone, 2) improving in-stream habitat and bed form diversity, 3) introducing large woody debris, and beginning the establishment of a native, forested riparian corridor along the stream reaches. These activities are known to support higher order functions like the processing of organic matter, nutrient cycling, and temperature regulation, aquatic life.

The project includes the majority of the headwater tributaries to Big Harris Creek and 35% of the 11-square mile Big Harris Creek watershed before it flows into the First Broad River. Within the project limits, approximately 34,130 LF of stream channel will be restored, enhanced or preserved. Water quality Best Management Practices (BMPs) will also be constructed to stabilize eroding ephemeral channels and provide water quality treatment on 171 acres of headwater drainage during the period after construction until the riparian buffer vegetation becomes established. 5,536 LF of ephemeral drainage will also be buffered and conserved, enhancing the overall watershed water quality and function.

The following specific goals and objectives will address the identified stressors in the Big Harris Creek and Magness Creek TLW.



Table 1. Mitigation Goals and Objectives - Big Harris Creek Mitigation Site

Goals	Objectives
<p>Improve stream stability and reduce stream bed and bank erosion.</p>	<p>Grade back eroding stream and headwater gully slopes and/or install bioengineering. Add bank revetments and in-stream structures to protect enhanced streams.</p>
	<p>Construct new stream channels that will maintain a stable pattern and profile considering the hydrologic and sediment inputs to the system, the landscape setting, and the watershed conditions.</p>
<p>Restore hydrologic connection between bankfull channels and floodplains, wetlands, and vernal pools.</p>	<p>Construct new stream channels with appropriate dimension and depth relative to their functioning floodplain elevation.</p>
<p>Improve instream habitat and instream habitat connectivity.</p>	<p>Install habitat features such as constructed riffles and brush toes into restored/enhanced streams, adding woody materials to channel beds and constructing pools of varying depth.</p>
	<p>Replace existing culverts with bottomless arch culverts, partially buried culverts, or ford crossings and enhance profile by removing vertical steps at culvert outlets.</p>
<p>Reduce agricultural pollutant loading to project streams.</p>	<p>Install BMPs at concentrated flow locations in the watershed headwaters to treat agricultural runoff until riparian buffer vegetation becomes established and reduce gully erosion. Plant riparian buffers that will uptake runoff and reduce pollutants once established.</p>
	<p>Construct new stream channels with floodplain connectivity, allowing flood flows to filter through a vegetated floodplain.</p>
	<p>Install fencing around conservation easements adjacent to cattle pastures to exclude cattle from the easement.</p>
<p>Create and improve forested riparian buffers.</p>	<p>Plant native tree and understory species in riparian zone.</p>

2.0 Project Site Location and Selection

2.1 Directions to Project Site

The Site is located in western Cleveland County, approximately 2.5 miles west of Lawndale, as shown in Figure 1. From Lawndale, NC, travel west on W. Stage Coach Trail approximately 2.5 miles to Stick Elliott Road. Turn left onto Stick Elliott Road and continue three quarters of a mile south. Area A of the project, shown on Figure 2a, is located upstream and downstream of Stick Elliott Road. To access Area B (Figure 2b) continue south on Stick Elliott Road an additional three quarters of a mile. The project area is upstream of Stick Elliott Rd. To access Area C (Figure 2c) continue south on Stick Elliott Road to Union Church Road. Turn left onto Union Church Road. Travel approximately 250 yards to Harris Creek Road. Turn left onto Harris Creek Road and travel another three quarters of a mile north. The Lower Big Harris Creek project reach is downstream of Harris Creek Road.

2.2 Site History and Project Components

The Site has been selected to provide stream mitigation units (SMUs) in the Broad River Basin based on the current degraded condition of the Site's streams and the potential for functional restoration described in Section 1.0. Proposed credit determinations are presented in Section 8.0.

The Site has a long history as a potential mitigation site. The Site was first identified in 2008 by DMS staff as a watershed-scale mitigation opportunity. The Site is located in a HUC that was designated as a high priority agricultural TLW and as a "focus area" for DMS in the 2009 RBRP. The initial Environmental Resources and Technical Report (ERTR) for the Site was completed in March 2009. Easement acquisition on 12 parcels, totaling 144.7 acres, was completed on the project area by the end of 2009. The Interagency Review Team (IRT) originally walked the Site in 2010 and requested a "light touch" approach to much of the site. Water quality, benthic, and storm water sampling has been collected for the project by multiple agencies and organizations, beginning in 2009 and as recently as 2013. The existing monitoring data is discussed in more detail in Section 4.2.5.

The availability of the pre-construction monitoring has led to more precise management recommendations for the Site. The proposed management approach, which is discussed in Section 9, has taken previous and recent IRT feedback into account and minimizes construction phase impacts to existing channels and riparian areas while providing the targeted uplifts to the system. Project components include intermittent and perennial stream restoration, enhancement, and preservation, and water quality treatment on ephemeral drainages. Wetlands on site have been delineated and while the project will enhance wetland functions, these improvements will not be associated with wetland mitigation credits. The streams proposed for restoration, enhancement, and preservation include Big Harris Creek and 25 unnamed tributaries.

In order to facilitate discussion of the project for the Mitigation Plan, the Site has been divided into three geographic areas: A, B, and C. The tributaries to Big Harris Creek, were given unofficial stream names as part of this Mitigation Plan. The unofficial names include: Cornwell Creek, Eaker Creek, Scism Creek, Royster Creek, Lower Stick Elliott Creek (LSEC), Scott Creek, Carroll Creek, Elliott Creek, Bridges Creek, Upper Stick Elliott Creek (USEC), Upper Fletcher Creek (UFC) and Lower Fletcher Creek (LFC). Big Harris Creek was divided into two sections: Upper Big Harris Creek (UBHC) and Lower Big Harris Creek (LBHC), also for purposes of discussion. Water quality BMPs are to be located on ephemeral channels (ECs) upstream of UBHC, Scism Creek, Royster Creek (EC 2-5), Scott Creek, and USEC. All project components naming conventions and their associated reach breaks are included in Table 2 below and shown in Figures 2a-2c.

Table 2. Project Components and Naming Conventions - Big Harris Creek Mitigation Site

Project Area	Stream Name	Reach / UT / EC	Existing LF	Perennial / Intermittent/ Ephemeral	NCDWR Stream ID Updated Score	NCDWR Classification
A	Cornwell Creek	Reach 1	2,430	Perennial	-	WS-IV
		UT1	78	Perennial	30	WS-IV
	Eaker Creek	Reach 1	135	Perennial/Intermittent	31.5/20.5	WS-IV
		UT1	45	Intermittent	21	WS-IV
		EC	-	Ephemeral	-	-
	Scism Creek	Reach 1	1,189	Perennial/Intermittent	34/22.5	WS-IV
		EC	-	Ephemeral	-	WS-IV
	Royster Creek	Reach 1	438	Intermittent	22.5	WS-IV
		Reach 2	3,185	Perennial	32	WS-IV
		EC2	-	Ephemeral	-	-
		EC3	-	Ephemeral	-	-
		EC4	-	Ephemeral	-	-
	Lower Stick Elliott Creek (LSEC)	Reach 1	1,422	Perennial	-	WS-IV
		EC	-	Ephemeral	-	-
	Scott Creek	Reach 1	630	Intermittent	28.5	WS-IV
		EC	-	Ephemeral	-	-
	Carroll Creek	Reach 1	553	Perennial	38	WS-IV
	Upper Big Harris Creek (UBHC)	Reach 1	2,615	Perennial/Intermittent	25 (intermittent score only)	WS-IV
		Reach 2	990	Perennial	-	WS-IV
		Reach 3	880	Perennial	-	WS-IV
		Reach 4	1,203	Perennial	-	WS-IV
Reach 5		845	Perennial	-	WS-IV	
Reach 6		2,258	Perennial	-	WS-IV	
UT1		84	Perennial	-	WS-IV	
UT2		97	Intermittent	-	WS-IV	
UT3		105	Intermittent	-	WS-IV	
UT4		84	Perennial	24	WS-IV	
EC		-	Ephemeral	-	-	
B	Elliott Creek	Reach 1	1,389	Perennial	33.5	WS-IV
		UT1	141	Perennial	33.5	WS-IV
	Bridges Creek	Reach 1	445	Perennial/Intermittent	33/25.5	WS-IV
		Reach 2	366	Perennial	-	WS-IV
		UT1	58	Intermittent	24	WS-IV

Project Area	Stream Name	Reach / UT / EC	Existing LF	Perennial / Intermittent/ Ephemeral	NCDWR Stream ID Updated Score	NCDWR Classification
	Upper Stick Elliott Creek (USEC)	EC	-	Ephemeral	-	-
		Reach 1	352	Perennial	33.5	WS-IV
		Reach 2	869	Perennial	-	WS-IV
		Reach 3	1,514	Perennial	-	WS-IV
		Reach 4a	428	Perennial	-	WS-IV
		Reach 4b	113	Perennial	-	WS-IV
		Reach 5	1,909	Perennial	-	WS-IV
		Reach 6	1,036	Perennial	-	WS-IV
		UT1	50	Intermittent	25.5	WS-IV
		UT2	56	Perennial	33	WS-IV
	UT3	107	Intermittent	25.5	WS-IV	
	Upper Fletcher Creek (UFC)	Reach 1	1,493	Perennial	-	WS-IV
		Reach 2	1,465	Perennial	-	WS-IV
	Lower Fletcher Creek (LFC)	Reach 1	574	Perennial	38	WS-IV
Reach 2		467	Perennial	-	WS-IV	
C	Lower Big Harris Creek (LBHC)	Reach 1a	509	Perennial	-	WS-IV
		Reach 1b	385	Perennial	-	WS-IV
		Reach 2	987	Perennial	-	WS-IV
		Reach 3	414	Perennial	-	WS-IV
		UT1	229	Perennial	-	WS-IV
		UT2	511	Perennial	35.5	WS-IV
		UT3	99	Perennial	32	WS-IV
		UT4	362	Perennial	35.5	WS-IV

3.0 Site Protection Instrument

The Big Harris Creek Mitigation Site is located on 12 parcels in Cleveland County, NC. Conservation easements for the project area have been recorded and are held by the State of North Carolina. A summary of the project’s conservation easements, included Deed Book and Page Number, is listed in Table 3. Copies of the Conservation Easements and recorded plats are included in Appendix A. Figures 2a-2c depict the recorded conservation easement areas.

There are three areas of the existing conservation easement boundary that are proposed to be slightly modified in order to provide adequate buffer width (UBHC Reach 6) or to accommodate necessary crossing structures (Royster Creek EC2 and USEC Reach 4b). These areas are shown on Figures 2a and 2b. Wildlands will work with the property owners, DMS, and the NC State Property Office to make the proposed easement modifications. All other figures, included the preliminary design plan set, show the future conservation easement boundary.

Table 3. Site Protection Instrument - Big Harris Creek Mitigation Site

Landowner	PIN	County	Site Protection Instrument	Deed Book and Page Number	Plat Book and Page Number	Acreage Protected
Bridges, James E.	2610989802	Cleveland	Conservation Easement	1591 / 175	33 / 185	15.03
Cornwell, Jo Ellen Shuford	2621167143	Cleveland	Conservation Easement	1581 / 158	33 / 106	6.71
Eaker, Joan H.	2621040101	Cleveland	Conservation Easement	1580 / 2053	33 / 73	24.42
Elliotts Memorial Church	2621147864	Cleveland	Conservation Easement	1595 / 2121	34 / 20	0.42
Holtzclaw, Charles K.	2621713636	Cleveland	Conservation Easement	1587 / 1735	33 / 107	2.56
Jones, Donald E.	2621801772	Cleveland	Conservation Easement	1561 / 1462	32 / 114	12.11
Kernohan, John Joseph	2621713137	Cleveland	Conservation Easement	1581 / 690	33 / 108	1.89
Langley, Ruth E.	2611915501	Cleveland	Conservation Easement	1582 / 322	33 / 54	3.67
Royster, Edwin Stamey	2621016792	Cleveland	Conservation Easement	1557 / 139	32 / 77	0.72
Royster Turkey Farm, Inc.	2621425643	Cleveland	Conservation Easement	1585 / 295	33 / 143	68.49
State of North Carolina	2620292239	Cleveland	Deed Restrictions	1593 / 994	33 / 57	7.09
Whisnant, Janet Beatrice	2620193169	Cleveland	Conservation Easement	1586 / 622	33 / 53	1.67
TOTAL						144.78

All site protection instruments require 60-day advance notification to the Corps and the State prior to any action to void, amend, or modify the document. No such action shall take place unless approved by the State.

4.0 Baseline Conditions- Project Site and Watershed Summary

Table 4 presents the project information and baseline watershed information. The watershed areas were delineated using 2-foot contour intervals derived from Light Detection and Ranging (LiDAR) data. Figure 3 shows the watershed boundaries for the Site and Figure 4 shows the USGS topography.

Table 4. Project Watershed Information - Big Harris Creek Mitigation Site

Project County	Cleveland County
Project Area (acres)	145
Project Coordinates	35° 24' 32.70" N, 81° 36' 41.55" W
Physiographic Region	Piedmont Physiographic Province
Ecoregion	Southern Outer Piedmont
River Basin	Broad
Temperature Regime	Warm
USGS HUC (8 digit, 14 digit)	03050105, 03050105080060
NCDWR Sub-basin	03-08-04

Table 5. Project Watershed Land Use Information - Big Harris Creek Mitigation Site

				% Land Use (2011)										
Area	Reach	Drainage Area at Outlet (acres)	Drainage Area at Outlet (square miles)	Cultivated Crops	Deciduous Forest	Developed, Low Density	Developed, Medium Density	Developed, Open Space	Evergreen Forest	Hay/Pasture	Herbaceous	Mixed Forest	Shrub/Scrub	Woody Wetlands
A	Cornwell Creek	211	0.33	6%	13%	0%	0%	10%	27%	40%	0%	4%	1%	0%
	Eaker Creek	27	0.04	40%	4%	0%	0%	4%	19%	33%	0%	0%	0%	0%
	Scism Creek	40	0.06	0%	23%	0%	0%	9%	0%	68%	0%	0%	0%	0%
	Royster Creek	149	0.23	0%	5%	0%	0%	5%	0%	89%	0%	1%	0%	0%
	LSEC	943	1.47	2%	22%	1%	1%	5%	11%	47%	3%	1%	6%	1%
	Scott Creek	42	0.07	0%	1%	0%	0%	5%	0%	95%	0%	0%	0%	0%
	Carroll Creek	203	0.32	0%	21%	1%	0%	9%	5%	61%	1%	0%	0%	2%
	UBHC	1969	3.08	2%	20%	0%	0%	6%	16%	48%	2%	1%	3%	1%
B	Elliott Creek	82	0.13	0%	33%	0%	0%	3%	6%	51%	6%	0%	0%	0%
	Bridges Creek	38	0.06	0%	6%	0%	0%	0%	5%	77%	3%	0%	8%	0%
	USEC	487	0.76	2%	23%	1%	1%	4%	12%	40%	3%	2%	10%	1%
	UFC	185	0.29	3%	6%	0%	0%	2%	11%	72%	5%	0%	0%	0%
	LFC	266	0.42	2%	10%	0%	0%	3%	9%	69%	4%	0%	2%	0%
C	LBHC	2509	3.92	2%	22%	1%	0%	9%	14%	46%	2%	1%	2%	1%

4.1 Watershed

Big Harris Creek drains 3.9 square miles of rural land approximately 2.5 miles west of the Town of Lawndale in Cleveland County, NC. The watershed has a long history of agriculture, likely dating back to the 1700s or early 1800s, and most of the stressors to stream functions are related to this historic, and current, land use. A description of the watershed and specific stressors is provided in this section.

4.1.1 Land Use

The land within the watershed and surrounding rural area has been primarily used for agriculture for centuries. Historic agricultural practices in this watershed were likely similar to those throughout the western Piedmont. Agriculture production increased significantly in this region during the years 1810-1920. During this period, cotton was the most commonly cultivated crop and consideration of soil management was rare and unsophisticated. It was a common practice to abandon cultivated fields once successive years of growing a single crop resulted in mass erosion and depletion of soil nutrients. In the late 1800s and early 1900s, rising cotton prices and demand resulted in utilization of more land for cotton production. Because the lowlands and gentler slopes were already utilized, land on steeper slopes was cleared. During this period, soil loss rapidly accelerated, even where some form of terracing was practiced. After 1920 there was a general trend of decreasing row crop agriculture in the region. This was due to multiple factors including the degraded condition of the land and introduction of the boll weevil to the area. After the decline of row crop agriculture, steeper slopes were allowed to revert to forest and gentler slopes were maintained as pasture. Soil conservation districts widely promoted the general principles of crop rotation, contour plowing, and proper terracing. At this point, some form of terracing was a nearly ever-present practice in the upper Piedmont (Trimble, 1974). However, broad terraces were unsuccessful at preventing rill and gully erosion unless properly constructed and diligently maintained (Hall, 1949).

Multiple aerial photos of the Site taken between 1938 and 2013 were reviewed to assess how land use and land cover have changed on the Site and to confirm the agricultural practices referenced above were in use on the site (Appendix B). The land in the watershed has been used primarily for agriculture as far back as aerial photos are available. Overall, more of the land is forested today than in 1938, especially at the perimeter of the watershed. This land cover condition matches the concept that steeper areas have been allowed to revert to forest or, in some cases, have been planted for timber production. Signs of terracing can be seen on all historic aerial photos and were evident during on-site inspections. Development in the watershed since the 1930's has included construction of a few paved roads (Stick Elliott, Royster, and Harris Creek Roads), a few, scattered residential dwellings, some agricultural buildings, a church, and a school.

Existing land cover in the watershed consists of: pasture (46%); deciduous forest (22%); evergreen forest (14%); developed (10%); herbaceous (2%); shrub/scrub (2%); cultivated crops (2%); mixed forest (1%); and woody wetlands (1%) (Homer et al, 2015). The largest contiguous impervious area is the Union Elementary School near the upstream end of USEC which includes approximately five acres of impervious surface. Wildlands conducted a watershed assessment to verify current land uses observed from the aerial photography and to identify potential specific stressors. Land use within the watershed was found to be consistent with the recent aerial photography. Currently, the primary agricultural practice in the watershed is grazing cattle. Cattle were observed actively grazing in many of the pastures and many stream reaches are used to provide water for the livestock. There are no signs of recent development or clearing that might have resulted in impacts to aquatic systems. Likewise, there are no indications of impending land use changes or development pressure that would impact the project in the near term after construction.

4.1.2 Watershed Stressors

As stated in Section 1, the major stressors in the Big Harris Creek watershed are all related to the current and historic agricultural land use. It seems likely that nearly all of the watershed was once cleared and used for agricultural production, even the steeper areas. While some areas have been allowed to become re-forested, much of the watershed (over 60%) remains cleared of forest cover. Removal of natural forest cover, along with other factors such as compaction of soil by cattle, can result in altered stream hydrology. These agricultural stressors have resulted in degraded water quality and habitat throughout the watershed when compared to reference conditions. Historic farming practices resulted in incision of streams and erosion of the valleys decades ago. While the downcutting of streams seems to have ceased throughout the watershed, the streams continue to erode laterally to gain pattern and the side gullies are still actively eroding and downcutting. The effects of these stressors, including increased sedimentation from lateral erosion in streams and gully headcutting, are most apparent on the Site near the point of the impact, although they propagate downstream with gradually lessening effect.

4.2 Project Site

4.2.1 Surface Water Classifications and Hydrology

Wildlands reviewed the project area for jurisdictional waters of the US during February and March 2015. A previously issued Jurisdictional Determination (Action ID: SAW-2009-0475) expired in December 2014. Wildlands used the US Army Corps of Engineers (USACE) Routine On-Site Determination Method defined in the 1987 Corps of Engineers Wetlands Delineation Manual and subsequent Eastern Mountain and Piedmont Regional Supplement. Determination methods also utilized the NCDWR Stream Identification Form. Additional stream assessment was performed with the USACE Stream Quality Assessment Worksheet. Stream classification and assessment forms were completed on select project channels that were not delineated in the previous delineation or whose classification were thought to have changed. Potential jurisdictional wetland areas as well as typical upland areas were classified using the USACE Wetland Determination Data Form (refer to Section 6.1 for more information on jurisdictional wetlands).

The results of the on-site field investigation indicate that there are 26 jurisdictional stream channels located within the proposed project area including Big Harris Creek and 25 unnamed tributaries. Figures 5a-5c show the hydrologic features on the Site. Stream classification forms representative of on-site jurisdictional channels are included in Appendix C and site photos are in Appendix D. NCDWR assigns best usage classifications to waters of the state that reflect water quality conditions and potential resource usage. Big Harris Creek is classified as WS-IV throughout the project site. WS-IV is a water supply watershed designation.

A study that included measuring discharge at various locations in the watershed was performed by Western Carolina University (WCU) in 2013. The findings from the study indicate that the runoff response of the watershed appears to be closely linked to rainfall intensity and to antecedent soil moisture conditions. The watershed is not as responsive to moderate to large rainfall events when the rainfall intensity is lower (i.e. long duration, low intensity storms). The study also found that the watershed is “very flashy,” meaning that stormflow stage tends to rise and fall rapidly once runoff begins. The upper watershed is flashier than the downstream portions. Specifically, a monitoring station at the downstream end of the watershed (LBHC Reach 2) had a significantly longer time period for the primary rise and fall of the stormflow hydrograph than a station at the midway point along a major tributary (immediately downstream of USEC Reach 6).

The results of the WCU hydrology analyses are not unexpected. Rainfall intensity and soil moisture conditions normally affect runoff response and larger watersheds typically respond more slowly and have more extended stormflow hydrographs than similar, smaller watersheds. However, the WCU report states that the streamflows did not increase as expected for many moderate to large precipitation events. Flashy flows can increase incision and bank erosion, and this lack of hydrologic response to larger storm events may indicate decreased rate of bank erosion risk on the site for higher storm flows.

4.2.2 Valley Classification

The Site contains several different valley types. UBHC Reaches 2, 3, and its tributaries UT3 and UT4, USEC Reaches 5 and 6, and LBHC and its tributaries flow through broad, flat, alluvial valleys with gently sloped valley bottoms. LSEC, Carroll Creek, UBHC Reaches 5 and 6, USEC Reaches 1, 2, 3, 4a, and 4b, UFC, and LFC flow through narrow alluvial valleys. The remaining streams on the Site flow through colluvial valleys that are moderately steep and U-shaped. In general, where tributaries flowing through colluvial valleys approach their confluence with alluvial valleys on the Site, the valley widens and becomes alluvial. Each stream and its relationship to the surrounding landscape is discussed in detail in Section 5.

4.2.3 Soils

The Site is mapped by the USDA Web Soil Survey (NRCS, 2013). The project soils are mapped primarily as Pacolet sandy clay loam (29.4% of the drainage area), Cecil sandy clay loam (23.7%), Pacolet- Bethlehem complex (28.6%), Pacolet Saw complex (5.1%), Appling sandy loam (5.9%), Chewacla loam (4.3%), Toccoa loam (2.1%), and Helena-Worsham complex (0.9%). Of these soils, the only listed hydric soils are Chewacla (5% of the map unit is likely hydric) and Helena-Worsham (25% of the map unit is likely hydric). None of these soils are classified as highly erodible. However, any soils on 15% slopes or greater may be subject to significant erosion. Figures 6a-6c show the soils on the Site.

Legacy sediments, or sediments eroded off adjacent hillslopes and fields during historic agricultural or anthropogenic activities, may be present in the valleys along the larger reaches. Chewacla and Toccoa soils signify alluvial settings and are likely areas of legacy sediment deposition. Chewacla soils underlay many of the reaches, including Upper Big Harris, Cornwell, Royster, Upper Fletcher, Lower Fletcher, Upper Stick Elliott, and Elliott Creeks. Toccoa soils are present in the vicinity of Lower Big Harris and Lower Stick Elliott Creeks.

4.2.4 Geology and Topography

The Site is located in the Inner Piedmont geologic belt. The rocks of the Inner Piedmont Belt are predominantly metamorphic and range from 500 to 750 million years in age. The underlying geology of the Site is mapped as sillimanite mica schist (EZss), mica schist (EZms), biotite gneiss and schist (EZbg) from the Cambrian and late Proterozoic periods, and Early Ordovician and Cambrian Toluca granite (NCGS, 1985). These rocks are fairly resistant and bedrock outcrops are present across the Site. Bedrock creates natural grade control in many of the channels and has prevented deeper incision in some streams in the watershed.

The observed substrate in the project streams is primarily sand, gravel, and, in Carroll Creek and Upper Big Harris Creek Reach 4, cobble. The substrate appears to be the product of the gneiss and schist through weathering of the less resistant components, including amphibolite, biotite, and plagioclase.

The topography of the area is characterized by gently rolling, well-rounded hills with long, low ridges (Figure 4). The elevations in the watershed range from 885 feet MSE at the watershed outlet to 1,065 feet at the highest point along the ridgeline. The stream valleys within the watershed are characterized



by relatively narrow floodplains and moderately steep side slopes. Because of the narrow valleys, the streams tend to be relatively straight and moderately steep, especially in the headwater reaches.

4.2.5 Water Quality

Water quality data were collected at multiple stations throughout the project site by NCDWR from 2009 through 2012 (Figure 7). NCDWR methods and results are cataloged in the December 2013 *Pre-Construction Water Quality Monitoring Report for Big Harris Creek Restoration Project – Cleveland County* report, provided in Appendix H for review. The data were collected to characterize pre-construction water quality of the system. Stormflow and baseflow samples were collected within the project watershed (16 baseflow sites and five stormflow sites) and within a watershed to the south called Little Harris Creek (four baseflow sites and one stormflow site) which was referred to by NCDWR as a “reference” watershed. The location of the Little Harris Creek watershed is mapped on Figure 8.

Median values of a suite of parameters including nutrients (total phosphorus, nitrite + nitrate nitrogen, ammonia nitrogen, and total Kjeldahl nitrogen), specific conductance, fecal coliform, and total suspended residues were calculated for baseflow and stormflow conditions. These median values were compared between sampling locations to provide an analysis of spatial variation in water quality and to provide some initial indications of differences between the project watershed and reference watershed. Based on these data, the water quality of the Big Harris Creek project watershed is more degraded for many parameters compared to the Little Harris Creek watershed. Parameters of concern for the project watersheds include nutrients, fecal coliform bacteria, specific conductance, and suspended sediment in stormflow. In general, the poorest water quality within the project subwatersheds appears to be on the mainstem of Big Harris Creek in the vicinity of Royster Road (UBHC Reaches 2 and 3). In this location, which is approximately halfway through the project watershed, median concentrations for nitrogen, phosphorous, and fecal coliform are all significantly worse than the Little Harris Creek reference watershed for both baseflow and stormflow samples. At the downstream end of the project area (LBHC), median values for most parameters are more similar to reference condition levels, except for total phosphorus (baseflow only), and specific conductance. Fecal coliform concentrations at baseflow are also high in a major tributary system that flows from Stick Elliott Road and enters Big Harris Creek just east of Royster Road (LFC Reach 2 and USEC Reach 6). Fecal coliform is elevated at most monitoring locations in the project watershed compared to the Little Harris Creek reference watershed for baseflow and every station for stormflow. A separate suspended solids concentration (SSC) stormflow study was also performed by NCDWR. The results of this study indicate that both Royster Creek and USEC have higher mean suspended sediment concentration at stormflow than two locations on the mainstem including UBHC Reach 2 and the downstream end of the project at LBHC Reach 2.

The results of the water quality studies suggest that degraded water quality results where cattle access the stream but that many of the pollutants dissipate or become diluted in downstream reaches where cattle are not accessing the streams. Cattle have access to the mainstem and tributaries in the vicinity of Royster Road, where fecal coliform and nutrient concentrations are high, but not at the downstream end of the project where concentrations are lower. Fecal coliform concentrations are also particularly high (compared to reference conditions) at other locations where cattle access the stream including a monitoring location at Stick Elliott Road on UBHC Reach 3, just downstream of Eaker Creek, and on UFC Reach 2. At locations where cattle do not presently access streams, even significantly downstream of locations where they do have access, concentrations of fecal coliform are lower at baseflows. During stormflows fecal coliform are elevated everywhere, which is likely due to movement of waste and contaminated sediments downstream.

Stormflow TSS is also high where cattle access streams and downstream of areas of significant erosion. Monitoring stations at Royster Creek Reach 2 and USEC Reach 6 have high stormflow TSS results. The



watersheds of these tributaries are mostly pasture and cattle have access to the streams. In addition, there is significant lateral bank erosion along the tributaries and smaller channels. Gullies in the watersheds are actively headcutting. The Royster Creek and USEC reaches in particular have several massive headcuts, approximately 10 to 20 feet vertically, that are actively eroding and contributing large volumes of sediment to the system.

There are no point sources within the watershed and the only runoff from an area of significant impervious cover is from Union Elementary School, located at the headwaters of USEC Reach 1. While this five-acre site likely produces runoff with elevated levels of pollutants associated with urban development, its effects on the overall system were not detected.

The main purpose of the data collection was to characterize the pre-construction water quality of the project watershed. While the data indicate differences in water quality between the project watershed and the NCDWR-identified water quality reference watershed, NCDWR indicated in the report that a better understanding of the intensity of livestock production in the reference watershed would be necessary to make better water quality comparisons between the two watersheds. Due to the presentation of the data in the NCDWR report in a series of 20 box and whisker plots and 12 maps, there is no way to concisely display the data in this document. The NCDWR report is included in Appendix H.

4.2.6 Aquatic Habitat and Biology

Aquatic habitat and biology were sampled at stations throughout the watershed by NCDWR in 2009 and 2013 (Figure 7). NCDWR methods and results are cataloged in the January 2014 *Macroinvertebrate Results for Big Harris Creek Broad River Basin, Cleveland County – Spring 2013* report, provided in Appendix H for review. NCDWR rated habitat at ten sites in the study watershed and also at four sites in the Little Harris Creek reference watershed using the NCDWR Biological Assessment Branch's Qual 4 assessment protocol for Piedmont and mountain streams (NCDWR 2016). The method results in a numerical score which can be compared to scores of other locations or streams. Five monitoring locations in the project watershed had habitat scores in the range of the four reference watershed sites. These include the lower end of Royster Creek Reach 2, UBHC Reach 5, the downstream end of LSEC, LBHC Reach 2, and UT2 to LBHC. All other stations, including all stations on Big Harris Creek, except for the station near Stick Elliott Road on UBHC Reach 2, received ratings lower than the reference streams. Two stations on tributaries had habitat scores significantly lower than the reference sites. These include USEC Reach 6 and UFC Reach 1. The lowest bioclassification rating (based on benthic monitoring) of any of the stations was for UFC Reach 2.

Many of the stream channels impacted by historic incision are now stabilized at lower elevations relative to the original floodplains. In many locations, the bedforms are diverse and the substrates are the appropriate-sized gravel and cobble for the location and size of the project streams. Good or even excellent aquatic habitat was noted in many locations throughout the watershed. Poor habitat was also identified in multiple locations, especially where cattle access the streams. More information on available habitats is provided by reach in Section 5. The worst benthic macroinvertebrate score, or bioclassification, is located in a reach impacted by cattle on UFC Reach 2. One benthic station near the upstream end of Big Harris Creek has an excellent bioclassification and is not impacted by cattle. Overall, the aquatic habitat and benthic macroinvertebrates studies throughout the watershed have indicated good quality of habitats and communities, but not as high quality as reference reaches. The habitat and benthic community impacts are mostly due to cattle trampling and sediment covering bedforms.

4.2.7 Vegetation Communities

There are two primary natural vegetation communities found throughout project area: Piedmont alluvial forest and mesic mixed hardwood forest / dry-mesic oak-hickory (Schafale & Weakley 1990 and Schafale

2012). There are also sections of the project area that have previously been planted for timber and areas where invasive species were identified. Specific species of vegetation that were observed in the project area are described in more detail below.

4.2.7.1 Piedmont Alluvial Forest

This type of vegetative community is typically found along small to medium size streams where flooding and alluvial processes have a modest effect on vegetation. The forest type has limited diversity and dominance of floodplain species. The typical canopy coverage was observed within the project area. It consists of tulip poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), American sycamore (*Platanus occidentalis*) and river birch (*Betula nigra*). Other species found in these areas include red cedar (*Juniperus virginiana*), water oak (*Quercus nigra*), white oak (*Quercus alba*) and red maple (*Acer rubrum*). The understory growth consists of a variety of species such as spicebush (*Lindera benzoin*), American holly (*Ilex opaca*), black cherry (*Prunus serotina*), sugarberry (*Celtis laevigata*) and flowering dogwood (*Cornus florida*). The herbaceous layer in the project area is more abundant and contains deertongue (*Dichanthelium clandestinum*), giant cane (*Arundinaria gigantea*), dense patches of jewelweed (*Impatiens capensis*), asiatic dayflower (*Commelina communis*), curly dock (*Rumex crispus*), Virginia creeper (*Parthenocissus quinquefolia*), and wingstem (*Verbesina alternifolia*). In some areas of the project there were various types of moss (*Bryophyta* sp.), violet (*Viola* sp.) and fern patches containing Christmas fern (*Polystichum acrostichoides*), sensitive fern (*Onoclea sensibilis*) and hay scented fern (*Dennstaedtia punctibobula*). These forest areas are typically surrounded by larger floodplains, which is consistent with this project setting. These extended, larger floodplain areas of the project are pasture and agricultural fields. The agricultural fields contain fescue (*Festuca* sp.) and several types of warm season annual grass such as crabgrass (*Digitaria* sp.) and cool season annual grasses such as ryegrass (*Lolium* sp.).

4.2.7.2 Mesic Mixed Hardwood Forest / Dry-Mesic Oak-Hickory

These natural communities are located on acidic slopes that lack evidence of flooding. The dominant species found in this forest on the Site is the American beech (*Fagus grandifolia*) along with a variety of oak species such as the water oak, white oak, red oak (*Quercus rubra*) and swamp chestnut oak (*Quercus michauxii*). Other canopy hardwoods identified include tulip poplar, American hornbeam (*Carpinus caroliniana*), green ash (*Fraxinus Americana*) and shortleaf pine (*Pinus echinata*). The understory vegetation includes sourwood (*Oxydendrum arboreum*), American holly, blueberry (*Vaccinium stamineum*), flowering dogwood, and mountain laurel (*Kalmia latifolia*). The herbaceous layer is relatively sparse other than areas where canopy coverage is minimal. Observed herbaceous species included common blackberry (*Rubus argutus*), poison ivy (*Toxicodendron radicans*), Virginia creeper, wild grapevine (*Vitis vinifera*), pokeweed (*Phytolacca americana*), Christmas fern and moss along the stream banks. A heartleaf species (*Hexastylis* sp.) was observed but the exact species was not identified. More on this species is included in Section 6.2

4.2.7.3 Timber Forest

There is a section of forest within the project area that has been planted for timber harvesting. Planted species include pitch pine (*Pinus rigida*) and white pine (*Pinus strobus*) which is located along UBHC - Reach 1, Reach 2, UT1, UT2 and UT3.

4.2.7.4 Invasive and Undesirable Species

Several invasive species were identified within the project area. These species include Chinese privet (*Ligustrum sinense*), thick areas of stilt grass (*Microstegium vimenium*), multiflora rose (*Rosa multiflora*), Japanese honeysuckle (*Lonicera japonica*) and kudzu (*Pueraria lobata*). In addition to those species listed



above, a dense section of hardy orange (*Poncirus trifoliata*) was present along Cornwell Creek. Fescue dominates pasture land throughout the site.

4.2.8 Utilities and Site Access

There is one overhead electric power lines that crosses the Site. There are no other utilities located within the project boundary.

Site access and parking locations preferred by the property owners are shown on Figures 2a-2c.

5.0 Baseline Information – Stream Reach Summaries

The existing stream reaches are characterized here in terms of key geomorphic descriptors and stability indicators including Rosgen stream type, entrenchment ratio, bank height ratio, and width-to-depth ratio.

Due to the unique availability of long-term pre-construction monitoring data at the Site, a qualitative functional assessment (Harman et al., 2012) was used along with the geomorphic stability indicators in order to help with the selection of management recommendations. In a qualitative functional assessment, each functional category (Hydrology, Hydraulics, Geomorphology, Physicochemical, and Biology) is evaluated for each reach to be Functioning, Functioning-At-Risk, or Not Functioning. An overall functional capacity is then determined for each reach and provided in the subsequent tables with descriptions of how these conclusions were reached. Definitions of each of the functional conditions are provided below.

A Functioning score means that the measurement method is quantifying the functional capacity of one aspect of a function-based parameter in a way that does support a healthy aquatic ecosystem. A single functioning measurement method, out of several measurement methods, may not mean that the function-based parameter is functioning. Therefore, functional capacity (Functioning, Functioning-At-Risk, or Not Functioning) is “rolled up” to the parameter level and not determined at the measurement method level. Results can then be “rolled up” to determine functional capacity at the functional category level and as a final determination across all functional categories.

A Functioning-At-Risk score means that the measurement method is quantifying or describing one aspect of a function-based parameter in a way that can support a healthy aquatic ecosystem. In many cases, this indicates the function-based parameter is adjusting in response to changes in the reach or the watershed. The trend may be towards lower or higher function. A Functioning-At-Risk score implies that the aspect of the function-based parameter, described by the measurement method, is between Functioning and Not Functioning.

A Not Functioning score means that the measurement method is quantifying or describing one aspect of a function-based parameter in a way that does not support a healthy aquatic ecosystem. A single not functioning measurement method may not mean that the function-based parameter is not functioning.

The project stream reaches functional assessment scores, Rosgen stream type, entrenchment ratio, bank height ratio, and width-to-depth ratio are outlined in Tables 5a-5aa.

5.1 Project Area A

Project Area A consists of UBHC and its tributaries: UT1, UT2, UT3, UT4, Cornwell Creek, Eaker Creek, Scism Creek, Royster Creek, LSEC, Scott Creek, and Carroll Creek (Figure 5a). The streams are at varying stages of degradation and recovery. Many of the streams are deeply incised; however, the streambeds have stabilized and begun to recover. Livestock have access to the majority of reaches in Project Area A, and livestock trampling has resulted in mass wasting of bank material and fining of bed material.



Livestock grazing has also limited the growth of a vegetative understory in existing forested areas. The presence of riparian buffers vary widely across the site as some areas are in timber production (UBHC Reaches 1 and 2, and UT1-UT4) and other areas are active cattle pastures. Sections 5.1.1-5.1.8 describe each reach in detail and provide a synopsis of geomorphic parameters. Full geomorphic parameters from topographic survey are presented in Appendix E.

5.1.1 Cornwell Creek

Cornwell Creek is a tributary channel that joins UBHC near the upstream project boundary. Trees in the watershed are approximately 10 to 20 years old. Cornwell Creek has a continuous wooded riparian buffer ranging from 5 to over 50 feet wide off both banks. While there are no cleared areas immediately adjacent to the stream, maintained fields are present in both the left and right floodplains. Cattle have access to this creek, in particular at the existing ford crossing and from pastures adjacent to the creek. Invasive species, including Chinese privet, were noted throughout the buffer.

Cornwell Creek is incised with a bank height ratio (BHR) of 4.7 to 5.0 and is entrenched. Despite the incision, the streambed appears geomorphically stable with good bedform diversity and low potential for further erosion. Bed material is coarse and riffles are relatively free of fine sediment. Cornwell Creek has built sporadic floodplain benches within the larger, incised channel providing areas of flood relief along its length. Above the floodplain bench, the banks are vegetated and stable. Cornwell Creek classifies as a Rosgen type B4c. The evolutionary stage of this channel can be best described as quasi-equilibrium (Stage VI) because of the sporadic and developing floodplain benches.

The aquatic biology of this stream appears to be fully functioning: aquatic insects and small fish were observed throughout. Fish redds were also observed in the upstream portion of the project reach.

Table 5a. Summary of Geomorphic Form, Functions, and Stressors - Cornwell Creek

Watershed		Notes
Drainage Area (sq. mi)	0.33	
Geomorphic Form		Notes
Rosgen Stream Type	B4c	
Valley Type	Colluvial	
Entrenchment Ratio	1.3-1.8	Range taken from two surveyed riffle cross sections.
Bank Height Ratio	3.8-6.2	Range taken from two surveyed riffle cross sections.
Width-to-Depth Ratio	10.1-20.2	Range taken from two surveyed riffle cross sections.
Simon Evolution Stage	VI	
Functional Category	Condition	Description
Hydrology	FAR	Portions of the watershed have been cleared, developed, and logged.
Hydraulics	F	Stream has constructed floodplain benches after incision and now has access to floodplains
Geomorphology	F	Bedform diversity is good, substrates include larger material. Banks are stable.
Physicochemical	FAR	Fecal coliform and fines may be linked to cattle access.
Biology	F	Aquatic communities are functioning, aquatic insects and small fish observed throughout.
Overall	FAR	This stream has stabilized following past incision and now has a functioning floodplain at a lower elevation. Bedforms are diverse and aquatic communities are thriving.

5.1.2 Eaker Creek

Eaker Creek flows through a wooded area of approximately 5- to 15-year-old trees and Chinese privet, joining UBHC just west of Stick Elliott Road. This reach is incised (BHR of 3.2 to 3.5), straight, and is undergoing active lateral erosion as evidenced by vertical and unvegetated stream banks. The bed is predominantly clay with some gravel and cobble in riffle sections. As the stream enters the floodplain of UBHC, it transitions from an incised channel to an undefined channel with subsurface flow. The channel

reforms approximately 150 feet downstream with a seven-foot headcut and flows into UBHC. This portion of the channel is highly incised, actively degrading, and is best described as Simon evolutionary Stage IIIa - degradation with undercutting. Without intervention, the seven-foot headcut will continue to move upstream and degrade, until it widens and forms a new equilibrium. The stream flows adjacent to Stick Elliott Road for approximately 75 feet, which is the only constraint to potential redesign.

Table 5b. Summary of Geomorphic Form, Functions, and Stressors - Eaker Creek

Watershed		Notes
Drainage Area (sq. mi)	0.04	
Geomorphic Form		Notes
Rosgen Stream Type	A4	
Valley Type	Colluvial	
Entrenchment Ratio	1.9-2.0	Range taken from two surveyed riffle cross sections.
Bank Height Ratio	3.1-3.5	Range taken from two surveyed riffle cross sections.
Width-to-Depth Ratio	6.6-6.9	Range taken from two surveyed riffle cross sections.
Simon Evolution Stage	IIIa	
Functional Category	Condition	Description
Hydrology	FAR	Portions of the watershed have been cleared, developed, and logged.
Hydraulics	NF	Stream is generally not connected to floodplain; bank erosion may be attributed to in-channel velocities.
Geomorphology	NF	Bedform diversity is poor, substrates dominated by fines, banks are vertical and eroding in many locations.
Physicochemical	FAR	High fecal coliform from upstream and fines are likely a problem for this reach.
Biology	FAR	While substrates are not as large or variable in size for this reach, aquatic biology appropriate for this type of stream should be present. With better substrates, biology could improve.
Overall	NF	The stream has downcut and is eroding laterally. Pollution from upstream pastures enters this stream. Substrates and bedforms likely do not support abundant and diverse biology.

5.1.3 Scism Creek

Scism Creek originates within the project limits just east of Stick Elliott Road at the low point in a gently sloped valley maintained as pasture. No impoundments are present in the watershed and there are only a few small, disconnected impervious areas in the watershed. Hydrology to the system is likely impacted to some degree by the maintained pastureland. Several gullies have formed at concentrated flow locations from the surrounding pastures. As drainage area increases, a defined channel with actively eroding bed and banks forms (Simon Stage I: undisturbed, moving towards Stage II: channelized). A 5-foot wooded buffer is present along the stream with maintained pasture beyond. Approximately 100 LF downstream from where the feature becomes jurisdictional, the stream drops approximately 15 feet over an active headcut and enters a deep, canyon-like valley that appears to have been formed by fluvial erosion (Simon Stage III/IV). The stream transitions here from a Rosgen type B stream to a G4 due to the incision of the system. The streambed has reached a point of vertical stability within this deep valley.



Scism Creek below 15-foot headcut

Some outer bend erosion along with some mid-channel and lateral bars are present, and bedforms appear dominated by runs with a few riffles (Simon Stage V). DMS's pre-construction monitoring cross-sections showed relatively no change in the pool cross-section, and the riffle cross-section narrowed from 2013 to 2014. Along the stream and the new valley walls, the buffer consists entirely of Japanese stiltgrass with intermittent mature hardwoods. More hardwood species are present on the historic floodplain, but the understory is sparse and impacted by grazing. The stream continues in this condition down valley and encounters bedrock where Scism Creek's valley meets the broad valley of UBHC. Within the UBHC valley, the stream regains floodplain connectivity but livestock access to the stream here has destroyed bed and bank definition and the bed consists primarily of fine silts with no available aquatic habitats. Just upstream of the stream's confluence with UBHC, the stream again drops several feet over an active headcut (Simon Stage III) and then flows out over a bedrock outcrop to meet the invert of UBHC.

WCU's passive, multi-stage sediment sampler WCU-7, located near the outlet of Scism Creek, reported markedly higher concentrations of suspended sediments during storm flows than several other sites sampled throughout the watershed. It appears that the active headcuts and lateral erosion processes, which represent Stages III, IV and V of Simon's evolutionary sequence, combined with the disturbance from livestock are contributing to increased suspended sediments during storm flows and have decreased the quality of aquatic habitats by filling pools and fining of riffles.

Table 5c. Summary of Geomorphic Form, Functions, and Stressors - Scism Creek

Watershed		Notes
Drainage Area (sq. mi)	0.06	
Geomorphic Form		Notes
Rosgen Stream Type	B4 - G4	Transitions from a B4 to a G4 as incision increases below headcut
Valley Type	Colluvial, Alluvial	
Entrenchment Ratio	1.3 – 1.3	Range taken from two surveyed riffle cross sections.
Bank Height Ratio	7.5-10.7	Bank height ratios reduce at confluence with Upper Big Harris Creek. Range taken from two surveyed riffle cross sections.
Width-to-Depth Ratio	8.4-26.3	Range taken from two surveyed riffle cross sections.
Simon Evolution Stage	III, IV, V	
Functional Category	Condition	Description
Hydrology	FAR	Upper watershed is pastured: may affect rainfall-runoff relationship.
Hydraulics	FAR	Floodplain access ranges from none, floodplain developing at lower elevation, or full connection in isolated areas.
Geomorphology	NF	Incised, active lateral and vertical erosion (two active headcuts), poor quality riparian buffer, low bedform diversity.
Physicochemical	NF	Cattle in the stream, active agricultural pasture draining to stream (potential for fertilizer/nutrient loading), high suspended sediment concentrations during storms.
Biology	NF	Aquatic habitats dominated by silted in runs, low quality habitats throughout most of the stream length.
Overall	NF	Active headcuts and lateral erosion, limited floodplain access, cattle present, high suspended sediments during storms, few/poor aquatic habitats.

5.1.4 Royster Creek

Royster Creek originates outside of the project limits at the low point in the valley between two terraced farm fields. No impoundments are present in the watershed. The watershed includes several single family residential homes, forested land, active agricultural fields, and pasture adjacent to the stream. Hydrology to the system is strongly influenced by the concentrated flow paths produced by land terracing. Several gullies have developed at these concentrated flow paths and erosion from the gullies appears to contribute large volumes of sediment to the system particularly on Reach 2. The stream is straight and deeply incised with banks that are bare and erodible. The buffer consists of a 5-10-foot corridor of mature trees with active cattle pasture beyond. Tree roots have little stabilizing effect on the channel banks due to the depth of incision. Invasive species such as Chinese privet are present but do not dominate the wooded buffer area.

Royster Creek flows through a narrow colluvial valley. The valley floor is slightly wider on Reach 1, above the large headcut, and significantly narrows downstream. This narrowing can be attributed to the historic incision and widening undergone by Royster Creek while the land was being farmed for cotton. The bed of Royster Creek Reach 1 is clay and lacks bedform features. Royster Creek crosses through a farm culvert, drops over multiple stable knickpoints, and becomes progressively more incised. The break between Reach 1 and Reach 2 is at the knickpoints. Reach 1 of Royster Creek appears to be in Simon Stage III/IV (degrading and widening). The bed substrate begins to diversify moving downstream into Reach 2, and gravels and cobbles are present. Bank erosion still seems active through Reach 2. Below the confluence with Royster Creek EC2 drainage, the stream is choked with old farm garbage for approximately 30 feet before dropping over a 15-foot bedrock slide. Aquatic habitat is well developed and consists of deep pools formed around the roots of 100-year old trees and gravel/cobble riffles.

Stream banks have spot areas of erosion, but the bed and banks do not appear to be actively eroding. The old stream banks from where the channel incised years ago have become new valley walls for this system. The stream appears to be in late Stage V of the Simon sequence (aggrading and widening) or at Stage VI - quasi-equilibrium. Moving downstream, bar features and narrow bankfull benches develop. Below the confluence with Royster Creek EC5 drainage, where cattle actively access to the stream and bank trampling with fine sediment deposition on the bed begins to degrade the available aquatic habitats. Royster Creek continues to show good bedform, though impaired by cattle access, from this point to the confluence with UBHC.

Monitoring data from Royster Creek reported higher conductivity values and higher nutrient concentrations during baseflow than other areas of the Site (Appendix H). The NCDWR report suggests that the sediment and nutrient loading may come from livestock or wildlife sources. WCU's passive, multi-stage sediment sampler WCU-5, located near the outlet of Royster Creek, reported markedly higher concentrations of suspended sediments during storm flows than several other sites sampled throughout the watershed. It is likely that the active vertical and lateral erosion processes from Royster Creek Reach 1 and the ephemeral drainages contributing to Royster Creek (including EC2, EC3, EC4, and EC5) combined with the disturbance from livestock are contributing both to increased suspended sediments during storm flows and may have decreased the quality of aquatic habitats by filling pools and fining of riffles. Macroinvertebrate sampling conducted at Site 8 (near the outlet of Royster Creek) received a 'Good' bioclassification in 2013, so while fine sediments are clearly a problem based on other monitoring data, they are not having a devastating effect on the macroinvertebrate populations.

Table 5d. Summary of Geomorphic Form, Functions, and Stressors - Royster Creek

Watershed		Notes	
Drainage Area (sq mi)	0.23		
Geomorphic Form	R1	R2	Notes
Rosgen Stream Type	G4c	F4b	
Valley Type	Colluvial		
Entrenchment Ratio	1.2-1.5	1.2-1.3	Ranges taken from 3 surveyed cross sections each on Reach 1 and Reach 2.
Bank Height Ratio	6.2-7.3	8.4-16.7	Ranges taken from 3 surveyed cross sections each on Reach 1 and Reach 2.
Width-to-Depth Ratio	3.9-9.6	12-45.4	Ranges taken from 3 surveyed cross sections each on Reach 1 and Reach 2.
Simon Evolution Stage	III/IV	V/VI	
Function Category	Condition		Description
Hydrology	FAR		Watershed is dominated by terraced agricultural fields and pasture; likely affects rainfall- runoff relationship.
Hydraulics	FAR		No floodplain access to the historic floodplain, but stream has developed new floodplain features at lower elevations throughout much of the reach.
Geomorphology	FAR		Very incised, but most of stream length has stabilized at new elevation.
Physicochemical	NF		Cattle in the stream, high suspended sediment concentrations during storms, high recorded conductivity and nutrient levels.
Biology	FAR		Aquatic habitats are impacted by fines in lower Reach 2, but bioclassification from sampling indicates 'Good' bioclassification.
Overall	FAR		Overall good habitat despite deep incision; stream has come to equilibrium at lower elevation. Cattle access and gully erosion are clear nutrient/sediment problem.

5.1.5 Lower Stick Elliott Creek (LSEC)

LSEC receives drainage from USEC in Project Area B. No impoundments are present in the watershed, and drainage to the system includes mostly forest and pastureland with some agricultural lots and some light public/institutional land use at the Union Elementary School. Hydrology to these reaches appears undisturbed but is likely impacted by the variety of land uses in the watershed. The channel is incised and overwidened and exhibits bedrock outcrops and good bedform diversity. The riparian buffer consists of mature woods. Cattle were observed throughout the reach. The approved Categorical Exclusion for the project notes that the federally threatened Dwarf-flowered heartleaf (*Hexastylis naniflora*) may be present within the buffer of this reach. A bedrock slide is present mid-reach and the creek flows through a large meander bend to join UBHC. LSEC exhibits active lateral erosion undermining mature tree roots and threatening the trees' overall stability. The reach includes undercut banks, some woody debris, root mats, bedrock outcrops, and some fine-grained riffles. While available aquatic habitats are varied, they are subject to fine sediment deposition from the actively eroding stream banks; depositional bars are present throughout the reach. LSEC appears to be in Simon Stage V (widening and depositing). The buffer through this section of the project consists of a mature, hardwood canopy with a sparse understory that is impacted by grazing.



Lower Stick Elliott Creek

Baseflow water quality data were collected on this zone from April 2009 to September 2010 (Site 6 in the NCDWR December 2013c report, Appendix H); however, the data appeared similar to data collected at other sites throughout the watershed and did not shed light on any particular stressors to this reach. Macroinvertebrate monitoring was conducted on LSEC. The macroinvertebrate sampling was conducted in 2009 and 2013, and Site 6 (near Lower Stick Elliott's confluence with UBHC) experienced a decline in both number of EPT taxa and bioclassification over those years. The NCDWR report summarizing the results of macroinvertebrate sampling across the Site ranked Site 6 as the third worst site on the project.

Table 5e. Summary of Geomorphic Form, Functions, and Stressors - LSEC

Watershed		Notes
Drainage Area (sq. mi)	1.47	
Geomorphic Form		Notes
Rosgen Stream Type	F4 - C4	
Valley Type	Alluvial	
Entrenchment Ratio	1.2 - 1.8	Ranges taken from 3 surveyed cross sections.
Bank Height Ratio	3.8 - 4.4	Ranges taken from 3 surveyed cross sections.
Width-to-Depth Ratio	21.4 - 52.4	Ranges taken from 3 surveyed cross sections.
Simon Evolution Stage	V	
Functional Category	Condition	Description
Hydrology	FAR	Watershed includes mixed land use including forest, pasture, active agriculture and some public/industrial. Hydrology likely impacted by land use.
Hydraulics	FAR	Stream is incised and banks are subject to high shear stresses.
Geomorphology	FAR	Active lateral erosion, active deposition on bed. Bedform diversity adequate.
Physicochemical	FAR	Cattle in the stream, active agricultural pasture draining to stream (potential for nutrient loading), however baseflow water quality data comparable to other areas of the site.
Biology	FAR	Macroinvertebrate populations ranked as third worst on the project site.
Overall	FAR	Active lateral erosion, macroinvertebrate populations are good but macroinvertebrates may be on the decline.

5.1.6 Scott Creek

Drainage to Scott Creek includes an active farm complex, farm fields, and pasture adjacent to the stream system. Hydrology to the system appears undisturbed but is likely impacted by the maintained pastureland in the watershed. There is a narrow wooded buffer along the stream, however the buffer’s understory is choked with invasive vines and shrubs. Maintained pasture exists beyond the buffer. Scott Creek becomes intermittent within the project limits. On the intermittent reach, the stream banks are vertical and eroded. Available habitat features include pools and large woody debris. A knickpoint was observed at an old fence line where debris was piled in the stream. Cattle have access to some of this reach. The intermittent stream appears to be in Simon Stage IV/V with the potential for continued bed degradation (Simon Stage III) if knickpoints are destabilized or undermined.

While no water quality data was collected on this zone, a single-stage, passive sampler was established near the outlet of Scott Creek (WCU-4). Scott Creek reported higher suspended sediment contributions during stormflow than other areas of the Site (Appendix H). These concentrations are likely from active bed and bank erosion observed throughout the stream.

Table 5f. Summary of Geomorphic Form, Functions, and Stressors - Scott Creek

Watershed		Notes
Drainage Area (sq. mi)	0.07	
Geomorphic Form		Notes
Rosgen Stream Type	A4	
Valley Type	Colluvial	
Entrenchment Ratio	1.2–1.4	Ranges taken from 2 surveyed cross sections.
Bank Height Ratio	3.8–10.6	Ranges taken from 2 surveyed cross sections.
Width-to-Depth Ratio	7.4-30.8	Ranges taken from 2 surveyed cross sections.
Simon Evolution Stage	III	
Functional Category	Condition	Description
Hydrology	FAR	Upper watershed is farmed: may affect rainfall-runoff relationship.
Hydraulics	NF	No floodplain access.
Geomorphology	NF	Incised, active lateral erosion with potential for vertical erosion (manmade knickpoints), poor quality riparian buffer, low bedform diversity.
Physicochemical	NF	Cattle in the buffer, active agricultural pasture draining to stream (potential for fertilizer/nutrient loading), high suspended sediment concentrations during storms.
Biology	FAR	Aquatic habitat diversity is low, dominated by pools and wood.
Overall	NF	Active lateral erosion, no floodplain access, cattle present, few/poor aquatic habitats, high suspended sediment concentrations during storm flow.

5.1.7 Carroll Creek

Carroll Creek is a perennial drainage that originates outside the project limits at the outlet of a pond and flows south to meet UBHC. The watershed consists of a forested stream corridor with some active agricultural pastures and fields in the upper watershed. Within the project limits, the stream is incised, but has some well-formed bed features including deep pools in bends with large root mass and woody overhangs, woody debris, and some riffles composed of mixed substrate sizes. Alternating banks show signs of erosion, however the erosion does not appear to be active (Simon Stage IV/V). The riparian buffer immediately adjacent to the stream is wooded with a high density of invasive species in the understory, while the outer extents of the buffer consist of active cattle pasture. The reach is currently fenced off from livestock and the stream is entirely shaded. No active headcuts were observed in this reach. No pre-construction monitoring was conducted on this reach.

Table 5g. Summary of Geomorphic Form, Functions, and Stressors - Carroll Creek

Watershed		Notes
Drainage Area (sq. mi)	0.32	
Geomorphic Form		Notes
Rosgen Stream Type	E4 – G4c	Varies based on degree of incision
Valley Type	Alluvial	
Entrenchment Ratio	1.2 - 1.5	Ranges taken from 2 surveyed cross sections.
Bank Height Ratio	3.4 - 5	Ranges taken from 2 surveyed cross sections.
Width-to-Depth Ratio	6.6 – 12.5	Ranges taken from 2 surveyed cross sections.
Simon Evolution Stage	IV/V	
Functional Category	Condition	Description
Hydrology	FAR	Stream originates at the outlet of a pond offsite, which may regulate hydrology to the system.
Hydraulics	NF	The stream incised and lacks access to a floodplain
Geomorphology	FAR	Incised with some signs of lateral instability. Some stable bedform features present.
Physicochemical	FAR	Pond in headwaters may provide some treatment for agricultural fields draining to it. Some pastureland below pond in watershed, however majority of watershed is forested.
Biology	FAR	Habitats present, however bank instability and fine sediment contributions may limit potential for intolerant species.
Overall	FAR	Stream is generally functional but limited floodplain access and bank erosion are impairments to water quality and habitat.

5.1.8 Upper Big Harris Creek (UBHC) and its contributing tributaries UT1, UT2, UT3, and UT4

UBHC is the main channel through Area A. The upstream portion (Reaches 1, 2a, 2b, UT1-UT4) of UBHC flows through a dense forest of young, mostly coniferous, trees up to approximately 15 years in age. The buffer is overgrown with briars, Chinese privet, and other understory plants. The channel is incised through this area. As UBHC flows east, the riparian buffer varies in width with large hardwood trees and little to no understory due to livestock access. The stream is incised and widened with varying degrees of stability and recovery from Reaches 3-6. Each reach is described in greater detail in the sections below.



Upper Big Harris Creek

5.1.8.1 UBHC Reach 1 and its contributing tributaries UT1 and UT2

The watershed to this portion of UBHC and its tributaries UT1 and UT2 is largely wooded. There are areas along the perimeter that have been cleared for residential land use. The reaches flow through a dense forest of young trees up to approximately 15 years in age west of Stick Elliott Road. The buffers also have invasive species including Chinese privet. UBHC Reach 1 is somewhat sinuous but confined within a fairly tight valley with a narrow floodplain that broadens in the downstream direction. The stream is narrow and deeply incised. UBHC Reach 1 most closely classifies as a Rosgen type B4c stream. In discrete locations, one or both banks are eroded. The incision occurred in the past and the bed is now stable due to bedrock in the channel. However, the incised channel prevents moderate flood flows from accessing the floodplain which results in increased shear stress on the channel banks. Fluvial erosion is evident along the lower half of many sections of bank while the upper portions have been held in place by the root systems of adjacent vegetation. Undercuts with overhanging bank sections that will

eventually fail are present. This process corresponds to Stage IIIa-degradation with undercutting according to Simon’s model of stream evolution (1989). UBHC Reach 1 appears horizontally stable due to lower, less steep banks and more mature native vegetation. The evolution of this stream corresponds most closely with Stage III of Simon’s model; however, the stream appears both vertically and horizontally stable and does not appear to be moving towards Stage IV at this time. UBHC Reach 1 has good bedform diversity that decreases in the downstream direction. The bed material includes gravel, cobble, and bedrock with fine sediments in pools.

NCDWR performed benthic sampling on UBHC at Stick Elliott Road (NCDWR Station 13, Appendix H). The overall bioclassification for this station is excellent, which, along with the good bedform and substrate conditions through much of the reach, indicates functioning biology and physicochemical processes. NCDWR also collected physicochemical data at this station. The results for most parameters indicated good water quality. However, the results show elevated levels of fecal coliform, especially during storm flows. This is probably related to livestock accessing Eaker Creek, a tributary that joins UBHC Reach 2 just upstream of the sampling point.

Table 5h. Summary of Geomorphic Form, Functions, and Stressors - UBHC Reach 1 and its tributaries UT1 and UT2

Watershed		Notes
Drainage Area (sq. mi)	0.22	
Geomorphic Form		Notes
Rosgen Stream Type	B4c	
Valley Type	Colluvial	
Entrenchment Ratio	1.5–1.7	Ranges taken from 3 surveyed cross sections.
Bank Height Ratio	2.1-2.8	Ranges taken from 3 surveyed cross sections.
Width-to-Depth Ratio	5.2–6.4	Ranges taken from 3 surveyed cross sections.
Simon Evolution Stage	III	
Functional Category	Condition	Notes
Hydrology	FAR	Portions of the watershed have been cleared, developed, and logged.
Hydraulics	FAR	Stream is generally not connected to floodplain though, in some areas, a floodplain bench has formed.
Geomorphology	FAR	Bedform is good but stream is incised and laterally eroding in some locations (evolutionary Stage III-IIIa).
Physicochemical	F	Good water quality for this reach based on monitoring data.
Biology	F	Good aquatic insects for this reach based on monitoring data.
Overall	FAR to F	The stream has downcut and has started to slowly erode laterally. However, the bedforms have reestablished and biology and physicochemical processes appear to be functioning.

5.1.8.2 UBHC Tributaries UT3 and UT4 and UBHC Reach 2

UT3 and UT4 are tributaries that enter UBHC at the break between Reach 1 and Reach 2. These streams are both stable due to bedrock controls. The banks are stable and the bedforms and substrate is adequate to provide habitat for aquatic communities. The buffer along these reaches is similar to that of UBHC in this vicinity consisting of a dense stand of young trees with significant thickets of native and invasive understory species. The evolutionary stage of these streams is most similar to Stage I-premodification.

UBHC Reach 2 is largely wooded but appears to have been cleared in the past 10-20 years. Chinese privet was noted throughout the buffer. The channel is incised and one or both banks are eroded to

varying degrees. Similar to other section of UBHC, the incision appears to have occurred decades ago and the downcutting has ceased. Lateral bank erosion is occurring in discrete locations with a tortuous meander pattern, or long straight stretches. While the stream has downcut and overwidened in the past, it shows little signs of developing adequate floodplain benches to provide relief from shear stress during storm events. Without access to a floodplain or floodplain bench, the potential remains for further erosion of bank material and input of sediment into the system. It also limits the potential for nutrient removal and retention along the reach. The evolution of this stream corresponds most closely with Stage III of Simon’s model, however, progression towards Stage IV appears very slow. In its current state the stream most closely classifies as a Rosgen type G4c stream upstream of Cornwell Creek (Reach 2a) and an F4 downstream of Cornwell Creek (Reach 2b).

These reaches have riffle-pool sequences and bed material includes gravel, cobble, and bedrock with some fine sediments in pools. NCDWR performed benthic monitoring on UBHC near Stick Elliott Road. The overall bioclassification for this station is excellent, which along with the good bedform and substrate conditions through much of the reach, indicates functioning biology and physicochemical processes. NCDWR also collected physicochemical data at this station. The results for most parameters indicated good water quality. However, the results show elevated levels of fecal coliform, especially during storm flows. The water quality and benthic monitoring results for this reach are a reflection of the stable watershed condition. The majority of the watershed is forested and has not been disturbed since it was last harvested for timber. The high levels of fecal coliform during storm events is likely correlated to the livestock access along Eaker Creek, a tributary that flows into UBHC Reach 2 just upstream of the sampling point. These results are a good indication for the potential this reach and the remainder of UBHC has for recovery.

Table 5i. Summary of Geomorphic Form, Functions, and Stressors - UBHC Tributaries UT2 and UT3 and UBHC Reach 2

Watershed	R2a ¹	R2b ¹	Notes
Drainage Area (sq. mi)	0.36	0.74	
Geomorphic Form	R2a	R2b	Notes
Rosgen Stream Type	G4c	F4	
Valley Type	Alluvial		
Entrenchment Ratio	1.2-1.4	1.3-1.5	Ranges taken from 2 surveyed cross sections each on Reach 1 and Reach 2.
Bank Height Ratio	3.1-4.6	3.4-4.4	Ranges taken from 2 surveyed cross sections each on Reach 1 and Reach 2.
Width-to-Depth Ratio	9.1-11.5	11.4-12.7	Ranges taken from 2 surveyed cross sections each on Reach 1 and Reach 2.
Simon Evolution Stage	III	III	
Functional Category	Condition		Description
Hydrology	FAR		Portions of the watershed have been cleared, developed, and logged.
Hydraulics	NF		Stream is generally not connected to floodplain though, in some areas.
Geomorphology	NF		Bedform is fair but stream is incised and laterally eroding in some locations (evolutionary Stage III-IIIa).
Physicochemical	F		Good water quality for this reach based on monitoring data.
Biology	F		Good aquatic insects for this reach based on monitoring data.
Overall	FAR		The stream has downcut and has started to slowly erode laterally. However, the bedforms have reestablished and biology and physicochemical processes appear to be functioning.

1. Reach 2a/2b break is at confluence with Cornwell Creek.

5.1.8.3 UBHC Reach 3

The buffer along UBHC Reach 3 is wooded but cattle from adjacent fields have access to these streams. The trees along these reaches are more mature than those upstream and livestock have restricted the growth of understory vegetation. There is some Chinese privet along this reach and Japanese stiltgrass is common along the banks. The stream is slightly incised, over-widened, and many of the banks are vertical and raw. Where cattle do access the stream, the banks are extensively trampled except where large root masses hold them together. There are several cattle wallow areas along this reach.

The bedforms along the majority of this reach have been extensively impacted by the cattle. Though there are several bedrock outcrops in the channel and some gravel and cobble riffles, the bed is dominated by accumulations of fines. Riffles with large substrate and deep pools are infrequent, except for a few hundred feet mid reach where large rocks and woody debris provide improved habitat.

UBHC Reach 3 has a sinuosity of 1.15 and most closely classifies as a Rosgen type F4 due to the degree of entrenchment. The stream incised to bedrock, then eroded laterally through both fluvial processes and trampling from cattle. Along some sections of bank, the erosion is active and has undercut the rootmass from the riparian vegetation. These processes will continue until equilibrium is reached, or until corrected.

The nearest biological monitoring station downstream of these reaches is NCDWR Station 9 at Royster Road. The overall biolclassification here is good. Water quality monitoring conducted at stations in this portion of UBHC (NCDWR Stations 9 and 7) has indicated high levels of nutrients, fecal coliform, and specific conductance. Results from monitoring are presented in Appendix H.

Table 5j. Summary of Geomorphic Form, Functions, and Stressors - UBHC Reach 3

Watershed		Notes
Drainage Area (sq. mi)	0.77	
Geomorphic Form		Notes
Rosgen Stream Type	F4	
Valley Type	Alluvial	
Entrenchment Ratio	1.2	Value from 1 surveyed cross section.
Bank Height Ratio	4.3	Value from 1 surveyed cross section.
Width-to-Depth Ratio	23.7	Value from 1 surveyed cross section.
Simon Evolution Stage	IV	
Functional Category	Condition	Description
Hydrology	FAR	Portions of the watershed have been cleared, developed, and logged.
Hydraulics	NF	Stream does not have adequate access to floodplains.
Geomorphology	NF	Bedform diversity is limited, pools are silted in, substrates include some larger material but also a large number of fines. Banks are unstable and trampled.
Physicochemical	NF	Degraded water quality for this reach is assumed based on based on monitoring data downstream.
Biology	FAR	Aquatic communities limited based on observations, bed material and "good" biolclassification at downstream station.
Overall	NF	Stream hydraulics, geomorphic processes, and water quality all need improvement. Aquatic biology at risk.

5.1.8.4 UBHC Reach 4

UBHC Reach 4 begins at an easement break between Stick Elliott Road and the confluence with Scism Creek just upstream of a bedrock slide on UBHC. The buffer along this reach is similar to UBHC Reach 3. There are mature trees throughout the buffer but there is a complete lack of understory due to livestock access. There are cattle pathways in and out of the channel throughout the reach that have caused additional bank failure and sedimentation of the stream bed.



UBHC Reach 4

Cattle have impacted this stream by trampling the banks, causing fining of the bed substrate and polluting the stream with fecal matter. Japanese stiltgrass is common on the banks. The stream is incised and over widened with actively eroding meander bends. The outer meander bends have pushed against the valley walls and continue lateral movement as erosion on the lower half of the stream banks causes undercut banks and ultimately bank failure. The meander pattern itself has become unstable in its ability to naturally dissipate energy without causing degradation of meander bends. The stream has incised down to the elevation of a historic bed as evidenced by gravel and cobble in the eroded bank profiles.

As mentioned above under the description for UBHC Reach 3, the overall bioclassification is good and the water quality results indicate elevated levels of nutrients, fecal coliform, and specific conductance. The evolutionary stage of this reach is best described as Stage IV – degradation and widening.

Table 5k. Summary of Geomorphic Form, Functions, and Stressors - UBHC Reach 4

Watershed		Notes
Drainage Area (sq. mi)	0.89	
Geomorphic Form		Notes
Rosgen Stream Type	F4	
Valley Type	Alluvial	
Entrenchment Ratio	1.1–1.8	Ranges taken from 4 surveyed cross sections.
Bank Height Ratio	1.6-2.9	Ranges taken from 4 surveyed cross sections.
Width-to-Depth Ratio	17.6-30.3	Ranges taken from 4 surveyed cross sections.
Simon Evolution Stage	IV	
Functional Category	Condition	Description
Hydrology	FAR	Portions of the watershed have been cleared, developed, and logged.
Hydraulics	FAR	Streams have limited access to floodplains.
Geomorphology	NF	Geomorphic channel pattern unstable. Banks are severely eroded and floodplain access is limited for stress relief. Livestock bank trampling adds fines to bed material.
Physicochemical	NF	Degraded water quality for this reach is assumed based on monitoring data downstream.
Biology	FAR	Aquatic communities limited based on observations and bed material and “good” bioclassification at downstream station.
Overall	NF	Stream hydraulics, geomorphic processes, and water quality all need improvement. Aquatic biology at risk.

5.1.8.5 UBHC Reach 5

UBHC Reach 5 begins at an easement break downstream of Scism Creek and ends at Stick Elliott Road. The buffer along this stream is wooded with trees of varying age. Invasives, including Chinese privet, are present in the understory. Japanese stiltgrass is common on the banks.

Cattle have impacted this stream by trampling the banks and polluting the stream with fecal matter. Gravel and cobbles are common on the bed, but the fines from the trampled banks have embedded the riffles. The stream is slightly incised and over widened. Bedrock outcrops in several spots along the channel bed function as grade control. The bedrock control at the upper end of Reach 5 (upstream of Royster Creek) holds grade and has limited the incision of the reach over time. The channel in this section classifies as an incised Rosgen C4. Reach 5 lacks exposed bedrock between the confluences of Royster Creek and Lower Stick Elliot Creek, allowing the stream to incise and over widen. The channel in this section classifies as a Rosgen Type F4. Downstream of Lower Stick Elliot the stream remains moderately entrenched, classifying it as a Rosgen Type B4c channel.

The water quality monitoring stations (NCDWR Stations 9 and 7) and benthic Station 9 are located at the downstream end of UBHC Reach 5. As mentioned above under the description for UBHC Reach 3, the overall bioclassification is good and the water quality results indicate elevated levels of nutrients, fecal coliform, and specific conductance.

Cattle trampling has caused bed and bank instability. The evolutionary stage of this reach is best described as Stage III-degradation, although the degradation appears to have ceased. Benches are forming along some of the channel indicating a slow progression towards recovery. Cattle still have access to this reach, which would likely prevent the channel from recovering fully on its own.

Table 51. Summary of Geomorphic Form, Functions, and Stressors - UBHC Reach 5

Watershed		Notes
Drainage Area (sq. mi)	1.15	
Geomorphic Form		Notes
Rosgen Stream Type	C4-F4-B4c	Transitions throughout the reach as described above.
Valley Type	Alluvial	
Entrenchment Ratio	1.2-2.4	Ranges taken from 3 surveyed cross sections.
Bank Height Ratio	2.3-6.5	Ranges taken from 3 surveyed cross sections.
Width-to-Depth Ratio	19-26	Ranges taken from 3 surveyed cross sections.
Simon Evolution Stage	III	
Functional Category	Condition	Description
Hydrology	FAR	Portions of the watershed have been cleared, developed, and logged.
Hydraulics	FAR	Streams have limited access to floodplains.
Geomorphology	FAR	Bedform diversity is limited, substrates include some larger material but also a large number of fines. Banks stable in many locations, trampled in others.
Physicochemical	NF	Degraded water quality for this reach is assumed based on based on monitoring data downstream.
Biology	FAR	Aquatic communities limited based on observations and bed material and "good" bioclassification at downstream station.
Overall	FAR	Stream generally functioning but impacted by cattle access. Without intervention, cattle impact will cause further degradation.

5.1.8.6 UBHC Reach 6

UBHC Reach 6 begins at a culvert under Royster Road. The stream buffer is narrow, especially on the right bank, and has a significant amount of Chinese privet. The stream has incised in the past but now seems vertically stable. The stream most closely matches a straightened and incised Rosgen type C4 stream. Like much of UBHC, cattle have access to Reach 6 and create the most significant problems. Banks are trampled, pools are silted in, and the few riffle areas are embedded with fines. Cattle waste was observed in the stream. While overall channel evolution is best described as Stage III-degradation, benches have formed on portions of the reach indicating a gradual shift to recovery. NCDWR Station 5 and benthic Station 5 best represent these reaches. At this location, the 2013 bioclassification rating was good. Water quality monitoring at this site indicates elevated levels of nutrients and fecal coliform although specific conductance was generally not as high as some of the other monitoring locations on the creek.

Table 5m. Summary of Geomorphic Form, Functions, and Stressors - UBHC Reach 6

Watershed		Notes
Drainage Area (sq. mi)	3.08	
Geomorphic Form		Notes
Rosgen Stream Type	C4	This is closest to a straightened Rosgen type C4.
Valley Type	Alluvial	
Entrenchment Ratio	1.2-1.6	Ranges taken from 3 surveyed cross sections.
Bank Height Ratio	3.3-7.2	Ranges taken from 3 surveyed cross sections.
Width-to-Depth Ratio	11.8-31.5	Ranges taken from 3 surveyed cross sections.
Simon Evolution Stage	III	Listed in stage III, though degradation appears to have ceased
Functional Category	Condition	Description
Hydrology	FAR	Portions of the watershed have been cleared, developed, and logged.
Hydraulics	FAR	Stream has limited access to floodplains.
Geomorphology	FAR	Bedform diversity is limited, substrates include some larger material but also a large number of fines. Banks stable in many locations, trampled in others.
Physicochemical	NF	Degraded water quality for this reach is assumed based on based on monitoring data at one station along this reach.
Biology	FAR	Aquatic communities limited based on observations and bed material and "good" bioclassification at one station.
Overall	FAR	Stream generally functioning but impacted by cattle access. Without intervention, cattle impact will cause further degradation.

5.2 Project Area B

This project area represents the southwestern portion of the overall Site. Project Area B includes the project reaches along USEC, UFC and LFC, and project tributaries that drain into these reaches (Figure 5b). The streams in this project area are characterized by the larger, generally incised mainstem reaches of USEC and LFC, partially to fully wooded riparian buffers, and mostly gravel substrates. Many of the smaller project tributaries that drain into the main steam reaches are also incised and eroding. In the sections that follow, each of the project stream reaches that make up Project Area B are described in detail.

5.2.1 Elliott Creek

Elliott Creek flows through a forested canopy in which the trees immediately along the stream and adjacent buffers are more mature than the areas just outside of the stream buffers. Forested areas adjacent to the stream were harvested around 2006. Currently, these areas are primarily comprised of tulip poplar and some non-native invasive species. Chinese privet and multiflora rose are prevalent throughout the reach. The downstream portion of the reach also contains a dense area of kudzu near the confluence with USEC Reach 2 and 3.

Elliott Creek is incised with bank height ratios averaging 1.9 throughout the reach. The vertical incision has slowed and trees have begun to grow on the lower banks and benches that have now formed within the larger incised channel (Simon Stage IV/V). Areas of active lateral instability are common; however, there are sections of channel that are relatively stable and offer appropriate habitat and bedform diversity. There are also several deep ephemeral gullies that drain into Elliott Creek, contributing water and sediment to the system during larger runoff events. A single-stage, passive sampler was installed near the outlet of Elliott Creek (WCU-15 – Appendix H). Elliott Creek reported notably higher suspended sediment concentrations during stormflow. These concentrations are likely from active lateral instability observed throughout the stream.

Table 5n. Summary of Geomorphic Form, Functions, and Stressors - Elliott Creek

Watershed		Notes
Drainage Area	0.13	
Geomorphic Form		Notes
Rosgen Stream Type	C5	Channel incised.
Valley Type	Colluvial	
Entrenchment Ratio	2.3	Value from 1 surveyed cross section.
Bank Height Ratio	1.9	Value from 1 surveyed cross section.
Width-to-Depth Ratio	14.9	Value from 1 surveyed cross section.
Simon Evolution Stage	IV/V	
Functional Category	Condition	Description
Hydrology	FAR	Upper watershed is primarily agricultural fields and local water table has been lowered.
Hydraulics	NF	Benches and bankfull channel features have formed within the larger incised channel; however, many of these features are still actively adjusting.
Geomorphology	NF	Bankfull channel has formed at a lower elevation, but there is still significant bank erosion, channel incision, and marginal bed form diversity.
Physicochemical	FAR	Based on monitoring by NCDWR reporting higher suspended sediments.
Biology	FAR	Based on altered higher suspended sediments in the reach.
Overall	NF	Deeply incised channels, lateral erosion, and limited floodplain access.

5.2.2 UT1 to Elliott Creek

UT1 to Elliott Creek enters the upstream of Elliott Creek from the west. Like Elliott Creek, the stream also flows through a mature forest along the riparian buffer, with younger vegetation along the periphery of the stream buffer. The reach is highly incised with steep stream banks, but due to the smaller drainage area and infrequent flow, bank instability is not widespread. The stream exhibits a very

straight pattern and adjacent spoil piles, indicating the reach was very likely channelized in the past. The channel bed shows indications of incision and downcutting (Simon Stage III), so it is likely that over time channel stability will decrease, especially in localized areas where channel incision will threaten the base of stream banks.

Table 50. Summary of Geomorphic Form, Functions, and Stressors - UT1 to Elliott Creek

Watershed		Notes
Drainage Area	0.02	
Geomorphic Form		Notes
Rosgen Stream Type	F4	
Valley Type	Colluvial	
Entrenchment Ratio	1.1	Value from 1 surveyed cross section.
Bank Height Ratio	17.3	Value from 1 surveyed cross section.
Width-to-Depth Ratio	26.3	Value from 1 surveyed cross section.
Simon Evolution Stage	III	
Functional Category	Condition	Description
Hydrology	FAR	Upper watershed is primarily agricultural fields and local water table has been lowered.
Hydraulics	NF	Some benches and bankfull channel features have formed within the larger incised channel; however, many of these features are still actively adjusting and floodplain access is very limited.
Geomorphology	NF	Bankfull channel has formed at a lower elevation, but there is still significant bank erosion, channel incision, headcutting, and marginal bed form diversity.
Physicochemical	FAR	Based on altered land use in the watershed.
Biology	FAR	Based on altered land use in the watershed.
Overall	NF	Deeply incised channel with some lateral erosion, limited floodplain access, and active incision.

5.2.3 Bridges Creek and UT1 to Bridges Creek

Bridges Creek flows through middle-aged forest consisting primarily of hardwoods such as tulip poplar, red maple, and white oak that serves as a stream buffer. The stream buffer is at least 50 feet from the top of stream banks. Outside of this stream buffer, the vegetation is noticeably denser with few mature trees and mostly young successional species dominating the area. Just prior to entering the project area at the upstream end, Bridges Creek flows through an existing wetland. Near the upstream project boundary, the channel becomes incised at a headcut and drops approximately 4 feet to form an incised channel (BHR = 1.9). Bridges Creek remains incised throughout the top portion of the reach, with some fluctuations in bank height ratios due to grade control (i.e. roots) and headcuts within the channel. Lateral bank erosion is common on the outside of meander bends, with some benches that have formed at a lower elevation within the larger channel. Channel incision is active and most of the benches are at an elevation higher than the predicted bankfull stage (Simon Stage III/IV).

Midway along the project reach, the channel is less incised (BHR < 1.5), bars and benches are better defined and stable, and a bankfull channel has formed within the larger incised channel (Simon Stage V/VI). This reach is more stable than the rest of the stream; however, bedform diversity and habitat are relatively poor since the substrate is mostly sand and there is very little pool habitat. For the downstream portion of Bridges Creek, channel incision increases (BHR >= 2.1) again as the channel has downcut to its confluence with USEC Reach 3 (Simon Stage III). Within 50 feet of the confluence, Bridges

Creek’s elevation drops approximately 4 feet over small headcuts that are slowly working up the reach, but are being held temporarily by tree roots and debris.

UT1 to Bridges Creek enters the project at the upstream end of Bridges Creek, where the channel starts as a headcut and then travels approximately 50 feet before flowing into Bridges Creek. UT1 to Bridges Creek shares the same forested stand as the one described for Bridges Creek. The reach contains overhanging and near vertical banks throughout its short length, where active degradation is occurring (Simon Stage III/IV). This short reach is highly incised and has an average BHR of 6.2.

Table 5p. Summary of Geomorphic Form, Functions, and Stressors - Bridges Creek

Watershed		Notes
Drainage Area	0.06	
Geomorphic Form		Notes
Rosgen Stream Type	E4	Channel incised.
Valley Type	Colluvial	
Entrenchment Ratio	2.2 - 4.7	Ranges from 3 surveyed cross sections.
Bank Height Ratio	1.9 - 2.3	Ranges from 3 surveyed cross sections.
Width-to-Depth Ratio	3.0 - 9.8	Ranges from 3 surveyed cross sections.
Simon Evolution Stage	III/IV/V/VI	
Functional Category	Condition	Description
Hydrology	FAR	Upper watershed is primarily agricultural fields and local water table has been lowered.
Hydraulics	NF	Benches and bankfull channel features have formed within the larger incised channel; however, many of these features are still adjusting, particularly on the upstream and downstream portions of the reach. Approximately 100 feet is FAR near the middle of the reach.
Geomorphology	NF	Bankfull channel has formed at a lower elevation in some locations, but there is still significant lateral bank erosion and channel incision occurring in upstream and downstream portions. Approximately 100 feet is FAR near the middle of the reach.
Physicochemical	FAR	Based on altered land use in the watershed.
Biology	FAR	Visual inspection indicates limited aquatic macroinvertebrates and other life. Extensive fine sediment.
Overall	NF	NF for most of the reach, with a middle portion that is considered FAR.

5.2.4 Upper Stick Elliott Creek (USEC)

5.2.4.1 USEC Reach 1

The flow for USEC Reach 1 emanates from the Union Elementary School property via parking lots and grass swales prior to entering the project easement. Within the easement, flow travels through a forested canopy of varying age and diversity north of Union Elementary School athletic field. The first 200 feet into the easement area is a straight, ephemeral stormwater swale that has little bedform diversity. The channel then drops approximately 12 to 15 feet at an active headcut that is continuing to work upstream and contributes large volumes of sediment to the downstream reaches. Directly downstream of the headcut, the channel is still actively adjusting as evidenced by depositional bars, vertical eroding banks, a streambed with significant sand and fine sediment, and herbaceous vegetation dominating channel banks and bench areas (Simon Stage III/IV). The channel remains deeply incised along the downstream portion of the reach. Baseflow water quality data were previously collected for USEC Reach 1 (Site 12 in the NCDWR December 2013c report). Nutrients and fecal coliform were

typically lower for this headwater system due to the absence of cattle for this reach watershed. There were elevated levels of specific conductance, temperature, TSS, and total phosphorus, likely due to the active headcut increasing sediment in the reach and the volume of water flowing from the impervious parking lot.

Table 5q. Summary of Geomorphic Form, Functions, and Stressors - USEC Reach 1

Watershed		Notes
Drainage Area	0.05	
Geomorphic Form		Notes
Rosgen Stream Type	F4	
Valley Type	Alluvial	
Entrenchment Ratio	1.3	Value from 1 surveyed cross section.
Bank Height Ratio	20.7	Value from 1 surveyed cross section.
Width-to-Depth Ratio	12.8	Value from 1 surveyed cross section.
Simon Evolution Stage	III/IV	
Functional Category	Condition	Description
Hydrology	FAR	Upper watershed is primarily ditched and includes some development, and local water table has been lowered.
Hydraulics	NF	Benches and bankfull channel features have formed within the larger incised channel; however, these features are still actively adjusting
Geomorphology	NF	Reach is highly unstable below the headcut, with significant bank erosion, channel incision, and limited bed form diversity.
Physicochemical	FAR	Based on NCDWR monitoring data there are elevated levels of TSS, water temperature, and total P.
Biology	NF	Based on altered land use in the watershed, documented water quality and a NF rating of the hydraulics and geomorphology of the system.
Overall	NF	Active headcutting with severe lateral erosion and incision, and limited floodplain access.

5.2.4.2 USEC Reach 2

Within USEC Reach 2, channel incision occurred in the more distant past than on Reach 1 and trees have begun to grow on the lower banks and benches that have formed within the larger incised channel (BHR = 2.2) (Simon Stage IV/V). While areas of active lateral instability are present, sections of the channel appear to have reached a stage of quasi-equilibrium in which channel adjustment is occurring at a much slower pace. This condition is apparent from the presence of older, larger trees within the channel, more vegetated banks, and more appropriate bedform diversity (alternating gravel/cobble riffles and deeper pools). The rate of erosion appears to be slow due to a relatively small drainage area, cohesive soils, and vegetation establishment. Visual inspection of the reach during field assessments indicated the presence of mayflies and caddis flies, as well as small fish and amphibians. Suspended sediment monitoring was conducted for USEC Reach 2. The suspended sediment concentrations were consistently high for this reach (WCU-14). The sediment from the actively eroding headcut in USEC R1 is contributing to these higher concentrations. UT1 to USEC has a small drainage area, which starts near Polkville Road and flows northeast along a wooded stormwater gully, where it becomes UT1 to USEC. The majority of the watershed is wooded with a small portion consisting of residential areas and agricultural fields. The stream is highly incised (BHR > 10) and actively eroding in an attempt to reach equilibrium with USEC Reach 2. The bed is comprised of gravel and considerable fine sediment, due to the active bank erosion

along the reach, and the vegetative community adjacent to the reach is similar to that described for USEC Reach 2.

Table 5r. Summary of Geomorphic Form, Functions, and Stressors - USEC Reach 2

Watershed		Notes
Drainage Area	0.16	
Geomorphic Form		Notes
Rosgen Stream Type	B4c	Channel incised.
Valley Type	Alluvial	
Entrenchment Ratio	1.9	Value from 1 surveyed cross section.
Bank Height Ratio	2.1	Value from 1 surveyed cross section.
Width-to-Depth Ratio	7.2	Value from 1 surveyed cross section.
Simon Evolution Stage	IV/V	
Functional Category	Condition	Description
Hydrology	FAR	Upper watershed is primarily ditched with some development and agriculture, and local water table has been lowered.
Hydraulics	FAR	Benches and bankfull channel features have formed within the larger incised channel; however, many of these features are still adjusting.
Geomorphology	FAR	Bankfull channel has formed at a lower elevation, but there is still bank erosion, channel incision, and marginal bed form diversity.
Physicochemical	FAR	Based on altered land use in the watershed, and a FAR rating of the hydrology, hydraulics, and geomorphology of the system, and documented higher concentrations of suspended sediments.
Biology	FAR	Based on altered land use in the watershed, a FAR rating of the hydrology, hydraulics, and geomorphology of the system, and documented impacts to water quality. Visual evidence of diverse aquatic life.
Overall	FAR	Incised channel that has formed lower bankfull benches and features. Some lateral erosion and limited floodplain access.

5.2.4.3 USEC Reach 3

USEC Reach 3 is in similar condition to USEC Reach 2. The reach flows through a forested canopy of varying age and diversity, with a number of large mature trees that have developed within the incised stream channel. The stream channel exhibits BHRs ranging from 1.7 to greater than 3.0 along much of its length; however, there appears to be little active bed degradation and incision. While highly incised, the reach has developed extensive lateral benches that appear stable in many areas and a smaller bankfull channel has developed at a lower elevation (Simon Stage V). The channel bedforms are diverse with alternating riffles and pools and some woody debris present that enhances habitat value. Areas of significant, localized bank erosion and lateral instability are present. Chinese privet is common, but is not as dense and wide spread as along Elliott Creek.

Table 5s. Summary of Geomorphic Form, Functions, and Stressors - USEC Reach 3

Watershed		Notes
Drainage Area	0.42	
Geomorphic Form		Notes
Rosgen Stream Type	E4	
Valley Type	Alluvial	
Entrenchment Ratio	2.6	Value from 1 surveyed cross section.
Bank Height Ratio	1.7 - 3.0	Values from 1 surveyed cross section and profile data.
Width-to-Depth Ratio	8.4	Value from 1 surveyed cross section.
Simon Evolution Stage	V	
Functional Category	Condition	Description
Hydrology	FAR	Upper watershed contains agriculture, some development, and wooded lands, and local water table has been lowered.
Hydraulics	FAR	Benches and bankfull channel features have formed within the larger incised channel; however, some of these features are still adjusting.
Geomorphology	FAR	Bankfull channel has formed at a lower elevation, but there is still lateral bank erosion in areas.
Physicochemical	FAR	Based on altered land use in the watershed, and a FAR rating of the hydrology, hydraulics, and geomorphology of the system.
Biology	FAR	Based on altered land use in the watershed, and a FAR rating of the hydrology, hydraulics, and geomorphology of the system.
Overall	FAR	Deeply incised channel with a smaller bankfull channel that has formed within, some lateral erosion, and limited floodplain access.

5.2.4.4 USEC Reach 4a and 4b

USEC Reaches 4a and 4b flow through a forested area with mowed fields on the upland slopes, and a riparian buffer that ranges from 25 to 50 feet in width. The upper portion of the stream (Reach 4a) exhibits a fairly stable bankfull channel that has developed within the larger channel that was likely straightened and ditched in the past (Simon Stage V). Incision increases as the stream approaches the dual culverts beneath the Whisnant private driveway (Reach 4b). Bank erosion becomes more prevalent as a result of the increased channel incision, and the stream becomes disconnected from the adjacent floodplain (Simon Stage III). Bed material along the reach is primarily sand and small gravel, and bedform diversity is relatively poor. The riparian community is diverse, and includes some large mature trees along the stream banks. There is also a small existing wetland along the right bank that is dominated primarily by herbaceous species. Baseflow water quality data was collected for USEC Reach 4b (Site 11 in the NCDWR December 2013c report). Nutrients, specific conductance, and fecal coliform were typically lower for this system due to the exclusion of cattle from this reach watershed.



Upper Stick Elliott Creek Reach 4a, eroding banks

Table 5t. Summary of Geomorphic Form, Functions, and Stressors - USEC Reaches 4a and 4b

Watershed		Notes
Drainage Area	0.53	
Geomorphic Form		Notes
Rosgen Stream Type	E4	Channel incised.
Valley Type	Alluvial	
Entrenchment Ratio	2.0 - 2.4	Range from 2 surveyed cross sections.
Bank Height Ratio	1.8 - 2.3	Range from 2 surveyed cross sections.
Width-to-Depth Ratio	3.5 - 8.9	Range from 2 surveyed cross sections.
Simon Evolution Stage	III/V/VI	
Functional Category		Description
Hydrology	FAR	Watershed contains a significant amount of agriculture and local water table has been lowered.
Hydraulics	FAR	Benches and bankfull channel features have formed; however, many of these features are still adjusting. Channel becomes more incised and disconnected on the downstream portion.
Geomorphology	FAR	Bankfull channel has formed at a lower elevation in some locations, but there is still some lateral bank erosion and channel incision occurring, particularly on the downstream portion.
Physicochemical	FAR	Based on altered land use in the watershed, and a FAR rating of the hydrology, hydraulics, and geomorphology of the system, and sampled water quality data.
Biology	FAR	Visual inspection indicates limited aquatic macroinvertebrates and other life. Extensive fine sediment.
Overall	FAR	Somewhat incised channels, lateral erosion, and limited floodplain access.

5.2.4.5 USEC Reach 5

USEC Reach 5 begins at the culverts of the Whisnant private driveway, downstream of Reach 4b. Channel incision on Reach 5 increases directly below the driveway culverts and is progressively deeper moving down the reach. Stream bank erosion is prevalent along much of the reach, with steep vertical banks in many areas that are actively eroding. In at least two locations, lateral migration has begun to erode into a terrace slope. There is some development of benches and bars, primarily along the lower portion of the reach, but these features are early in their development (Simon Stage IV). Alternating riffles and pools are present along the reach, with riffles being composed of gravel, and pools substantially filled with sand. While the entire reach is wooded, the species present are primarily younger, successional species with a few scattered mature hardwood trees. Suspended sediment monitoring was previously conducted on USEC Reach 5 (WCU-12), and the data support that TSS is not elevated for the reach, although visually there is fine sediment present along the stream bed (Appendix H).

UT2 to USEC is a small tributary that enters the lower portion of USEC Reach 5 from the south. UT2 is highly incised (BHR = 4.0), and as would be expected, the tributary has incised down to the bed level of USEC Reach 5 through a series of headcuts that are moving up through the reach. The project reach has a relatively steep gradient and active bank erosion along its outer meander bends (Simon Stage III). The bed is comprised of gravel and considerable fine sediment, due to the active bank erosion along the reach, and the vegetative community adjacent to the reach is similar to that described for USEC Reach 5.

UT3 to USEC is a small tributary that enters the downstream portion of USEC Reach 5 from the west. The reach begins as a 4- to 5-foot deep headcut within the project boundary and remains highly incised (BHR

= 4.1) down to its confluence with USEC Reach 5. The project reach has a relatively steep gradient and active bank erosion along its length (Simon Stage III/IV). The bed is comprised of sand due to the active bank erosion along the reach, and the vegetative community adjacent to the reach is similar to that described for USEC Reach 5.

Table 5u. Summary of Geomorphic Form, Functions, and Stressors - USEC Reach 5

Watershed		Notes
Drainage Area	0.72	
Geomorphic Form		Notes
Rosgen Stream Type	B4c	Channel incised.
Valley Type	Alluvial	
Entrenchment Ratio	1.5	Value from 1 surveyed cross section.
Bank Height Ratio	1.7	Value from 1 surveyed cross section.
Width-to-Depth Ratio	12.6	Value from 1 surveyed cross section.
Simon Evolution Stage	IV	
Functional Category		Description
Hydrology	FAR	Watershed contains a significant amount of agriculture and local water table has been lowered.
Hydraulics	NF	Minimal functional floodplain and overall low entrenchment ratios.
Geomorphology	NF	Numerous eroding bank areas and poor bedforms.
Physicochemical	NF	Watershed is agricultural and cattle have access to the lower portions.
Biology	NF	Visual inspection indicates limited aquatic macroinvertebrates and other life. Extensive fine sediment.
Overall	NF	Incised and extensively eroding channels, and limited floodplain access.

5.2.4.6 USEC Reach 6

USEC Reach 6 flows through active cattle pasture along Stick Elliott Road, directly downstream of Reach 5. The channel is incised to a depth of approximately 6 to 7 feet in most places, and in several locations bedrock has been exposed along the bed of the channel. Active bank erosion is prevalent throughout (Simon Stage IV/ V), and has been documented by DMS through the collection of cross-section and bank pin data over the past few years. Lateral erosion is more prevalent than observed on Reach 5 upstream. USEC Reach 6 has active cattle access and only a single line of large mature trees along their banks, with some sparse mature trees further from the banks. In numerous locations, the bank erosion is significantly undermining the existing trees. The bed material along the reach is primarily coarse gravel in the riffles (which dominate the reach); fine sediment and sand fill many of the pool areas.

NCDWR’s water quality monitoring report found that concentrations of nutrients, specific conductance, and fecal coliform were high for USEC R6 (NCDWR Station 3) and above water quality standards. This is due to cattle access on the reach. The fisheries surveys for this reach (BHC04) found that the NC Index of Biotic Integrity Score was fair for this reach and suggests that the exclusion of cattle will result in more diverse species. In 2009 and 2013 a macroinvertebrate survey was completed. The EPT Richness and Qual 4 – Biotic Index was evaluated as good for both years but still had the 5th worst ranking for macroinvertebrate community integrity for the fourteen sites evaluated (Appendix H).

Table 5v. Summary of Geomorphic Form, Functions, and Stressors - USEC Reach 6

Watershed		Notes
Drainage Area	0.76	
Geomorphic Form		Notes
Rosgen Stream Type	C4/F4	Channel incised.
Valley Type	Alluvial	
Entrenchment Ratio	1.2 - 2.3	Range from 2 surveyed cross sections.
Bank Height Ratio	1.4 - 3.5	Range from 2 surveyed cross sections.
Width-to-Depth Ratio	13.5 – 34.4	Range from 2 surveyed cross sections.
Simon Evolution Stage	IV/V	
Functional Category		Description
Hydrology	FAR	Watershed contains a significant amount of agriculture, and local water table has been lowered.
Hydraulics	NF	Minimal functional floodplain, and overall low entrenchment ratios.
Geomorphology	NF	Numerous eroding bank areas, poor bedforms, and cattle trampling of geomorphic features on the lower portions.
Physicochemical	NF	Watershed is agricultural and cattle have access to the entire reach, and elevated levels of nutrients, specific conductance, and fecal coliform documented through sampling.
Biology	FAR	Limited aquatic macroinvertebrates and fish. Visual fine sediment in the stream bed.
Overall	NF	Incised and extensively eroding channels, and limited floodplain access.

5.2.5 UFC Reaches 1 and 2

UFC flows through a V-shaped valley with active pasture on the right bank and hay field on the left bank. This length of UFC is deeply incised, with the greatest degree of incision at the upstream extents of Reach 1. Moving downstream through the reaches, incision decreases. The Fletcher Road culvert at the downstream end of Reach 2 provides grade control. The valley bottom transitions from roughly 40 feet wide in Reach 1 to roughly 80 to 100 feet wide in Reach 2, apparently in response to the grade control provided by this culvert. UFC Reaches 1 and 2 are both relatively sinuous, and the stream has formed a new active floodplain 8 feet or more below the adjacent terrace.



Upper Fletcher Creek Reach 1

Livestock have trampled the entirety of UFC, but despite this trampling, the channel bed and banks show signs of quasi-stability. Raw, eroding slopes are present at the valley walls in portions of Reaches 1 and 2, but a review of 18 months of DMS bank pin data indicates that the rate of terrace slope erosion or collapse is relatively slow. Several mature trees are growing on the new floodplain and along the terrace slopes. A few defined gravel/cobble riffles and deep pools are present, but livestock trampling and excess fine sediment has hindered most riffle and pool formation throughout. Bed materials range in size from fine sand to cobble. Two prominent gullies, one on each bank, are present near the conservation easement break between Reaches 1 and 2. These gullies appear to be a source of fine sediment. The riparian buffer on both the left and right bank varies, but is on average 20 feet wide. The

buffer includes numerous mature trees as well as many young trees and a relatively sparse understory. Kudzu is present in the buffer immediately upstream of the project limits.

The overall NCDWR bioclassification for a station at the upstream end of UFC Reach 1 during both 2009 and 2013 was good while a station in UFC Reach 2 was classified as good-fair during both years, indicating that the observed stressors within the two project reaches are negatively impacting biological function. The downstream site ranked last among the 14 sampling sites. NCDWR also collected physicochemical data at these two stations and their results indicate elevated nutrient and fecal coliform levels at both stations, indicating not functioning conditions.

Table 5w. Summary of Geomorphic Form, Functions and Stressors - UFC Reaches 1 and 2

Watershed		Notes
Drainage Area	0.29	Agricultural land uses, primarily pasture
Geomorphic Form		Notes
Rosgen Stream Type	G4	Functions as an E4 at bankfull flow
Valley Type	Alluvial	
Entrenchment Ratio	2.0	Value from 1 surveyed cross section.
Bank Height Ratio	3.2	Value from 1 surveyed cross section.
Width-to-Depth Ratio	8.3	Value from 1 surveyed cross section.
Simon Evolutionary Stage	VI	
Functional Category	Condition	Description
Hydrology	FAR	Adjacent pasture land uses may affect rainfall-runoff relationship.
Hydraulics	FAR	Floodplain developing at lower elevation but the process is incomplete.
Geomorphology	FAR	Highly Incised, some active lateral erosion, extensive livestock impacts, mature trees in buffer are threatened by kudzu encroaching at upstream end, Reach 2 buffer heavily impacted by livestock trampling.
Physicochemical	NF	Active agricultural pasture, elevated nutrient and fecal coliform concentrations, high suspended sediment concentrations during storms.
Biology	FAR	Good fish and benthic populations threatened by ongoing livestock impacts and excess fine sediment.
Overall	FAR	Ongoing livestock impacts, elevated nutrients and fecal coliform, highly incised valley, high suspended sediments during storms, kudzu encroachment.

5.2.6 LFC

5.2.6.1 LFC Reach 1

LFC Reach 1 flows through a cattle pasture with a 5 to 10-foot strip of large trees along both stream banks. LFC Reach 1 begins as a highly incised (BHR = 5.1) and overly wide channel. The stream was obviously channelized in the past and has subsequently widened (Simon Stage IV/V). Numerous livestock paths along the zone are contributing sediment, bacteria, and nutrients directly to the stream system. Many of the stream bank sections along Reach 1 are vertical or near vertical, with some undercutting of the trees along the banks. The reach bed material is composed of sand, gravel, and



LFC Reach 1

some cobble. Significant accumulations of sand have occurred as lateral bars along the reach, but due to constant cattle trampling, the benches and bars are poorly developed and do not appear stable. An existing ford stream crossing is located near the downstream extent of Reach 1 that is used by both farm equipment and livestock. NCDWR’s water quality monitoring report found that concentrations of fecal coliform were high for LFC Reach 2 (NCDWR Station 4) and above water quality standards (Appendix H). Reach 2 is directly downstream of Reach 1, and both reaches have direct cattle access.

Table 5x. Summary of Geomorphic Form, Functions, and Stressors - LFC Reach 1

Watershed		Notes
Drainage Area	0.41	
Geomorphic Form		Notes
Rosgen Stream Type	F4	
Valley Type	Alluvial	
Entrenchment Ratio	1.3	Value from 1 surveyed cross section.
Bank Height Ratio	5.1	Value from 1 surveyed cross section.
Width-to-Depth Ratio	21.6	Value from 1 surveyed cross section.
Simon Evolution Stage	IV/V	
Functional Category		Description
Hydrology	FAR	Watershed contains a significant amount of agriculture, and local water table has been lowered.
Hydraulics	NF	Minimal functional floodplain, and overall low entrenchment ratios.
Geomorphology	NF	Numerous eroding bank areas and constant cattle trampling of geomorphic features that may develop.
Physicochemical	NF	Watershed has a significant amount of agriculture, and cattle have direct access. Elevated levels of fecal coliform.
Biology	NF	Limited aquatic macroinvertebrates and fish. Extensive fine sediment.
Overall	NF	Deeply incised channels, lateral erosion, and limited floodplain access.

5.2.6.2 LFC Reach 2

LFC Reach 2 begins downstream of an easement break. Reach 2 continues through the same cattle pasture surrounding Reach 1, but this reach of the stream is considerably steeper and narrower with more gently sloped streambanks. The streambed has much coarser bed material (gravel, cobble, and some small boulders) and bedform diversity is greater than Reach 1; however, substrate along the reach contains accumulated sand and fine sediment from the direct cattle access. Pools that should be deep from scour around larger boulders and bedrock are filled with fine sediment.



LFC Reach 2

The remnants of an earthen dam are present near the upstream end of Reach 2 at an outcropping of bedrock in the streambed. Stream banks are well vegetated throughout the reach, except for approximately 100 feet upstream of the culvert at Stick Elliott Road where Reach 2 appears to be used regularly by cattle for watering and shade. Here, the stream has very poor bedform diversity, is overly wide, and contains significant fine sediment. A roadside gully/ditch drains into Reach 2 just upstream of Stick Elliott Road and is contributing significant sediment to the system and threatening the road embankment. NCDWR’s water quality monitoring report found that concentrations of fecal coliform

were high for LFC R2 (NCDWR Station 4) and above water quality standards (Appendix H). This is due to cattle access on the reach.

Table 5y. Summary of Geomorphic Form, Functions, and Stressors - LFC Reach 2

Watershed		Notes
Drainage Area	0.42	
Geomorphic Form		Notes
Rosgen Stream Type	F4	
Valley Type	Alluvial	
Entrenchment Ratio	1.2	Value from 1 surveyed cross section.
Bank Height Ratio	2.3	Value from 1 surveyed cross section.
Width-to-Depth Ratio	9.2	Value from 1 surveyed cross section.
Simon Evolution Stage	III/IV	
Functional Category		Description
Hydrology	FAR	Watershed contains a significant amount of agriculture, and local water table has been lowered.
Hydraulics	NF	Minimal functional floodplain, and overall low entrenchment ratios.
Geomorphology	NF	Numerous eroding bank areas and constant cattle trampling of geomorphic features that may develop.
Physicochemical	NF	Watershed has a significant amount of agriculture, and cattle have direct access. Elevated levels of fecal coliform.
Biology	NF	Limited aquatic macroinvertebrates and fish. Extensive fine sediment.
Overall	NF	Deeply incised channels, lateral erosion, and limited floodplain access.

5.3 Project Area C

This project area represents the eastern portion of the overall Site. Project Area C includes the project reaches along LBHC and project tributaries that drain into these reaches (Figure 5c). The streams in this project area are characterized by the larger, generally incised mainstem reaches LBHC, and the partially to fully wooded riparian buffers. In the sections that follow, each of the project stream reaches that make up Project Area C are described in detail.



LBHC Reach 2

5.3.1 LBHC Reaches 1a, 1b, and 2; and UT1, UT2, and UT3 to LBHC

LBHC flows through a wide alluvial valley. The bridge on Harris Creek Road at the upstream end of Reach 1a is a 3-span structure with its low chord well above the bankfull stage of the creek. At the upstream end of Reach 1a, there is a narrow wooded buffer on the left bank with horse pasture beyond. The right bank has a wooded buffer until just below the UT1 confluence, where the land use changes to an approximate 5 to 10-foot wide wooded buffer with pasture and lawn beyond. The remainder of LBHC and each of the tributaries have wooded buffers, with many mature trees and varying degrees of invasive species infestation. Buffer widths measure 200 feet or more along Reach 2. Kudzu is the primary invasive species of concern and is present along several hundred feet of the right bank of LBHC near the Reach 1b and Reach 2 break. Chinese privet is prominent in the understory.

LBHC is incised and laterally unstable (to varying degrees) from the bridge on Harris Creek Road to the downstream end of the project. The lateral instability observed along LBHC appears to be in response to

historic buffer clearing and subsequent bank collapse and widening. There also appears to be a large fine sediment load from the watershed, and this, coupled with reach-scale widening, has led to a significant aggradation problem, primarily in Reach 2.

UT1 to LBHC is relatively straight and incised and appears to have been straightened decades ago. Despite UT1's position in its valley, the stream has developed riffle and pool sequences and has several large trees are growing along its banks, the root masses of which are serving to maintain bank stability.

UT2 to LBHC also appears to have been straightened at the upstream end of the project reach and, as with UT1, several large trees along the banks are helping maintain stability. There are signs of lateral instability at the outside of meander bends over the downstream third of UT2.

UT3 to LBHC is an intermittent stream that appears to be relatively stable despite being deeply incised. Several mature trees are present near the tops of banks and out in the adjacent floodplain.

The NCDWR bioclassification at a site in LBHC Reach 1b was good in both 2009 and 2013, indicating functioning biology despite the observed channel instability immediately upstream. The site ranked seventh among the 14 NCDWR sampling stations.

Table 5z. Summary of Geomorphic Form, Functions and Stressors - LBHC Reaches 1a, 1b and 2, and UT1, UT2, and UT3 to LBHC

Watershed	1a/1 b/2	UT1	UT2	UT3	Notes
Drainage Area	3.4/3.8	0.17	0.4	0.06	Agricultural land uses, pasture and row crops; some forested areas
Geomorphic Form					Notes
Rosgen Stream Type	E4/G4c	G4	F4	G4	Functions as an E4 at bankfull flow and a G4 at higher discharges
Valley Type	Alluvial				
Entrenchment Ratio	2.0	<2	1.2	<2	Value from 1 surveyed cross section.
Bank Height Ratio	2.3	>3	3.3	>2	Value from 1 surveyed cross section.
Width-to-Depth Ratio	9.5	<8	14.5	<8	Value from 1 surveyed cross section.
Simon Evolutionary Stage	IV/V				
Functional Category	Condition				Description
Hydrology	FAR	FAR	FAR	F	Adjacent pasture land uses may affect rainfall-runoff relationship. UT3 watershed is primarily forested.
Hydraulics	FAR				Floodplain access limited, over-wide conditions in Reach 2 are affecting sediment movement.
Geomorphology	NF	FAR	FAR	FAR	Reach 1a/1b/2 - Incised, active lateral erosion and mid-channel deposition, poor quality riparian buffers near upstream end, limited bedform diversity, kudzu infestation will continue to spread throughout buffer if untreated. UT1, UT2, UT3 – Incised but quasi-stable bed and banks, limited bedform diversity, some active bank erosion, abundant mature trees.
Physicochemical	FAR				Low nutrient and fecal coliform but elevated phosphorus, high suspended sediment concentrations during storms. Active agricultural pasture and upland row crops in the watershed suggest potential for pollutant loading.
Biology	FAR				Some functional aquatic habitats in isolated reaches, but other reaches are smothered by fine sediment; good fish and benthic populations.
Overall	FAR				Lateral erosion, limited floodplain access, elevated phosphorus, high suspended sediments during storms, kudzu infestation. Reach 2 and UT2 – mid-channel deposition.

5.3.2 LBHC Reach 3 and UT4 to LBHC

LBHC Reach 3 flows through a wide alluvial valley. The reach has a wooded buffer, with many mature trees and varying degrees of invasive species infestation. Buffer widths measure 200 feet or more. Chinese privet is prominent in the understory. LBHC Reach 3 is generally stable, with isolated lateral instability. Bedrock in the bed at the upstream end of Reach 2 appears to have halted channel incision.

UT4 to LBHC is similar to UT2 in its plan form; it is relatively stable aside from isolated areas of bank erosion at the outside of meander bends. The many mature trees along UT4 are helping maintain stability. Chinese privet is present in the understory, and kudzu was observed near the downstream end of UT4.

Table 5aa. Summary of Geomorphic Form, Functions, and Stressors - LBHC Reach 3 and contributing tributary UT4

Watershed	LBHC 3	UT4	Notes
Drainage Area	3.9		Agricultural land uses, pasture and row crops; some forested areas
Geomorphic Form			Notes
Rosgen Stream Type	E4/G4c		Functions as an E4 at bankfull flow and a G4 at higher discharges
Valley Type	Alluvial		
Entrenchment Ratio	2.0		Value from 1 surveyed cross section.
Bank Height Ratio	2.3		Value from 1 surveyed cross section.
Width-to-Depth Ratio	9.5		Value from 1 surveyed cross section.
Simon Evolutionary Stage	IV/V	VI	
Functional Category	Condition		Description
Hydrology	FAR	F	Adjacent pastureland uses may affect rainfall-runoff relationship.
Hydraulics	FAR		Floodplain access limited, over-wide conditions in Reach 3 are affecting sediment movement.
Geomorphology	NF	FAR	Reach 3 - Incised, active lateral erosion and mid-channel deposition, poor quality riparian buffers near upstream end, limited bedform diversity, kudzu infestation will continue to spread throughout buffer if untreated. UT4 – Incised but quasi-stable bed and banks, limited bedform diversity, some active bank erosion, abundant mature trees.
Physicochemical	FAR		Low nutrient and fecal coliform but elevated phosphorus, high suspended sediment concentrations during storms. Active agricultural pasture and upland row crops in the watershed suggest potential for pollutant loading,
Biology	FAR		Some functional aquatic habitats in isolated reaches, but other reaches are smothered by fine sediment; good fish and benthic populations.
Overall	FAR		Extensive lateral erosion and mid-channel deposition, limited floodplain access, elevated phosphorus, high suspended sediments during storms, kudzu infestation.

5.4 Design Discharge Development

Multiple methods were used to develop bankfull discharge estimates for each of the project restoration reaches. The resulting values were compared and concurrence between the estimates and best professional judgement was used to determine the specific design discharge for each restoration reach.

The methods to estimate discharge included:

1. The published North Carolina rural Piedmont drainage area – discharge relationships (Harman, et al., 1999) shown on Figure 9;

2. The recently completed provisional North Carolina rural Piedmont/ Mountain drainage area-discharge relationships (Walker, unpublished) also shown on Figure 9;
3. Drainage area-discharge relationships developed from reference reaches selected for this project;
4. Regional flood frequency analysis;
5. Hydraulic equations for existing channels at observed bankfull features to estimate bankfull discharge;
6. Site-specific observations.

5.4.1 NC Rural Piedmont Regional Curve Predictions

The published NC rural Piedmont curve was used to estimate discharge based on drainage area using regional relationships (Harman, et al., 1999). Figure 9 illustrates the NC Piedmont curve along with other data used for these analyses.

5.4.2 Provisional Updated NC Piedmont/Mountain Regional Curve Predictions

The draft updated curve for rural Piedmont and mountain stream channels was used to estimate discharge based on drainage area using regional relationships (Walker, unpublished). Experience indicates that the original NC rural Piedmont curves often over-predict bankfull discharge for smaller stream systems. The original rural curve was developed using both gaged and ungaged sites. The methods used to develop discharge estimations for the ungaged sites are believed to have over-estimated the points on the discharge curve (Walker, 2013). In addition, some of the gaged sites used in the original rural curve may have been somewhat incised, with bank height ratios up to 1.5. This enlargement may have contributed to larger discharge values used in development of the curve (Harman, 2013). The updated curves appear to be a better predictor of bankfull parameters for many streams. This updated curve is also plotted as the draft Walker curve on Figure 9.

5.4.3 Drainage Area- Discharge Relationships from Reference Reaches

Several reference reaches were identified during the course of this project. Six were selected for the development of a localized drainage area – discharge relationship: Group Camp Tributary with a drainage area of 0.10 square mile, UT to Sandy Run with a drainage area of 0.15 square mile, UT to South Crowders with a drainage area of 0.22 square mile, UT to Cane Creek with a drainage area of 0.29 square mile, Boyd Branch with a drainage area of 0.90 square mile, and Hall Creek with a drainage area of 4.0 square miles. This range in drainage areas is representative of the range of drainage areas for restoration reaches on the Site. Bankfull features and cross-sections were surveyed at each reference site and Manning’s equation was used to estimate a discharge corresponding to the bankfull stage of each. These estimates of bankfull discharge were plotted on Figure 9 for comparison to regional curves and other methods of estimating discharge. The reference reach discharge estimates plot near or below the other data sets. All but one site is lower than the NC Rural Piedmont Regional Curve. The reference reach discharge curve aligns closest with the unpublished updated regional curve trend (Walker). More information about reference reaches and their geomorphology is provided in Section 8.0 of this report.

5.4.4 Wildlands’ In-House Flood Frequency Equations

Wildlands produced a design discharge estimation tool using 28 published USGS gage station records for drainage basins entirely within Region 1 (Piedmont). All 28 gages have data published in the report *Magnitude and Frequency of Rural Floods in the Southeastern United States* (Weaver, et al., 2009) and 23 of the gages were used in the USGS report’s regression analysis. The 5 gages not included in the USGS regression analysis all had drainage areas less than 1 square mile and were added to supplement the data set. For the analyzed gages, drainage areas varied from 0.25 to 9.62 square miles, had at least 10

years of peak streamflow data records, and had a maximum percent impervious less than 10% during the period of record. The gages were statistically analyzed by Wildlands to support the in-house regression equations developed. The in-house equations provide estimates of peak discharge for floods with recurrence intervals of 1, 1.2, 1.5, 1.8, and 2 years.

5.4.5 Discharge Analysis of Existing Channel

Manning's equation or HEC-RAS hydraulic models were used to estimate the bankfull discharge in the project reaches at cross-section locations where observable bankfull indicators were able to be surveyed.

5.4.6 Design Discharge Selection

In consideration of each of these discharge estimates, low baseflow characteristics, size of contributing watersheds, desired restoration of a natural flooding regime, and experience designing stream complexes in agricultural Piedmont settings, Wildlands selected the design discharge values near the low end of the range that can be supported by available data. The design values selected were most similar to the reference reach estimates, the updated Walker curve predictions, and the bankfull discharges calculated from on-site survey. Table 6 summarizes the results of each of the discharge analyses described in this section and the final selected design discharge for each of the project reaches.



Table 6. Design Discharge Analysis Summary - Big Harris Creek Mitigation Site

Discharge Estimation Method	Area A								Area B														Area C			
	Cornwell Creek	Eaker Creek	Royster Creek	Scott Creek	Carroll Creek	UBHC			Elliott Creek	Elliott Creek UT1	Bridges Creek	Bridges UT1	USEC						USEC UT1	USEC UT2	USEC UT3	UFC	LFC		LBHC	
			Reach 1			Reach 2a	Reach 2b	Reach 4					Reach 2	Reach 3	Reach 4a	Reach 4b	Reach 5	Reach 6				Reach 1	Reach 1	Reach 2	Reach 1a	Reach 1b
Drainage Area (square miles)	0.33	0.04	0.23	0.07	0.32	0.36	0.74	0.83	0.13	0.02	0.07	0.01	0.16	0.42	0.52	0.53	0.72	0.76	0.08	0.07	0.1	0.29	0.41	0.42	3.36	3.88
NC Piedmont Regional Curve (cfs)	40	9	31	13	39	42	72	82	20	5	13	3	24	48	56	58	70	73	14	14	17	36	46	47	214	237
Draft Walker NC Regional Curve (cfs)	23	5	18	6.6	22.6	24.8	44	51	11	2	7	1	13	28	33	35	43	45	8	7	9	21	27	28	144	162
Reference Reach Analysis (cfs)	32	9	26	12	31	34	52	58	18	5	12	4	21	38	44	45	54	56	13	13	15	30	37	38	143	156
Regional Flood Frequency Analysis 1.2-year event (cfs)	34	7	26	10	33	36	62	71	16	13	10	3	20	41	48	50	61	63	12	12	14	31	40	41	190	211
Regional Flood Frequency Analysis 1.5-year event (cfs)	50	11	38	15	48	53	89	102	24	19	15	4	29	59	69	72	87	91	18	17	20	45	57	59	265	294
Regional Flood Frequency	61	13	47	19	59	65	109	125	29	23	19	5	36	72	85	88	107	111	22	21	25	56	70	72	322	357

Discharge Estimation Method	Area A								Area B														Area C				
	Cornwell Creek	Eaker Creek	Royster Creek	Scott Creek	Carroll Creek	UBHC			Elliott Creek	Elliott Creek UT1	Bridges Creek	Bridges UT1	USEC						USEC UT1	USEC UT2	USEC UT3	UFC	LFC			LBHC	
			Reach 1			Reach 2a	Reach 2b	Reach 4					Reach 2	Reach 3	Reach 4a	Reach 4b	Reach 5	Reach 6				Reach 1	Reach 1	Reach 2	Reach 1a	Reach 1b	
Analysis 1.8-year event (cfs)																											
¹ Manning's Equation Cross-Section Survey (XS1)	-	-	-	12	24	23	49	68	15	9	12	2.4	18	18	47	66	73	53	7	11	20	40	46	44	182	205	
Manning's Equation Cross-Section Survey (XS2)	-	-	-	13	28	22	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60	-	-	255	350	
Design Discharge (cfs)	32	9	23	12	32	33	53	55	17	6	12	3	21	38	47	47	52	54	13	12	15	30	35	37	176	195	

1. Manning's values were only calculated for cross-sections with a field identifiable bankfull call. Calls may not have been appropriate for highly degraded channels with no clear field indicators.

2. USGS analysis used in the development of flowrates for culvert design. Flowrates only developed on reaches where culverts are being designed.

5.5 Headwater Drainages

Throughout the project watershed, headwater drainages have formed ephemeral channels at the upstream ends of small streams. Past agricultural terracing practices concentrated flows in these ephemeral channels. These drainages discharge directly to the jurisdictional project streams and drain pastures used for grazing cattle. They contribute significant volumes of sediment, nutrients, and other pollutants to project streams. The origins of these channels are positioned much higher on the landscape than the perennial streams to which they discharge and, in many cases, large headcuts are migrating upstream from the confluences. If left uncontrolled, these headcuts will progress over time and many more tons of sediment will be contributed to the receiving streams. These drainages offer important opportunities to control sediment and other pollutants and improve water quality in the perennial streams throughout the watershed. Below are brief descriptions of the existing conditions of several headwater drainages in the watershed.

5.5.1 Eaker Creek Headwaters

The upper reach of Eaker Creek is an ephemeral channel that flows for approximately 1,300 LF before it becomes intermittent for 65 feet and then perennial for an additional 70 before it discharges into UBHC Reach 2 just upstream of Stick Elliott Road. The upper half of the channel flows through active cattle pasture and the downstream half flows through a wooded area. The upper reach has some mature hardwoods along both banks. The slope of this channel is steep (up to 12%) and knickpoints exist at multiple locations. For more descriptions of the downstream reach of Eaker Creek, see Section 5.1.2.

5.5.2 Scism Creek Headwaters

Scism Creek also begins as an ephemeral channel near Stick Elliott Road and flows into UBHC Reach 4. At the upstream end it is a stable, wide, grassed swale through open pasture. A narrow buffer of hardwoods begins along the channel approximately 180 LF downstream of the road. At this point, the banks of the channel become raw and erosion is active, mostly due to cattle access. A series of vertical knickpoints is located less than 100 feet downstream of the point at which the buffer begins. The channel drops over 30 feet in less than 75 feet of length through this section. Below these headcuts, the channel becomes perennial. The perennial reach flows through a wooded area as a meandering, yet deeply incised, stream (see Section 5.1.3).

5.5.3 EC to UBHC Reach 5

This is a small, steep ephemeral channel that discharges to UBHC approximately 300 LF downstream of Scism Creek. This actively eroding channel is 40 LF in length and drops 15 feet over this length. It flows through a narrow band of trees. The drainage area at the confluence with UBHC is 8 acres.

5.5.4 Royster Creek EC2

The watershed draining to this channel near the upstream end of Royster Creek is approximately 9 acres of cattle pasture. Approximately 450 LF of ephemeral ditch drains this small watershed. This ditch is badly eroded and lateral erosion is ongoing. The banks of the channel are unvegetated and fluvial erosion and sloughing are apparent along much of its length. Further vertical erosion is prevented by a culvert under a farm road approximately 175 LF upstream of Royster Creek, which acts as local grade control. Immediately upstream from the culvert is a relatively flat area extending 25 LF upstream.



Royster Creek EC2

Downstream of the culvert, flow is diffuse for 5 to 10 feet in length but concentrates and forms two channels into Royster Creek. Each of these has a headcut approximately 15 feet high just upstream from Royster Creek, within the buffer of the receiving stream. Both headcuts are at risk for migrating upstream.

5.5.5 Royster Creek EC3

Royster Creek EC3 is an ephemeral channel that flows through cattle pasture and discharges into Royster Creek on the right side, approximately 600 LF downstream of EC2. The drainage area for this reach is 14 acres. This is a short 300 LF channel that becomes severely incised. There are multiple existing headcuts on this reach ranging from 3 feet to 15 feet high. It is reasonable to expect these headcuts will continue to migrate upstream over time if the bed is not protected from further erosion. The channel also flows through a small grove of trees used by cattle for shade and the surrounding ground around the grove outside of the channel is eroding.

5.5.6 Royster Creek EC4

Royster Creek EC4 drains a 28-acre watershed and is 1,200 LF in length. EC4 flows into Royster Creek. From the project boundary 600 LF downstream, this channel is vertically stable and has only minor bank erosion in a few spots. Here the buffer is an active cattle pasture and the banks and bed of the channel are vegetated with Chinese privet and herbaceous plants. Below this, there is a 3-foot) headcut. Shortly downstream of this knickpoint, a narrow buffer of woody vegetation begins. The wooded buffer becomes wider as EC4 approaches Royster Creek. Once in the woods, the channel drops 36 feet over 150 LF through a series of alternating sections of very steep (up to 45%) and gentler (as low as 3.6%) slope. Here, bed degradation is active. The last 150 LF of EC4 appears more stable but drops another 16 feet in elevation to the confluence with Royster Creek.

5.5.7 Royster Creek EC5

The drainage area for this short ephemeral tributary is approximately 7 acres. This channel consists of a 90-foot long reach upstream of an existing set of three small culverts under a farm road and an additional 250-foot-long reach from the outlet of the culverts to the confluence with Royster Creek. Immediately upstream of the culverts, the channel is undefined on a flat area that extends for approximately 70 feet. Upstream of this flat feature is a stormwater flow path on a steep slope (22%) that is actively headcutting. The main knickpoint on this short section is approximately 6 feet high. Downstream of the culverts, the channel is more defined but also actively headcutting. Along this reach there is a series of knickpoints, two of which are approximately seven feet high. The last 64 feet of this channel is an eroded gully that drops over 30 feet down to the confluence with Royster Creek including a series of headcuts as high as 15 feet. Portions of the channel downstream of the culverts have herbaceous vegetation and the last 75 feet are within the Royster Creek buffer and are wooded.

5.5.8 Scott Creek EC

Scott Creek is an ephemeral and intermittent channel that flows from the north end of North Royster Road to UBHC Reach 5. The ephemeral reach begins as a shallow ditch vegetated with dense herbaceous and small woody vegetation. There is a five-foot high knickpoint approximately 100 LF downstream of the upper limit of the channel. Near this knickpoint, the channel enters a wooded buffer that extends most of the way to UBHC. Below the knickpoint, the channel is very steep, dropping 21 feet over 100 LF of channel. The channel is very incised for the rest of the length all the way to UBHC. Beyond this point, the channel bed is stable for 650 LF but the slope continues to be relatively high at over 4%. Another six-foot high knickpoint exists below this section. There is a large amount of metal and other debris including an old car in the channel approximately 350 LF down the channel from the upstream end. The intermittent reach begins about 630 upstream of the confluence with UBHC.

5.5.9 USEC

The beginning of USEC is a perennial drainage way that drains 29 acres of cropland and the Union Elementary School campus. There is a significant, migrating headcut at station 12+00. The primary concerns for this site include severely eroding channel bed, stormwater runoff, and invasive species treatment.



USEC



Downstream of USEC

5.5.10 Headwater Drainages Summary

Table 7 summarizes the watershed characteristics for the nine headwater drainages. Pollutant loads for total nitrogen (TN), total phosphorous (TP), and total suspended sediment (TSS) for these drainages were estimated with a spreadsheet model called Spreadsheet Tool for Estimating Pollutant Loads (STEPL). It is important to note that sediment from streambed erosion (a major source of sediment) is not included in these estimates.

Table 7. Headwater Drainage Area and WQ Summary - Big Harris Creek Mitigation Site

	Area A								Area B
	Eaker EC	Scism EC	Royster EC2	Royster EC3	Royster EC4	Royster EC5	Scott EC	UBHC Reach 5 EC	USEC EC1
Drainage Area (acres)	26	16	9	14	28	7	34	8	29
Drainage Area (square miles)	0.041	0.025	0.014	0.021	0.044	0.01	0.053	0.012	0.045
Land Use - Agricultural	72%	75%	92%	91%	99%	92%	82%	67%	63%
Land Use - Forest	26%	17%	8%	0%	0%	8%	8%	33%	23%
Land Use - Residential	2%	8%	0%	9%	1%	0%	10%	0%	14%
Annual Pollutant Load – TN (lbs/yr)	313	211	325	220	465	113	451	89	386
Annual Pollutant Load – TP (lbs/yr)	73	51	113	52	110	29	102	22	104
Annual Pollutant Load – TSS (tons/yr)	52	40	92	38	87	24	71	16	75

6.0 Baseline Information - Regulatory Considerations

A Categorical Exclusion (CE) was completed and approved in 2009 to satisfy federal funding requirements. The approved CE is included in Appendix F. Table 8 summarizes regulatory considerations for the project.

Table 8. Regulatory Considerations - Big Harris Creek Mitigation Site

	Applicable?	Resolved?	Supporting Documentation
Waters of the US – Section 404	Yes	PCN to be prepared	Appendix C
Waters of the US – Section 401	Yes	PCN to be prepared	Appendix C
Endangered Species Act	Yes	Yes	Appendix F
Historic Preservation Act	Yes	Yes	Appendix F
Coastal Zone Management Act/Coastal Area Management Act	No	N/A	N/A
FEMA Floodplain Compliance	Yes	Floodplain Development Permit Application to be prepared for Cleveland County	Appendix F
Essential Fisheries Habitat	No	N/A	N/A

6.1 401/404 and Jurisdictional Waters of the US

As discussed in Section 4.2, the results of the on-site delineation of jurisdictional waters of the US indicates 26 jurisdictional channels including Big Harris Creek and 25 unnamed tributaries within the proposed project area. Stream determinations for on-site channels are included in Table 2.

Additionally, 18 jurisdictional wetland areas (wetlands A-K, M-S) (Figures 5a-5c) were delineated within or immediately adjacent to the proposed project area, totaling 1.12 acres. Jurisdictional wetlands were delineated using the USACE Routine On-Site Determination Method. This method is defined by the 1987 Corps of Engineers Wetlands Delineation Manual and subsequent Eastern Mountain and Piedmont Regional Supplement. On-site wetland features exhibited one or more of the following wetland hydrology indicators: saturation within the upper 12 inches of the soil profile, algal mats, shallow inundation, iron deposits, water stained leaves, and/or drainage patterns. All wetlands had low chroma soils. Common vegetation found within on-site wetlands included red maple, tulip poplar, Japanese stiltgrass, and giant cane (*Arundinaria gigantea*). Wetland determination data forms representative of on-site jurisdictional areas as well as non-jurisdictional upland areas have been included in Appendix C. A site walk was conducted with personnel from USACE and NCDWR on April 28, 2015, to review jurisdictional waters. The jurisdictional determination is currently under review by the USACE.

Impacts to jurisdictional stream and wetlands were avoided and minimized as much as possible during the design phase. Streams proposed for preservation will not be impacted. Streams proposed for enhancement and restoration will be temporarily impacted for construction purposes. Restoration and enhancement activities will result in an uplift of aquatic resource function.

During the design phase, efforts were made to align proposed restoration stream sections to avoid existing wetlands as much as possible and minimize grading impacts as well. Minor wetland impacts will be necessary along enhancement and restoration reaches. The majority of wetland impacts, approximately 0.38 acres, will be temporary for construction access and/or minor grading. The hydrology and vegetation in these wetlands will be improved after grading and restoration activities are completed. Approximately 0.26 acres of wetland will be permanently filled or converted to stream in

areas of proposed stream restoration. These permanent wetland impacts will be offset by vernal pool creation within the existing channel when it is backfilled. Stream and wetland impacts will be detailed in the 401/404 PCN application. Project streams and wetlands will continue to be protected under the conservation easement placed on the property.

6.2 Threatened and Endangered Species

6.2.1 Site Evaluation Methodology

The Endangered Species Act (ESA) of 1973, amended (16 U.S.C. 1531 et seq.), defines protection for species with the Federal Classification of Threatened (T) or Endangered (E). An “Endangered Species” is defined as “any species which is in danger of extinction throughout all or a significant portion of its range” and a “Threatened Species” is defined as “any species which is likely to become an Endangered Species within the foreseeable future throughout all or a significant portion of its range” (16 U.S.C. 1532).

Wildlands utilized the US Fish and Wildlife Service (USFWS) and North Carolina Natural Heritage Program (NHP) databases in order to identify federally listed Threatened and Endangered plant and animal species for Cleveland County, NC (USFWS, 2015 and NHP, 2015). The northern long-eared bat (*Myotis septentrionalis*) and the dwarf-flowered heartleaf (*Hexastylis naniflora*) are listed as threatened in Cleveland County. The dwarf-flowered heartleaf has been listed as threatened since 1989, while the northern long-eared bat was listed in 2015.

Table 9. Listed Threatened and Endangered Species in Cleveland County, NC – Big Harris Creek Mitigation Site

Species	Federal Status	Habitat
Vascular Plant		
Dwarf-flowered heartleaf (<i>Hexastylis naniflora</i>)	Threatened	Boggy areas adjacent to creek heads and streams and along slopes with acidic soils.
Vertebrate		
Northern long-eared bat (<i>Myotis septentrionalis</i>)	Threatened	Caves and mines during winter. Exfoliating bark, cavities or hollows of 3” dbh trees during summer located less than a mile from a water source.

6.2.2 Threatened and Endangered Species Descriptions

6.2.2.1 Dwarf-flowered heartleaf

The dwarf-flowered heartleaf is listed as a threatened species due to habitat disturbance and destruction. The species is an evergreen ground cover perennial plant. The dark green heart-shaped leaves are 4-6 cm long with a leathery texture that are supported by long thin leaf stems. The jug-shaped flowers bloom between mid-March to early June and are typically beige to dark brown or purplish in color. These small blooms are found near the base of the leaf stems and are not easily visible. This species is typically found in boggy areas adjacent to creek heads and streams as well as slopes of nearby hillsides and ravines containing acidic soils.

6.2.2.2 Northern Long-eared Bat

The Northern long-eared bat (*Myotis septentrionalis*) is listed as a threatened species due to the disease known as white-nose syndrome, which has severely impacted the bat populations. This nocturnal insectivore is a medium-sized bat with a body length of 3-3.7 inches. The pelage is typically medium to dark brown on the dorsal and tan to pale-brown on the ventral. These philopatric species have a range that includes 37 states in the U.S. and all of the Canadian provinces from the Atlantic Ocean west to southern Yukon Territory and eastern British Columbia. Their hibernacula are typically caves and mines where there is a constant temperature, high humidity and minimum air current. Summer habitats

include a wide array of dense forest, loose aggregate, linear features and human-made structures. The conditions of the trees, location and microclimate are all determining factors when roosting. Human disturbances such as impacts to their hibernacula and loss or degradation of summer habitats are other important factors affecting this bat's viability.

6.2.3 Biological Conclusion

Multiple pedestrian surveys have been conducted with the latest on November 4, 2015. The Site evaluation resulted in observations of a *Hexastylis sp.* along LSEC that exhibits morphological characteristics of both the *Hexastylis naniflora* and the more common and non-threatened *Hexastylis virginica*. Since these two species share similar characteristics, an exact species identification was not made in the field. Their habitats consist of acidic soils along nearby slopes, hillside and ravines, often in close proximity of mountain laurel or paw paw (*Asimina triloba*). The species is typically found in boggy areas adjacent to creek heads and streams. The observed plants were found near existing mountain laurel on a hillside. The design approach will avoid impacting the areas containing the observed plant so it was determined that the project would result in "not likely to adversely affect" the dwarf-flowered heartleaf.

This Site does contain suitable summer habitat for the northern long-eared bat; however, the project area does not provide suitable winter hibernacula or winter roosting areas. The summer habitats exist on the periphery of the project area as well as in certain interior areas. These summer habitats contain a variety of roosting preferences from dense forest to linear features to human-made structures. They prefer 3 inch dbh trees that are exfoliating, contain cavities or hollows for roosting, and are located less than a mile to a water source such as a pond or stream. Their winter habitats consist of caves and mines with crevices and cracks to hibernate leaving only their nose and ears visible. No individuals or populations have been observed during the surveys. It was determined that the project "may affect, but is not likely to adversely affect" the northern long-eared bat.

6.2.4 USFWS and NCWRC Concurrence

Review and comment from the NCWRC and USFWS was requested in 2008 as part of the 2009 Categorical Exclusion in respect to the Big Harris Mitigation Site and its potential impacts on threatened or endangered species. The NCWRC responded without any objections to the project. Given the commitment not to impact the areas where the heartleaf plants are located on LSEC, the USFWS confirmed the biological conclusion of "not likely to adversely affect" for the dwarf-flowered heartleaf. Since that time, the Northern long-eared bat was listed as a threatened species. The USFWS was contacted on April 22, 2016, for additional comment in relation to the northern long-eared bat. The agency responded on May 9, 2016, and stated that even though there was potential summer habitat for the bat in the project area, due to the project's distance from known hibernation and/or maternity roost locations "any incidental take that may result from associated activities is exempt under the 4(d) rule". All correspondence and the approved Categorical Exclusion is included in Appendix F.

6.3 Cultural Resources

6.3.1 Site Evaluation Methodology

The National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470), defines the policy of historic preservation to protect, restore, and reuse districts, sites, structures, and objects significant in American history, architecture, and culture. Section 106 of the NHPA mandates that federal agencies take into account the effect of an undertaking on any property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

6.3.2 SHPO/THPO Concurrence

The North Carolina State Historic Preservation Office (SHPO) conducted a review of the project and determined they were aware of “no historic resources which would be affected by the project” June 25, 2008. This review was done as part of the Big Harris Creek Categorical Exclusion. The Eastern Band of Cherokee Indians Tribal Historic Preservation Office (THPO) was contacted regarding the project as well in 2008, but no response was received. A copy of the letter from SHPO and the approved Categorical Exclusion are included in Appendix F.

6.4 FEMA Floodplain Compliance and Hydrologic Trespass

LBHC Reaches 1a, 1b, and 2 are located in a Federal Emergency Management Agency (FEMA) special flood hazard area, as indicated on Flood Insurance Rate Map (FIRM) Panels 2620 and 2621 of the Cleveland County FIS (Figure 10). This Flood Insurance Study (FIS) indicates that a limited detailed study was performed on Big Harris Creek, with the upstream study limits immediately upstream of Harris Creek Road. The FIS also established non-encroachment areas along Big Harris Creek.

Restoration, Enhancement Level I and Level II work is proposed for Lower Big Harris Creek. The design is being developed with consideration for the effective base flood elevation mapping and modeling. Enhancement and restoration measures on Big Harris Creek will be designed to result in no increases in the base flood elevation. A no impact study with detailed hydraulic modeling will be completed prior to construction, and the flood study will be submitted to the Cleveland County Floodplain Administrator for approval with a Floodplain Development Permit Application. If required, a Letter of Map Revision (LOMR) will be submitted after the project is constructed. A DMS Floodplain Requirements Checklist is included in Appendix F.

7.0 Reference Sites

7.1 Reference Streams

Three groups of reference streams were selected to aid in the development of design parameters for stream reaches at the Big Harris Site:

1. Group 1 reference streams consist of moderately sloped, small drainage area E or C meandering streams. Valley slopes range from 1.2% to 2.6% and drainage areas range from 0.1 to 0.9 square miles. Channel substrate is in the sand to gravel range.
2. Group 2 reference streams consist of moderately sloped, larger drainage area reaches. Valley slopes range from 1.0% to 2.2% and drainage areas range from 1.0 to 4.4 square miles. These channels are E, C, or B channels with a median substrate in the gravel range.
3. Group 3 reference streams consist of small, steep Eb, B and A channels. Valley slopes range from 1% to 4% and drainage areas are less than 1.1 square mile. Channel substrate is in the gravel range.

The locations of these reference sites in relation to the Site are mapped on Figure 8. Tables 10a-10c summarize the geomorphic parameters for each reach.

7.2 Channel Morphology and Classification of Group 1 Reference Streams

These higher sloped, small drainage area systems were primarily used to assist with development of design parameters for Upper Big Harris Reaches 2a, 2b, and 4, and Carroll Creek, Reach 2 of Upper Fletcher Creek, Elliott Creek and its UT1, UT1 to Bridges Creek, LFC, and USEC and its UTs on the Big Harris site. Table 10A summarizes the geomorphic conditions of these reaches.

Table 10a. Reference Reach Geomorphic Parameters Group 1 - Big Harris Creek Mitigation Site

	Description	Notation	Units	Group Camp Tributary		UT to South Crowders		UT to Cane Creek		Boyd Branch	
				min	max	min	max	min	max	min	max
	stream type			E5b		E4		E4		E4	
	drainage area	DA	sq mi	0.1		0.22		0.29		0.9	
	bankfull discharge	Qbkf	cfs	12		30		40		51	
Cross-Section Features	bankfull cross-sectional area	Abkf	SF	3.4	3.6	6.4	8.7	8.9	12.2	15.4	
	average bankfull velocity	vbkf	fps	3.4	3.6	4		3.8		3.2	
	width at bankfull	wbkf	feet	4.2	4.4	6.1	8.4	11.5	12.3	13.5	
	maximum depth at bankfull	dmax	feet	1	1.2	1.4		1.2	1.6	1.9	
	mean depth at bankfull	dbkf	feet	0.8	0.8	1	1.1	0.8	1	1.1	
	bankfull width to depth ratio	wbkf/dbkf		5.2	5.5	5.8	8	12.3	14.4	11.8	
	depth ratio	dmax/dbkf		1.3	1.4	1.3	1.4			1.7	
	low bank height			1	1.2	2	2.9	1.4	2.5	1.9	
	bank height ratio	BHR		1	1	1.4	2.1			1	
	floodprone area width	wfpa	feet	8.6	10.6	26	31	31		37	
	entrenchment ratio	ER		1.9	2.5	3.7	4.3	2.5	2.7	2.8	
Pattern Features	sinuosity	K		1.6		2.2		1.4		1.4	
	belt width	wblt	feet	16	17	81		102		230	
	meander width ratio	wblt/wbkf		3.6	3.8	9.6	13.3	8.3	8.9	17	
	meander length	Lm	feet	31	34	45	72	45	81	600	623
	meander length ratio	Lm/wbkf		7.2	7.9	7.4	8.6	3.9	6.6	44.4	46.1
	radius of curvature	Rc	feet	8	12	9	20	23	38	50	180

	Description	Notation	Units	Group Camp Tributary		UT to South Crowders		UT to Cane Creek		Boyd Branch	
				min	max	min	max	min	max	min	max
	radius of curvature ratio	Rc/ wbkf		1.9	2.7	1.5	2.4	2	3.1	3.7	13.3
Profile Features	valley slope	Svalley	feet/foot	0.0229		0.0257		0.0262		0.012	
	channel slope	Schannel	feet/foot	0.0167		0.0091		0.015		0.009	
	riffle slope	Sriffle	feet/foot	0.0105	0.1218	0.0202	0.0664	0.0188	0.0704	0.015	0.028
	riffle slope ratio	Sriffle/Schannel		0.6	7.3	2.2	7.3	1.3	4.7	1.7	3.1
	pool slope	Spool	feet/foot	0	0.01	0	0.006	0.0005	0.0108	0.0008	0.002
	pool slope ratio	Spool/Schannel		0	0.6	0	0.6	0	0.7	0.1	0.2
Pool Features	pool-to-pool spacing	Lp-p	feet	9	58	28	63	27	73	260	345
	pool spacing ratio	Lp-p/wbkf		2	13.4	3.9	8.7	2.3	6.1	19.3	25.6
	maximum pool depth at bankfull	dpool	feet	1.8	2.8	1.3	3	1.8	2.3	2.6	
	pool depth ratio	dpool/dbkf		2.3	3.4	1.3	2.7	2.3		2.4	
	pool width at bankfull	wpool	feet	N/A		8		8.5		16	
	pool width ratio	wpool/wbkf		N/A		1	1.3	0.7		1.2	
	pool bankfull cross-sectional area	Apool	SF	N/A		9.2		11.9			
	pool area ratio	Apool/Abkf		N/A		1.1	1.4	1	1.3		
Sediment	d50			sand		Coarse Gravel		Coarse Gravel		Gravel	
		d16	mm	silt/clay		0.8		0.6			
		d35	mm	0.1		12.1		12.2			
		d50	mm	0.3		19.7		27.8			
		d84	mm	16		49.5		74.5			
		d95	mm	55.6		75.9		128			
		d99	mm	128		180		>2048			

7.2.1 Group Camp Tributary

Group Camp Tributary is located in Lake Norman State Park and receives drainage from a predominantly forested watershed and portions of two park shelters. The stream has a sinuosity of 1.6 and an entrenchment ratio ranging from 1.9 to 2.5. The width to depth ratio is 5.2 to 5.5. The channel slope is 1.7%. Group Camp Tributary is classified as a Rosgen E5b and as Piedmont Deciduous Mesic Forest community.



Consistent bankfull indicator



Sinuous channel with stable outer meander bends



Varied habitat structures: leaf packs, woody debris, undercut banks

7.2.2 UT to South Crowders

UT to South Crowders is a perennial stream located in Crowder Mountain State Park and receives drainage from the forested mountain side. The stream has a high sinuosity of 2.2. The width to depth ratio ranges from 5.7 to 8.2 and it has a high entrenchment ratio ranging from 3.7 to 4.2. Habitat features include root mats, deep meander pools, rock riffles, and woody debris in the channel. This stream classifies as a Rosgen E4 stream type and as Piedmont Deciduous Mesic Forest community.



Stable point bar in meander bend



Deep meander pool

7.2.3 UT to Cane Creek

The UT to Cane Creek reference is located in northeastern Rutherford County. The dataset was used as a reference stream for the Cane Creek Restoration prepared by Restoration Systems and Axiom Environmental in 2007. The drainage area is 0.29 square miles and the land use within the drainage area is a semi-mature forest. The UT to Cane Creek reference site was classified as a C4/E4 stream type with a sinuosity of 1.4. The channel has a width to depth ratio ranging from 8.9 – 12.2 and an entrenchment ratio greater than 2.5. The reach has a valley slope of 2.6% while the channel slope is 1.5%. The bed material d_{50} for the reach is 27.8 mm. It is classified as a Piedmont Deciduous Mesic Forest community.



Habitat structures include undercut banks, leaf packs and coarse substrate



Rootmass from tree armoring tight outer meander bend

7.2.4 Boyd Branch

The reference reach of Boyd Branch is located within the Bent Creek Experimental Forest near Asheville. Boyd Branch drains a 0.9-square mile, forested watershed. The site was surveyed in December 2014 and was found to have a measurable pattern on USGS quadrangle maps. The reach has a slope of approximately 0.9 percent. With a width-depth ratio of 11.8, an entrenchment ratio greater than 3 and gravel sized bed material, Boyd Branch is classified as an E4 stream type.



Consistent bankfull indicators on both banks through riffle section



Ample floodplain access along both banks

Boyd Branch is located within Pisgah National Forest. Vegetation at this site is composed of typical Piedmont bottomland riparian forest tree species. Dominant species include sweetgum, tulip poplar, hackberry (*Celtis occidentalis*), red maple, and American elm (*Ulmus americana*). Common understory vegetation includes ironwood (*Carpinus caroliniana*), American holly, paw paw, and flowering dogwood.

The mature species within this riparian vegetation community provides a large portion of the vertical and horizontal stabilizing force to this reference reach system.

7.3 Channel Morphology and Classification of Group 2 Reference Streams

These mid-range sloped, larger drainage area systems were primarily used to assist with development of design parameters for Reach 2 of Upper Fletcher Creek and Reaches 1a, 1b, and 2 on Lower Big Harris Creek. Table 10b summarizes the geomorphic conditions of these reaches.

Table 10b. Reference Reach Geomorphic Parameters Group 2 - Big Harris Creek Mitigation Site

	Description	Notation	Units	Spencer Creek		Box Creek		Hall Creek		Meadow Fork	
				min	max	min	max	min	max	min	max
	stream type			E4		C4		B4c		E4	
	drainage area	DA	sq mi	0.96		2.13		4.09		4.37	
	bankfull discharge	Qbkf	cfs	97		94.9		159		224	
Cross-Section Features	bankfull cross-sectional area	Abkf	SF	17.8	19.7	28.9		36.9		44	
	average bankfull velocity	vbkf	fps	4.9	5.4	3.3		4.3		5.1	
	width at bankfull	wbkf	feet	10.7	11.2	23.5		20.7	27	21.4	
	maximum depth at bankfull	dmax	feet	2.1	2.6	1.9		3.1		3.1	
	mean depth at bankfull	dbkf	feet	1.6	1.8	1.2		1.4	1.8	2.1	
	bankfull width to depth ratio	wbkf/dbkf		5.8	7.1	19.1		11.6	19.7	10.4	
	depth ratio	dmax/dbkf		1.3	1.4	1.7		1.4	1.4	1.5	
	low bank height					2.9		4.6	4.8	3.5	
	bank height ratio	BHR		1		1.5		2.1	2.2	1.1	
	floodprone area width	wfpa	feet	60	114	76		34	39	N/A	
	entrenchment ratio	ER		5.5	10.2+	3.3		1.4	1.6	>2.2	
Pattern Features	sinuosity	K		1.3		1.3		1.04		N/A	
	belt width	wblt	feet	38	41	62	88	35	41	N/A	
	meander width ratio	wblt/wbkf		3.4	3.6	2.6	3.7	1.5	1.7	N/A	
	meander length	Lm	feet	46	48	39	76	78	200	N/A	
	meander length ratio	Lm/wbkf		4.1	4.4	1.7	3.2	3.3	8.4	N/A	

	Description	Notation	Units	Spencer Creek		Box Creek		Hall Creek		Meadow Fork	
				min	max	min	max	min	max	min	max
	radius of curvature	Rc	feet	11	15	23	38	28	82	N/A	
	radius of curvature ratio	Rc/ wbkf		1.3	1.4	1	1.6	1.2	3.5	N/A	
Profile Features	valley slope	Svalley	feet/ foot	0.0109		0.0225		0.0107		N/A	
	channel slope	Schannel	feet/ foot	0.0047		0.0084		0.0069		0.01	
	riffle slope	Sriffle	feet/ foot	0.013		0.01	0.077	0.008	0.02	0.239	
	riffle slope ratio	Sriffle/ Schannel		2.8		0.8	9.2	1.2	2.9	2.4	
	pool slope	Spool	feet/ foot	7E-04	0.0009	0	8E-04	0	0	N/A	
	pool slope ratio	Spool/ Schannel		0.1	0.2	0	0.1	0	0.2	N/A	
Pool Features	pool-to-pool spacing	Lp-p	feet	71		29	88	35	108	N/A	
	pool spacing ratio	Lp-p/wbkf		6.3	6.6	1.2	3.8	1.5	4.6	N/A	
	maximum pool depth at bankfull	dpool	feet	3.3		4.4		2.7	3.5	N/A	
	pool depth ratio	dpool/dbkf		1.8	2	3.8		1.8	2.3	N/A	
	pool width at bankfull	wpool	feet	17.5		18.8		19.1		N/A	
	pool width ratio	wpool/wbkf		2.7		0.7		0.8		N/A	
	pool bankfull cross-sectional area	Apool	SF	24.5		49.9		35.7		N/A	
	pool area ratio	Apool/Abkf		1.2	1.4	1.7		0.9	1	N/A	
Sediment	Particle Size Distribution from Reachwide Count										
	d50			Medium Gravel				medium gravel			
		d16	mm	<0.063				<0.063			
		d35	mm	3				1			
		d50	mm	8.8				13			
		d84	mm	42				70			
		d95	mm	90				110			
	d99	mm	N/A								

7.3.1 Spencer Creek

The Spencer Creek site has a drainage area of 0.96 square miles and the land use within the drainage area is a semi-mature forest. The reach was classified as an E4 stream type with a sinuosity of 1.3. The channel has a width to depth ranging from 5.8 to 7.1 and an entrenchment ratio ranging from 5.5 to 10.2. The reach has a valley slope of 0.4% while the channel slope is 0.3%. The bed material d_{50} for the reach is 8.8 mm. Pattern data are included in the dataset.

Wildlands visited the Spencer Creek site in March 2012 and visually confirmed that the land use is unchanged and that the stream is laterally and vertically stable. Spencer Creek exhibits a stable, measurable, meandering pattern.

Spencer Creek is surrounded by mature hardwood forests within the Uwharrie National Forests. Vegetation at this site is composed of typical Piedmont bottomland riparian forest tree species. Dominant species include sweetgum, tulip tree, hackberry, red maple, and American elm. Common understory vegetation includes ironwood, American holly, paw paw, and flowering dogwood. The mature species within this riparian vegetation community provides a large portion of the vertical and horizontal stabilizing force to these reference reach systems.

7.3.2 Box Creek

The Box Creek reference reach site is part of the Broad River Basin located in Rutherford County and has a drainage area of 2.13 square miles. It is located within the Box Creek Wilderness area on the western periphery of the property, about two miles northeast of the town of Union Mills. The entire watershed is forested and the reference reach site is located approximately a quarter mile upstream from a large pond. The reach is characterized by short riffles, deep pools, and long shallow runs. This moderately sinuous reach (1.19) classifies as a C4 channel and has a high width/depth ratio of 21.9. This reach reported a bank height ratio of 1.5 but banks were typically stable due to a large extent of woody vegetation lining each bank, especially along the outer bends of a few tight meanders. In-stream habitat structures included undercut banks, woody debris, and coarse substrate from which fish have built several gravel piles for nesting.



Stable riffle section looking downstream



Stable riffle section looking upstream

The Box Creek site is comprised of Montane Alluvial Forest natural community types as part of the Piedmont and Mountain Floodplain. Dominant species include American sycamore, red maple, and tulip tree. Common understory vegetation includes tag alder (*Alnus serrulata*), American holly, flowering dogwood, and New York fern (*Thelypteris noveboracensis*).

7.3.3 Hall Creek

Hall Creek is part of the Catawba River Basin and drains portions of the South Mountain range between Rutherford and Burke Counties. The 4.09 square mile reference reach site is located in a valley on the



Pool section armored with trees along left bank looking downstream



Consistent bankfull indicators on both banks of riffle section (looking downstream)

northwest periphery of the South Mountains Game Lands in Burke County, approximately 10 miles southwest of the town of Morganton. The Hall Creek reference reach classifies as a B4c channel and is characterized by successions of gravel/cobble riffles and fairly shallow pools in general. The few deep pools documented along the reach were located within slight meanders bends with outer bends armored by trees and rootmass. The larger cobble substrate and woody debris observed within many of the riffle features have created numerous micropools that provide beneficial habitat for macro-invertebrates. Even though the channel is incised (bank height ratio greater than 2.0), the banks are very cohesive and stable. Banks are protected by a high density and depth of woody rootmass from mature trees as well as a dense understory of shrubs, herbaceous species and moss. Surface protection along the banks is provided by cobble embedded banks and cobble substrate lining the channel toe, both of which help to minimize bank scour. The reach featured consistent bankfull indicators in the form of narrow, mossy flood benches, the back of point bars, and wracklines from woody debris and leaves. For a stream channel of this drainage area and size, the reach is well-shaded by a dense overstory of mature, forested vegetation and an additional layer of shading provided by overhanging understory vegetation. Several gravel piles formed by fish for nesting were observed throughout the reach.

Hall Creek is classified as Dry Mesic Oak and Hardwood Forest. Dominant species include American beech, red oak, red maple, and tulip tree. Understory vegetation includes American holly, flowering dogwood, ironwood, and Christmas fern.

7.3.4 Meadow Fork

Meadow Fork is located along the Blue Ridge Parkway in southern Alleghany County approximately fourteen miles southwest of the project site. The drainage area is 4.4 square miles with a mix of agricultural and forested land use. A cross-section and a longitudinal water surface profile were surveyed and a reach-wide pebble count was conducted. The stream is an E4 stream type with a width to depth ratio of 10.2 and an entrenchment ratio greater than 2.2. The water surface slope is 1.0%. The D_{50} of the bed material is 31 mm. The estimated bankfull discharge is 224 cfs. The reach is located in a pasture with a narrow woody buffer and is connected to the floodplain near the top of bank. The bed form is an alternating riffle pool sequence with armored coarse riffle substrate. The stream does meander slightly but is relatively straight.



Dense thicket of tag alder along both banks provides toe protection and channel shading



Stable riffle section armored with coarse substrate

The Meadow Fork reference site is located within a maintained agriculture field. The stream banks are planted with a dense thicket of tag alder. Beyond the dense alder thickets, the floodplain vegetation is pasture grasses such as fescue. The densely wooded stream banks contribute to the stream's stability.

7.4 Channel Morphology and Classification of Group 3 Reference Streams

These steeply sloped, larger drainage area systems were primarily used to assist with development of design parameters for Bridges Creek, Scott Creek, and Royster Creek. Table 10c summarizes the geomorphic conditions of these reaches.

Table 10c. Reference Reach Geomorphic Parameters Group 3 - Big Harris Creek Mitigation Site

	Description	Notation	Units	UT to Gap Branch		UT to Kelly Branch		UT to Sandy Run		UT to Rocky Creek		
				min	max	min	max	min	max	min	max	
	stream type			B4a		A4		E4		E4b		
	drainage area	DA	sq mi	0.04		0.08		0.15		1.1		
	bankfull discharge	Qbkf	cfs	18.7		23.2		19		85		
Cross-Section Features	bankfull cross-sectional area	Abkf	SF	3.8	5.7	5.7	6.2			16.3		
	average bankfull velocity	vbkf	fps	5	6.2	3.2				5.5		
	width at bankfull	wbkf	feet	6.2	7.9	7.3	7.8			12.2		
	maximum depth at bankfull	dmax	feet	1	1.1	1.1	1.4			1.8		
	mean depth at bankfull	dbkf	feet	0.6	0.7	0.7	0.8			1.3		
	bankfull width to depth ratio	wbkf/dbkf		10.1	10.9	6.6	9.8			9.1		
	depth ratio	dmax/dbkf		1.7	1.6	1.6	1.8			1.3		
	low bank height			1	2.8	2.4	2.9			N/A		
	bank height ratio	BHR		1	2.5	1.7	2.6			1		
	floodprone area width	wfpa	feet	20.9	9.1	12.2	15.6			72		
	entrenchment ratio	ER		3.4	1.2	1.6	2.1			6		
	Pattern Features	Sinuosity*	K		1.12	1.19	1.6				1.1	
belt width		wblt	feet	N/A	17.9	34.2	24.3	59.6			N/A	
meander width ratio		wblt/wbkf		N/A	2.3	4.3	3.3	7.6			N/A	
meander length		Lm	feet	N/A	27	94	63	72			N/A	
meander length ratio		Lm/wbkf		N/A	3.4	11.9	8.6	9.2			N/A	
radius of curvature		Rc	feet	N/A	8	26	13.7	29.4			N/A	
radius of curvature ratio		Rc/ wbkf		N/A	1	3.3	1.9	3.8			N/A	

	Description	Notation	Units	UT to Gap Branch		UT to Kelly Branch		UT to Sandy Run		UT to Rocky Creek	
				min	max	min	max	min	max	min	max
Profile Features	valley slope	Svalley	feet/foot	0.1176		0.0426		0.02		0.0261	
	channel slope	Schannel	feet/foot	0.068		0.0417		0.015		0.0235	
	riffle slope	Sriffle	feet/foot	0.01	0.14	N/A		0.004	0.04	0.06	0.0892
	riffle slope ratio	Sriffle/Schannel		0.2	2.1	N/A		0.2	2.8	2.6	3.8
	pool slope	Spool	feet/foot	0	0.061	N/A		0	0.01	0	0.0037
	pool slope ratio	Spool/Schannel		0.1	0.9	N/A		0	0.5	0	0.2
Pool Features	pool-to-pool spacing	Lp-p	feet	18.4	26.8	N/A		9.3	54.8	26	81
	pool spacing ratio	Lp-p/wbkf		3	4.4	N/A		1.3	7	2.2	6.7
	maximum pool depth at bankfull	dpool	feet	1.5		N/A		1.3	1.5	2.2	
	pool depth ratio	dpool/dbkf		2.5		N/A		1.9	1.9	1.6	
	pool width at bankfull	wpool	feet	6.1		N/A		7.6	9.2	10.9	
	pool width ratio	wpool/wbkf		1		N/A		1	1.2	0.9	
	pool bankfull cross-sectional area	Apool	SF	7.1		N/A		5.5	8.7	19.3	
	pool area ratio	Apool/Abkf		1.9		N/A		1	1.4	1.2	
Sediment	Particle Size Distribution from Reachwide Count										
	d50			coarse gravel				coarse gravel		coarse gravel	
		d16	mm	0.4				0.062		<0.063	
		d35	mm	8				1		2.4	
		d50	mm	19				19		22.6	
		d84	mm	102.3				76		120	
		d95	mm	256				150		256	
	d99	mm	>2048								

* Sinuosity values calculated from valley and channel lengths, not from valley and channel slopes.

7.4.1 UT to Gap Branch

UT to Gap Branch is located in the Box Creek Wilderness in Union Mills, NC. This stream flows through a confined valley with an alluvial bottom, much like UT1 Reach 2. The overall stream slope is 6.8% and the width to depth ratio is 10.1. The entrenchment ratio is 3.4, and Rosgen classification for this reach unclear: this reach could be classified either as a slightly entrenched B4a or a slightly entrenched A4. Available habitats at UT to Gap Branch include boulder/cobble steps, pools, rock riffles, runs, root mats, and undercut banks.



Stable bankfull benches located along portions of both banks within confined valley



Succession of boulder/cobble steps (looking upstream)

UT to Gap Branch is classified as Dry Mesic Oak and Hardwood Forest. Dominant species include American beech, red oak, red maple, and tulip tree. Understory vegetation includes American holly, flowering dogwood, ironwood, and Christmas fern.

7.4.2 UT to Kelly Branch

The UT to Kelly Branch reference reach is a small, steep, headwater channel located in the McDowell County. It has a drainage area of 0.08 square miles and is part of the Broad River Basin. It is situated along the northeastern periphery of the Box Creek Wilderness area which is nestled between the South Mountain range and the Blue Ridge Escarpment in the western vicinity of the Piedmont ecoregion. The reach classifies as an A4 step pool channel, but pool depths are negligible as they are filled with sediment from the leaching of an upstream, anthropogenic sediment source. Bankfull channel dimensions of riffle features were fairly uniform and consistent throughout the reach. A bank height ratio of 2.5, reported from the geomorphic survey assessment, suggests the stream channel is severely



Long stable riffle section (looking downstream)



Rootmass from doghobble, ferns, and moss along banks help stabilize outer meander bends

incised; however, it appears that this value may be inflated. Bank height ratio was calculated by measuring the bankfull elevation (max depth) at stable and well established bankfull features that appeared to correspond to the bankfull flow water surface elevation *before* the channel bed aggraded with sediment. The difference between this pre-existing bankfull elevation and the raised channel bed elevation resulted in a shallower bankfull max depth, that when compared to low bank height, may have exaggerated bank height ratio. The reach is densely forested and mountain doghobble (*Leucothoe fontanesiana*), rhododendron (*Rhododendron maximum*), ferns, moss, and sporadic mature overstory trees were commonly observed along both stream banks. The channel is sinuous for a high gradient system (sinuosity of 1.19), exhibiting a stable planform while maximizing the width of the valley where possible. Several long gravel/cobble riffles were observed at the site that cascaded into pools over rootmass, woody debris or a boulder step at the tail of riffle.

UT to Kelly Branch is comprised of Acidic Cove Forest natural community types. Dominant species include tulip tree, eastern hemlock (*Tsuga canadensis*), and sweet birch (*Betula lenta*). Common understory vegetation includes tag alder, rhododendron, dog hobble, red maple, flowering dogwood, mountain laurel, and New York fern.

7.4.3 UT to Sandy Run

UT to Sandy Run is a small, sinuous, headwater stream located in Cleveland County, just southwest of the town of Boiling Springs. It has a drainage area of 0.15 square miles and is part of the Broad River Basin in the Piedmont ecoregion. The reference reach drains into another unnamed tributary of Sandy Run before flowing into Sandy Run, which eventually empties into the Broad River. The reference reach is situated within the Broad River Greenway property which is densely forested and is protected by a conservation easement. The channel classifies as an E4 channel, but is moderately entrenched and fairly incised. Entrenchment ratios range between 1.6 to 2.1 and bank height ratios range between 1.7 and 2.6. The channel bed, however, is vertically contained by long, stable, gravel/cobble riffle sequences that serve as grade control, and a lower elevation, nested bankfull channel has formed within the original incised channel. Stable, well-vegetated bankfull benches are evident throughout the majority of the reach and alternate between the left and right bank. Banks are covered with moss and ferns, and generally lined with hearty root mass from a combination of mature trees and younger understory vegetation. The majority of pools are stable with moderate depths, and are typically situated in meander bends containing surface protection armoring in the outer meander bend in the form of tree trunks and root mass. In-stream habitat structures include undercut banks and woody debris.



Narrow bankfull bench along right bank of riffle section (looking downstream)



Rootmass from trees along steep banks provide surface protection and encourage the formation of undercut banks for habitat

UT to Sandy Run is classified as Dry Mesic Oak and Hardwood Forest. Dominant species include American beech, red oak, red maple, and tulip poplar. Understory vegetation includes American holly, flowering dogwood, ironwood, and Christmas fern.

7.4.4 UT to Rocky Creek

The UT to Rocky Branch reference site is located in Central Montgomery County within the Uwharrie National Forest. The stream was used as a reference stream in the Big Cedar Creek Restoration Plan by Baker Engineering NY, Inc. (Baker, 2007). The drainage area is 1.10 square miles and the land use within the drainage area is a semi-mature forest. The UT to Rocky Creek Reference site was classified as an E4b stream type with a low sinuosity (1.1). The channel has a width to depth ratio of 9.1 and an entrenchment ratio of 6. The reach has a valley slope of 2.6% while the channel slope is 2.4%. The bed material d_{50} for the reach is 22.6 mm. Due to the low sinuosity, no pattern data were collected.



Ample floodplain access along both banks



Habitat structures include coarse substrate, leaf packs, snags, and micropools

UT to Rocky Creek are surrounded by mature hardwood forests within the Uwharrie National Forests. Vegetation at this site is composed of typical Piedmont bottomland riparian forest tree species. Dominant species include sweetgum, tulip poplar, hackberry, red maple, and American elm. Common understory vegetation includes ironwood, American holly, paw paw, and flowering dogwood. The mature species within this riparian vegetation community provides a large portion of the vertical and horizontal stabilizing force to these reference reach systems.

8.0 Determination of Credits

The credit ratios proposed for the Site have been developed in consultation with the Interagency Review Team (IRT) as summarized in a technical memo dated February 23, 2015, the IRT response dated May 4, 2015, IRT meeting discussions on August 23, 2016, and the IRT's Mitigation Plan review comment email dated September 22, 2016. This correspondence is included in Appendix G.

1. The requested restoration credit ratio is 1:1, for mitigation activities that include reconstruction of the channels to a stable form and connection of the channels to the adjacent floodplain and will be generally performed on channels that are "not functioning" (NF) from the existing conditions functional pyramid assessment. This work will result in restoration of the dimension, pattern, and profile of the channels. For restoration reaches, the riparian buffers will be planted with native tree species and the conservation easement will be fenced to exclude livestock from streams.

2. The requested Enhancement I (EI) credit ratio ranges from 1:1 to 1.5:1. A credit ratio of 1.5:1 is requested for mitigation activities that include creating bankfull benches resulting in a cross section of the appropriate size to convey the bankfull discharge and providing the channel access to a functioning floodplain and will be generally performed on channels that are NF. These activities will reduce shear stress in the channel and help stabilize the reach. The bankfull profile and cross section of the reach will be changed but the pattern will not. In-stream structures will be added to improve habitat and channel stability. The riparian buffer will also be planted with native tree species and conservation easements adjacent to pastureland will be fenced to exclude livestock. The requested EI credit ratio increases to 1:1 for reaches with the same mitigation activities stated above that are also directly confluent to upstream BMPs. Upstream BMPs are not credited directly.
3. The requested Enhancement II (EII) credit ratio ranges from 1.5: 1 to 2.5:1. A credit ratio of 2.5:1 is requested for mitigation activities that include limited work on the stream channel (such as bank stabilization in discrete areas) but involve other components such as planting native buffer vegetation; treating invasive, non-native vegetation; adding structures or habitat improvements; and fencing out livestock. EII activities will be performed on a large number of reaches throughout the project watershed. The reaches slated for EII have been primarily classified as “functioning at risk” (FAR). Some of these are in wooded areas but in many of these instances the buffers contain pine trees and invasive species such as Chinese privet. Other reaches that are proposed as EII are in pasture areas (though some of these have a narrow and/or sparse buffer) and cattle have access to the channels. The proposed actions for the EII reaches include removal of pines, invasive species treatment, planting native tree and/or understory species to restore or supplement the buffer, and limited bank repair work in discrete areas. In proposed EII areas where livestock are accessing the riparian zones or streams the livestock will be fenced out. The requested EII credit ratio increases to 1.5:1 or 2:1 for reaches with the same mitigation activities stated above that are also directly confluent to upstream BMPs (which are not credited directly) and/or have additional bed and bank treatments proposed.
4. The requested Preservation credit ratio is 10:1, for reaches that are properly “functioning” (F) and do not require additional work for ecological uplift. These reaches have been protected in perpetuity by a conservation easement. This credit ratio is consistent with the most recent IRT guidance for preservation reaches.
5. An additional 4% credit allowance based on total linear footage of the project will be granted by the IRT for the post-construction water quality, benthic, and fish monitoring presented in Section 12.7 of this Mitigation Plan.
6. An additional 1.5% credit allowance based on total linear footage of the project will be granted by the IRT for the watershed scale of the project.
7. An additional 2% credit allowance based on the total project SMUs may be granted by the IRT if statistical improvement is shown in the post-construction water quality metrics.
 - a. In order to gain an additional 2% of the total SMUs for this project, Wildlands will collaborate with the IRT to develop and implement a water quality monitoring and evaluation program with the goal of demonstrating improvement in select water quality parameters. This water quality monitoring and evaluation program will be agreed upon at or before the MYO/Baseline Monitoring report completion.
 - b. If post-construction water quality monitoring demonstrates improvements at an agreed upon level for all selected parameters, then a full 2% of total SMUs (507 SMUs) will be awarded in addition to the 25,330 SMUs already agreed upon. Some portion of the 2% of total SMUs will be awarded for demonstrating partial success for water quality



improvements. The following elements must be determined and agreed upon prior to implementing the program:

- Parameters to monitor to verify success. These need to be selected based on past sampling results, project goals, and likelihood of providing meaningful results.
- Methods of sampling and evaluating results.
- Level of improvement required to demonstrate success.

If a monitoring program is not agreed upon, then the 2% of additional SMUs will not be granted.

The credit ratios fall within the ranges provided in the 2003 USACE Wilmington District Stream Mitigation Guidelines and take into consideration that the project:

- Encompasses 144.78 acres under a conservation easement in the headwaters of Big Harris Creek. This project constitutes a large-scale watershed restoration effort, much larger and more comprehensive than the typical mitigation project. The project includes 34,130 LF of stream on Big Harris Creek and 25 tributaries. The cumulative benefits of this project are greater than the combined benefits of several smaller projects scattered throughout the Broad River basin. The 2008 Environmental Protection Agency (EPA)/USACE mitigation rule strongly supports larger, watershed-based projects and approaches.
- Includes many EII improvements above and beyond typical EII practices, with most EII work occurring on perennial channels and on biologically functioning channels.
- Watershed-wide work includes the construction of stormwater BMPs to stabilize and permanently protect 5,536 LF of ephemeral channels and treat 171 acres of headwater drainage that are impacted by cattle. The intention is that the stormwater BMPs will function to treat runoff until riparian buffer vegetation becomes established. Degraded water quality and sedimentation are significant problems in this watershed and the nine proposed BMPs will help improve water quality and reduce sedimentation. No direct credit is requested for these BMPs or the additional easement area along ephemeral channels.
- Provides significant buffer protection. A majority of the Site is impacted directly by cattle access causing bank shear, bed trampling, and water quality impairments. Cattle will be excluded from all reaches. Buffers often exceed the minimum standards and additional credits are being requested for buffer widths exceeding 50 feet in accordance with typical buffer width adjustments. No additional credit is being requested directly due to buffers planted along headwater ephemeral drainages.
- Addresses gully stabilization which will not only improve function, but will also prevent the loss of additional function. The prevention of additional functional loss is important because of the project location in the landscape.
- Focuses on creating ecological and hydrologic improvements from existing to proposed conditions. The EPA/USACE 2008 Rule states, "The number of credits (generated) must reflect the difference between pre- and post-compensatory mitigation project site conditions..." (33 CFR §332.8). Given the existing degraded conditions of the Site and the suite of traditional and non-traditional activities proposed, the project is completing activities aimed at functional lift of water quality, ecology, hydrology, and geomorphic stability.

Approximately 10% of the project stream length is affected by buffers that are less than the required 50-foot standard width for Piedmont streams. Approximately 46% are affected by buffers greater than the buffer standard (50-75 feet for purposes of credit calculation). A detailed buffer credit calculation was



completed to accurately account for credit reductions and additions throughout the project site. Wildlands analyzed buffer width across the project site to calculate credit reductions or increases based on buffer widths. In order to complete these calculations, CAD software was used to offset the proposed easement in toward the creek by a standard 50-foot buffer. This standard buffer width was reviewed to assess where the buffer was wider or narrower than standard based on the belt width of the stream at outer meander bends. Figures 11a-11c illustrate the variances from a standard buffer width of 50 feet. Credit percent reductions and percent increases were cut in half and applied to either the left or right bank as appropriate. Appendix I contains detailed credit calculations.

Mitigation credits presented in Table 11 are projections based upon site design. The Site is submitted for mitigation credit in the Broad 03050105. Upon completion of site construction, the project components and credits data will be revised to be consistent with the as-built condition.



Table 11. Determination of Credits - Big Harris Creek Mitigation Site

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	25,266	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Project Components									
Project Area	Project Reach	Existing Footage (LF) ¹	Proposed Stationing/Location		Approach (P1, P2, etc.)	Restoration (R) or Restoration Equivalent (RE)	Restoration Footage (LF) ¹	Mitigation Ratio	Proposed Credit ^{2,4}
A	Cornwell Creek R1	2,144	403+44	425+20	cattle fencing; buffer planting	EII	2,144	2.5	883
	Cornwell Creek R2	286	425+20	428+27	Full restoration with structures	EII	307	2.5	123
	UT1 to Cornwell Creek	78	430+27	431+05	cattle fencing; buffer planting	EII	78	2.5	31
	Eaker Creek	135	513+11	514+45	cattle fencing, bank grading and in-stream structures	EI	134	1.0	134
	Eaker Creek EC	N/A	N/A	N/A	headwater BMP	N/A	N/A	N/A	N/A
	UT1 to Eaker Creek	45	N/A	N/A	roadside ditch; stabilization grading ³	N/A	45	0.0	0
	Scism Creek	1,189	606+92	618+81	BMP, bank grading and in-stream structures	EII	1,189	1.5	805
	Scism Creek EC	N/A	N/A	N/A	headwater BMP	N/A	N/A	N/A	N/A
	Royster Creek R1	438	802+54	807+13	Priority 2 Restoration	R	459	1.0	454
	Royster Creek R2	3,185	807+40	839+40	cattle fencing; buffer planting	EII	3,170	2.0	1,606
	Royster EC2	N/A	N/A	N/A	headwater BMP	N/A	N/A	N/A	N/A
	Royster EC3	N/A	N/A	N/A	headwater BMP	N/A	N/A	N/A	N/A
	Royster EC4	N/A	N/A	N/A	headwater BMP	N/A	N/A	N/A	N/A
	Royster EC5	N/A	N/A	N/A	headwater BMP	N/A	N/A	N/A	N/A
	Lower Stick Elliott Creek	1,422	1101+13	1115+34	cattle fencing; buffer planting	EII	1,389	2.5	527
	Scott Creek	630	1210+12	1216+74	Priority 1 Restoration	R	662	1.0	681
	Scott Creek EC	N/A	N/A	N/A	headwater BMP	N/A	N/A	N/A	N/A
	Carroll Creek	553	1301+68	1307+63	Priority 2 Restoration	R	595	1.0	539
	Upper Big Harris Creek-R1	2,615	104+25	129+81	bank grading and in-stream structures; pine removal and buffer planting	EII	2,556	2.5	1,141
Upper Big Harris Creek-R2	990	129+81	139+15	Priority 2 Restoration	R	934	1.0	1,060	

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	25,266	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Project Components									
Project Area	Project Reach	Existing Footage (LF) ¹	Proposed Stationing/Location		Approach (P1, P2, etc.)	Restoration (R) or Restoration Equivalent (RE)	Restoration Footage (LF) ¹	Mitigation Ratio	Proposed Credit ^{2,4}
	Upper Big Harris Creek-R3	880	139+75	148+45	cattle fencing; bank grading and in-stream structures	EII	870	2.0	510
	Upper Big Harris Creek-R4	1,203	148+76	159+15	Priority 2 Restoration	R	1,039	1.0	1,050
	Upper Big Harris Creek-R5	845	159+58	168+03	cattle fencing; bank grading and in-stream structures	EII	845	1.5	604
	Upper Big Harris Creek-R6A	824	168+63	177+50	cattle fencing; benching; bank grading and in-stream structures	EII	855	1.5	571
	Upper Big Harris Creek – R6B	1,434	177+50	191+84	cattle fencing; benching; bank grading and bank structures	EII	1,403	1.5	925
	Upper Big Harris EC	N/A	N/A	N/A	headwater BMP into Upper Big Harris Reach 5	N/A	N/A	N/A	N/A
	UT1 to Upper Big Harris Creek	84	197+13	197+97	bank grading and in-stream structures; pine removal and buffer planting	EII	84	2.5	26
	UT2 to Upper Big Harris Creek	97	200+42	201+39	bank grading and in-stream structures; pine removal and buffer planting	EII	97	2.5	35
	UT3 to Upper Big Harris Creek	105	202+00	203+05	preservation	P	105	10.0	11
	UT4 to Upper Big Harris Creek	84	204+00	204+84	preservation	P	84	10.0	7
B	Elliott Creek	1,389	1400+85	1412+06	bank grading, segments of profile and bench restoration, in-stream structures	EI	1,121	1.0	1,163
	UT1 to Elliott Creek	141	1415+87	1417+28	bank grading, segments of profile and bench restoration, in-stream structures	EI	141	1.0	122
	Bridges Creek-R1	445	1500+91	1504+67	Priority 1 Restoration	R	376	1.0	391
	Bridges Creek-R2	366	1504+67	1507+84	bank grading and in-stream structures	EII	317	2.0	168

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	25,266	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Project Components									
Project Area	Project Reach	Existing Footage (LF) ¹	Proposed Stationing/Location		Approach (P1, P2, etc.)	Restoration (R) or Restoration Equivalent (RE)	Restoration Footage (LF) ¹	Mitigation Ratio	Proposed Credit ^{2,4}
	UT1 to Bridges Creek	58	1510+46	1511+01	Priority 1 Restoration	R	55	1.0	27
	Upper Stick Elliott Creek EC	N/A	N/A	N/A	headwater BMP into USEC	N/A	N/A	N/A	N/A
	Upper Stick Elliott Creek-R1	352	1002+89	1006+98	Priority 1 Restoration	R	409	1.0	354
	Upper Stick Elliott Creek-R2A	535	1006+98	1012+00	bank grading and in-stream structures	EII	471	2.0	240
	Upper Stick Elliott Creek – R2B	334	1012+00	1015+10	bank grading and in-stream structures	EII	310	2.0	155
	Upper Stick Elliott Creek-R3A	209	1015+10	1018+25	bank grading and benching	EII	315	2.0	175
	Upper Stick Elliott Creek – R3B	1,336	1018+25	1027+44	bank grading, benching, and in-stream structures	EII	889	2.0	465
	Upper Stick Elliott Creek-R4A	428	1038+11	1042+08	cattle fencing, bank grading and in-stream structures	EII	397	2.0	182
	Upper Stick Elliott Creek-R4B	113	1042+28	1043+21	in-stream structures	EII	113	1.5	69
	Upper Stick Elliott Creek-R5	1,909	1043+77	1058+84	Priority 2 -> Priority 1 Restoration	R	1,507	1.0	1,596
	Upper Stick Elliott Creek-R6	1,036	1059+14	1069+83	Priority 1 -> Priority 2 Restoration	R	1,069	1.0	1,069
	UT1 to Upper Stick Elliott Creek	50	1078+08	1078+80	bank grading and in-stream structures	EII	72	1.5	39
	UT2 to Upper Stick Elliott Creek	56	1080+00	1081+54	reconnection; Priority 1 Restoration	R	154	1.0	144
	UT3 to Upper Stick Elliott Creek	107	1082+00	1083+18	reconnection; Priority 1 Restoration	R	118	1.0	118

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	25,266	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Project Components									
Project Area	Project Reach	Existing Footage (LF) ¹	Proposed Stationing/Location		Approach (P1, P2, etc.)	Restoration (R) or Restoration Equivalent (RE)	Restoration Footage (LF) ¹	Mitigation Ratio	Proposed Credit ^{2,4}
	Upper Fletcher Creek- R1	1,493	1600+00	1615+71	isolated bank grading and in-stream structures, livestock fencing, invasives treatment	EII	1,571	2.5	644
	Upper Fletcher Creek- R2	1,465	1616+02	1630+09	Priority 2 Restoration	R	1,407	1.0	1,440
	Lower Fletcher Creek- R1	574	1641+28	1647+02	bank grading, benching, and in-stream structures	EI	574	1.0	493
	Lower Fletcher Creek- R2	467	1647+33	1651+60	bank grading, benching, and in-stream structures	EI	427	1.0	464
C	Lower Big Harris Creek- R1A	509	300+13	305+13	bank grading, segments of profile and bench restoration, in-stream structures	EI	500	1.5	304
	Lower Big Harris Creek- R1B	385	305+13	308+33	Priority 2 Restoration	R	320	1.0	333
	Lower Big Harris Creek- R2	987	308+33	318+00	Priority 2 Restoration	R	967	1.0	1,092
	Lower Big Harris Creek - R3	414	318+00	322+14	isolated bank grading and in-stream structures, invasives treatment	EII	414	2.5	198
	UT1 to Lower Big Harris Creek	229	330+68	332+96	isolated bank grading and in-stream structures, invasives treatment	EII	228	2.5	53
	UT2 to Lower Big Harris Creek	511	334+20	338+60	heavy enhancement with in-stream structures, invasives treatment	EII	440	2.0	183
	UT3 to Lower Big Harris Creek	99	341+69	342+87	preservation	P	118	10.0	11
	UT4 to Lower Big Harris Creek	362	343+12	346+74	preservation	P	362	10.0	36

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	25,266	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Project Components									
Project Area	Project Reach	Existing Footage (LF) ¹	Proposed Stationing/Location	Approach (P1, P2, etc.)	Restoration (R) or Restoration Equivalent (RE)	Restoration Footage (LF) ¹	Mitigation Ratio	Proposed Credit ^{2,4}	
Total Intermittent/Perennial (I/P) Streams						34,161		23,451	
Additional 4% Credit Based on I/P Stream Length for Extra Project Monitoring								1,366	
Additional 1.5% Credit Based on I/P Stream Length for Watershed Nature of Project								512	
Additional 2% Credit Based on Total SMUs for Statistical Improvement in Water Quality								507	
Component Summation									
Restoration Level	Stream	Riparian	Non-Riparian Wetland	Buffer (square	Upland (acres)				
Restoration	10,071								
Enhancement	N/A								
Enhancement I	2,897								
Enhancement II	20,524								
Creation	N/A								
Wetland Rehabilitation	N/A								
Wetland Re-Establishment	N/A								
Preservation	669								
High Quality Preservation	N/A								

Notes:

- Existing and proposed lengths include only reach length located within the conservation easement. No direct credit for BMPs. BMP lengths not included in proposed footage.
- Credits reported have been adjusted based on buffer width deviations from standard 50-foot buffer width. Detailed calculations included in Appendix I.
- UT1 to Eaker Creek is a roadside ditch that will be stabilized, but does not have adequate buffer. No credit is being proposed.
- The lengths of Royster Reach 2 and Scott Creek that are located underneath the existing overhead electric power line corridor have credits reduced by 100%.

9.0 Project Site Mitigation Plan

9.1 Justification for Proposed Intervention

Wildlands’ approach focuses on evaluating the key stressors affecting the system’s hydrology, hydraulics, geomorphology, physicochemistry, and biology. The conceptual approach is driven by this information and takes a “lighter touch” approach to semi-stable, moderately functioning reaches where large-scale construction would negatively impact existing functions. We have invested design and construction resources toward addressing the headwater conveyances which are delivering large volumes of sediment and agricultural pollutants to the system. The concept design is shown on Figures 12a-12c.

9.2 Design Channel Summary

9.2.1 Area A

Area A encompasses UBHC and its tributaries. The degree of degradation varies widely throughout the watershed, as described in Section 5.1. Restoration activities were chosen based on the present state of the stream and its watershed and the potential for functional uplift. Several of the reaches in Area A are highly incised, but the streambed and lower portion of the banks have stabilized and the watershed land use has remained consistent over many years. These systems are providing habitat to macroinvertebrates and fish, and often bedrock is providing natural grade control. Restoring these streams would likely be more disruptive to the ecosystem than beneficial, as the functioning streambeds would be relocated and/or significantly disturbed. EII activities are assigned to these reaches. Representative activities include fencing out livestock, vegetating the streambanks, repairing eroded banks, or adding habitat features. On streams where both the streambed and stream banks are degraded, and the stream is disconnected from its natural floodplain, restoration activities are proposed. A combination of Priority 1 and Priority 2 approaches will be used on site, depending on what the existing topography allows. Restoration reaches restore the plan, pattern, and profile of the reach, and also include installation of in-stream structures including constructed riffles, log vanes, j-hooks, and angled rock and log sills. Care was taken to provide adequate grade control in the design of each reach.

On Priority Level 1 Restoration reaches, there is a potential for groundwater to become temporarily disconnected from the streambed initially after construction; however, the hyporheic zone is expected to be restored and stable over time with channels maintaining baseflow conditions. For Priority Level 1 projects being constructed in cut conditions, soil profiles will be monitored with construction oversight to determine if unconsolidated sediments are intercepted that would promote preferential flow at an elevation other than the proposed channel invert. If unconsolidated layers are observed, a channel plug will be installed across the floodplain. For Priority Level 1 channels being constructed in fill conditions, fill material will be inspected to ensure it is free of debris, well mixed, and is suitably compacted. Fill material will be placed in layers in order to achieve proper compaction. Baseflow conditions will be monitored throughout the year (post-construction) via continuous flow stage recorders on reaches proposed for restoration or Enhancement I (EI).

Table 12a and the subsequent text describe the restoration/enhancement approach of individual reaches in Area A.

Table 12a. Design Morphologic Parameters Area A - Big Harris Creek Mitigation Site

			Area A																	
	Notation	Units	Royster			Scott Creek			Carroll Creek			UBHC - Reach 2a			UBHC - Reach 2b			UBHC - Reach 4		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max
stream type			B4			B4a			C4			C4			C4			C4		
drainage area	DA	sq mi	0.23			0.07			0.32			0.36			0.74			0.83		
design discharge	Q	cfs	23	22	25	12	10	13	32	25	29	33	25	30	53	48	54	55	52	57
bankfull cross-sectional area	A _{bkf}	SF	5.3			3.1			8.2			7.9			12.5			14.4		
average velocity during bankfull event	V _{bkf}	fps	4.4	2.5	4.5	3.9	2.5	4.5	3.9	2.5	4.5	4.2	2.5	4.5	4.2	2.5	4.5	3.8	2.5	4.5
Cross-Section																				
width at bankfull	w _{bkf}	feet	8.3			6.5			10.4			10.2			12.8			13.8		
maximum depth at bankfull	d _{max}	feet	1.00			0.70			1.20			1.20			1.50			1.60		
mean depth at bankfull	d _{bkf}	feet	0.6			0.5			0.8			0.8			1.0			1.04		
maximum depth ratio	d _{max} /d _{avg}		1.6	1.2	1.6	1.5	1.2	1.6	1.5	1.3	1.5	1.5	1.2	1.5	1.5	1.2	1.5	1.5	1.2	1.5
bankfull width to depth ratio	w _{bkf} /d _{bkf}		13.0		12-14	13.6		13-16	13.2		12-14	13.2		12-14	13.1		12-14	13.2		12-14
low bank height		feet	1			0.7			1.2			1.20			1.50			1.6		

			Area A																	
	Notation	Units	Royster			Scott Creek			Carroll Creek			UBHC - Reach 2a			UBHC - Reach 2b			UBHC - Reach 4		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max
bank height ratio	BHR		1.0	1.0	1.2	1.0	1.0	1.2	1.0	1.0	1.2	1.0	1.0	1.2	1.0	1.0	1.2	1.0	1.0	1.2
floodprone area width	W_{fpa}	feet																		
Entrenchment ratio	ER			2.2+			1.4	2.2		2.2+			2.2+			2.2+			2.2+	
Slope																				
valley slope	S_{valley}	feet/foot	0.0325			0.0444			0.0150			0.0152			0.0163			0.0129		
channel slope	S_{chnl}	feet/foot	0.0295			0.0411			0.0131			0.0130			0.0140			0.0105		
Profile																				
rifle slope	S_{rifle}	feet/foot		0.033	0.050		0.045	0.053		0.016	0.050		0.016	0.049		0.017	0.050		0.017	0.047
rifle slope ratio	S_{rifle}/S_{chnl}			1.1	1.7		1.1	1.3		1.2	3.8		1.2	3.8		1.2	3.6		1.6	4.5
pool slope	S_p	feet/foot		0.000	0.0059		0.000	0.0082		0.000	0.0026		0.000	0.0026		0.000	0.0028		0.000	0.0021
pool slope ratio	S_p/S_{chnl}			0.0	0.2		0.0	0.2		0.0	0.2		0.0	0.2		0.0	0.2		0.0	0.2
pool-to-pool spacing	L_{p-p}	feet		13	58		8	42		17	73		23	66		29	83		30	110
pool spacing ratio	L_{p-p}/W_{bkf}			1.6	7.0		1.2	6.5		1.6	7.0		2.3	6.5		2.3	6.5		2.2	8.0
pool cross-sectional area		SF	11	6	11	6.0	4	6	16	10	16	13.6	9	16	24	15	25	26	17	29

			Area A																	
	Notation	Units	Royster			Scott Creek			Carroll Creek			UBHC - Reach 2a			UBHC - Reach 2b			UBHC - Reach 4		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max
pool area ratio			2.0	1.2	2.0	2	1.2	2.0	2.0	1.2	2.0	1.7	1.2	2.0	1.9	1.2	2.0	1.8	1.2	2.0
maximum pool depth		feet	1.6	1.1	2.0	1.2	1.0	1.7	2.0	1.3	2.4	1.8	1.2	2.3	2.4	1.5	2.9	2.5	1.6	3.1
pool depth ratio			2.5	1.7	3.1	2.5	2.0	3.5	2.5	1.7	3.1	2.3	1.5	3.0	2.5	1.5	3.0	2.4	1.5	3.0
pool width at bankfull		feet	11.5	9.1	12.5	8.6	6.5	9.8	14.0	11.4	15.6	13.0	12.2	15.3	17.0	15.4	19.2	18.0	16.6	20.7
pool width ratio			1.4	1.1	1.5	1.3	1.0	1.5	1.3	1.1	1.5	1.3	1.2	1.5	1.3	1.2	1.5	1.3	1.2	1.5
Pattern																				
sinuosity	K			1.1			1.05 - 1.1			1.15			1.18			1.15			1.1	
belt width	w_{bit}	feet		25	37		7	26		31	47		26	51		28	64		41	69
meander width ratio	w_{bit}/w_{bkf}			3.0	4.5		1.0	4.0		3.0	4.5		2.5	5.0		2.2	5.0		3.0	5.0
meander length	L_m	feet		25	83		20	52		31	104		36	97		45	122		48	193
meander length ratio	L_m/w_{bkf}			3.0	11.3		3.0	8.0		3.0	12.0		3.5	9.5		3.5	9.5		3.5	14.0
radius of curvature	R_c	feet		15	37		16	29		19	47		18	41		23	51		25	62
radius of curvature ratio	R_c/w_{bkf}			1.8	4.5		2.5	4.5		1.8	4.5		1.8	4.0		1.8	4.0		1.8	4.5

9.2.1.1 Cornwell Creek

Although the overall condition of Cornwell Creek is listed as functioning, the buffer is narrow in many locations, Chinese privet is prevalent, and cattle have access throughout. Wildlands prescribes an EII approach to enhance functions along the entire length of this creek within the project limits. This approach will involve fencing out cattle, planting buffers, invasive species treatment, and limited bank stabilization.

While the EII approach is consistent along the length of Cornwell Creek, additional work beyond the traditional scope of EII work is proposed on the downstream most length of the creek to transition the creek to the restored UBHC Reach 2a. Because of this additional work, Cornwell Creek is presented as two design reaches to aid agency mitigation credit review. Reach 1 extends from the upstream project limit to 307 feet upstream of Cornwell Creek's confluence with UBHC Reach 2a; Reach 2 encompasses the downstream most 307 feet of Cornwell Creek. Reach 2 will be raised to meet the grade of the restored UBHC Reach 2a. The stream planform in Reach 2 will be adjusted to improve stability at the Cornwell- UBHC confluence. Raising the bed and grading the banks will allow Cornwell Creek Reach 2 access to its floodplain where it intersects the floodplain of UBHC. The installation of constructed riffles along this section will provide grade control to prevent headcuts from traveling up Cornwell Creek.

9.2.1.2 Eaker Creek

This is steep reach of intermittent to perennial stream that is incised and has vertical banks with lateral erosion. The design for this reach will include laying back and stabilizing banks, adding constructed riffles, step pools, rock cascades, and woody debris to improve habitat conditions, and invasive species treatment within the conservation easement. Large trees in the buffer will be saved to the extent possible while native canopy and understory species will be planted in areas where trees are removed. These treatments will improve channel hydraulic function, geomorphic processes, and aquatic biology. The treatments correspond to the EI category of work. The stormwater BMP constructed on the headwater drainage to Eaker Creek will reduce fecal pollution from cattle waste and enhance nutrient cycling to improve the water quality of this reach.

9.2.1.3 Scism Creek

The recorded TSS impacts on Scism Creek's water quality were a primary consideration when selecting a design approach. Preservation alone would fail to address the active vertical instabilities observed on the reach and aquatic habitats and water quality would remain impacted by the fine sediment contributions. The main enhancement or restoration design challenge identified on Scism Creek is how to move a deeply incised channel towards a more stable form while balancing both the potential mature buffer loss resulting from mass earthwork with the overall functional lift to the watershed.

A design constraint that Wildlands considered was the depth of the existing eroded valley and the established vegetation within it. This existing condition seems to prohibit reestablishing a new channel on the old floodplain due to the massive amount of imported fill that would be required. The channel at the base of the valley appears to be moving towards stability in many areas but is still eroding valley walls. Ultimately, Wildlands determined that the existing stream channel is in the latter evolutionary stages for an EII approach to be successful. Bedform will be diversified and aquatic habitats will be constructed. Active vertical incision will be stabilized and eroding banks will be sloped to address lateral and vertical instabilities. Cattle will be fenced out of the entire reach. Invasive species will be treated within the conservation easement and native species will be planted.

9.2.1.4 Royster Creek

A design approach for Royster Creek must strike a balance with some inherently contradictory existing conditions: the agricultural watershed, the extremely incised channel, the mature existing bedforms and aquatic habitats, the observed cattle impacts to bank stability and fine sediment contribution, the 'Good' macroinvertebrate populations, and the measured high nutrient loads and high suspended sediment concentrations delivered by the system during storm flows.

Wildlands' alternatives analysis began by first considering constraints that reduce options or affect the outcome or success of restoration. The watershed does not appear to be at risk for future development, and a conservation easement will protect the use of the riparian zone. The depth of the existing eroded valley and the high quality bedforms found within this valley were given strong consideration while forming a design approach. The bedform is of high enough quality downstream of Reach 1 that complete channel relocation and abandonment of the existing channel was ruled out. Valley wall and bank erosion is spotty and does not appear to be highly active. Wildlands believes the source of nutrients and sediment is likely from the livestock access midway through the reach and from the eroded, ephemeral tributaries which fail to provide retention of storm flows from the agricultural watershed.

Wildlands believes the best approach is to restore the upstream end of Royster Creek (Reach 1) as it transitions into an incised system and then to transition to EII activities for the remainder of Royster Creek. Royster Creek Reach 1 will be designed as a Rosgen B4 channel. Dimension, pattern, and profile will be restored. A Priority 1 restoration will be achieved for a majority of the reach and it will transition to a Priority 2 approach to tie into the existing channel grade at the culvert crossing. This will allow access to the floodplain at the upstream end of Royster Creek, allowing for a natural dissipation of energy associated with flood flows. Stabilizing the bed of this reach and the base of the culvert at the easement crossing will prevent further headcut migration into this section.

The stream transitions to EII activities downstream of the culvert crossing. Reach 2 will include construction of a series of off-line stormwater treatment cells to treat watershed storm flows within the ephemeral headwaters as well as in the contributing ephemeral gullies (see description for EC2, EC3, EC4, and EC5). The treatment cells will help to slow the stormwater flow, which will help reduce the effect that pasture conversion and terracing farm fields in the watershed has had on stream hydrology. Additional activities on this reach include fencing out cattle, treating invasive species, and replanting native vegetation.

9.2.1.5 LSEC

LSEC is slated for EII due to its stable condition and the potential presence of the threatened *Hexastylis naniflora* on its banks. LSEC is undergoing active lateral erosion and shows signs of deposition. The health of the macroinvertebrate community living in this reach was noted to have declined between 2009 and 2013. The health of the macroinvertebrate community is likely a reflection of the conditions in the upper watershed; however, there are adjustments that can be made downstream of the area where *Hexastylis naniflora* may be found that could help to stabilize some of the high quality habitats observed on the reach. Wildlands will fence the zone entirely to remove cattle access and plant the sparse understory with native vegetation. The stream will be re-aligned within the UBHC floodplain. This will alleviate the severe erosion on a bank that is failing. This approach will also correctly align the stream with the easement crossing, proposed culvert, and confluence with UBHC.

9.2.1.6 Scott Creek

Scott Creek is incised throughout its length with no access to a floodplain and lateral erosion is actively degrading banks on the lower half of this reach. Available aquatic habitats are few, and the buffer



condition is poor with a dense invasive understory. Hydrology to this stream is functioning-at-risk due to active farm practices in the watershed and this was considered while developing the design concept. The watershed to this stream is not at risk for future development, and a conservation easement will protect the immediately surrounding the zones.

Due to the severe incision of the system, a full Priority 1 Restoration will not be possible for the entire reach. The proposed stream design is a Priority 1 for a portion of the reach and between a Priority 1 and Priority 2 (Priority 1.5) for the remainder. An SPSC, as described in Section 9.4.7, will be designed to decrease the severity of the headcut located at the upstream point where Scott Creek becomes jurisdictional. Cut material from the Priority 2 Restoration of Carroll Creek will be used to raise the valley floor of Scott Creek to allow or a Priority 1/1.5 Restoration. The fill material will be free of debris and organic material. It will also be compacted so as not to promote preferential flow paths through the fill. In locations where the design is not a true Priority 1, a floodplain will be graded out and the valley walls will be graded back at a 3(H):1(V) slope. Scott Creek will maintain its current alignment through the new valley and floodplain, however the cross-section will be decreased to the typical design sections as shown on the plans. Since the reach is a steep B channel (Rosgen type B4a), the bedform will consist of several log and rock drop structures, step pool sequences, riffles, and small pools. It is expected that, over time, the groundwater table will respond to the Priority 1.5 Restoration and rise to the new stream bed level. Cattle will be fenced out of the conservation easement. Invasive species will be treated within the conservation easement and native species will be planted.

9.2.1.7 Carroll Creek

Carroll Creek is extremely incised throughout its length with no access to a floodplain and some indications of lateral instability. Available aquatic habitats are few, and the buffer condition is poor with a dense invasive understory. Hydrology to this reach is functioning-at-risk due to active farm practices in the watershed and this was considered while developing a design concept for this portion of the project.

This reach is proposed for complete Restoration using a Priority 2 approach. Lack of a headcut at the upstream end hindered the ability to implement a Priority 1 Restoration. Carroll Creek will be re-aligned onto what is currently the left floodplain. A floodplain will be excavated with a minimum width of 1.5 times the bankfull width from outside of meander bend to outside of meander bend. The floodplain will not meander. The stream will use a combination of angled log drops, brush toe, j-hooks, and various constructed riffles to provide bedform diversity and habitat structures. Cattle will be fenced out of the conservation easement. Invasive species will be treated within the conservation easement and native species will be planted.

9.2.1.8 Upper Big Harris Creek

UBHC Reach 1

Based on the field assessment and review of data collected at the site, the Wildlands team has concluded that overall Reach 1 is functioning-at-risk but trending towards functioning. Because the bedforms and substrates are in good condition and support a healthy population of aquatic insects and bank erosion is not widespread nor rapidly occurring, restoration activities are not appropriate.

However, some bank repair and stabilization would be beneficial by arresting further erosion and stabilizing vertical banks with undercuts that will eventually fail and contributed additional sediments to the system. Treating invasive species such as Chinese privet would also be beneficial to the system. This reach will also include the selective thinning of pine trees in order to promote the development of a deciduous forest.

The design constraints for this reach include a functioning biological community in much of the reach that would be disturbed by restoration activities. This reach is also completely wooded, though the trees

are mostly young (10-15 years old), and mechanical treatments to the stream and banks would require clearing of some trees for access.

Based on the information available, enhancement activities are proposed for this portion of the project. Reaches UT1 and UT2 are proposed for EII activities consisting of laying back and stabilizing banks in specific locations where banks are vertical and eroding, treating privet, and replanting native trees and/or understory species where needed.

UT3 and UT4 to UBHC

The overall rating of UT3 and UT4 is functioning. Wildlands proposes preservation for both of these reaches and treatment of invasive species.

UBHC Reach 2

The overall rating for Reach 2 is functioning-at-risk. The majority of the banks are eroded and there is evidence of lateral instability. Reach 2 is proposed for Restoration. Reach 2a will be Priority 1 Restoration. The stream will be re-aligned through the low point in the valley and reconnected to the historic floodplain. Reach 2b, downstream of the confluence with Cornwell Creek, will transition to a Priority 2 Restoration to tie in to the existing channel bed upstream of the culvert at Stick Elliott Road. A floodplain will be established at the bankfull height through the length of this reach. The floodplain will be greater than 1.5 times the bankfull width from the outside of each meander bend in order to prevent contraction of flood flows. A variety of wood and rock habitat structures will be installed along the reach to provide habitat and promote bedform diversity. The proposed approach for this reach also includes privet treatment and planting.

UBHC Reach 3

Reach 3 has been impacted by cattle access as evidenced by bank trampling, the fining of bed material, and lack of a vegetated understory. Reach 3 is proposed as EII with efforts on bench development, bank grading, re-establishment of bank and bed vegetation, and the addition of roughness to the stream channel. The trampled, sloughed banks will be planted with plugs of juncus along the bank toes. Once established, these plants will help to capture sediment during high flow events. The area should then aggrade to a stable bench feature within the channel over time. Repairing the stream banks and adding roughness to riffle features through the incorporation of on-site native rock will promote a coarsening of bed material over time.

There is currently a hindrance to fish passage at the culvert under Stick Elliott Road. The 1-foot drop at the downstream end of the culvert is an obstacle to most local aquatic organisms. This will be remedied through the addition of a constructed riffle that will match the grade downstream of the plunge pool to the elevation of the downstream invert of the culvert. This will allow fish passage to the upstream reaches of UBHC during base flow. The existing culvert crossing downstream of Stick Elliott Road, on Reach 3, will be removed to further enhance aquatic organism passage on UBHC.

Activities on this reach also include the fencing out of cattle and the establishment of a riparian buffer and enhancement of the existing buffer's understory species.

UBHC Reach 4

This reach has been impacted by livestock access, it is incised, and there is evidence of lateral migration. The outside meander bends have migrated to the valley walls and are still actively eroding. The channel has incised down to a historic stream bed elevation, as evidenced by the cobble in the soil profile of the eroded banks. There are wallow areas located along this reach. Reach 4 is proposed for restoration. It will utilize an existing bedrock riffle series to achieve a Priority 1 Restoration approach and reconnect the stream to its historic floodplain. The stream will then transition to Priority 2 Restoration at the downstream end to tie into the existing stream bed. Care was taken to minimize impacts to large trees



and wetland cells in the re-alignment of this stream channel. Bioengineered bank treatments along with a variety of constructed riffles and habitat structures will be used to add bedform complexity, provide carbon to the system, and increase habitat value. Treatment for this reach also includes fencing out cattle, treating invasive species, and supplementing the buffer with understory species.

UBHC Reaches 5 and 6

Reaches 5 and 6 of Upper Big Harris have less evidence of active channel incision and lateral channel migration as compared to proposed restoration reaches UBH Reach 2 and UBH Reach 4. The continued degradation of Reaches 5 and 6 is due to livestock access. Cattle pathways weave along the top of banks. These pathways destabilize the bank and cause sloughing. They also prevent the vegetation and root mass development that would serve to naturally protect the banks. The pathways cross the stream at several narrow fords allowing livestock to wallow in the streambed. These wallow areas are severely eroded and are an active source of sediment input to the stream system. Another source of sediment is areas of concentrated flow from the floodplain.

EII is proposed for Reaches 5 and 6. While the EII approach is consistent along Reaches 5 and 6, additional benching, bank stabilization, and bank structures beyond the traditional scope of EII work are proposed on the upstream half of Reach 6 to address some concentrated areas of cattle impacts. Because of this additional work, Reach 6 is presented as two design reaches to aid agency mitigation credit review: Reach 6A extends from Royster Road to 200 feet downstream from the Scott Creek confluence, Reach 6B extends from the end of Reach 6A downstream 1,403 feet to the end of Area A.

Enhancement activities will serve to remedy the issues caused by livestock access on these reaches. Cattle pathways will be re-vegetated to provide necessary root mass for bank stabilization. Understory species will also be planted in the buffer. Crossing and wallow areas will be addressed with bank grading and stream structure placement where necessary. Benches will be graded and vegetated in the over widened portions of the wallow areas to stabilize the disturbed soil and prevent further sediment inputs. Vegetation plugs will be planted along the benches to trap sediment moving downstream and improve nutrient cycling. Areas of concentrated flow in the floodplain will be stabilized with erosion control matting and seeded to create stable vegetated swales. At easement breaks, fords will be properly designed to prevent cattle access to the streams and stabilize currently eroded areas. The entirety of Reaches 5 and 6 will be fenced for cattle exclusion.

9.2.2 Area B

Area B encompasses USEC and its tributaries. Table 12b and the subsequent text describe the restoration/enhancement approach of individual reaches in Area B.



Table 12b. Design Morphologic Parameters Area B - Big Harris Creek Mitigation Site

	Notation	Units	Elliott Creek			Elliott Creek UT1			Bridges Creek			UT1 to Bridges Creek			Upper Stick Elliott Creek Reach 5			Upper Stick Elliott Creek Reach 6			Upper Stick Elliott Creek UT2			Upper Stick Elliott Creek UT3			UFC Reach 2			Lower Fletcher Creek Reach 1			Lower Fletcher Creek Reach 2		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max			
stream type			C5			C4			B4			C4			C4			C4			C4			C			C4			C4					
drainage area	DA	sq mi	0.13			0.02			0.07			0.01			0.72			0.76			0.07			0.10			0.29			0.41			0.42		
design discharge	Q	cfs	17			6			12			3			52			54			12			15			30			35			37		
bankfull cross-sectional area	A _{bkf}	SF	4			2.0			3.7			2.0			18.4			18.4			3.5			4.0			9			10.0			11		
average velocity during bankfull event	v _{bkf}	fps	4.3			3.0			3.2			1.5			2.8			2.9			3.4			3.8			3.3			3.5			3.4		
Cross-Section																																			
width at bankfull	w _{bkf}	feet	7.5			4.9			6.9			4.9			16.0			16.0			6.7			7.2			10.5			11.8			12.4		
maximum depth at bankfull	d _{max}	feet	0.80			0.70			0.80			0.70			1.60			1.60			0.80			0.80			1.30			1.20			1.30		
mean depth at bankfull	d _{bkf}	feet	0.5			0.4			0.5			0.4			1.1			1.1			0.5			0.6			0.9			0.8			0.9		

	Notation	Units	Elliott Creek			Elliott Creek UT1			Bridges Creek			UT1 to Bridges Creek			Upper Stick Elliott Creek Reach 5			Upper Stick Elliott Creek Reach 6			Upper Stick Elliott Creek UT2			Upper Stick Elliott Creek UT3			UFC Reach 2			Lower Fletcher Creek Reach 1			Lower Fletcher Creek Reach 2		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max			
maximum depth ratio	d_{max}/d_{avg}		1.5			1.7			1.5			1.7			1.4			1.4			1.5			1.4			1.5			1.2			1.5		
bankfull width to depth ratio	w_{bkf}/d_{bkf}		14.0			12.0			13.0			12.0			14.0			14.0			13.0			13.0			12.2			14.0			14.0		
low bank height		feet	0.80			0.70			0.80			0.70			1.60			1.60			0.80			0.80			1.30			1.20			1.30		
bank height ratio	BHR		1.0			1.0			1.0			1.0			1.0			1.0			1.0			1.0			1.0			1.0			1.0		
flood prone area width	w_{rpa}	feet	16.5			10.8			9.7	15.3		10.8			22.5	35.3		35.3			14.8			15.9			50.0	100.0		26.0			27.3		
entrenchment ratio	ER		2.2			2.2			1.4	2.2		2.2			1.4	2.2		2.2			2.2			2.2			4.8	9.5		2.2			2.2		
Slope																																			
valley slope	S_{valley}	feet / foot	.0174			.0302			0.029			0.058			0.011			0.0115			0.0045			0.015			0.0158			0.0089			0.0150		
channel slope	S_{chnl}	feet / foot	0.0149			0.0255			0.028			0.049			0.008			0.0101			0.0035			0.013				0.0128	0.0263	0.0088			0.0146		
riffle slope	S_{riffle}	feet / foot		0.022	0.030		0.038	0.051		0.025	0.047		0.074	0.098		0.009	0.014		0.015	0.020		0.005	0.007		0.020	0.026		0.021	0.032		0.013	0.018		0.022	0.029
riffle slope ratio	S_{riffle}/S_{chnl}			1.5	2		1.5	2		1.1	1.8		1.5	2		1.1	1.8		1.5	2		1.5	2		1.5	2		1.2	1.6		1.5	2		1.5	2

	Notation	Units	Elliott Creek			Elliott Creek UT1			Bridges Creek			UT1 to Bridges Creek			Upper Stick Elliott Creek Reach 5			Upper Stick Elliott Creek Reach 6			Upper Stick Elliott Creek UT2			Upper Stick Elliott Creek UT3			UFC Reach 2			Lower Fletcher Creek Reach 1			Lower Fletcher Creek Reach 2		
			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values					
			Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max	
pool slope	S_p	feet / foot	0.000	0.003		0.000	0.005		0.000	0.011		0.000	0.010		0.000	0.003		0.000	0.002		0.000	0.001		0.000	0.003		0.0020	0.0132		0.000	0.002		0.000	0.003	
pool slope ratio	S_p/S_{chnl}		0.0	0.2		0.0	0.2		0.0	0.4		0.0	0.2		0.0	0.4		0.0	0.2		0.0	0.2		0.0	0.2		0.2	0.5		0.0	0.2		0.0	0.2	
pool-to-pool spacing	L_{p-p}	feet	26	45		17	29		24	55		17	29		88	119		63	109		24	45		25	43		40	100		41	71		43	74	
pool spacing ratio	L_{p-p}/W_{bkf}		3.5	6		3.5	6		3.4	7.9		3.5	6		5.5	7.4		3.9	6.8		3.5	6.7		3.5	6		3.8	9.5		3.5	6		3.5	6	
pool cross-sectional area	SF		4.8	6.0		2.4	3.0		4.4	5.6		2.4	3.0		22.1	27.6		22.1	27.6		4.2	5.3		4.8	6.0	16.7				12.0	15.0		13.2	16.5	
pool area ratio			1.2	1.5		1.2	1.5		1.2	1.5		1.2	1.5		1.2	1.5		1.2	1.5		1.2	1.5		1.2	1.5	1.9				1.2	1.5		1.2	1.5	
maximum pool depth		feet	1.1	1.9		0.8	1.4		1.1	1.9		0.8	1.4		2.3	4.0		2.3	4.0		1.0	1.8		1.1	1.9	2.2				1.7	3.0		1.8	3.1	
pool depth ratio			2.0	3.5		2.0	3.5		2.0	3.5		2.0	3.5		2.0	3.5		2.0	3.5		2.0	3.5		2.0	3.5	2.6				2.0	3.5		2.0	3.5	
pool width at bankfull		feet	9.7	12.7		6.4	8.3		7.6	10.4		6.4	8.3		17.7	24.1		20.9	27.3		8.8	11.5		9.4	12.3	15.2				15.4	20.1		16.1	21.1	
pool width ratio			1.3	1.7		1.3	1.7		1.1	1.5		1.3	1.7		1.1	1.5		1.3	1.7		1.3	1.7		1.3	1.7	1.5				1.3	1.7		1.3	1.7	

Pattern	Notation	Units	Elliott Creek			Elliott Creek UT1			Bridges Creek			UT1 to Bridges Creek			Upper Stick Elliott Creek Reach 5			Upper Stick Elliott Creek Reach 6			Upper Stick Elliott Creek UT2			Upper Stick Elliott Creek UT3			UFC Reach 2			Lower Fletcher Creek Reach 1			Lower Fletcher Creek Reach 2		
			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values			Typical Section Values					
			Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max		Min	Max	
sinuosity	K		1.19			1.19			1.03			1.20			1.34			1.13			1.27			1.09			1.21			1.02			1.03		
belt width	W _{bit}	feet	18.7	59.9		17.1	39.2		N/A	N/A		17.1	39.2		61.1	81.0		61.7	77.6		23.6	54.0		25.2	57.7		25.0	95.0		41.4	94.7		43.4	99.3	
meander width ratio	W _{bit} /W _{bkf}		2.5	8		3.5	8		N/A	N/A		3.5	8		3.8	5.0		3.8	4.8		3.5	8		3.5	8		2.4	9.0		3.5	8		3.5	8	
meander length	L _m	feet	52.4	89.8		34.3	58.8		N/A	N/A		34	59		139.1	192.1		166.2	191.2		47	81		50	87		100.0	200.0		82.8	142.0		86.9	148.9	
meander length ratio	L _m /W _{bkf}		7.0	12.0		7.0	12.0		N/A	N/A		7.0	12.0		8.7	12.0		10.4	11.9		7.0	12.0		7.0	12.0		9.5	19.0		7.0	12.0		7.0	12.0	
radius of curvature	R _c	feet	15	26		10	17		N/A	N/A		10	17		33.0	56.0		32.0	43.0		13	24		14	25		23.0	50.0		24	41		25	43	
radius of curvature ratio	R _c /W _{bkf}		2	3.5		2	3.5		N/A	N/A		2	3.5		2.1	3.5		2.0	2.7		2	3.5		2	3.5		2.2	4.8		2	3.5		2	3.5	

9.2.2.1 Elliott Creek and UT1 to Elliott Creek

Elliott Creek displays significant instability through lateral erosion and active incision, and the stream overall is considered “not functioning.” The primary design constraints for this reach are the steep, somewhat confined valley and the need to work around large, mature trees and sections of stable channel to the extent practicable. EI is proposed for the system and will include the targeted use of bank stabilization practices and slight channel realignments to address areas of instability, particularly on the outside of meander bends. Constructed riffles and other grade control structures will be incorporated in key locations to prevent further downcutting. The design also avoids areas that are stable and functioning. Treatment of invasive species, including Chinese privet and kudzu, will be required throughout Elliott Creek. These approaches, when applied collectively, will improve the overall functioning condition of the zone by correcting the sources of impairment while also keeping intact areas that are relatively stable and functioning well in their current condition.

UT1 to Elliott Creek was channelized in the past and, as a result, exhibits high bank height ratios, steep stream banks, and some minor headcutting and active incision. As a result of the past channelization and its current level of instability, the stream is considered to be “not functioning.” The stream is proposed for EI that will include the targeted use of bank stabilization and benching practices to address areas of instability, incorporating grade control structures, and connecting to Elliott Creek at the design elevation.

9.2.2.2 Bridges Creek and UT1 to Bridges Creek

Bridges Creek Reach 1

Bridges Creek was assessed as “not functioning” along the majority of its length. In its current condition, the upstream and downstream portions of the reach are unstable with active incision and lateral bank erosion. A middle portion of the reach is relatively stable, with a small bankfull channel that has formed within the larger channel. The primary design constraint for this evaluation zone is the need to work around the few mature/desirable trees and areas of stable channel in the middle of the reach, to the extent practicable. Wildlands proposes restoration and enhancement approaches for this stream that will improve impaired segments while minimizing impacts to areas that are currently functioning. Restoration activities proposed for Reach 1 of Bridges Creek include raising the channel bed profile at the current headcut to reconnect with the un-incised channel and reference wetland above the headcut, modifying channel pattern, and incorporating constructed riffles and angled log sills in locations to provide long-term protection against any further incision.

Bridges Creek Reach 2

Bridges Creek Reach 2 will consist of EII treatments including targeted use of bank stabilization practices to address isolated areas of instability. Grade control will be particularly important on the downstream portion of the reach to protect against headcuts that are slowly moving up the reach from USEC Reach 3. In a few locations on Reach 2, slight modification of channel pattern will be required to address meander bend erosion. This work will be conducted primarily within the existing channel, utilizing existing benches and bars with minimal need for excavation beyond those limits. These approaches will improve the overall functioning condition of the reach by correcting the impairment sources while also keeping stable, functioning areas intact. In-stream structures will focus on adding wood and structure to promote scour pools and improved habitat within the stream bed that will likely remain dominated by sand and fine sediment. It is expected that over time, the groundwater table will respond to the restoration approaches on the upstream portion and will rise to the new stream bed level, hydrating the adjacent floodplain and promoting wetland hydrology.



UT1 to Bridges Creek

UT1 to Bridges Creek, like Bridges Creek Reach 1, is incised along its length due to a headcut that has moved up the system. Due to the level of incision and instability, the reach is considered “not functioning.” UT1 will also use restoration procedures to raise the current bed-level to reconnect at the design elevation of the Bridges Creek restoration and to the un-incised channel of UT1 above the headcut. Some modification of channel pattern, incorporating constructed riffles and angled log step structures will be used to prevent further incision of the tributary. Through this restoration approach, the groundwater table is expected to respond to the restoration approach and will rise to the new stream bed level, hydrating the adjacent floodplain and promoting wetland hydrology like the restoration of Bridges Creek.

9.2.2.3 Upper Stick Elliott Creek

USEC Reach 1

USEC Reach 1 was evaluated as “not functioning,” due to the considerable instability caused by a very large headcut that is moving up through the reach. A boulder cascade and Rosgen B step-pool channel will be restored to step the channel down through this area. This approach will improve the overall functioning condition of the reach by stabilizing the headcut and channel side slopes, preventing against future headcutting and incision, and correcting the sources of impairment for the reach.

USEC Reach 2 and UT1 to USEC

Based on the field assessment and review of data collected at the site, Wildlands has concluded that the stream overall is “functioning-at-risk.” Instabilities such as isolated eroding banks and minor headcuts along the upstream portion of Reach 2 contribute significant sediment to the system. EII activities are proposed for the system that will include the targeted use of bank stabilization practices to address isolated areas of instability, and incorporating constructed riffles, angled log sills, and log vane grade control structures in key locations to prevent further downcutting. This approach will improve the overall functioning condition of the reach by correcting the sources of impairment while also keeping intact areas that are relatively stable and functioning well in their current condition. While the EII approach is consistent along USEC Reach 2, additional bank stabilization beyond the traditional scope of EII work are proposed on the upstream half of Reach 2 to address some concentrated areas of eroding banks. Because of this additional work, Reach 2 is presented as two design reaches to aid agency mitigation credit review. The reach break between Reach 2A and Reach 2B is roughly 100 feet downstream of the proposed culvert crossing depicted on Figure 12b.

The primary design constraints for USEC Reach 2 are the narrow conservation easement widths, and the goal to minimize impacts to large trees and areas of stable channel to the extent practicable.

UT1 to USEC was evaluated as “not functioning” due to it being highly incised and actively eroding in an attempt to reach equilibrium with USEC Reach 2. EII activities are proposed for the system that will include the targeted use of bank stabilization practices to address isolated areas of instability, and incorporating log step grade control structures in key locations to prevent further downcutting.

The primary design constraint for UT1 to USEC is the proximity to the conservation easement that has been secured for the stream system.

USEC Reach 3

Wildlands concluded that USEC Reach 3 is overall “functioning-at-risk.” While the stream appears to be supporting a variety of aquatic life and the bed form diversity is good, there are several areas of instability present, primarily lateral bank migration and erosion located along the outside of meander

bends. The primary design constraint for this reach is the goal to minimize impacts to large trees and areas of stable channel to the extent practicable.

EI activities are proposed for the reach that will include the targeted use of bank stabilization practices to address isolated areas of instability, and incorporating constructed riffles and log grade control structures in some locations to provide long-term protection against any further incision. Slight modification of channel pattern will be required to address meander bend erosion on the upstream half of Reach 3. This work will be conducted primarily within the limits of the existing channel, utilizing existing benches and bars with minimal need to excavation beyond those limits. This pattern correction is beyond the traditional scope of EI work; therefore, Reach 3 is presented as two design reaches to aid agency mitigation credit review. The reach break between Reach 3A and Reach 3B is at the end of the proposed channel pattern adjustments as shown on Figure 12b. These approaches when applied collectively will improve the overall functioning condition of the reach by correcting the sources of impairment while also keeping intact areas that are relatively stable and functioning well in their current condition.

USEC Reaches 4a and 4b

Based on the field assessment and review of data collected at the site, the Wildlands team has concluded that USEC Reach 4a is “functioning-at-risk.” Since Reach 4a has a fairly stable bankfull channel that has developed within the larger channel at the upper portions of Reach 4a, EI activities and approaches are proposed that will involve the installation of angled log step grade control structures along the lower portion of Reach 4a to reconnect floodplain benches that have been disconnected due to channel incision. This work will be done strategically and with minimal disturbance to the existing riparian areas and vegetation. Raising the channel bed elevation will also have the added benefit of raising the local water table and should improve the overall hydrology and extent of existing wetlands in the riparian buffer.

Wildlands concluded that Reach 4b is also “functioning-at-risk.” Since incision increases as Reach 4b approaches the dual culverts beneath the private driveway, EI approaches are proposed for Reach 4b. Angled log step grade control structures will be incorporated in key locations to prevent further downcutting. The culverts and driveway crossing at the downstream end of the reach are design constraints, but step down structures will be used to tie into the existing culverts.

USEC Reaches 5 and 6 and UT2 and UT3 to USEC

USEC Reach 5 was evaluated as “not functioning,” due to the considerable bank erosion and channel incision that are occurring. Reach 5 will be restored offline using a combination of Priority 1 and 2 approaches. Directly below the culverts at the upstream extent of the reach, a new floodplain bench and bankfull channel will be constructed offline through areas of young successional vegetation, avoiding larger trees to the extent practical (i.e. Priority 2 approach). This approach is required due to the elevation of the existing culverts upstream. The bed of the stream will be raised moving downstream, until the restoration can be transitioned to a Priority 1 approach by constructing a new offline bankfull channel along the adjacent floodplain of the existing stream. Some portions of the new channel alignment will go back into the existing channel alignment due to valley and easement constraints. The approach will weave the new restored channel through the existing woods, avoiding larger mature trees to the extent practicable. In-stream structures such as angled log sills and vanes will be used to protect stream banks, provide grade control, and promote scour in pools since the restored system will continue to carry sand from the upstream watershed. This approach will restore the hydraulic and geomorphic functions of the stream while minimizing damage to the existing riparian vegetation.

USEC Reach 6 was evaluated as “not functioning,” due to the considerable bank erosion and channel incision present, and active cattle access. The Priority 1 Restoration of Reach 5 will continue along USEC



Reach 6. There is sufficient open pastureland along the left bank of USEC Reach 6 to construct an offline bankfull channel and remove few mature trees.

After restoration, the abandoned channel of USEC Reach 6 will be completely to partially filled, depending on the final design grades and the amount of fill material available. Some vernal pools will be created in partially filled portions of the old channel to enhance floodplain storage and habitat. At the lower end of USEC Reach 6, the Priority 1 restored channel will transition back to the existing channel in LFC Reach 2 before flowing into the culverts beneath Stick Elliott Road. This transition will be completed gradually with the use of rock cross vane and J-hook grade control structures and floodplain benches to ensure long-term stability. Cattle will be excluded from USEC Reaches 5 and 6.

The primary design constraints for USEC Reaches 5 and 6 are the need to match existing grades at road culverts and minimize the loss of mature trees and climax species. Stream grades will be stepped down and lowered gradually upstream of culverts to avoid excessive stresses being placed on individual in-stream structures. The vegetation communities along the reach have been inspected and the design approaches proposed here can be implemented with only moderate disturbance to mature trees and desirable vegetation.

UT2 and UT3 to USEC were evaluated as “not functioning” due to minimal access to the floodplain and considerable bank erosion. Since Reach 5 will be raised to its historic floodplain, both tributaries will need to be raised to that grade through restoration approaches. Raising the elevation of UT2 and UT3 will limit the incision that occurred due to the tributaries connecting to an incised Upper Stick Elliott Reach 5 and will address the headcuts. Stream grades will be stepped down and lowered gradually to avoid excessive stresses being placed on individual in-stream structures. The design constraints for UT2 and UT3 are limited to the need to match Reach 5 in pattern and grade.

9.2.2.4 Upper Fletcher Creek

Given the relatively stable conditions and significant access constraints, an EI approach is proposed for UFC Reach 1. Proposed work includes installing in-stream wood and rock structures to encourage riffle and pool formation and address channel dimension issues while also protecting worthwhile existing features such as the active floodplain and mature vegetation. Isolated bank grading and bioengineering measures are proposed in sections where spot bank erosion is a problem. Structures, grading and bank treatments will be installed/performed in the downstream half of Reach 1 where equipment can feasibly access these areas. The Reach 1 alignment and profile will remain in place, with minor localized shifts. Livestock fencing will be installed throughout Reach 1, and invasive plant species will be treated.

In Reach 2, with its wider valley and fewer topographic constraints, restoration level practices are appropriate. Here, a Priority 1.5 Restoration approach is proposed, whereby a new meandering channel will be constructed off-line of the existing channel. The primary restoration objectives will be to shift the alignment away from eroding terrace slopes and connect the stream to a continuous floodplain. The two gullies entering the stream near the upstream end of Reach 2 will be stabilized with a combination of stone, compacted soil fill and vegetation. Stormwater will be routed away from the gullies using diversion berms, swales or wattles while vegetation becomes established. As with Reach 1, the easement boundary will be fenced and invasive plant species will be treated within the easement.

9.2.2.5 LFC Reaches 1 and 2

Based on the field assessment and review of data collected at the site, Wildlands concluded that LFC Reach 1 and Reach 2 are “not functioning.” Instability is present along LFC Reach 1, and direct cattle access is causing additional impairment through the direct discharge of sediment, bacteria and nutrients into the stream reaches. Based on the information available, an EI approach is recommended for Reach 1 and Reach 2. EI activities proposed for the system include benching along one stream bank for the



majority of the reaches to provide adequate floodplain access, the use of in-stream structures such as log vanes and log sills to narrow the channel in sections where the stream is overly wide, exclusion of cattle and livestock through fencing, and restoration of an adequate riparian buffer with native tree species.

The primary design constraint for LFC Reach 1 and Reach 2 is the presence of a single line of mature trees along both banks of the stream, and a proposed culvert crossing between Reach 1 and Reach 2. Proposed benching along the right bank of Reach 1 was chosen because there are fewer trees along that bank, and the right bank is the most unstable. Along Reach 2, the benching will shift to the left bank because there are fewer trees that will be impacted. The roadside ditch at Stick Elliott Road will be stabilized using bank grading and rock step structures that will stabilize not only the ditch area but also the road embankment. These approaches, when applied collectively, will improve the overall functioning condition by correcting the sources of impairment, promoting an appropriate channel form, and reducing energies placed on stream banks during flood events.

9.2.3 Area C

Area C encompasses LBHC and its tributaries. Table 12c and the subsequent text describe the restoration/enhancement approach of individual reaches in Area C.

Table 12c. Design Morphologic Parameters Area C - Big Harris Creek Mitigation Site

	Notation	Units	LBHC Reach 1a/1b			LBHC Reach 2		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max
stream type			C			C		
drainage area	DA	sq mi	3.36			3.88		
design discharge	Q	cfs	176			194		
bankfull cross-sectional area	A_{bkf}	SF	54.4			58.5		
average velocity during bankfull event	v_{bkf}	fps	3.3			3.4		
Cross-Section								
width at bankfull	w_{bkf}	feet	26.0			27.0		
maximum depth at bankfull	d_{max}	feet	2.90			3.00		
mean depth at bankfull	d_{bkf}	feet	2.1			2.2		
maximum depth ratio	d_{max}/d_{avg}		1.4			1.4		
bankfull width to depth ratio	w_{bkf}/d_{bkf}		12.4			12.5		
low bank height		feet	2.90			3.00		
bank height ratio	BHR		1.0			1.0		

	Notation	Units	LBHC Reach 1a/1b			LBHC Reach 2		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max
floodprone area width	W_{fpa}	feet		75.0	115.0		100.0	200.0
entrenchment ratio	ER			2.9	4.4		3.7	7.4
Slope								
valley slope	S_{valley}	feet/ foot		0.0053			0.0053	
channel slope	S_{chnl}	feet/ foot		0.0048			0.0048	
Profile								
riffle slope	S_{riffle}	feet/ foot			0.0054		0.0054	0.0086
riffle slope ratio	S_{riffle}/S_{chnl}			1	1.1		1.1	1.8
pool slope	S_p	feet/ foot		0.001	0.000		0.001	0.000
pool slope ratio	S_p/S_{chnl}			0.0	0.3		0.0	0.3
pool-to-pool spacing	L_{p-p}	feet		185	240		150	250
pool spacing ratio	L_{p-p}/W_{bkf}			7.1	9.2		5.6	9.3
pool cross-sectional area		SF	102			111		
pool area ratio			1.9			1.9		
maximum pool depth		feet	6.0			6.2		
pool depth ratio			2.9			2.8		
pool width at bankfull		feet	38.0			34.8		
pool width ratio			1.3			1.3		
Pattern								
sinuosity	K			1.10			1.11	
belt width	w_{blt}	feet		53.0	112.0		110.0	145.0
meander width ratio	w_{blt}/W_{bkf}			2.0	4.3		4.1	5.4
meander length	L_m	feet		290.0	440.0		344.0	420.0
meander length ratio	L_m/W_{bkf}			11.2	16.9		12.7	15.6
radius of curvature	R_c	feet		60.0	80.0		75.0	90.0
radius of curvature ratio	R_c/W_{bkf}			2.3	3.1		2.8	3.3

9.2.3.1 *LBHC*

Reaches 1a, 1b, 2 and 3, and its tributaries UT1, UT2, UT3, and UT4

The design constraints for LBHC include narrow easement boundaries along Reaches 1a and 1b, a functioning biological community in some areas that is worthy of protection, and densely wooded buffers in Reaches 2 and 3. Bedrock at the bed elevation at the upstream end of Reach 3 is another design constraint, but it also serves as a logical break point between treatment approaches. Bedrock and boulders were also noted in the bed of Reach 1a of LBHC. A combination of restoration and enhancement is proposed for LBHC.

Because stable, functioning riffles and pools are present in Reaches 1a and 1b, and monitoring data indicate the system is supporting a reasonably healthy population of aquatic insects and fish, full restoration is not appropriate. Here Wildlands proposes EI practices, including bank sloping, excavating floodplain benches where space allows, installing in-stream structures, and treating invasive species. Reach 2 of LBHC is appropriate for Priority 2 Restoration activities, beginning at a failed bank repair at a former up-valley meander bend and extending downstream with a new off-line channel that will abandon segments of existing channel where massive mid-channel deposition and bank erosion are present. The off-line channel will tie back into the existing alignment and profile at the upstream end of Reach 3 near where bedrock spans the channel bed. In Reach 3, the team proposes EII practices, including invasive species treatment and focused in-stream structures in order to shift flow away from raw banks and promote equilibrium sediment transport.

On UT2, a combination of EI and EII practices are proposed, with the higher level practices being incorporated at eroding outside banks and lower level practices elsewhere. EII level credit will be sought for the entire UT2 reach. The team proposes EII practices for UT1, UT3 and UT4, including in-stream structures in order to stabilize the channel beds near the confluences with LBHC and to reinforce existing riffle and pool habitats. EII practices on these tributaries will also include treatment of invasive species within the conservation easement.

9.3 Sediment Transport Analysis for Proposed Restoration and Enhancement I Channels

This section describes the watershed assessment, sediment transport competence, and sediment transport capacity evaluations and considerations that informed the project design.

9.3.1 Watershed Assessment of Sediment Load

The first step in performing a sediment transport analysis is to perform a qualitative assessment of the sediment load volume and sources. For this project, the watershed was assessed through aerial photography and field reconnaissance to characterize past and current land cover and potential sediment sources. (For more information on the watershed assessment and history, refer to Section 4.) The stream channels were assessed repeatedly over time to identify evidence of bed erosion and aggradation. Evidence of channel erosion includes bed and bank scour and mass wasting of material from the streambanks. Evidence of aggradation includes frequently occurring depositional features such as mid-channel bars, signs of recent deposition, depositional features constructed of coarse sediments, braiding, and very wide width-to-depth ratios. Investigations of the channels over time indicate that some reaches of the project streams are subject on-going fluvial erosion in addition to erosion related to livestock access in specific areas. However, throughout the watershed, there was little evidence of significant aggradation occurring. Some accumulations of fine sediments on the stream bed were observed in downstream reaches. The major sources of these fine sediments in the Big Harris watershed are severely eroding ephemeral headwaters tributaries, stream banks disturbed by cattle access, and lateral erosion of larger channels into floodplain deposits of legacy sediments. However, these accumulations are transient and will continue to move out of the system. There is very little

evidence of accumulation of coarse sediments throughout the watershed. In summary, fluvial erosion is a more significant problem to channel stability within the watershed than aggradation. Though deposition of fine material on the floodplains of larger reaches represent historic watershed-scale land cover disturbances, this problem was alleviated long ago due to conversion from cotton production to less intense agricultural uses. The streams have downcut through the legacy sediments and are continuing to erode and evacuate fine sediments downstream.

In March 2016, several acres were cleared and graded in the headwaters to the mainstem of Big Harris Creek. This event has created a short-term disturbance in the watershed that has produced fine sediment observed in Upper Big Harris Reaches 1 and 2. However, once the cleared site is stabilized, this sediment is expected to wash through. No other disturbances were observed in the watershed, which is primarily forest and pasture.

The beds of the channels are generally stable and, as discussed above, large depositional features have not been observed. Depositional features that have been observed are comprised of sand- and silt-sized grains and are mostly actively mobile sheets on the beds of larger reaches. Many of the channels have significant portions of gravel and cobble in the beds, which indicates a good supply of large material upstream channel beds and lower portions of channel banks.

Once the project is constructed, the major sources of fine sediments (headcutting ephemeral tributaries, livestock trampling of streambanks, and lateral erosion into legacy sediments) will be greatly reduced. However, the sources of larger grain sizes, which are a natural component of the watershed denudation, will remain. These primarily include steep valley walls in headwaters reaches, upstream channel beds, and banks of upper EII reaches. Therefore, some gradual coarsening of the overall bed material should occur. However, this change may not be significant enough in particular riffles to be observable.

The watershed assessment indicates that the project streams are not capacity limited. In this case, attempts to more precisely quantify the bedload supply are not warranted. Attempts to quantify bedload supply are prone to error for a variety of reasons that include “extreme temporal variations in transport rate” (Knighton, 1998). The sediment transport analysis described below was performed to inform the design of the restoration and EI streams. The analysis included an evaluation of transport competence and capacity. The competence analysis provides an estimate of the necessary shear stress to move the existing bed material. The capacity analysis is used to determine if the stream has the ability to pass the sediment load supplied by the watershed. Both are described below.

9.3.2 Competence Analysis

Two different competence analyses (Tables 13a-c) were performed for each of the restoration and EI reaches by comparing shear stress associated with the design bankfull discharge with the size distribution of the bed material. The first analysis utilized standard equations based on a methodology using the Shields (1936) curve and Andrews (1984) equation described by Rosgen (2001). This analysis was performed to calculate the critical dimensionless shear stress needed to move the bed material and the associated depth and slope combination needed to produce that stress. Critical depth and slope combinations were calculated for each proposed design reach and results were compared to existing channel depth and slope. Tables 13a-b provide a comparison between design parameters and calculated critical values of the same parameters which initiate movement of bed material. Average boundary shear stress was also calculated with a HEC-RAS model for each reach for comparison to the Rosgen method and these values are included in the final row of Tables 13a-b.

The results of the competence analyses for the proposed conditions of each reach analyzed indicate that there is enough boundary shear stress to mobilize the bed material at bankfull flows. Aggradation of the channel bed is not likely to be a problem. The results of this analysis indicate that there is excess shear

stress (more shear stress than that needed to move the existing subpavement D100) for each reach analyzed except for two. For Upper Stick Elliot Creek Reach 5, the design discharge shear stress is equal to that required to move the largest particle. For Lower Fletcher Creek, the design discharge shear stress is slightly lower than that required to move the largest particle. However, the difference is not significant.



Table 13a. Dimensionless Critical Shear Stress Calculations - Big Harris Creek Mitigation Site

	Area A					Area B	Area C	
	Scott Creek	Carroll Creek	UBHC Reach 2A	UBHC 2B	UBHC R4	UFC Reach 2	LBHC Reach 1A	LBHC Reach 1B
Design Riffle mean depth (ft)	0.5	0.8	0.8	0.9	1.0	0.9	2.1	2.1
Design channel slope (ft/ft)	0.048	0.019	0.013	0.023	0.022	0.020	0.0048	0.0048
Design discharge boundary shear stress (lbs/ft ²)	1.37	0.94	0.61	1.3	1.39	N/A	N/A	N/A
D100 subpavement (mm)	76	76	51	51	76	N/A	N/A	N/A
D95 Pebble Count	140	180	80	52	74.2	150	130	130
Calculated $d_{critical}$ (ft)	0.13	0.58	0.31	0.16	0.28	N/A	N/A	N/A
Calculated $S_{critical}$ (ft/ft)	0.125	0.014	0.005	0.004	0.006	N/A	N/A	N/A
Calculated critical shear stress required to move largest subpavement particle	0.39	0.39	0.23	0.23	0.39	N/A	N/A	N/A
Calculated mobile particle size at design discharge (mm)	191	145	106	184	194	N/A	N/A	N/A
Avg. boundary shear stress from HEC-RAS (lbs/ft ²)	0.85	0.79	0.6	0.92	0.86	0.73	0.64	0.57

Table 13b. Dimensionless Critical Shear Stress Calculations - Big Harris Creek Mitigation Site

	Area B						
	Elliott Creek	Bridges Creek	USEC Reach 1	USEC Reach 5	USEC Reach 6	LFC Reach 1	LFC Reach 2
Design riffle mean depth (ft)	0.5	0.4	0.5	1.1	1.1	0.9	0.8
Design channel slope (ft/ft)	0.015	0.026	0.028	0.008	0.010	0.013	0.009
Design discharge boundary shear stress (lbs/ft ²)	0.47	0.65	0.87	0.55	0.69	0.73	0.45
D100 subpavement (mm) ¹	12	34	60	70	40	110	70
D95 Pebble Count	10.9	10.2	54.5	123	86.3	126.4	99.5
Calculated $d_{critical}$ (ft)	N/A	N/A	0.43	0.84	0.47	1.96	N/A
Calculated $S_{critical}$ (ft/ft)	N/A	N/A	0.023	0.0061	0.0043	0.0215	N/A
Calculated critical shear stress required to move largest subpavement particle ²	0.06	0.4	0.5	0.55	0.45	0.9	0.55
Calculated mobile particle size at design discharge (mm) ²	65	80	60	70	80	60	85
Avg. boundary shear stress from HEC-RAS (lbs/ft ²)	0.53	0.89	0.46	0.55	0.7	0.47	0.78

These results indicate that the largest particles in the subpavement (representative of bed load) will move at bankfull discharge. Gravel, cobble, and some sand will be replaced from upstream sources. However, there is uncertainty in the results of this type of analysis. Therefore, some constructed riffles with larger particles (large cobble and boulder) and other grade control structures (logs and rock steps) will be installed at locations where bed erosion potential is significant such as steep local slopes. In addition to larger-sized rock in constructed riffles, the structures used to prevent erosion of the stream

bed will include log sills, boulder sills, step-pool boulder drop structures, and j-hooks. These structures are important to the design for reasons other than grade control. They are also intended to provide channel complexity and habitat structure, direct flows, and maintain pools. They will be built with materials obtained on-site. Excess energy will also be dissipated by pools and meandering planform geometry.

9.3.3 Capacity Analysis

As mentioned above, HEC-RAS models were developed for existing and proposed conditions for representative sections of each restoration and EI reach and the models were used to evaluate sediment transport capacity to verify that the proposed design reaches will transport the sediment loads supplied to them from their watersheds. The sediment transport capacity function of the hydraulic design component in HEC-RAS was used to perform the analysis. The Meyer-Peter-Mueller (MPM) equation was used for the analysis since the ranges of channel slope, depth, and sediment size for which the equation is recommended were the most representative of the project reaches. Table 14 shows the results of the capacity analysis for the existing and proposed conditions of each modeled reach. Results indicate that proposed design conditions will be similar or more effective at conveying the sediment load than existing conditions at bankfull discharge, with two exceptions. These include Upper Big Harris Reach 2A and Lower Fletcher Creek Reach 2 for which the proposed design conditions are slightly less effective. The results of this modeling support a threshold design approach as follows:

- If the capacity increases, then the proposed channel will transport more sediment than the existing channel. In this case, if the existing channel is not aggrading, as evidence indicates is true for all design reaches, then the proposed channel is not expected to aggrade. This is the result of the modeling performed for this project for all reaches except the two mentioned above. We predict that aggradation will not be a problem with the designs for these reaches.
- This does not eliminate the potential for bed scour however. For this reason, (and due to uncertainty in the methods), large rock and boulders, log sills, and other grade control structures must be used to prevent bed scour and achieve the threshold design.
- For some reaches, the modeling shows a slight decrease in capacity and/or power. However, the decreases are minor. In these cases, some aggradation may occur but degradation should not be a problem. The accumulations should be primarily sand and small gravel from the supplied sediment. Because sources of sand will be reduced as described above, some coarsening of the bed may occur over time.

In summary, the stream restoration designs utilize a natural channel design approach with channels appropriately sized to convey the bankfull discharge, meanders and pools or step-pools for energy dissipation, natural materials for bed stability, bank revetments, and habitat features, native vegetation, etc. that will meet the goals and objectives stated in Section 1. A goal of a threshold design approach is that the channel is intended to stay stable long term.

Table 14. Sediment Transport Capacity Analysis Results - Big Harris Creek Mitigation Site

Area	Reach	Sediment Transport Capacity (tons/day)	
		Existing	Proposed
A	Scott Creek	766	870
	Carroll Creek	1386	1695
	UBHC Reach 2A	685	554
	UBHC Reach 2B	927	922
	UBHC Reach 4	1123	1669
	UFC Reach 2	793	891
B	Elliott Creek	126	202
	Bridges Creek Reach 1	209	344
	USEC Reach 5	232	298
	USEC Reach 6	1452	2395
	LFC Reach 1	192	190
	LFC Reach 2	830	583
C	LBH Reach 1A	607	1218
	LBH Reach 1B	963	966

9.4 Headwaters Drainage BMP Design

Throughout the watershed, gullies have formed in headwater drainages at locations where flow is concentrated in ephemeral channels or as a result of past terracing practices. In most cases, the drainage ways are severely eroding with massive headcuts and/or extreme bed slopes. While these locations are not appropriate for restoration of aquatic habitat due to lack of sustained baseflows, they offer opportunities for a water quality enhancement throughout the watershed through the installation of headwaters BMPs. BMPs at these locations will capture runoff from pastures and provide some treatment of nutrient and other pollutant loads during the initial post-construction period until the riparian buffer vegetation becomes established. The BMPs stabilize severely eroding channel beds and gullies which will significantly reduce sources of sediment to receiving streams. Many of these BMPs will retain stormwater and promote infiltration and thereby serve to improve hydrology within the watershed and reduce peak stormflows in the perennial streams. The BMPs described below were chosen specifically for each site to provide the appropriate treatment for each headwaters drainage. For more information on the existing conditions of these headwaters drainages, refer to Section 5.5. The types of BMPs selected for this project include:

- Step Pool Stormwater Conveyance (SPSC):** These are linear BMPs that can be installed in ephemeral channels. They are constructed as a series of pools and riffles or cascades which are underlain with a sand and woodchip filter media. SPSCs filter sediment and other pollutants out of stormwater and allow runoff to infiltrate into shallow groundwater. They also dissipate energy and stabilize eroding channels. For this project, they have been designed to treat runoff for 1 inch of rainfall and to convey the 10-year discharge. These systems have been designed to treat the runoff from the surrounding pastures and to provide stabilization of the gullies to significantly reduce sources of sediment.
- Boulder Cascades:** These structures consist of one or more series of steep riffles and pools. The riffles will be constructed with large boulders. They are intended to provide energy dissipation

and stabilize ephemeral channels. They have been designed as standalone treatments for locations where the channels have very steep slopes or active headcuts. By stabilizing these channels, a significant source of sediment will be reduced. They have also been designed as elements of SPSCs. When used as part of an SPSC they are underlain by filter media to provide water quality treatment.

- **Vegetated Swales:** Vegetated swales are open channels lined with native herbaceous plants. They are intended to stabilize eroding channels, filter stormwater, and allow for infiltration of flows into the shallow groundwater. They have been designed for locations where channels are eroding but where slopes are less steep and do not require stabilization with boulders.
- **Detention Basin:** The detention basins designed for this project are small dry ponds that will detain runoff from the first inch of rainfall to reduce peak flows and allow sediments and associated pollutants to settle out. They have been designed at locations where the existing topography is appropriate for a basin rather than a linear BMP such as an SPSC.

Pollutant reductions for each BMP were estimated with a water quality model called Spreadsheet Tool for Estimating Pollutant Loads (STEPL). STEPL was developed for the U.S. EPA (Tetra Tech, 2010) to provide a simple method to calculate estimates of pollutant loadings from watersheds and reductions in loadings resulting from implementation of a wide variety of BMPs. It is noted that after the five-year monitoring period, the BMPs will not be maintained or managed and their pollutant reduction capabilities will likely decrease over time, but the reduction in BMP treatment capability is expected to be replaced by buffer filtration treatment as the newly restored riparian buffers become established. Table 15 summarizes the pollutant removal of the BMP practices described below by reach.

Table 15. Proposed Pollutant Reductions at BMP Locations - Big Harris Creek Mitigation Site

	Area A					
	Eaker EC		Scism EC		Royster EC2	
proposed BMP train	boulder cascade to boulder cascade to SPSC		vegetated swale		veg swale to boulder cascade to veg swale to detention basin to boulder cascade	
	Existing pollutant load rate	Proposed pollutant load rate	Existing pollutant load rate	Proposed pollutant load rate	Existing pollutant load rate	Proposed pollutant load rate
Total N (lbs/yr)	313	113	211	124	325	23
Total P (lbs/yr)	73	22	51	19	113	3
TSS (tons/yr)	52	14	40	11	92	2
	Area A					
	Royster EC3		Royster EC4		Royster EC5	
proposed BMP train	SPSC		SPSC		boulder cascade to detention basin to vegetated swale to boulder cascade	
	Existing pollutant load rate	Proposed pollutant load rate	Existing pollutant load rate	Proposed pollutant load rate	Existing pollutant load rate	Proposed pollutant load rate
Total N (lbs/yr)	220	79	465	162	113	23
Total P (lbs/yr)	52	15	110	31	29	2
TSS (tons/yr)	38	10	87	21	24	1
	Area A				Area B	
	Scott Creek EC		UBHC EC		USEC EC1	
proposed BMP train	SPSC		boulder cascade		vegetated swale	
	Existing pollutant load rate	Proposed pollutant load rate	Existing pollutant load rate	Proposed pollutant load rate	Existing pollutant load rate	Proposed pollutant load rate
Total N (lbs/yr)	451	164	89	88	386	204
Total P (lbs/yr)	102	31	22	22	104	38
TSS (tons/yr)	71	20	16	15	75	23

9.4.1 Eaker Creek BMP

The upper reach of Eaker Creek is an ephemeral channel that drains 26 acres of cattle pasture. While this channel is not as deeply incised as other ephemeral drainage ways, there are multiple knickpoints and steep slopes that should be stabilized to reduce further headcutting and sediment production. The objectives for this reach are to stabilize the eroding bed to reduce sediment loads in specific locations, provide stormwater treatment to reduce pollutants in agricultural runoff, and retain stormflows to help restore more natural hydrology and reduce peak flows in receiving streams. These objectives will be accomplished through the installation of a step pool stormwater conveyance (SPSC) and stabilization of two additional headcuts with rock cascades. The SPSC will be constructed from station 509+11 to 510+90. This system will be constructed with underlying filter media and sized to treat the water quality storm (runoff from the first 1 inch of rainfall). The rock cascades will be constructed at station 503+91 to 504+28 and from station 504+90 to 505+11.

9.4.2 Scism Creek BMP

The upper reach of Scism Creek is an ephemeral drainage way that drains 16 acres of pasture. There is a series of significant, migrating headcuts beginning near station 607+00. The channel is perennial immediately downstream of the headcuts. The primary objectives for this site are include stabilization of severely eroding channel bed, treatment of stormwater runoff, and invasive species treatment. These objectives will be accomplished through the installation of a vegetated swale on a low slope section from station 604+10 to 606+50. A step-pool sequence will be used to stabilize the headcuts from station 607+52 to 608+42. Invasive species will be treated and the easement in this area will be planted with native tree species.

9.4.3 Tributary to UBHC Reach 5 BMP

This reach very small ephemeral channel with an 8-acre drainage area is approximately 40 feet long on a steep slope that drains to UBHC Reach 5. The channel is eroding and offers an additional opportunity to meet the objective of bed stabilization and elimination of a sediment source. The treatment proposed for this reach is bed stabilization using boulder sills and bank planting. The buffer within this easement area is currently vegetated and tree roots are holding the banks and portions of the bed stable. This simple treatment will provide additional grade control without the need to construct large structures and will protect existing mature trees.

9.4.4 Royster Creek EC2 BMP

The drainage area to this site is approximately 9 acres and is bisected by an easement break with culvert crossing. The objectives for this site include stabilization of eroding channel bed, treatment of runoff from pasture, and retention of stormflows. The current farm road and culvert crossing are located within the conservation easement and do not align with the easement break. After consultation with DMS and review of the site topography, the farm road and culvert crossing will be stabilized in their current location and the conservation easement will be modified. Upstream of the culvert crossing the site exhibits severe lateral erosion which ends at the steep, eroding headcut near station 851+10. The upstream section of the channel will be stabilized using a vegetated swale from station 850+20 to 850+75. This will be followed by installing a series of step-pools on a steeper section of the channel from 850+75 to 851+17. A vegetated swale will be installed from this point to station 852+45. Beginning at 852+45 a small detention basin will be constructed. The detention basin will settle out sediment and other pollutants while providing retention and peak flow reduction. This basin has been sized to treat the water quality storm (runoff from the first inch of rainfall). The vegetated swales and step-pools will also provide pretreatment. There is no defined channel immediately downstream of the culvert crossing; runoff sheet flows through the pasture. Two 15-foot high headcuts have formed at the confluence with Royster Creek where the flows become more concentrated. A vegetated swale and

berm will be constructed to direct all of the flow to the more downstream headcut (station 853+21 to 854+34). The steep section adjacent to Royster Creek will be stabilized with another series of step-pools from 854+34 to 855+56. The entire easement outside of these treatment practices will be vegetated with native tree species.

9.4.5 Royster Creek EC3 BMP

This reach is another small ephemeral reach that drains 14 acres. Like the other ephemeral drainage ways that discharge to Royster Creek, this channel has an unstable bed with a 16% slope and multiple knickpoints. This is an appropriate location for an SPSC facility to provide treatment to the pasture runoff and stabilize the bed. The SPSC will be constructed with filter media underlying to provide treatment and will extend from station 864+01 to 865+85. Upstream of the SPSC location, there is an area of upland erosion due to cattle access. This area will be stabilized with grass and understory species in shaded areas. The entire easement will be fenced and planted with native tree species.

9.4.6 Royster Creek EC4 BMP

This reach drains 28 acres. The objectives for this reach are similar to Scism Creek. The channel is stable from its origin near station 873+00 to station 878+98. Proposed enhancements include Chinese privet treatment, buffer planting, and cattle fencing. A culvert crossing will be installed at station 878+85. Downstream of the culvert, the headcut will be stabilized with a rock cascade-pool sequence. Further downstream, a series of knickpoints and very steep slopes will be stabilized with an SPSC which will extend from station 881+29 to the confluence with Royster Creek at 884+33. This length of cascade-pool and riffle-pool sequences is necessary to stabilize the bed. A portion of this length (station 882+93 to 883+82) will be underlain with filter media to provide treatment of the water quality storm. Easement areas which are not currently vegetated with trees will be planted with native tree species.

9.4.7 Royster Creek EC5 BMP

The watershed for this ephemeral reach is 7 acres. There is an easement break with an existing farm road and three small culverts (12 to 18 inches) across this reach. Upstream of the crossing there is a short reach of defined channel which is actively headcutting (station 893+13 to 893+53) that flows into a more gently sloped and wider depression down to the culverts (station 893+90). The headcut will be stabilized with a series of step-pools and a boulder cascade (892+97-893+46). A small detention basin will be constructed that will outfall to the existing culverts. Like the basin proposed for Royster Creek EC2, this basin will settle out sediment and other pollutants while providing retention and peak flow reduction. This basin has been sized to treat the water quality storm (runoff from the first inch of rainfall). Downstream of the basin, the existing channel is very steep and headcutting in multiple locations. From station 894+43 to station 894+75 a vegetated swale will be constructed by regrading, matting, and seeding the channel with native grasses and forbs. From the end of this feature to station 895+23, a headcut will be stabilized with a series of step-pools. From the end of the step-pools to station 895+42 a second vegetated swale will be constructed. A third series of step-pools will stabilize a steeper section of bed from this point to 895+56. A vegetated swale will be installed from 895+56 to 895+88. The final feature on this reach will be a series of boulder cascades to stabilize the 30-foot-high headcut down to the confluence with Royster Creek (station 895+88 to 896+69). Easement areas which are not currently vegetated will be planted with native tree species.

9.4.8 Scott Creek

The upper reach of Scott Creek is an ephemeral channel draining 34 acres. Like the other ephemeral reaches described, the bed is very steep through this reach and there are multiple headcuts. An SPSC will be installed from station 1208+37 to station 1210+27. This SPSC will connect directly to the stream restoration reach that extends to the confluence with UBHC. The SPSC will stabilize the eroding bed and

will be sized to treat runoff from the water quality storm. Because the BMP will connect directly to the stream restoration reach, the riffle-pool sequences of the SPSC will extend the improvements to aquatic habitat upstream for an additional 200 feet. Easement areas which are not currently vegetated will be planted with native tree species.

9.4.9 USEC BMP (School Site)

The beginning of USEC is an ephemeral drainage way that drains 29 acres of cropland and the Union Elementary School campus. There is a significant, migrating headcut at station 1002+74, and below this headcut the stream becomes jurisdictional due to groundwater discharge. The primary objectives for this site include stabilization of the severely eroding channel bed, treatment of stormwater runoff, and invasive species treatment. These objectives will be accomplished through the installation of a vegetated swale from station 1000+68 to 1002+74. Upstream of the vegetated swale, Chinese privet will be treated within the easement. The easement in this area will be planted with native tree species.

9.5 Project Implementation

As detailed in Section 1.0, the principal goals and objectives focus on improving the ecological health of the Site, including a reduction in sedimentation and nutrient concentrations. The existing conditions assessment shows that the majority of the reaches are incised with actively eroding banks.

Enhancement is proposed on reaches that have established at least one functional stream feature, such as bedform diversity, stable banks, or low bank height. Restoration is not proposed for these reaches in order to preserve the functional feature(s) while avoiding large scale tree loss. Reaches without these functioning features are recommended for restoration. Throughout the Site, fencing and dedicated crossings will help to reduce stressors to the riparian buffer and corridor. Preservation along stable tributaries will provide additional protection.

9.5.1 In-stream Structures

In-stream structures will be used to add bed stability and bedform diversity. Structures will primarily include constructed riffles, angled log sills, log vanes, lunker log, brush toe, and log-vane j-hooks. Several types of constructed riffles will be utilized in the restoration reaches to establish varied flow pattern, habitat, and grade control while providing a source of carbon for nutrient cycling. Native rock of various sizes (cobble, gravel, and fines) harvested on site will be used as much as possible to create these types of riffles. Depth and size of substrate will be further designed in the final construction plans. Types of riffles proposed for this Site include:

- Chunky riffles with cobble sized rock embedded throughout the length of the native rock riffle to provide additional habitat as well as grade control for steeper riffles.
- Native material riffles to re-establish a large gravel substrate to the channels.
- Woody riffles with brush and logs compacted into the bed of native rock to increase woody material in the channel and promote refuge for aquatic macroinvertebrates.
- Jazz riffles to incorporate larger woody debris and meander the thalweg within longer riffles.

9.5.2 Riparian Planting

As a final stage of construction, riparian buffers throughout the conservation easement will be seeded and planted with native vegetation chosen to create a forested community. The specific species composition to be planted was selected based on the topography and climate, observations of the occurrence of species in the existing buffer, and best professional judgment on species establishment and anticipated Site conditions in the early years following project implementation. Species chosen for the planting plan are listed on Sheet 4.0 of the preliminary plan set.



The riparian buffer areas will be planted with bare root seedlings. In addition, stream banks will be planted with live stakes and the channel toe will be planted with herbaceous plugs where conditions allow. Permanent herbaceous seed will be placed on stream banks, floodplain areas, and all disturbed areas within the project easement.

To help ensure tree growth and survival, soil amendments may be added to floodplain cut areas. Soil tests will be performed in areas of cut; fertilizer and lime may be applied based on the results. Additionally, topsoil will be stockpiled, re-applied, and disked before permanent seeding and planting activities take place. Pasture areas with dense fescue growth will be sprayed with herbicide prior to bare root planting.

Species planted as bare roots will be spaced at an initial density of 605 plants per acre based on 12-ft by 6-ft spacing. Live stakes will be planted on the top half of channel banks at a 2-ft to 3-ft spacing on the outside of meander bends and a 6-ft to 8-ft spacing on tangent sections.

An overhead electric power line, as shown on Figure 2a, crosses Royster Creek Reach 2 and EC4, and Scott Creek. The planting plan in these areas underneath the power line will be planted with low growing vegetation such as Virginia sweetspire (*Itea virginica*), winterberry holly (*Ilex verticillata*), silky dogwood (*Cornus amomum*), ninebark (*Physocarpus opulifolius*), and black chokeberry (*Aronia melanocarpa*) per Sheet 4.0 of the Big Harris Creek Design Plan Set.

9.5.3 Fencing Installation

Permanent woven wire fencing will be installed along the easement on the parcels with adjacent pastures where no fencing currently exists and where existing fencing is inadequate. Temporary fencing will be installed before construction and maintained throughout the construction phase for livestock management.

9.5.4 Stream Crossings

Table 16 summarizes the proposed crossings on the Site. These crossing areas are excluded from the easement. Crossings will be fenced and gated. Cattle will have limited access to the live streams during times of landowner supervision for moving cattle to other pastures. The crossings have been designed to allow for fish passage and aquatic habitat continuity. Culvert pipes will be buried 6" to 12" to allow for a natural stream bed through the crossing. Many existing culverts on site have vertical profile steps at the outfalls, posing a challenge to fish passage. This project will help to improve aquatic passage and stream habitat by replacing these perched culverts and allowing for a continuous stream bed habitat.

Table 16. Crossings Summary – Big Harris Creek Mitigation Site

Reach	Crossing Location (STA)	Crossing Type
Cornwell Creek	419+68	ford
Eaker Creek	511+64	culvert
Scism Creek	606+66	culvert
Royster Creek- Reach 1/2	807+56	culvert
Royster- Reach 2	833+14	culvert
Royster EC2	853+38	culvert
Royster EC4	878+85	culvert
Royster EC5	894+14	culvert
LSEC	1113+25	ford
Scott Creek	1206+98	culvert
UBHC Reach 3/4	148+61	ford

Reach	Crossing Location (STA)	Crossing Type
UBHC Reach 4/5	159+37	ford
UBHC Reach 5/6	170+13	ford
UBHC Reach 6	183+56	ford
USEC Reach 2 OR Reach 3	1010+84 or 1022+29	culvert
USEC Reach 4A/ 4B	1043+90	culvert
USEC Reach 5/6	1059+00	culvert
UFC- Reach 1/2	1615+71	culvert
LFC Reach 1/2	1647+02	culvert

10.0 Maintenance Plan

The site shall be monitored on a regular basis and a physical inspection of the Site shall be conducted a minimum of twice per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance for stream features should be expected most often in the first two years following site construction. Wildlands will perform maintenance of BMPs and ephemeral reach areas as necessary during the five-year monitoring period. The need for maintenance will be evaluated annually during monitoring activities. Maintenance activities may include the following:

Table 17. Maintenance Plan - Big Harris Creek Mitigation Site

Component/ Feature	Maintenance through project close-out
Stream	Routine channel maintenance and repair activities 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. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head-cutting.
Water Quality BMPs	Routine BMP maintenance may include removal of accumulated sediment from the bottom of the BMP. Sediment and vegetation shall be removed from the stone weir or outlet channel to ensure a positive drainage pattern. Stone and boulders may need to be adjusted or re-installed to prevent scour. Wildlands will maintain the BMPs during the five-year monitoring period until close-out. Wildlands will evaluate whether sediment removal is necessary based on available sediment storage volume and post-construction stabilized watershed conditions. The dry detention ponds were designed with extra volume to allow significant accumulations to occur before maintenance would be needed. After close out, the newly established riparian buffer is expected to replace BMP treatment functions.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the forest. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be treated by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.
Site boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis.

Component/ Feature	Maintenance through project close-out
Ford and Culvert Crossings	Ford crossings within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restrictions, rights of way, or corridor agreements.

11.0 Performance Standards

The stream and vegetation performance criteria for the project site will follow approved performance criteria presented in the DMS Mitigation Plan Template (version 2.3, 12/18/2014), the Annual Monitoring and Closeout Reporting Template (February 2014), and the Stream Mitigation Guidelines issued in April 2003 by the USACE and NCDWR. Semi-annual site visits will be conducted to assess the condition of the finished project. The stream restoration and EI reaches of the project will be assigned specific performance criteria components for stream geomorphology, hydrology, and vegetation. EII reaches of the project will be assigned specific performance criteria components for vegetation only. The preservation reaches and water quality BMPs will not be assigned specific performance criteria. Performance criteria will be evaluated throughout the five-year post-construction monitoring program. In addition to the five-year monitoring program, water quality and benthic macroinvertebrate sampling will be conducted during monitoring years three, four, and five. Fish sampling will take place in year five. These additional parameters are intended to provide information to complement the pre-restoration data that have already been collected by DMS and others, but mitigation success criteria will not be based on these data.

Table 18 summarizes the performance standards for each project goal. Further explanation of certain performance criteria components is necessary and is included below in this section. The monitoring program is described in Section 12.

Table 18. Summary of Project Goals and Monitoring Approach - Big Harris Creek Mitigation Site

Goal	Performance Standard	Monitoring Approach
Improve stream stability and reduce stream bed and bank erosion.	Stream pattern, profile, and riffle cross sections will remain stable over time (note description of stability in Section 11.1.1 and 11.1.2).	Visual assessment and surveying of riffle cross sections. Surveying of longitudinal profiles and/or plan view pattern if visual assessment indicates potential instability.
Restore hydrologic connection between bankfull channels and floodplains, wetlands, and vernal pools.	Two bankfull or greater flow events will be documented during the monitoring period.	Crest gages and continuous stage recorders.
Improve instream habitat and instream habitat connectivity. *	Habitat features such as constructed riffles, cover logs, and other habitat features described in Section 9.5.1 will remain intact.	Visual assessment and habitat assessment form. *
Reduce agricultural pollutant loading to project streams. *	Water quality BMPs and floodplain connectivity will remain intact, allowing flood flows to dissipate onto a floodplain (where applicable).	Visual assessment and water quality sampling. *
	Cattle exclusion fence integrity will be routinely maintained throughout the monitoring period with any breaches limited to isolated incidents resulting from routine sources of fencing repair (e.g. tree fall).	Visual assessment.
Create and improve forested riparian buffers.	Survival of 260 planted stems per acre at the end of Monitoring Year five. Survival of at least 320 planted stems at the end of Monitoring Year three.	Vegetation plot monitoring.

* These goals are intended to provide information only to complement the pre-restoration data that have already been collected by DMS and others; the project’s mitigation success will not be based on these data.

11.1 Streams

11.1.1 Dimension

Riffle cross-sections on the restoration and EI reaches should be stable and should show little change in bankfull area, maximum depth ratio, and width-to-depth ratio over time after geomorphically significant flow events (defined in Section 11.1.4). Per DMS guidance, bank height ratios shall not exceed 1.2 and entrenchment ratios shall be at least 2.2 for restored E- and C-type channels and within 1.4-2.2 for B-type channels to be considered stable. All riffle cross-sections should fall within the parameters defined for channels of the appropriate stream type. If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth. Remedial action would not be taken if channel changes indicate a movement toward stability or enhanced function.

11.1.2 Profile and Pattern

Restoration and EI reaches must remain vertically stable throughout the monitoring period with little indication of downcutting or significant aggradation to the extent of obscuring habitat and/or generating lateral instability. Deposition of sediments at certain locations (such as the inside of meander bends) is expected and acceptable. Changes in pool depth are not an indication of vertical instability.

Restoration and EI reaches must remain laterally stable and major changes pattern dimensions and sinuosity should not occur. However, migration of meanders on alluvial channels is not an indication of instability if cross-sectional dimensions continue to meet the requirements described in Section 11.1.1.

11.1.3 Substrate

Substrate materials in the restoration reaches should indicate a progression towards or the maintenance of coarser materials in the riffle features and finer particles in the pool features.

11.2 Photo Reference Stations

Photographs should illustrate the Site's morphological stability on an annual basis. Cross-section photos should demonstrate a lack of excessive erosion or degradation of the banks. Longitudinal photos should indicate the absence of persistent bars within the channel or vertical incision. Grade control structures should remain stable. Deposition of sediment on the bank side of vane arms is preferable. Maintenance of scour pools on the channel side of vane arms is expected.

11.3 Visual Assessments

Visual assessments will be performed on a semi-annual basis in order to check for and document areas of concern. The monitoring team will note problem areas such as channel instability (i.e. lateral and/or vertical instability, in-stream structure failure/instability and/or piping, headcuts), vegetated buffer health (i.e. low stem density, vegetation mortality, invasive species or encroachment), beaver activity, or livestock access. Areas of concern will be mapped and photographed accompanied by a written description in the annual report. Problem areas will be re-evaluated during each subsequent visual assessment. Should remedial actions be required, recommendations will be provided in the next annual monitoring report.

11.4 Hydrology

The occurrence of bankfull events and geomorphically significant events will be documented throughout the five-year monitoring period. Streamflow stage will be monitored using a stage monitoring station which will consist of a crest gage and a continuous stage recorder at the same location. The stage monitoring stations will be installed within a surveyed riffle cross-section of the restoration and EI channels. The streamflow stage recorder data will be downloaded quarterly to determine if a bankfull event has occurred. Photographs taken with a handheld camera will be used to document the occurrence of debris lines and sediment deposition observed during field visits. In addition, the presence of baseflow must be documented along Scott Creek, Bridges Creek, and Royster Creek Reach 1 constructed with a Priority 1 Restoration approach. Baseflow must be present for at least 30 days (most likely in the winter/early spring) during each monitoring year with normal rainfall conditions.

11.5 Vegetation

The final vegetative success criteria will be the survival of 260 planted stems per acre in the riparian corridor at the end of the required monitoring period (year five). The interim measure of vegetative success for the Site will be the survival of at least 320 planted stems per acre at the end of the third monitoring year. The extent of invasive species coverage will also be monitored and treated as necessary throughout the required monitoring period (five years).

12.0 Monitoring Plan

12.1 Site Specific Monitoring

Using the DMS Baseline Monitoring Plan Template (February 2014), a baseline monitoring document and as-built record drawings of the project will be developed within 60 days of the planting completion and monitoring installation on the restored site. Monitoring reports will be prepared in the fall of each year of monitoring and submitted to DMS. Annual monitoring data will be reported using the DMS Annual Monitoring Report Format, Data Requirements, and Content Guidance (April 2015). The monitoring report will provide project data chronology that will facilitate an understanding of project status and trends, population of DMS databases for analysis, research purposes, and assist in decision making regarding close-out. The monitoring period will extend five years beyond completion of construction since the Big Harris Creek Mitigation Site was instituted by DMS on September 25, 2007. Though the RFP for the project specified five years of post-construction monitoring, it also referenced utilizing the most recent monitoring template which is based on a five- or seven-year monitoring program. Wildlands, DMS, and IRT members agreed to establish a five-year monitoring plan for the Site that will follow the latest 2014 guidance for monitoring programs, while adhering as close as possible to the 2003 guidance requirements (with the exclusion of longitudinal profile surveys). The monitoring plan for this project site is detailed in this section of the Mitigation Plan.

In addition to the required five-year monitoring program, based on the 2014 guidance and in response to IRT concerns about quantitative uplift evaluations, water quality and benthic macroinvertebrate data will be collected during monitoring years three, four, and five. Monitoring of fish will be completed in year five. These additional monitoring parameters are described in detail below. However, it is important to note that these additional parameters are intended to provide information only to complement the pre-restoration data that have already been collected by DMS and others, and is not part of the project success criteria. No monitoring is proposed on the individual BMPs. The performance standards for the project will be based on those specified in Section 11.

Components of the monitoring plan are summarized in Tables 19 a-e. Project monitoring locations are shown on Figures 13a-d. All surveys will be tied to grid.

Tables 19a. Monitoring Requirements - Big Harris Creek Mitigation Site (Area A) - Restoration and EI Reaches

Parameter	Monitoring Feature	Quantity/ Length by Reach					Frequency	Notes
		Carroll Creek	Royster Creek Reach 1	Scott Creek	UBHC Reach 2	UBHC Reach 4		
Dimension	Riffle Cross Sections	1	1	1	2	2	Annual	
	Pool Cross Section	1	1	1	2	2		
Pattern	Pattern	n/a	n/a	n/a	n/a	n/a	Annual	1
Profile	Longitudinal Profile	n/a	n/a	n/a	n/a	n/a	Annual	
Substrate	Reach wide (RW), Riffle (RF) 100 pebble count	1 RW, 1 RF	1 RW, 1 RF	1 RW, 1 RF	1 RW, 2 RF	1 RW, 2 RF	Annual	2
Hydrology	Crest Gage/ Transducer	1	1	1	1		Quarterly	3
Vegetation	CVS Level 2	17					Annual	

Parameter	Monitoring Feature	Quantity/ Length by Reach					Frequency	Notes
		Carroll Creek	Royster Creek Reach 1	Scott Creek	UBHC Reach 2	UBHC Reach 4		
Water Quality	4 baseflow, 4 stormflow grab samples	8 locations throughout total project areas A, B & C and 1 reference location					Years 3, 4 and 5	
Benthic Macroinvertebrate	NCDWR Qual 4						Years 3, 4, and 5	
Fisheries	NCDWR SOP						Year 5	
Exotic and nuisance vegetation						Semi-Annual	4	
Project Boundary						Semi-Annual	5	
Reference Photos	Photographs	18					Annual	

Notes:

1. Pattern and profile will be assessed visually during semi-annual site visits. Longitudinal profile will be collected during as-built baseline monitoring survey only, unless observations indicate lack of stability and profile survey is warranted in additional years.
2. Riffle pebble counts will be conducted on UT1 Reach 1 upper and lower cross sections only, but not on UT1 Reach 2.
3. Crest gages and/or transducers will be inspected quarterly or semi-annually, evidence of bankfull events will be documented with a photo when possible. Transducers will be set to record stage once every hour. Device will be inspected and downloaded semi-annually.
4. Locations of exotic and nuisance vegetation will be mapped.
5. Locations of vegetation damage, boundary encroachments, etc. will be mapped.

Tables 19b. Monitoring Requirements - Big Harris Creek Mitigation Site (Area A) - EII Reaches

Parameter	Monitoring Feature	Quantity/ Length by Reach											Frequency	Notes
		Cornwell Creek	Cornwell Creek UT 1	Eaker Creek	LSEC	Royster Creek Reach 2	Scism Creek	UBHC Reach 1	UBHC Reach 3	UBHC Reach 5	UBHC Reach 6	UBHC UT1		
Dimension	Riffle Cross Sections	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
	Pool Cross Section	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
Pattern	Pattern	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
Profile	Longitudinal Profile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
Substrate	Reach wide (RW), Riffle (RF) 100 pebble count	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
Hydrology	Crest Gage/ Transducer	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Quarterly	
Vegetation	CVS Level 2	49											Annual	
Exotic and nuisance vegetation													Semi-Annual	1

Project Boundary			Semi-Annual	2
Reference Photos	Photographs	36	Annual	3

Notes:

1. Locations of exotic and nuisance vegetation will be mapped.
2. Locations of vegetation damage, boundary encroachments, etc. will be mapped.
3. Photographs will be taken along preservation reaches not noted above on each reach (3 photographs total).

Tables 19c. Monitoring Requirements - Big Harris Creek Mitigation Site (Area B) - Restoration and EI Reaches

Parameter	Monitoring Feature	Quantity/ Length by Reach													Frequency	Notes
		Elliott Creek	Elliott Creek UT1	Bridges Creek Reach 1	Bridges Creek UT1	LFC Reach 1	LFC Reach 2	Upper Stick Elliott Creek R1	USEC Reach 4b	USEC Reach 5	USEC Reach 6	USEC UT2	USEC UT3	UFC Reach 2		
Dimension	Riffle Cross Sections	2	1	1	n/a	1	1	1	1	3	2	1	1	1	Annual	
	Pool Cross Section	1	0	0	n/a	1	1	0	0	2	1	0	0	0		
Pattern	Pattern	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Annual	1
Profile	Longitudinal Profile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
Substrate	Reach wide (RW), Riffle (RF) 100 pebble count	1 RW, 2 RF	1 RW, 1 RF	1 RW, 1 RF	n/a	1 RW, 1 RF	1 RW, 1 RF	1 RW, 1 RF	1 RW, 1 RF	1 RW, 3 RF	1 RW, 2 RF	1 RW, 1 RF	1 RW, 1 RF	1 RW, 1 RF	Annual	2
Hydrology	Crest Gage/ Transducer	1	1	1	n/a	1	1	1	1	1	1	1	1	1	Quarterly	3
Vegetation	CVS Level 2	20													Annual	
Water Quality	4 baseflow, 4 stormflow grab samples	8 locations throughout total project areas A, B & C and 1 reference location													Years 3, 4 and 5	
Benthic Macroinvertebrate	NCDWR Qual 4														Years 3, 4, and 5	
Fisheries	NCDWR SOP														Year 5	
Exotic and nuisance vegetation															Semi-Annual	4
Project Boundary															Semi-Annual	5
Reference Photos	Photographs	27													Annual	

Notes:

1. Pattern and profile will be assessed visually during semi-annual site visits. Longitudinal profile will be collected during as-built baseline monitoring survey only, unless observations indicate lack of stability and profile survey is warranted in additional years.
2. Riffle pebble counts will be conducted on UT1 Reach 1 upper and lower cross sections only, but not on UT1 Reach 2.
3. Crest gages and/or transducers will be inspected quarterly or semi-annually, evidence of bankfull events will be documented with a photo when possible. Transducers will be set to record stage once every hour. Device will be inspected and downloaded semi-annually.
4. Locations of exotic and nuisance vegetation will be mapped.
5. Locations of vegetation damage, boundary encroachments, etc. will be mapped.

Tables 19d. Monitoring Requirements - Big Harris Creek Mitigation Site (Area B) – EII Reaches

Parameter	Monitoring Feature	Quantity/ Length by Reach						Frequency	Notes
		Bridges Creek Reach 2	USEC Reach 2	USEC Reach 3	USEC Reach 4a	USEC UT1	UFC Reach 1		
Dimension	Riffle Cross Sections	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
	Pool Cross Section	n/a	n/a	n/a	n/a	n/a	n/a		
Pattern	Pattern	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
Profile	Longitudinal Profile	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
Substrate	Reach wide (RW), Riffle (RF) 100 pebble count	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
Hydrology	Crest Gage/ Transducer	n/a	n/a	n/a	n/a	n/a	n/a	Quarterly	
Vegetation	CVS Level 2	12						Annual	
Exotic and nuisance vegetation								Semi-Annual	1
Project Boundary								Semi-Annual	2
Reference Photos	Photographs	12						Annual	

Notes:

1. Locations of exotic and nuisance vegetation will be mapped.
2. Locations of vegetation damage, boundary encroachments, etc. will be mapped.

Tables 19e. Monitoring Requirements - Big Harris Creek Mitigation Site (Area C) – Restoration, EI, and EII Reaches

Parameter	Monitoring Feature	Quantity/ Length by Reach				Frequency	Notes
		LBHC Reach 1a	L BHC Reaches 1b & 2	LBHC UT1	LBHC UT2		
Dimension	Riffle Cross Sections	1	1	n/a	n/a	Annual	
	Pool Cross Section	1	1	n/a	n/a		
Pattern	Pattern	n/a	n/a	n/a	n/a	Annual	1
Profile	Longitudinal Profile	n/a	n/a	n/a	n/a	Annual	
Substrate	Reach wide (RW), Riffle (RF) 100 pebble count	1 RW, 1 RF	1 RW, 1 RF	n/a	n/a	Annual	2
Hydrology	Crest Gage/ Transducer	1	1	n/a	n/a	Quarterly	3
Vegetation	CVS Level 2	12				Annual	

Parameter	Monitoring Feature	Quantity/ Length by Reach				Frequency	Notes			
		LBHC Reach 1a	L BHC Reaches 1b & 2	LBHC UT1	LBHC UT2					
Water Quality	4 baseflow, 4 stormflow grab samples	8 locations throughout total project areas A, B & C and 1 reference location				Years 3, 4 and 5				
Benthic Macroinvertebrate	NCDWR Qual 4								Years 3, 4, and 5	
Fisheries	NCDWR SOP								Year 5	
Exotic and nuisance vegetation					Semi-Annual	4				
Project Boundary					Semi-Annual	5				
Reference Photos	Photographs		10		Annual	6				

Notes:

1. Pattern and profile will be assessed visually during semi-annual site visits. Longitudinal profile will be collected during as-built baseline monitoring survey only, unless observations indicate lack of stability and profile survey is warranted in additional years.
2. Riffle pebble counts will be conducted on UT1 Reach 1 upper and lower cross sections only, but not on UT1 Reach 2.
3. Crest gages and/or transducers will be inspected quarterly or semi-annually, evidence of bankfull events will be documented with a photo when possible. Transducers will be set to record stage once every hour. Device will be inspected and downloaded semi-annually.
4. Locations of exotic and nuisance vegetation will be mapped.
5. Locations of vegetation damage, boundary encroachments, etc. will be mapped.
6. Photographs will be taken along preservation reaches not noted above on each reach (2 photographs total).

12.2 Stream Assessments

12.2.1 Dimension

In order to assess channel dimension success, permanent cross-sections will be installed along stream restoration and EI reaches, with the percentage of riffle and pool sections in accordance with DMS guidance. The Site has several small streams proposed for restoration and EI with bankfull design widths less than 10 feet. Therefore, as defined in Table 20, streams with bankfull widths of 10 feet or less will have two cross-sections installed per 1,000 LF and streams with bankfull widths greater than 10 feet will have one cross-section installed per 20 bankfull widths. Each cross-section will be permanently marked with pins to establish its location. Cross-section surveys will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg. If moderate bank erosion is observed within permanent pool cross-sections during the monitoring period, an array of bank pins will be installed in the permanent cross-section where erosion is occurring for reaches with a bankfull width of greater than three feet. Bank pins will be installed on the outside bend of the cross-section in at least three locations (one in upper third of the pool, one at the permanent cross-section, and one in the lower third of the pool). Bank pins will be monitored by measuring exposed rebar and maintaining pins flush to bank to capture bank erosion progression. Cross-section surveys will be conducted annually and bank pin surveys (if applicable) will be conducted in monitoring years one, two, three, and five.

In addition to the above geomorphic surveys, at least three sets of hydraulic geometry measurements will be conducted within each distinct design reach following a geomorphically significant discharge (Qgs) event as described in the DMS Stream and Wetland Monitoring Guidelines (February 2014). Within each reach, a representative wavelength will be assessed using hydraulic measurements within riffle and

pool cross-sections and along water surface slopes. These measurements can occur at any time during the five-year monitoring period.

12.2.2 Profile and Pattern

Longitudinal profile surveys will not be conducted during the five-year monitoring period unless other indicators during the annual monitoring indicate a trend toward vertical and lateral instability. If a longitudinal profile is deemed necessary, monitoring will follow standards as described in the DMS Annual Monitoring and Closeout Reporting Template (February 2014), and the Stream Mitigation Guidelines issued in April 2003 by the USACE and NCDWR for the necessary reaches.

12.2.3 Substrate

An annual reach-wide pebble count will be performed in each restoration and EI reach for classification purposes. A Wolman pebble count will also be performed annually at each surveyed riffle to characterize the pavement.

12.3 Photo Reference Stations

Photographs will be taken once a year to visually document stability for the five-year monitoring period. Permanent markers will be established and located with GPS equipment so that the same locations and view directions on the site are photographed each year. Photos will be used to monitor all restoration, enhancement, and preservation stream reaches as well as vegetation plots.

Longitudinal reference photos will be established at the tail of riffles approximately every 300-500 LF along the channel by taking a photo looking upstream and downstream. Cross-sectional photos will be taken of each permanent cross-section looking upstream and downstream.

12.4 Visual Assessments

Visual assessments will be performed along stream reaches on a semi-annual basis during the five-year monitoring period. Areas of concern will be mapped and photographed accompanied by a written description in the annual report. Problem areas will be re-evaluated during each subsequent visual assessment. Should remedial actions be required, recommendations will be provided in the annual monitoring report.

12.5 Hydrology

The occurrence of bankfull events and geomorphically significant events will be documented throughout the five-year monitoring period. Streamflow stage will be monitored using a stage monitoring station which will consist of a crest gage and a continuous stage recorder at the same location. The stage monitoring stations will be installed within a surveyed riffle cross-section of the restoration and EI channels. The streamflow stage gages will be downloaded quarterly to determine if a bankfull event has occurred. Photographs taken with a handheld camera will be used to document the occurrence of debris lines and sediment deposition observed during field visits.

In addition, a flow gage pressure transducer will be installed on Scott Creek and Royster Creek Reach 1 to document flow patterns. The transducers will be downloaded quarterly.

12.6 Vegetation Assessments

Vegetation monitoring quadrants will be installed throughout the conservation easement to measure the survival of the planted trees. The number of vegetation monitoring quadrants required should be equal to or greater than 2% of the planted bare root area. The monitoring assessment approach will be based on Level 2 standards described in the CVS-EEP Protocol for Recording Vegetation (2008).



Reference photos will also be taken for each of the vegetation plots. Representative digital photos of each vegetation plot will be taken on the same day that vegetation assessments are conducted. The photographer will make every effort to consistently maintain the same area in each photo over time. Photographs should illustrate the Site's trend towards mature riparian conditions.

12.7 Additional Monitoring

12.7.1 Physicochemical

Water quality data collected by NCDWR indicates that the primary stressors in the project streams are elevated fecal coliform counts and elevated TSS during storm events. In order to assess water quality over time the following sampling protocol will be used in monitoring years three, four, and five. These monitoring tasks will include collecting water quality at eight locations throughout project area and at one reference location. The monitoring will include four baseflow water quality sampling events and four stormflow water quality sampling events per each of the three monitoring years at each location. Water quality parameters will include:

- a. Total Nitrogen (NH₃, NO_x, TKN)
- b. Total Phosphorus
- c. Fecal Coliform
- d. TSS
- e. Turbidity
- f. Temperature
- g. pH
- h. Dissolved Oxygen
- i. Conductivity

Parameters a through d above will be collected as grab samples and analyzed by a State-certified water quality lab. Additional items e through i (field parameters) will be measured with calibrated water quality meters in the field.

As previously mentioned the primary stressors of concern are fecal coliform and TSS. Cattle will be fenced out of the entire easement as part of project construction. This activity should remove the major source of elevated fecal coliform counts. Stabilization of large headcuts on the project should remove the primary source of fine sediment entering project streams. Treatment of agricultural runoff in ephemeral conveyances should further reduce fecal coliform and fine sediment inputs. However, due to the inability to control the entire watershed, Wildlands is not proposing to tie water quality data to specific performance criteria.

12.7.2 Benthic Macroinvertebrates and Habitat Assessment

Post-construction benthic macroinvertebrate and habitat assessments will be conducted in monitoring years three, four, and five to assess changes as a result of the restoration and best management activities. Sample site locations will be based on those utilized during the pre-construction data collection efforts (eight project site locations and one reference location). The benthic macroinvertebrate communities will be collected following the Qual-4 method as described in the Standard Operating Procedures for Collection and Analysis of Benthic Macroinvertebrates (February 2016). No specific performance criteria are proposed based on benthic macroinvertebrate surveys or habitat assessments.

12.7.3 Fisheries Survey

Post-construction fisheries surveys will be conducted during year five of the monitoring period to assess the response of the fish communities to the restoration activities. Sample site locations and collection



methodologies will be based on those utilized during the pre-construction data collection efforts. The fisheries surveys will be located at eight sites within the project area plus the reference watershed location on Little Harris Creek which was sampled during the pre-construction data collection efforts. No specific performance criteria are proposed based on fisheries.

12.8 Mitigation and Contingency Plans

The Wildlands Team will develop necessary adaptive measures or implement appropriate remedial actions in the event that the Site or a specific component of the Site fails to achieve the success criteria outlined above. The project-specific monitoring plan developed during the design phase will identify an appropriate threshold for maintenance intervention based on the monitored items. Any actions implemented will be designed to achieve the success criteria specified previously, and will include a work schedule and updated monitoring criteria.

13.0 Long-Term Management Plan

Upon approval for close-out by the IRT the Site will be transferred to the DEQ Division of Natural Resource Planning and Conservation's Stewardship Program. This party shall be responsible for periodic inspection of the Site to ensure that restrictions required in the conservation easement or the deed restriction document(s) are upheld. Endowment funds required to uphold easement and deed restrictions shall be negotiated prior to Site transfer to the responsible party.

The DEQ currently houses DMS stewardship endowments within the non-reverting, interest-bearing Conservation Lands Stewardship Endowment Account. The use of funds from the Endowment Account is governed by North Carolina General Statute GS 113A-232(d)(3). Interest gained by the endowment fund may be used only for the purpose of stewardship, monitoring, stewardship administration, and land transaction costs, if applicable. The NCDEQ Stewardship Program intends to manage the account as a non-wasting endowment. Only interest generated from the endowment funds will be used to steward the compensatory mitigation sites. Interest funds not used for those purposes will be re-invested in the Endowment Account to offset losses due to inflation.

The Stewardship Program will periodically install signage as needed to identify boundary markings as needed. Any livestock or associated fencing or permanent crossings will be the responsibility of the owner of the underlying property to maintain.

14.0 Adaptive Management Plan

Upon completion of site construction DMS will implement the post-construction monitoring protocols previously defined in this document. Project maintenance will be performed as described previously in this document. If, during the course of annual monitoring it is determined the Site's ability to achieve site performance standards are jeopardized, DMS will notify the USACE of the need to develop a Plan of Corrective Action. The Plan of Corrective Action may be prepared using in-house technical staff or may require engineering and consulting services. Once the Corrective Action Plan is prepared and finalized DMS will:

1. Notify the USACE as required by the Nationwide 27 permit general conditions.
2. Revise performance standards, maintenance requirements, and monitoring requirements as necessary and/or required by the USACE.
3. Obtain other permits as necessary.
4. Implement the Corrective Action Plan.

5. Provide the USACE a Record Drawing of Corrective Actions. This document shall depict the extent and nature of the work performed.

15.0 Financial Assurances

The NCDEQ has provided the USACE Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by DMS. This commitment provides financial assurance for mitigation projects implemented by the program.

16.0 References

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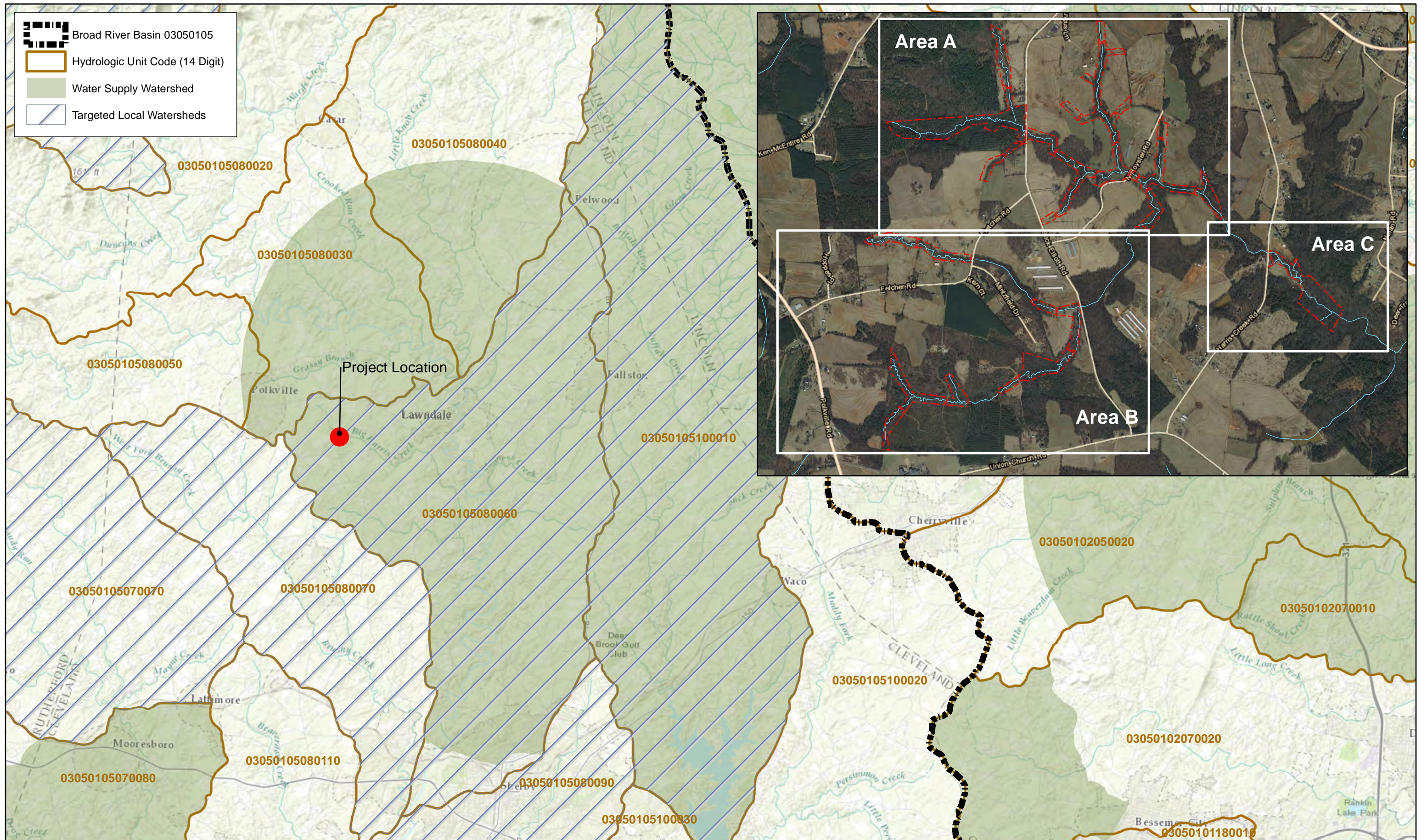
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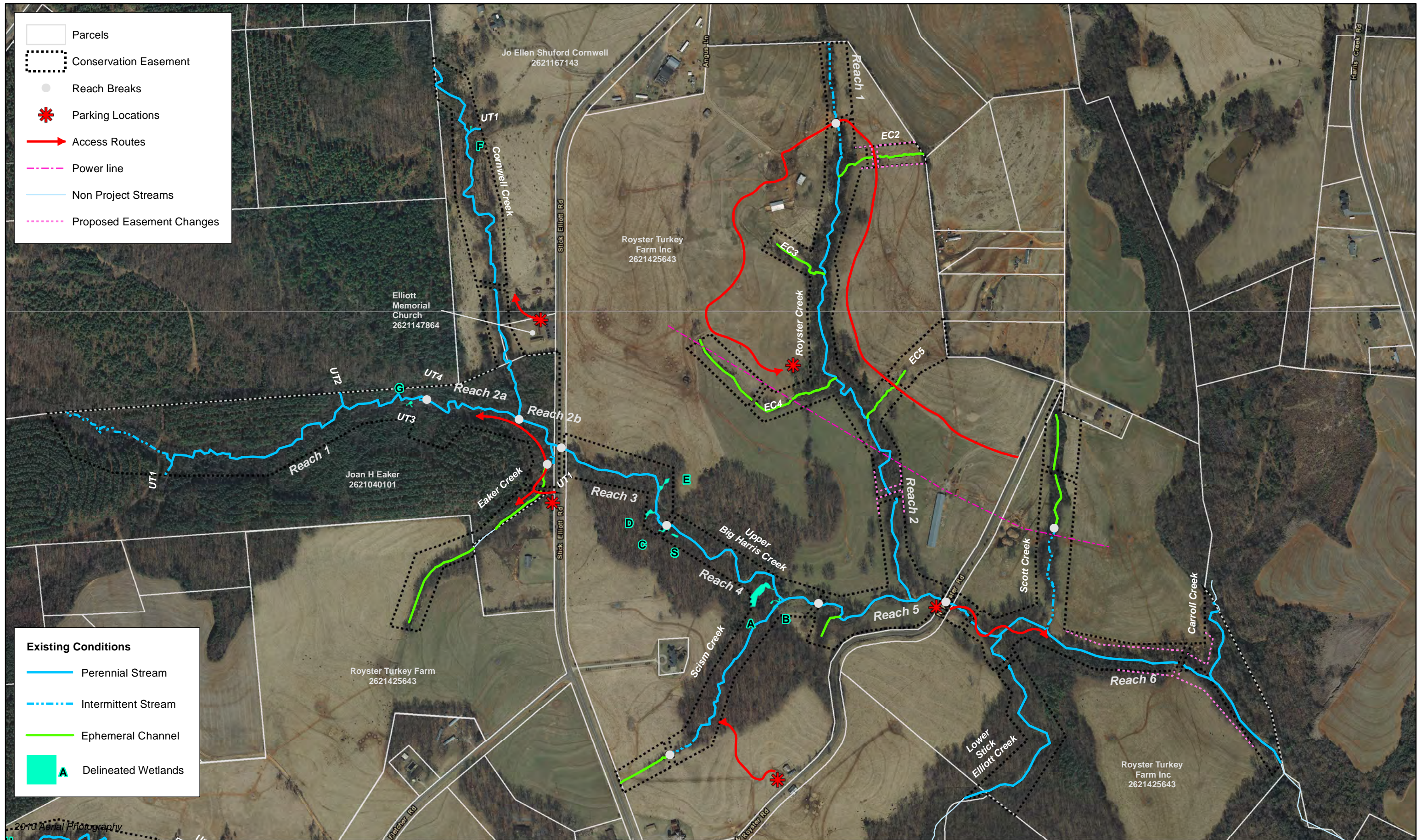
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[White Box] Parcels
 [Dashed Box] Conservation Easement
 [Grey Circle] Reach Breaks
 [Red Asterisk] Parking Locations
 [Red Arrow] Access Routes
 [Dashed Pink Line] Power line
 [Light Blue Line] Non Project Streams
 [Dotted Pink Line] Proposed Easement Changes

Existing Conditions

[Solid Blue Line] Perennial Stream
 [Dashed Blue Line] Intermittent Stream
 [Solid Green Line] Ephemeral Channel
 [Cyan Box with A] Delineated Wetlands

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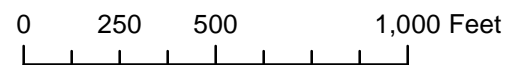
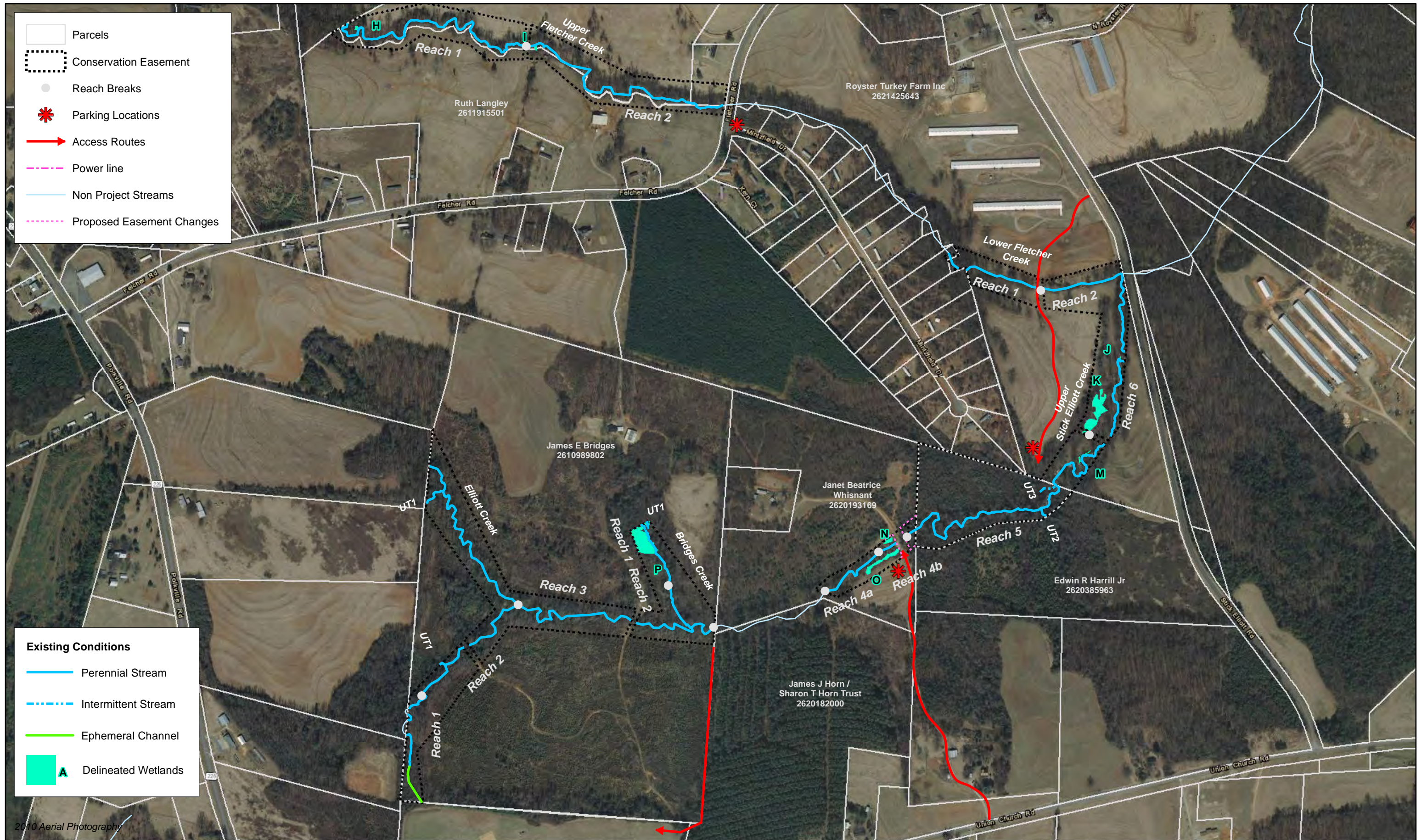


Figure 2a Site Map - Area A
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC



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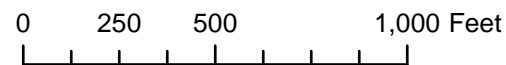














Figure 2b Site Map - Area B
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC

-  Parcels
-  Conservation Easement
-  Reach Breaks
-  Parking Locations
-  Access Routes
-  Power line
-  Non Project Streams
-  Proposed Easement Changes

Existing Conditions

-  Perennial Stream
-  Intermittent Stream
-  Ephemeral Channel
-  Delineated Wetlands



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0 250 500 1,000 Feet

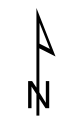


Figure 2c Site Map - Area C
Big Harris Creek Mitigation Site
Broad River Basin (03050105)
Cleveland County, NC

Watersheds
 Non Project Streams
 Project Streams

Area	Reach Name	Total Acres
Area A	Cornwell Creek	211
	Eaker Creek	27
	Eaker Creek - EC	26
	Scism Creek	40
	Scism Creek - EC	16
	Royster Creek - Reach 1	48
	Royster Creek - Reach 2	149
	Royster Creek - EC2	9
	Royster Creek - EC3	14
	Royster Creek - EC4	28
	Royster Creek - EC5	7
	Lower Stick Elliott Creek	943
	Scott Creek	42
	Scott Creek - EC	34
	Carroll Creek	203
	Upper Big Harris Creek - Reach 1	217
	Upper Big Harris Creek - Reach 2	474
	Upper Big Harris Creek - Reach 3	490
	Upper Big Harris Creek - Reach 4	572
	Upper Big Harris Creek - Reach 5	737
Upper Big Harris Creek - Reach 6	1969	
Upper Big Harris Creek - UT1	57	
Upper Big Harris Creek - UT2	71	
Upper Big Harris Creek - UT3	3	
Upper Big Harris Creek - UT4	2	
Upper Big Harris Creek - EC	8	
Area B	Elliott Creek	82
	Elliott Creek - UT1	12
	Bridges Creek	38
	Bridges Creek - UT1	9
	Upper Stick Elliott Creek - Reach 1	29
	Upper Stick Elliott Creek - Reach 2	100
	Upper Stick Elliott Creek - Reach 3	272
	Upper Stick Elliott Creek - Reach 4a	335
	Upper Stick Elliott Creek - Reach 4b	337
	Upper Stick Elliott Creek - Reach 5	463
	Upper Stick Elliott Creek - Reach 6	487
	Upper Stick Elliott Creek - UT1	8
	Upper Stick Elliott Creek - UT2	54
	Upper Stick Elliott Creek - UT3	39
	Upper Fletcher Creek - Reach 1	126
	Upper Fletcher Creek - Reach 2	185
Area C	Lower Big Harris Creek - Reach 1a	2149
	Lower Big Harris Creek - Reach 1b	2255
	Lower Big Harris Creek - Reach 2	2483
	Lower Big Harris Creek - Reach 3	2509
	Lower Big Harris Creek - UT1	106
	Lower Big Harris Creek - UT2	269
	Lower Big Harris Creek - UT3	36
	Lower Big Harris Creek - UT4	21



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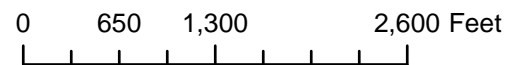

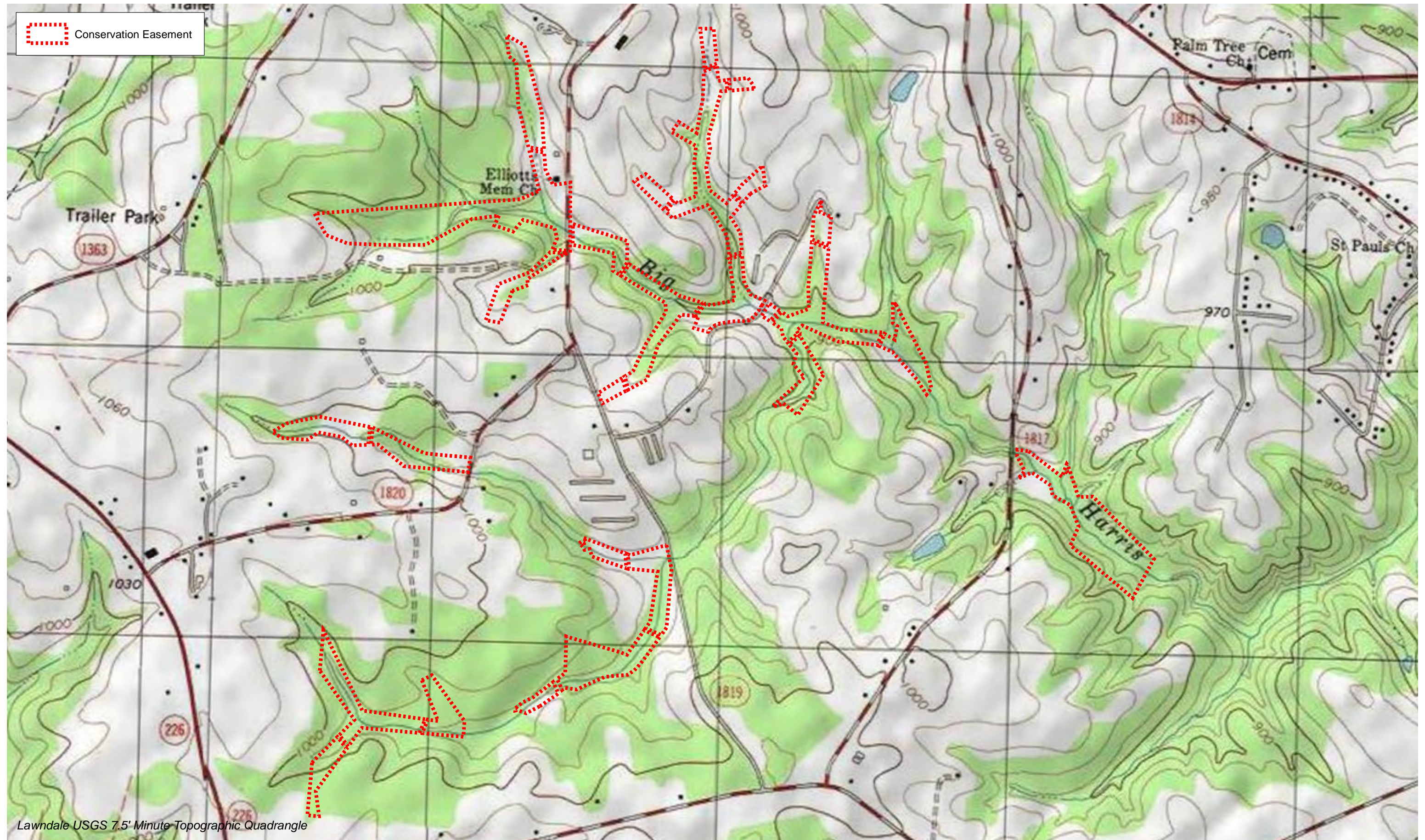


Figure 3 Watershed Map
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC

 Conservation Easement



Lawndale USGS 7.5' Minute Topographic Quadrangle

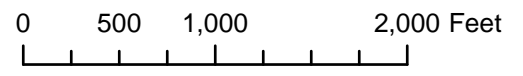
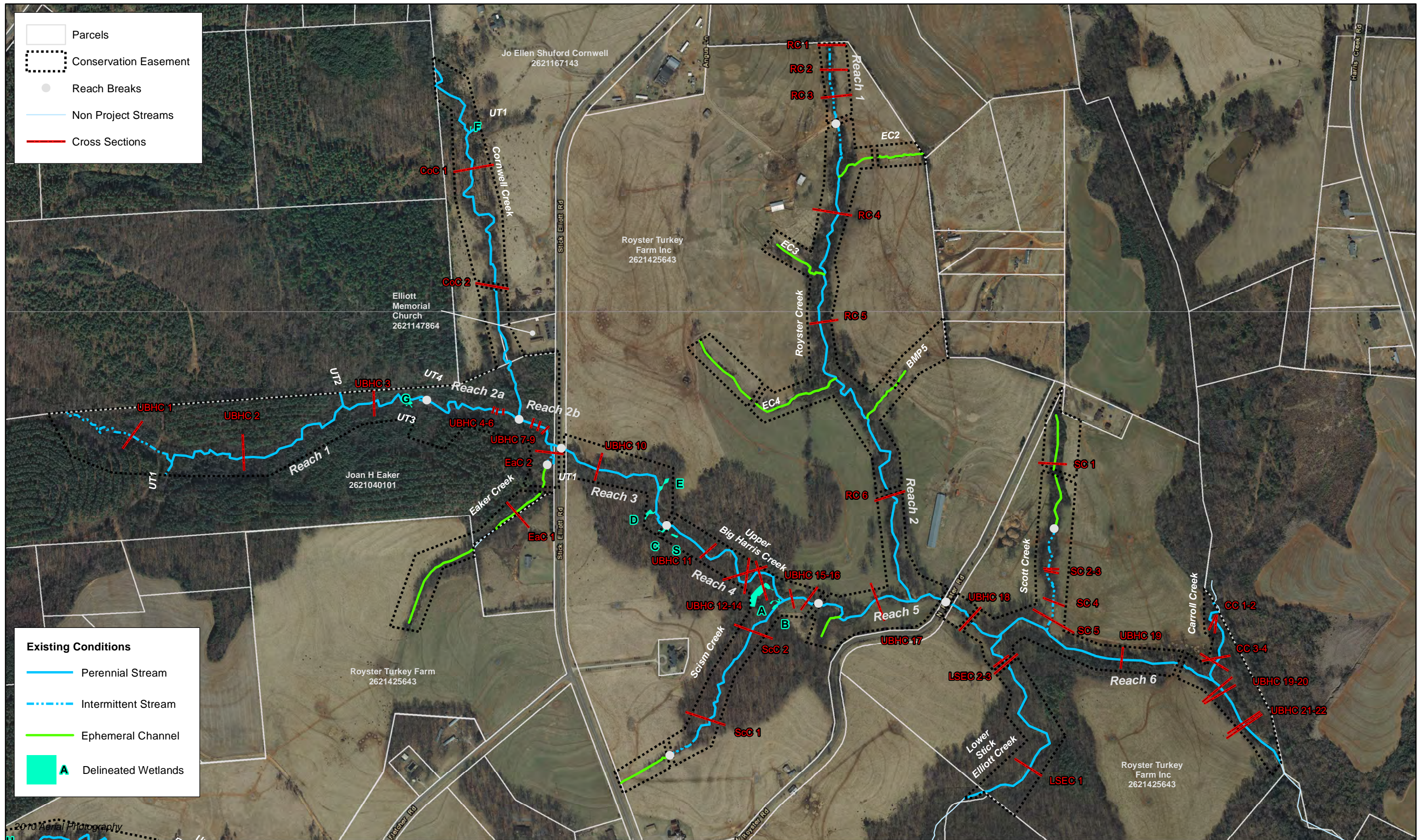


Figure 4 USGS Topographic Map
Big Harris Creek Mitigation Site
Broad River Basin (03050105)
Cleveland County, NC



Legend

- Parcels
- Conservation Easement
- Reach Breaks
- Non Project Streams
- Cross Sections

Existing Conditions

- Perennial Stream
- Intermittent Stream
- Ephemeral Channel
- Delineated Wetlands

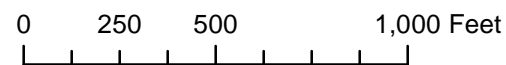


Figure 5a Hydrologic Features Map - Area A
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC



[White outline] Parcels
 [Dashed black outline] Conservation Easement
 [Grey dot] Reach Breaks
 [Blue line] Non Project Streams
 [Red line] Cross Sections

Existing Conditions

[Solid blue line] Perennial Stream
 [Dashed blue line] Intermittent Stream
 [Green line] Ephemeral Channel
 [Cyan area] Delineated Wetlands

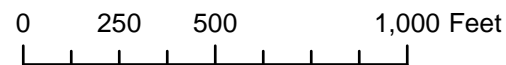
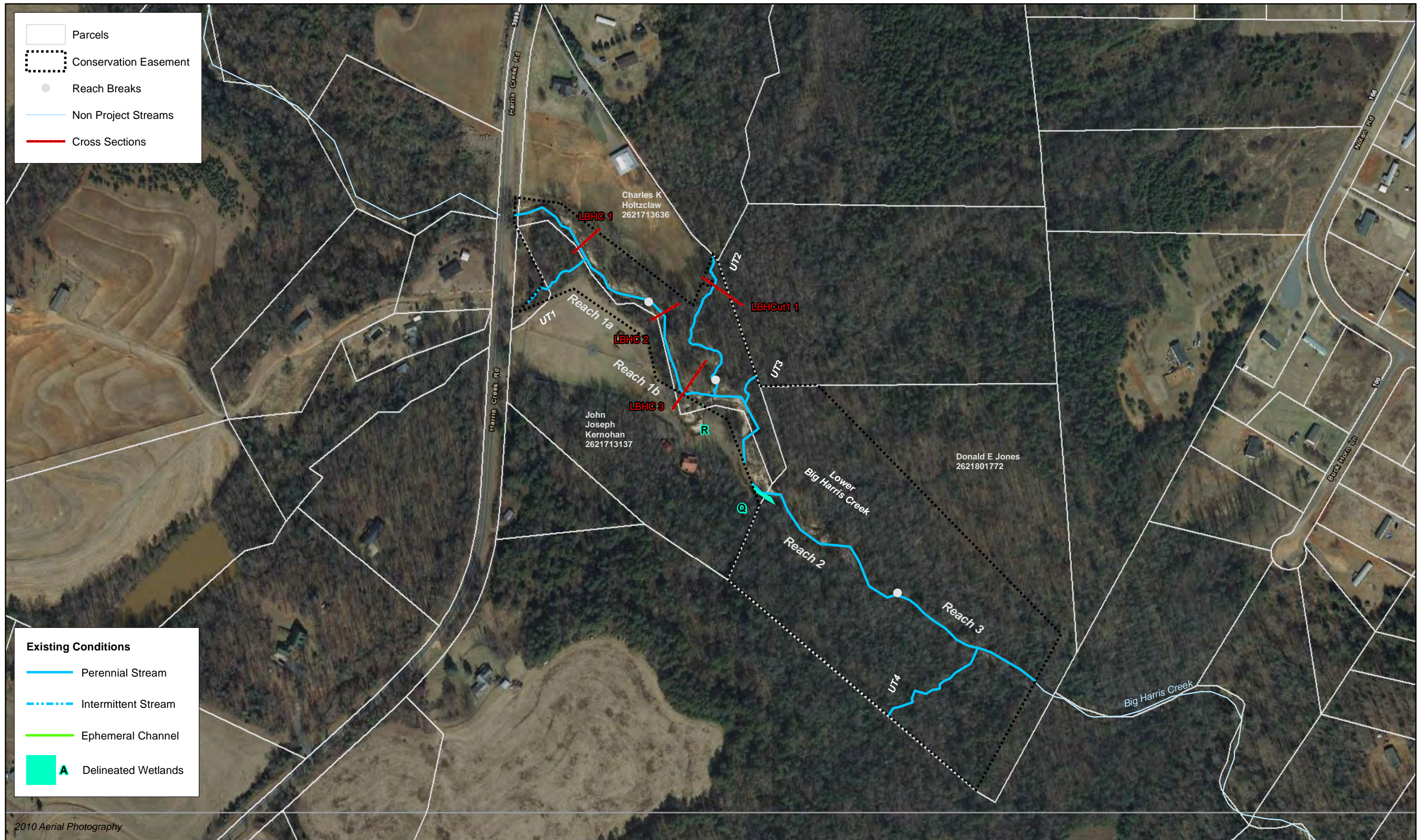


Figure 5b Hydrologic Features Map - Area B
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC



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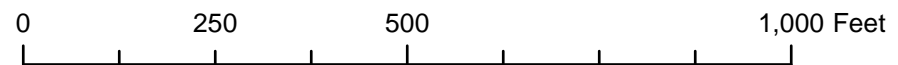
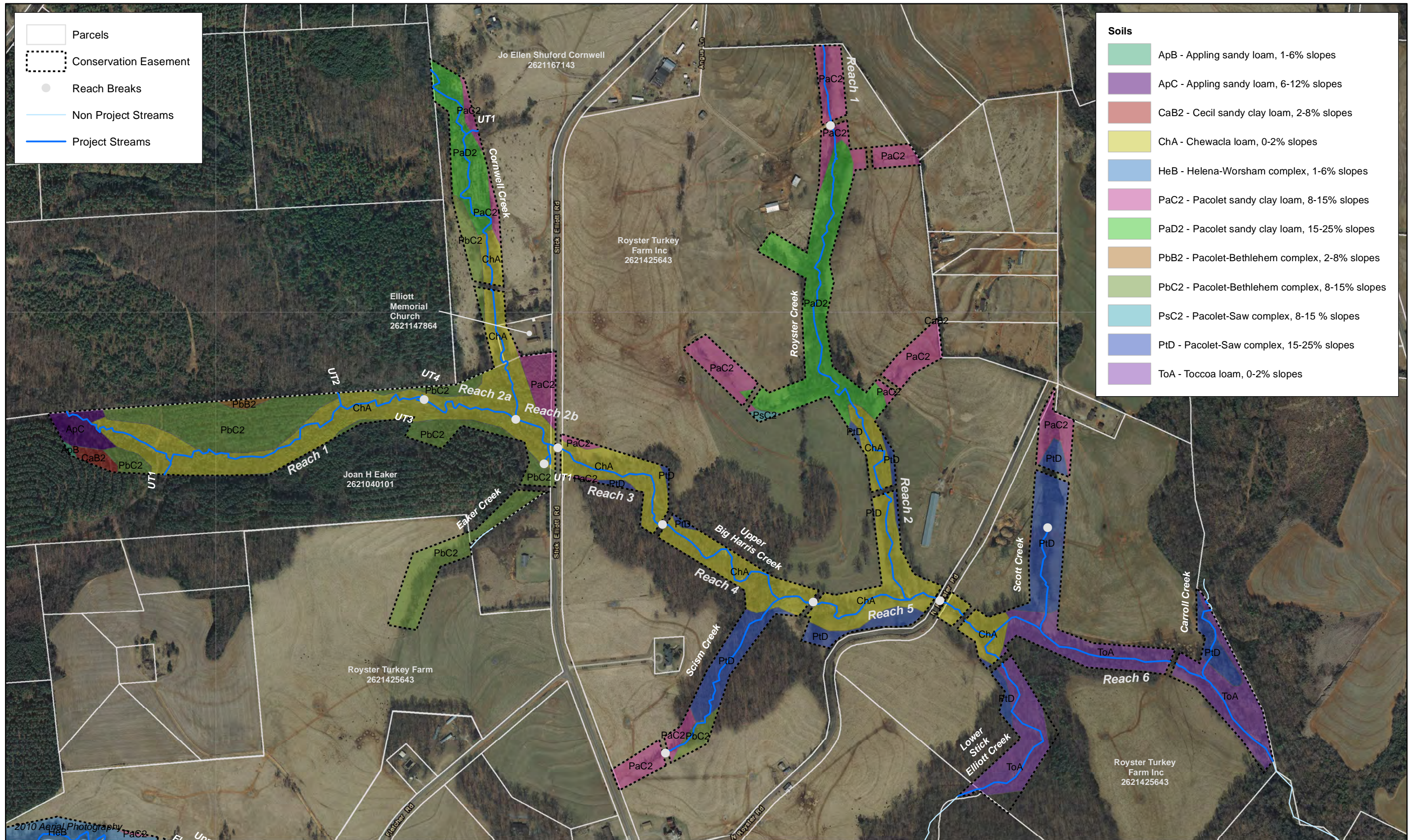
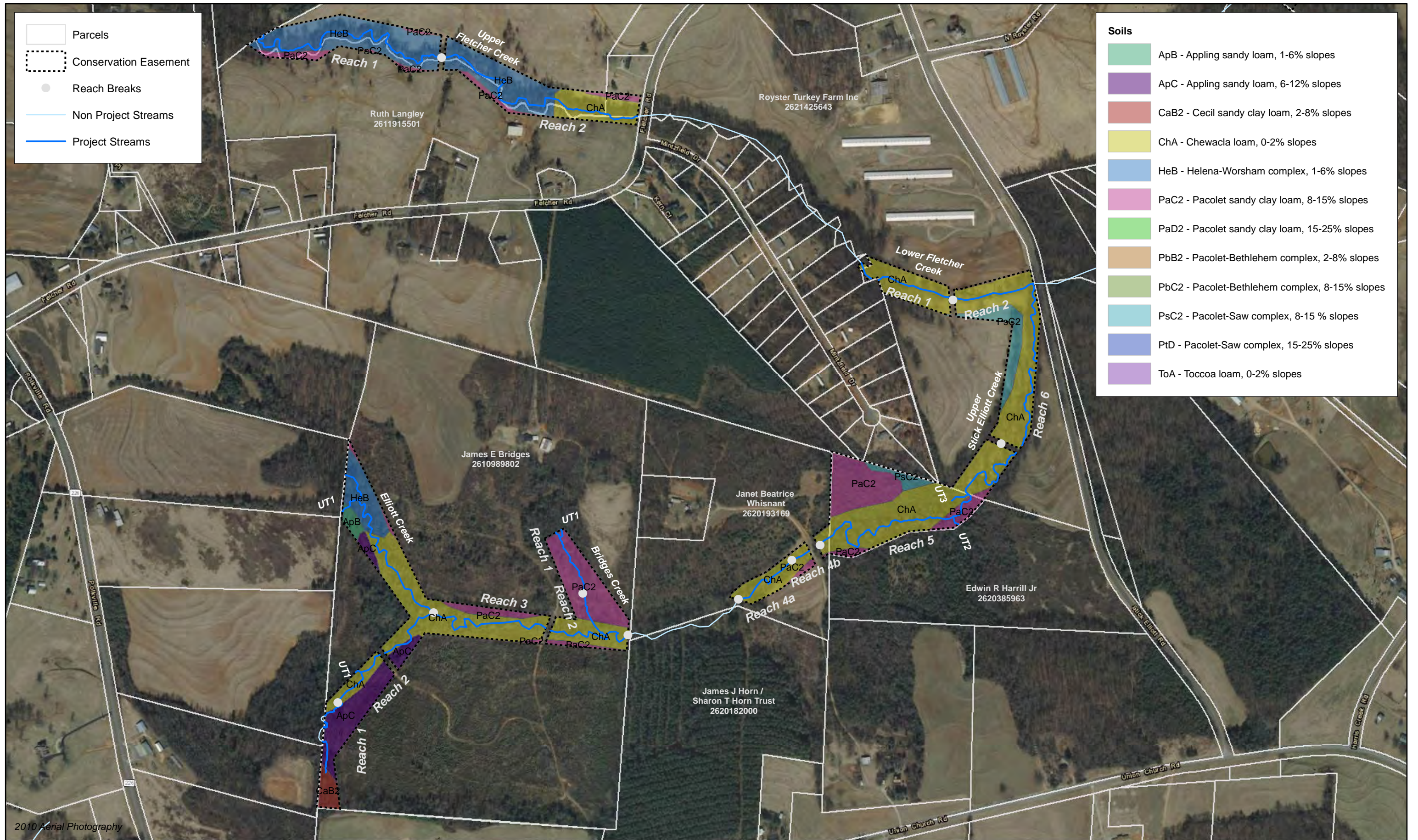


Figure 5c Hydrologic Features Map - Area C
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC





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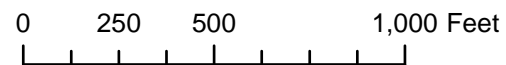
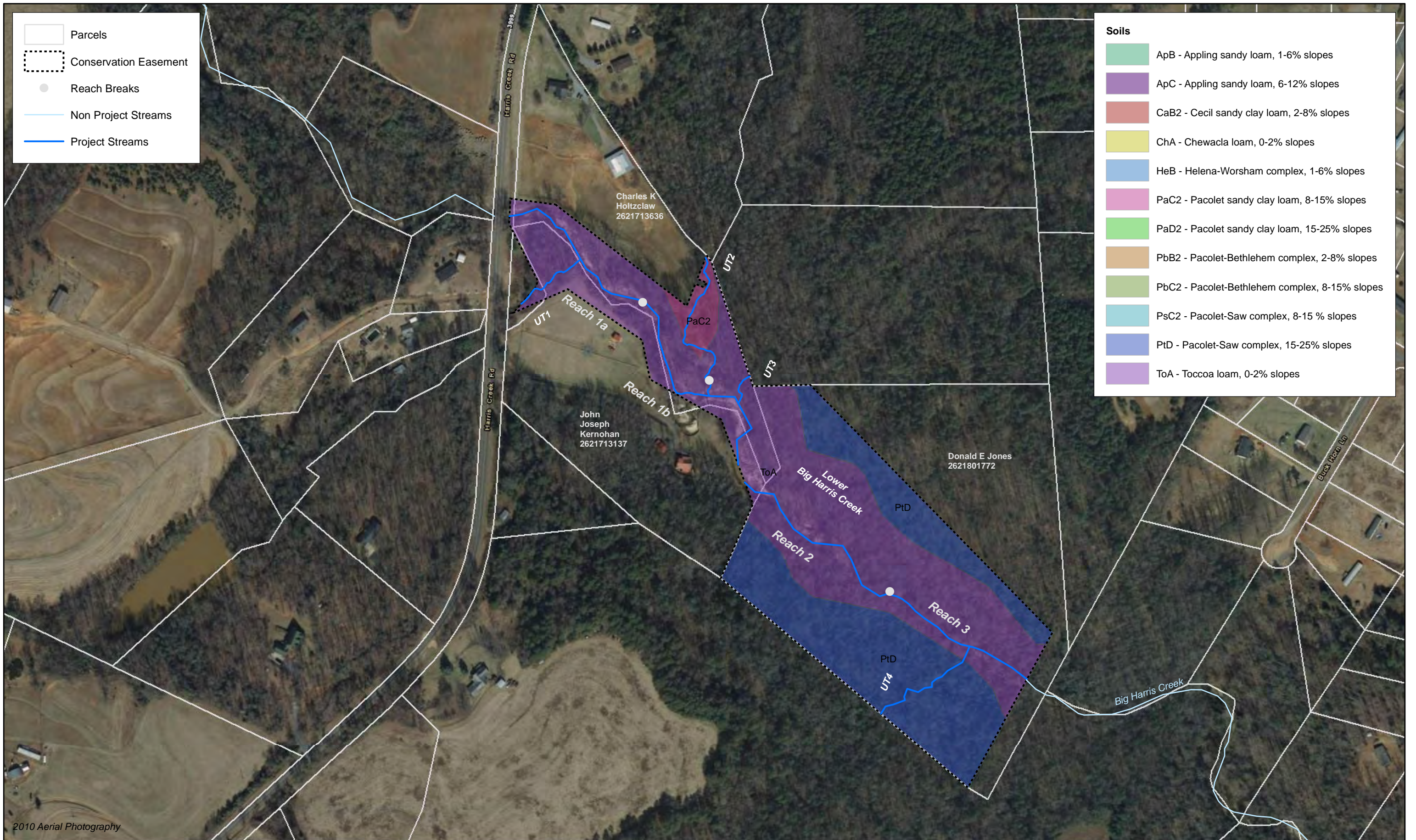


Figure 6b Soils Map - Area B
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC



Parcels
 Conservation Easement
 Reach Breaks
 Non Project Streams
 Project Streams

Soils

- ApB - Appling sandy loam, 1-6% slopes
- ApC - Appling sandy loam, 6-12% slopes
- CaB2 - Cecil sandy clay loam, 2-8% slopes
- ChA - Chewacla loam, 0-2% slopes
- HeB - Helena-Worsham complex, 1-6% slopes
- PaC2 - Pacolet sandy clay loam, 8-15% slopes
- PaD2 - Pacolet sandy clay loam, 15-25% slopes
- PbB2 - Pacolet-Bethlehem complex, 2-8% slopes
- PbC2 - Pacolet-Bethlehem complex, 8-15% slopes
- PsC2 - Pacolet-Saw complex, 8-15 % slopes
- PtD - Pacolet-Saw complex, 15-25% slopes
- ToA - Toccoa loam, 0-2% slopes

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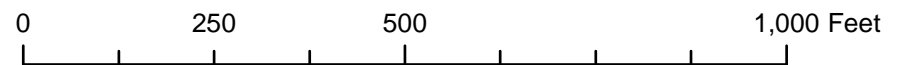


Figure 6c Soils Map - Area C
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC



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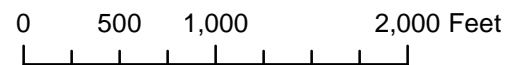


Figure 7b Water Quality and Aquatic Habitat Sampling Map Reference Sites
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC

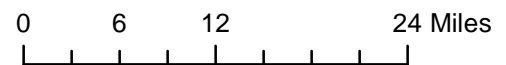
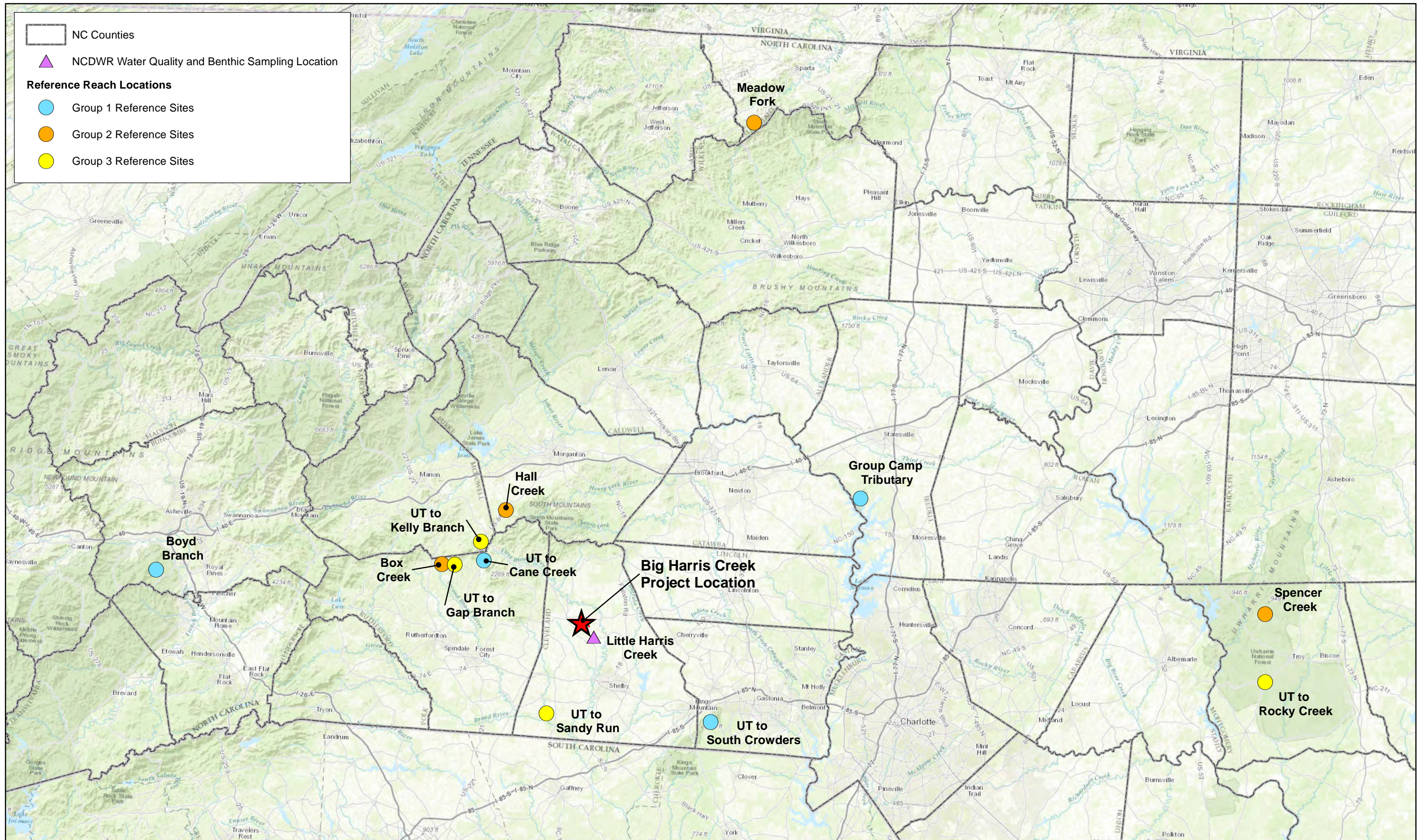
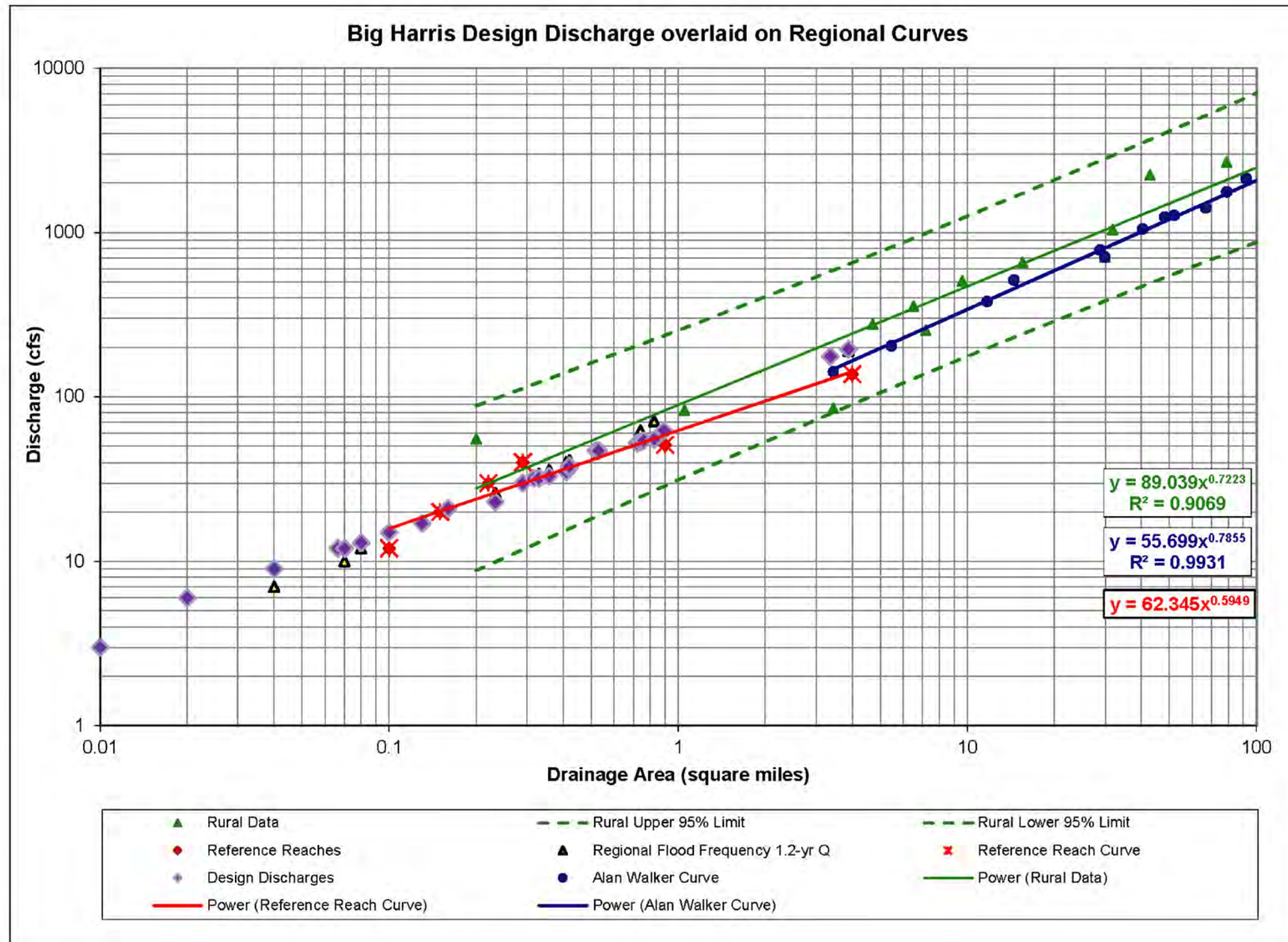
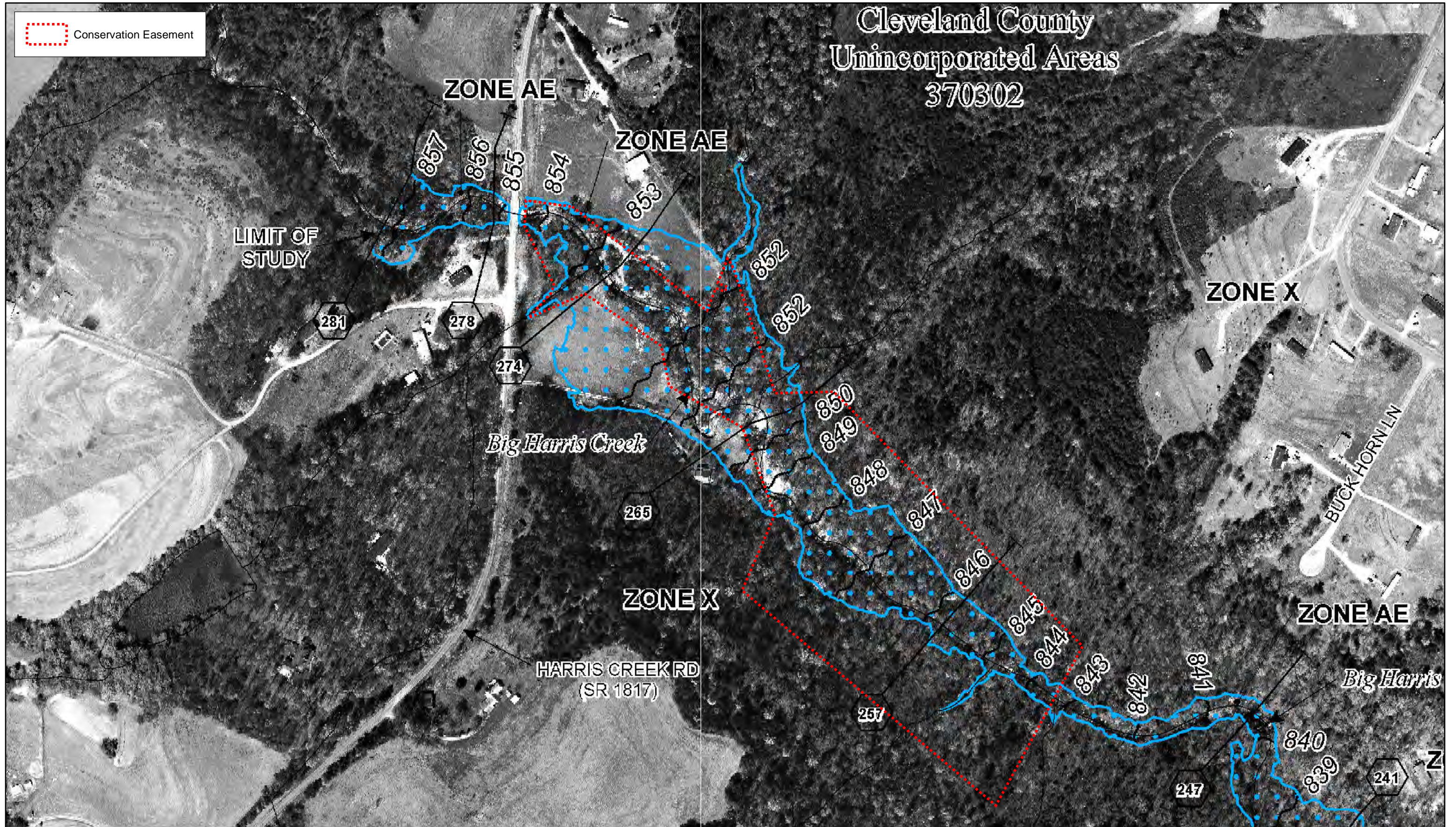


Figure 8 Reference Reach Vicinity Map
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC



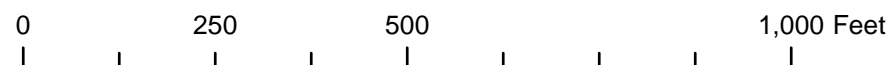
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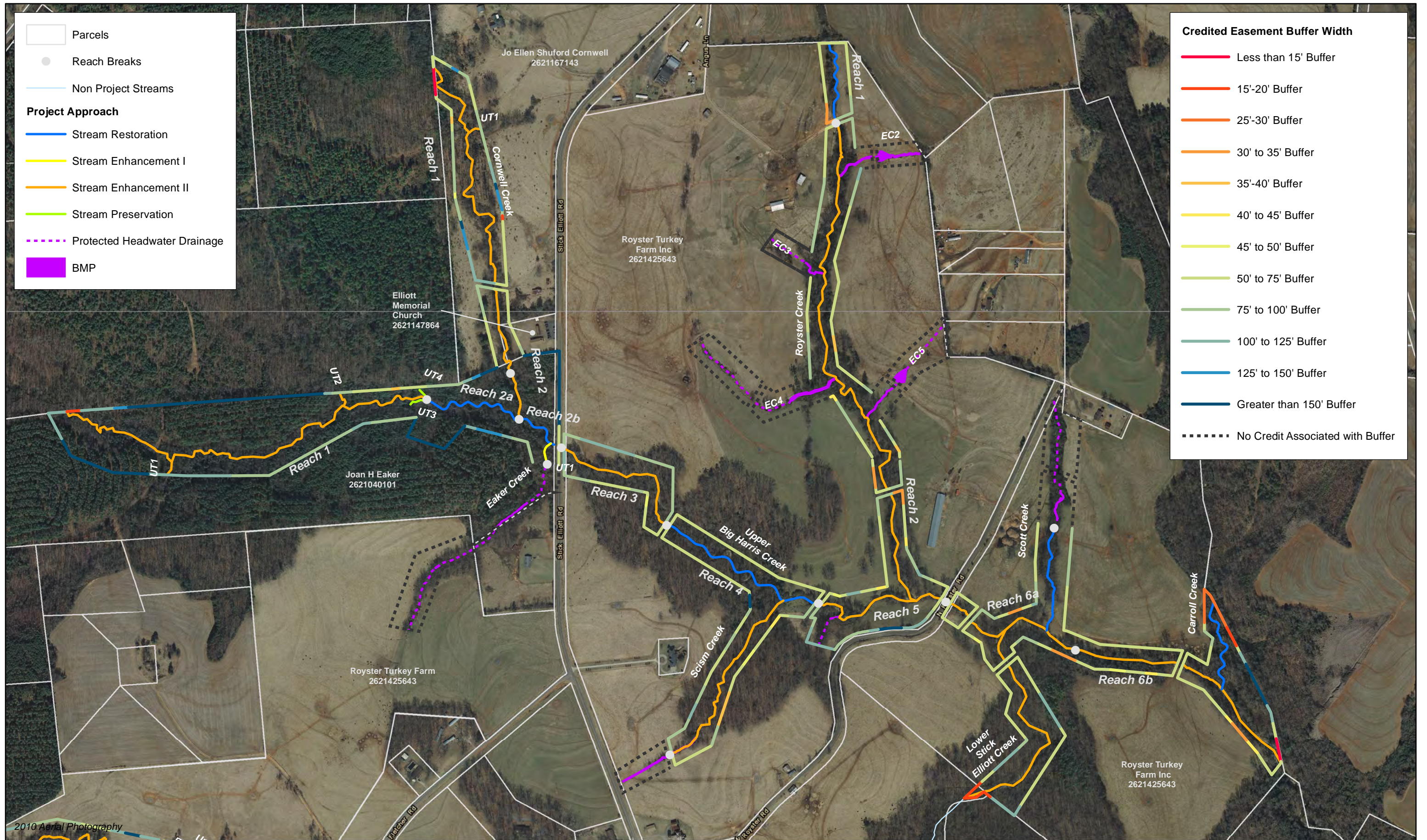
Cleveland County Unincorporated Areas 370302



FIRM Panels 2620 and 2621

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Parcels

- Parcels
- Reach Breaks
- Non Project Streams

Project Approach

- Stream Restoration
- Stream Enhancement I
- Stream Enhancement II
- Stream Preservation
- Protected Headwater Drainage
- BMP

Credited Easement Buffer Width

- Less than 15' Buffer
- 15'-20' Buffer
- 25'-30' Buffer
- 30' to 35' Buffer
- 35'-40' Buffer
- 40' to 45' Buffer
- 45' to 50' Buffer
- 50' to 75' Buffer
- 75' to 100' Buffer
- 100' to 125' Buffer
- 125' to 150' Buffer
- Greater than 150' Buffer
- No Credit Associated with Buffer

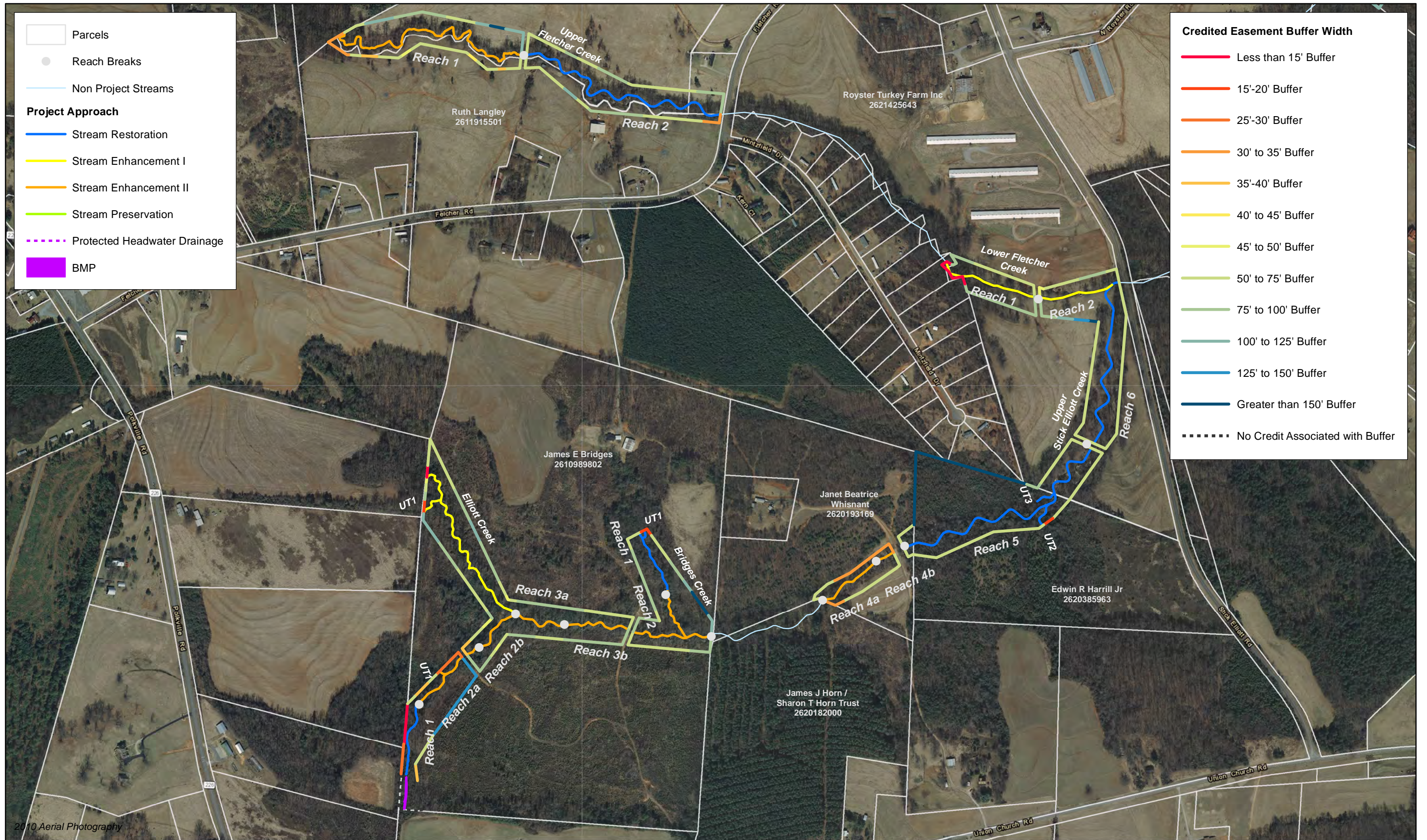
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Figure 11a Buffer Credit Calculations - Area A
Big Harris Creek Mitigation Site
Broad River Basin (03050105)
Cleveland County, NC



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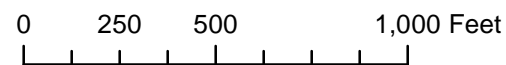
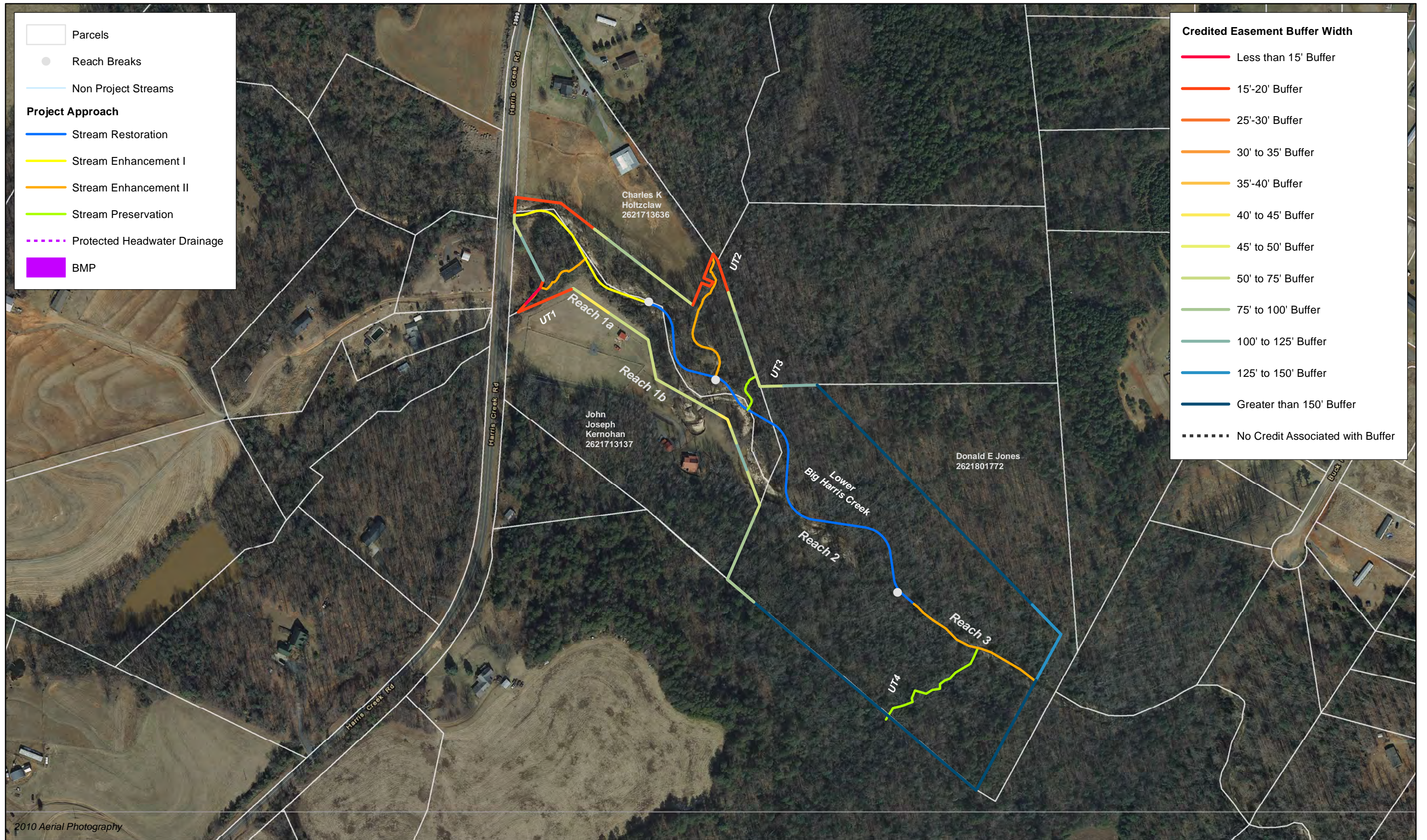
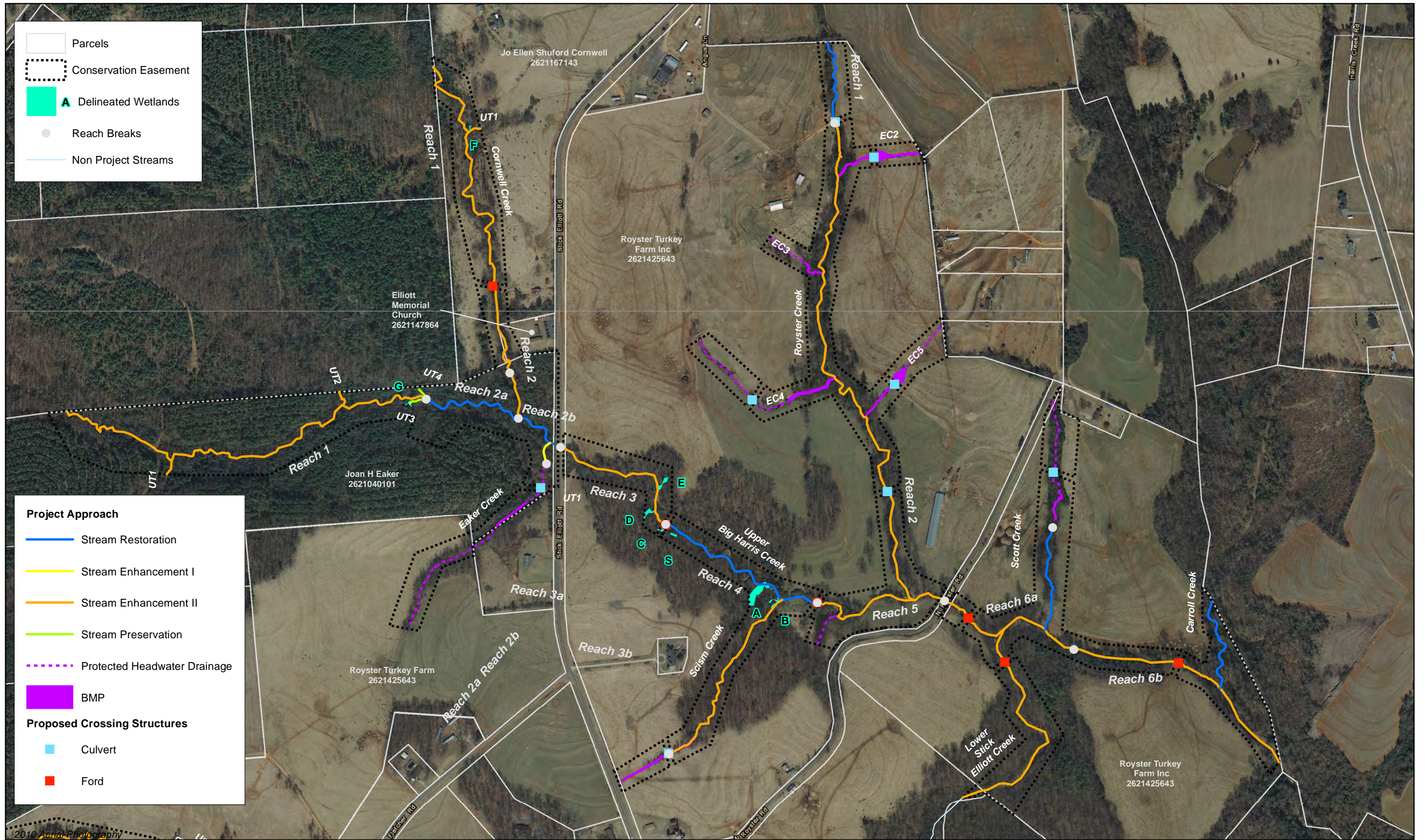


Figure 11b Buffer Credit Calculations - Area B
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC







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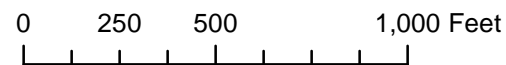
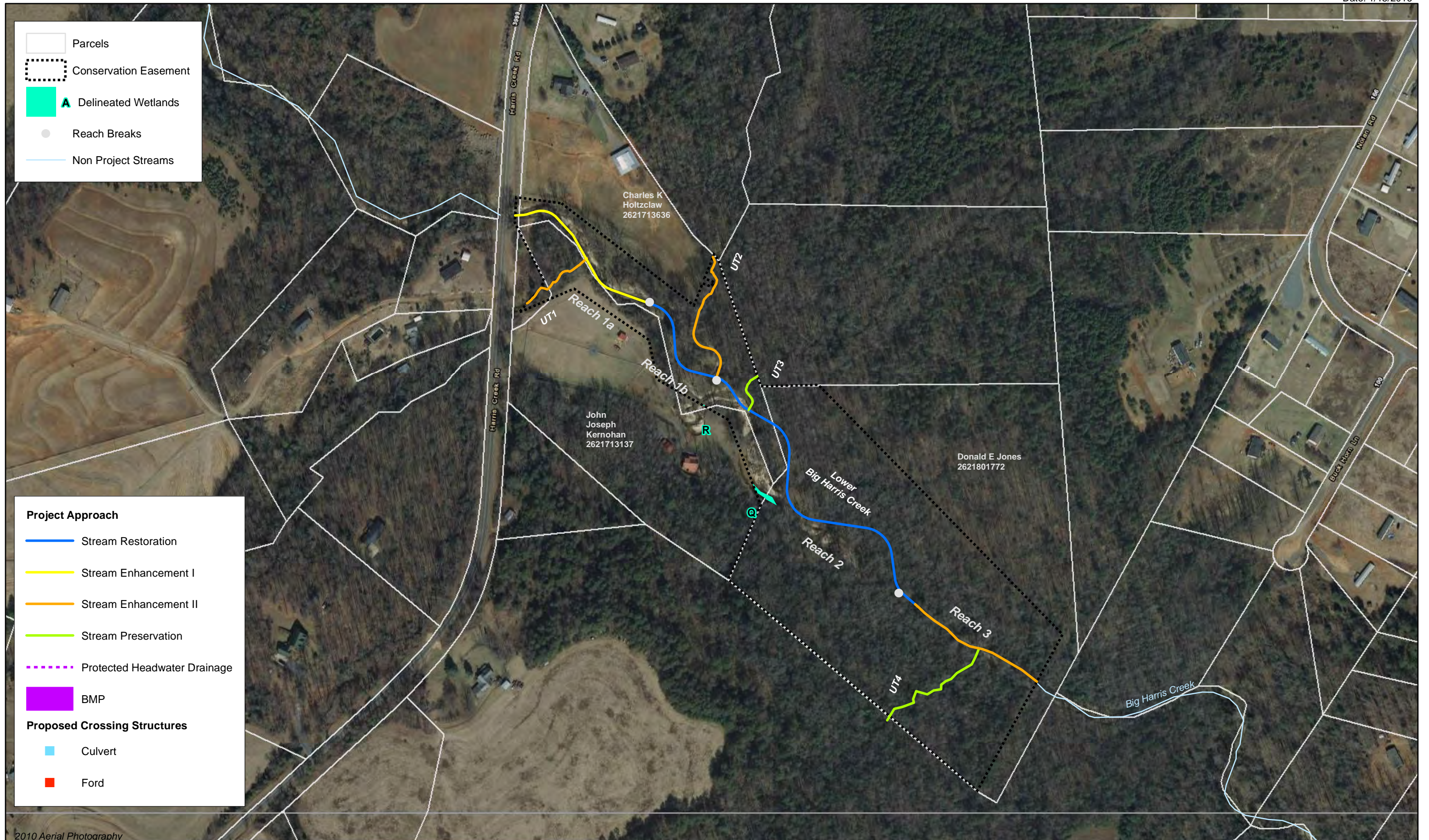


Figure 12b Concept Design Map - Area B
Big Harris Creek Mitigation Site
Broad River Basin (03050105)

Cleveland County, NC



Project Approach

- Stream Restoration
- Stream Enhancement I
- Stream Enhancement II
- Stream Preservation
- Protected Headwater Drainage
- BMP

Proposed Crossing Structures

- Culvert
- Ford

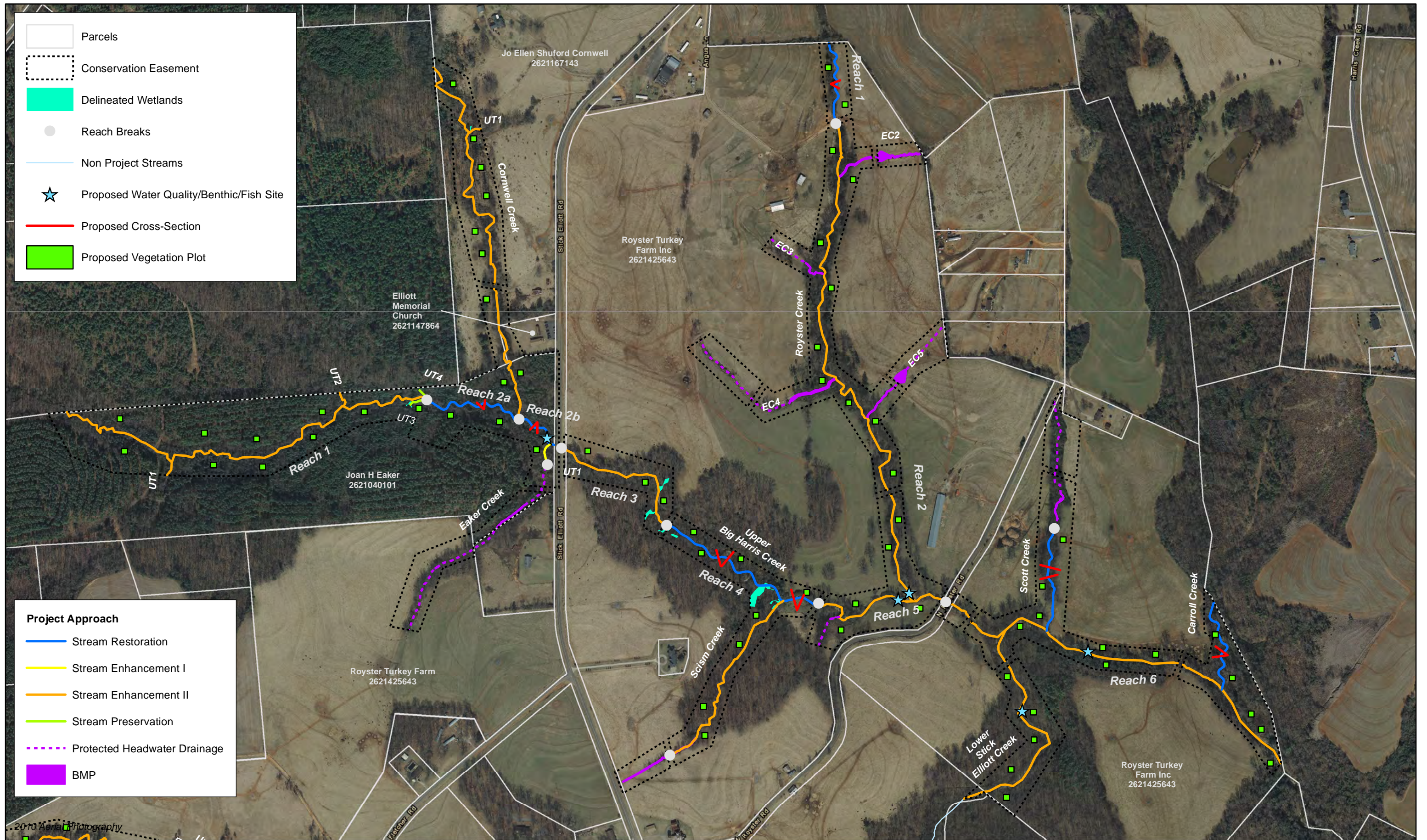
2010 Aerial Photography



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Figure 12c Concept Design Map - Area C
Big Harris Creek Mitigation Site
Broad River Basin (03050105)



- Parcels
- Conservation Easement
- Delineated Wetlands
- Reach Breaks
- Non Project Streams
- Proposed Water Quality/Benthic/Fish Site
- Proposed Cross-Section
- Proposed Vegetation Plot

Project Approach

- Stream Restoration
- Stream Enhancement I
- Stream Enhancement II
- Stream Preservation
- Protected Headwater Drainage
- BMP

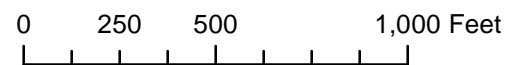
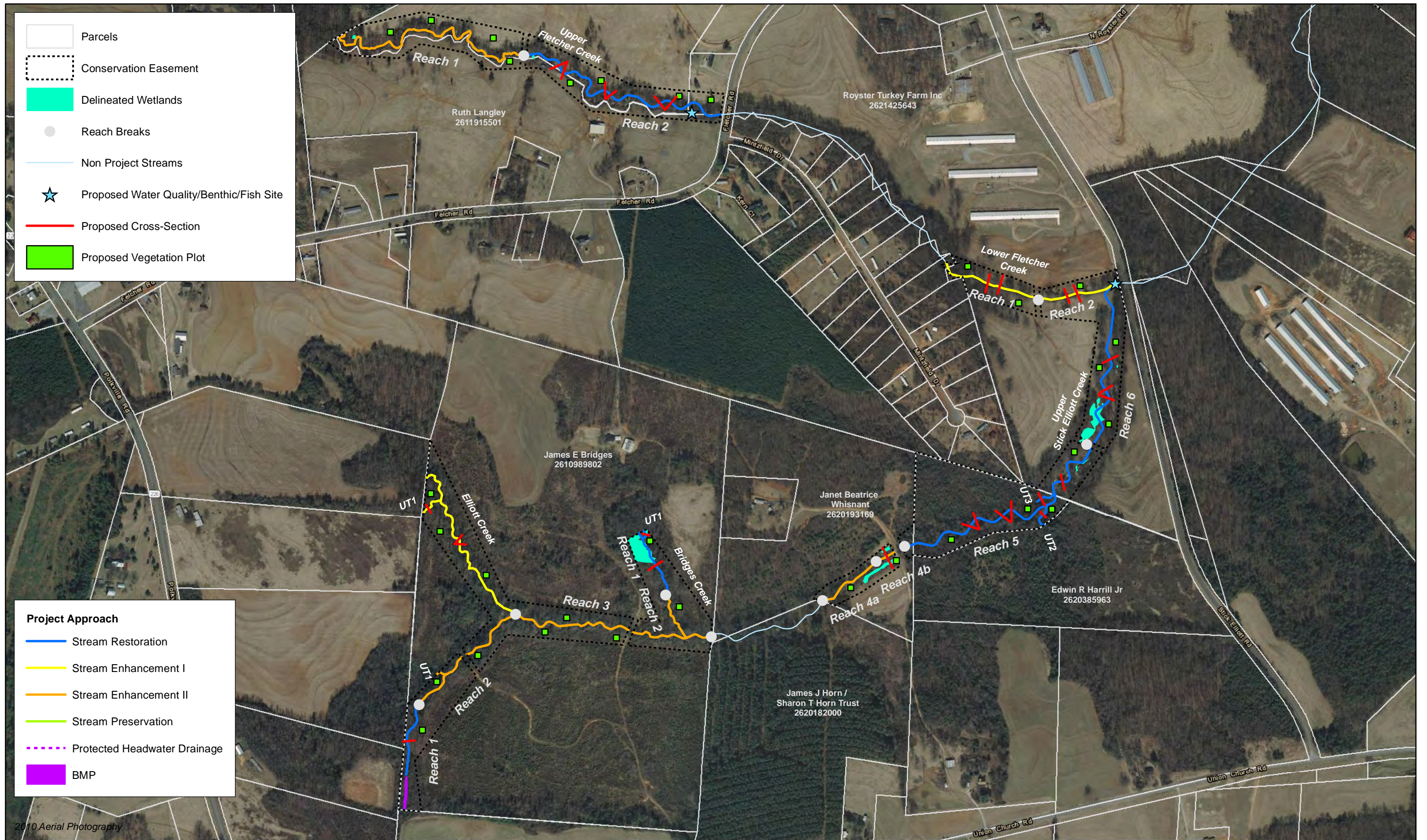


Figure 13a Monitoring Plan - Area A
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC



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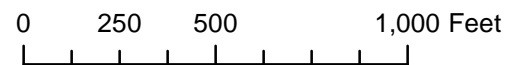
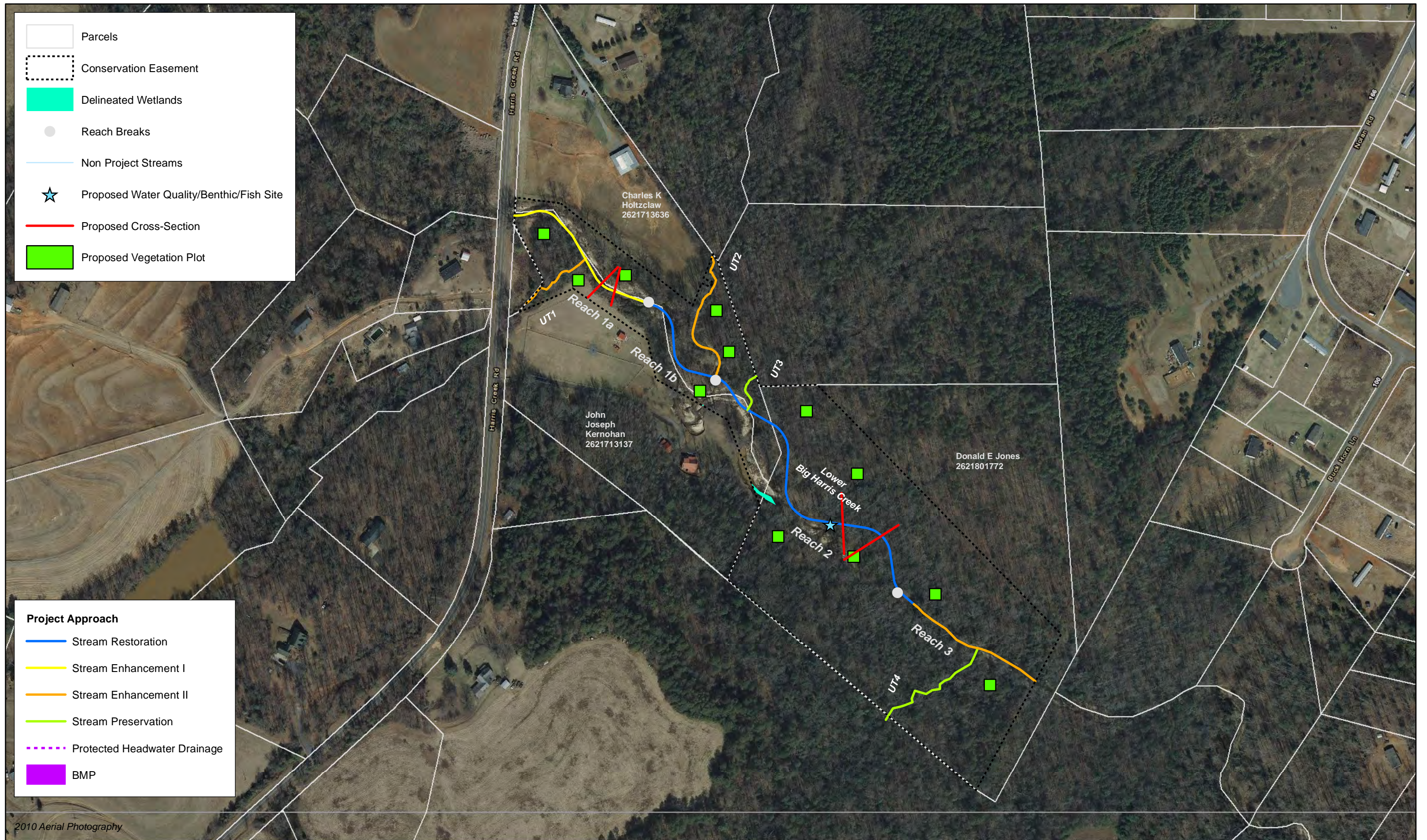


Figure 13b Monitoring Plan - Area B
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC



Project Approach

- Stream Restoration
- Stream Enhancement I
- Stream Enhancement II
- Stream Preservation
- ⋯ Protected Headwater Drainage
- BMP

2010 Aerial Photography

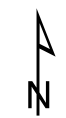
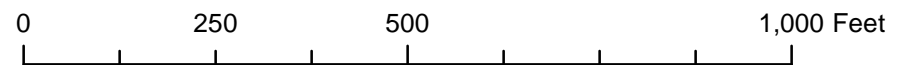


Figure 13c Monitoring Plan - Area C
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC

- Proposed Reference Watershed
- Non Project Streams
- NCDWR Benthic Sampling Locations
- ▲ NCDWR Water Chemistry Locations
- ★ Proposed Water Quality/Benthic/Fish Site



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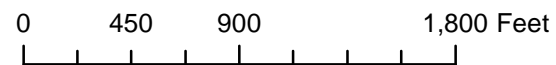


Figure 13d Monitoring Plan - Reference Watershed
 Big Harris Creek Mitigation Site
 Broad River Basin (03050105)
 Cleveland County, NC

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on Oct 16 2009, at 02:47:41 PM
by BONNIE E. REECE
REGISTER OF DEEDS

Book 1595 Page 295

Issued Oct 16 2009
\$469.00

by BONNIE E. REECE
REGISTER OF DEEDS ID.19985
State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

128737

RECORDING FEE \$ 76.⁰⁰ REVENUES 469.⁰⁰

* Deaton Biggers, HOZA PLLC

STATE OF NORTH CAROLINA
CLEVELAND COUNTY

CONSERVATION EASEMENT
AND RIGHT OF ACCESS

SPO File Number: 023-AB
EEP SITE ID: 739
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS
pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this
2nd day of October, 2009, by Royster Turkey Farm, Inc a North Carolina
Corporation ("Grantor"), whose mailing address is 3801 Stick Elliott Rd. Lawndale, NC 28090
, to the State of North Carolina, ("Grantee"), whose mailing address is State of North Carolina,
Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC
27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their
heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter
as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State
of North Carolina has established the Ecosystem Enhancement Program (formerly known as the
Wetlands Restoration Program) within the Department of Environment and Natural Resources
for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland
and riparian resources that contribute to the protection and improvement of water quality, flood
prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation
Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in No.8 Township, Cleveland County, North Carolina (the "Property"), and being more particularly described as that certain parcel of land containing approximately 481.76 acres and being conveyed to the Grantor by deed as recorded in Deed Book 9-H, 18W, 1180, 16-Z at Page 574,307,113,522, respectively of the Cleveland County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement and Right of Access over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept said Easement and Access Rights. The Conservation Easement shall be for the protection and benefit of the waters of Big Harris Creek.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with a general Right of Access.

The Easement Area consists of the following:

Tracts Number 1, 2, 3, 4, 5, 7, 8, 9,10,11,12,13,14,15,16,17,18,19,20 and 21 (Tract 6 combined with tract 5) containing a total of 68.49 acres as shown on the plats of survey entitled **Final Plat Conservation Easement Survey for the State of North Carolina, NC Department of Administration Ecosystem Enhancement Program Project Name: Big Harris Creek SPO File No.23-AB, EEP Site No. 739, Property Owner Royster Turkey Farm, dated August 1, 2009 by Dobbins Lattimore, PLS Number 33936 and recorded in the Cleveland County, North Carolina Register of Deeds at Plat Book 33 Pages 143.**

See attached "Exhibit A", Legal Description.

The purposes of this Conservation Easement are to maintain, restore, enhance, construct, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will

significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement and Right of Access shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area after the stream restoration construction is complete may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped recreational and education uses of the Easement Area

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written

approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Right of Access, Construction, and Inspection. The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Easement Area over the Property at reasonable times to undertake any activities to restore, construct, manage, maintain, enhance, and monitor the stream, wetland and any other riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

C. Signs. The Grantee shall be permitted to place signs on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the holder of the Conservation Easement.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns that comes to the attention of the Grantee the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times

for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown herein or to other addresses as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement. The U.S. Army Corps of Engineers must be notified 60 days in advance of any amendment to this Conservation Easement or transfer of property interest.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

Royster Turkey Farm, Inc.

Edwin S. Royster (SEAL)

Edwin S. Royster, President

**NORTH CAROLINA
COUNTY OF CLEVELAND**

I, Ann M. Deahn, a Notary Public in and for the County and State aforesaid, do hereby certify that **Edwin S. Royster**, being **President and Managing Member** of **Royster Turkey Farm, Inc.**, A North Carolina Corporation, Grantor, personally appeared before me this day and acknowledged that he is **Manager/Member** of **Royster Turkey Farm, Inc.**, a North Carolina Corporation, and that by authority duly given and as the act of the North Carolina Corporation the foregoing instrument was signed in its name by him as its **Managing Member** for **Royster Turkey Farms, Inc** a North Carolina Corporation for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 2nd
day of October, 2009.



Notary Public

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Exhibit A
Legal Description for Royster Turkey Farm, Inc.

Tract 1

Commencing on the Northwestern most corner of the Edwin S. Royster property as described in Deed book 1561 Page 746 of the Cleveland County Registry and running with the common line of the Royster property and the Royster Turkey Farm property as described in Deed book 1180 Page 113 of the Cleveland County Registry South 09 degrees 05 minutes 06 seconds West for a distance of 237.09 feet to a No.5 rebar set with a cap stamped Conservation Easement said corner marking the point of BEGINNING; THENCE running with the Royster line and the Royster Turkey Farm line South 09 degrees 05 minutes 06 seconds West for a distance of 110.11 feet to an unmarked point in the creek and passing over a No.5 rod at 98.01 feet; THENCE with the center of the creek and the Ruth Langley property as described in Deed book 1231 Page 1247 of the Cleveland County Registry for the next twenty-nine calls North 81 degrees 43 minutes 19 seconds West for a distance of 101.20 feet to an unmarked point; THENCE South 83 degrees 17 minutes 56 seconds West for a distance of 46.03 feet to an unmarked point; THENCE North 48 degrees 01 minutes 39 seconds West for a distance of 91.41 feet to an unmarked point; THENCE North 87 degrees 21 minutes 57 seconds West for a distance of 37.73 feet to an unmarked point; THENCE North 72 degrees 33 minutes 46 seconds West for a distance of 24.18 feet to an unmarked point; THENCE South 33 degrees 21 minutes 15 seconds West for a distance of 16.09 feet to an unmarked point; THENCE South 36 degrees 47 minutes 35 seconds East for a distance of 15.87 feet to an unmarked point; THENCE South 08 degrees 21 seconds 33 seconds West for a distance of 21.38 feet to an unmarked point; THENCE South 64 degrees 44 minutes 11 seconds West for a distance of 23.20 feet to an unmarked point; THENCE North 73 degrees 51 minutes 28 seconds West for a distance of 47.06 feet to an unmarked point; THENCE South 77 degrees 47 minutes 09 seconds West for a distance of 20.14 feet to an unmarked point; THENCE North 75 degrees 57 minutes 30 seconds West for a distance of 12.43 feet to an unmarked point; THENCE North 19 degrees 18 minutes 58 seconds West for a distance of 38.62 feet to an unmarked point; THENCE North 78 degrees 09 minutes 49 seconds West for a distance of 47.10 feet to an unmarked point; THENCE South 09 degrees 08 minutes 42 seconds West for a distance of 24.80 feet to an unmarked point; THENCE South 52 degrees 18 minutes 52 seconds West for a distance of 31.14 feet to an unmarked point; THENCE North 55 degrees 29 minutes 10 seconds West for a distance of 26.23 feet to an unmarked point; THENCE North 88 degrees 07 minutes 29 seconds West for a distance of 32.13 feet to an unmarked point; THENCE North 57 degrees 26 minutes 57 seconds West for a distance of 29.41 feet to an unmarked point; THENCE North 03 degrees 41 minutes 54 seconds East for a distance of 35.19 feet to an unmarked point; THENCE North 26 degrees 43 minutes 10 seconds West for a distance of 24.54 feet to an unmarked point; THENCE North 40 degrees 24 minutes 23 seconds East for a distance of 59.84 feet to an unmarked point; THENCE North 50 degrees 49 minutes 02 seconds West for a distance 19.60 feet to an unmarked point; THENCE North 86 degrees 24 minutes 02 seconds West for a distance of 82.89 feet to an unmarked point; THENCE North 61 degrees 52 minutes 34 seconds West for a distance of 76.54 feet to an unmarked point; THENCE North 38 degrees 15 minutes 16 seconds West for a distance of 74.02 feet to an unmarked point; THENCE North 62 degrees 00 minutes 52 seconds West for a distance of 62.20 feet to an unmarked point; THENCE North 84 degrees 17 minutes 12 seconds West for a distance of 40.06 feet to an unmarked point; THENCE South 75 degrees 33 minutes 33 seconds West for a distance of 40.10 feet to an unmarked point; THENCE leaving the creek and creating three new lines through the

Royster Turkey Farm property North 06 degrees 03 minutes 59 seconds East for a distance of 123.76 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 63 degrees 28 minutes 53 seconds East for a distance of 654.29 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 84 degrees 10 minutes 04 seconds East for a distance of 276.10 feet to the point of BEGINNING.
Containing 2.34 acres more or less.

Tract 2

Commencing on the terminus of the thirty-first call of Tract 1 and running North 78 degrees 28 minutes 10 seconds West for a distance of 30.14 feet to a No.5 rebar set with a cap stamped Conservation Easement and said iron marking the point of BEGINNING; THENCE a new line through the Royster Turkey Farm property South 06 degrees 03 minutes 59 seconds West for a distance of 126.63 feet to an unmarked point in the center of the creek; THENCE with the center of the creek and the Ruth Langley property for the next forty-five calls North 78 degrees 37 minutes 40 seconds West for a distance of 55.13 feet to an unmarked point; THENCE South 82 degrees 04 minutes 31 seconds West for a distance of 37.95 feet to an unmarked point; THENCE South 22 degrees 34 minutes 49 seconds West for a distance of 29.62 feet to an unmarked point; THENCE South 68 degrees 17 minutes 04 seconds West for a distance of 27.05 feet to an unmarked point; THENCE North 42 degrees 42 minutes 12 seconds West for a distance of 18.22 feet to an unmarked point; THENCE North 70 degrees 17 minutes 35 seconds West for a distance of 31.47 feet to an unmarked point; THENCE North 81 degrees 57 minutes 42 seconds West for a distance of 26.31 feet to an unmarked point; THENCE North 44 degrees 30 minutes 00 seconds West for a distance of 15.89 feet to an unmarked point; THENCE North 37 degrees 34 minutes 31 seconds West for a distance of 20.26 feet to an unmarked point; THENCE North 85 degrees 02 seconds 25 seconds West for a distance of 29.96 feet to an unmarked point; THENCE North 54 degrees 37 minutes 46 seconds West for a distance of 18.93 feet to an unmarked point; THENCE North 33 degrees 52 minutes 52 seconds West for a distance of 35.78 feet to an unmarked point; THENCE North 54 degrees 46 minutes 48 seconds West for a distance of 22.97 feet to an unmarked point; THENCE North 00 degrees 55 minutes 33 seconds East for a distance of 17.50 feet to an unmarked point; THENCE North 27 degrees 46 minutes 47 seconds East for a distance of 36.20 feet to an unmarked point; THENCE North 59 degrees 12 minutes 17 seconds West for a distance of 12.98 feet to an unmarked point; THENCE South 62 degrees 30 minutes 20 seconds West for a distance of 28.86 feet to an unmarked point; THENCE South 39 degrees 37 minutes 43 seconds West for a distance of 23.83 feet to an unmarked point; THENCE South 62 degrees 12 minutes 25 seconds West for a distance of 24.47 feet to an unmarked point; THENCE North 61 degrees 55 minutes 55 seconds West for a distance of 20.59 feet to an unmarked point; THENCE North 13 degrees 22 minutes 29 seconds West for a distance of 45.07 feet to an unmarked point; THENCE North 51 degrees 43 minutes 31 seconds West for a distance of 9.23 feet to an unmarked point; THENCE South 63 degrees 02 minutes 02 seconds West for a distance of 39.55 feet to an unmarked point; THENCE South 51 degrees 26 minutes 54 seconds West for a distance of 41.15 feet to an unmarked point; THENCE North 69 degrees 17 minutes 58 seconds West for a distance of 66.60 feet to an unmarked point; THENCE North 78 degrees 03 minutes 08 seconds West for a distance of 88.70 feet to an unmarked point; THENCE South 78 degrees 12 minutes 24 seconds West for a distance of 35.23 feet to an unmarked point; THENCE South 33 degrees 20 minutes 17 seconds West for a distance of 42.16 feet to an unmarked point; THENCE South 13 degrees 12 minutes 20 seconds West for a distance of 28.29 feet to an unmarked point; THENCE South 02 degrees 10 minutes 56 seconds West for a distance of 24.16 feet to an unmarked point; THENCE South 61 degrees 35 minutes

50 seconds West for a distance of 33.99 feet to an unmarked point; THENCE North 48 degrees 19 minutes 59 seconds West for a distance of 56.45 feet to an unmarked point; THENCE South 58 degrees 14 minutes 01 seconds West for a distance of 35.42 feet to an unmarked point; THENCE South 70 degrees 28 minutes 11 seconds West for a distance of 42.51 feet to an unmarked point; THENCE South 80 degrees 23 minutes 10 seconds West for a distance of 43.31 feet to an unmarked point; THENCE North 84 degrees 34 minutes 50 seconds West for a distance of 39.97 feet to an unmarked point; THENCE North 30 degrees 30 minutes 52 seconds West for a distance of 19.66 feet to an unmarked point; THENCE North 80 degrees 44 minutes 57 seconds West for a distance of 36.14 feet to an unmarked point; THENCE South 78 degrees 48 minutes 07 seconds West for a distance of 41.40 feet to an unmarked point; THENCE North 46 degrees 37 minutes 19 seconds West for a distance of 22.11 feet to an unmarked point; THENCE North 13 degrees 40 minutes 59 seconds East for a distance of 11.19 feet to an unmarked point; THENCE North 74 degrees 28 minutes 29 seconds West for a distance of 25.37 feet to an unmarked point; THENCE North 14 degrees 23 minutes 18 seconds West for a distance of 9.89 feet to an unmarked point; THENCE North 65 degrees 49 minutes 43 seconds East for a distance of 27.01 feet to an unmarked point; THENCE North 06 degrees 36 minutes 45 seconds West for a distance of 14.58 feet to an unmarked point in the Southern line of the Ray and Hattie Bridges property as described in Deed book 1386 Page 189 of the Cleveland County Registry; THENCE with the Southern line of the Bridges Property North 59 degrees 27 minutes 07 seconds East for a distance of 82.12 feet to a No.5 rebar set with a cap stamped Conservation Easement and passing over a No.5 rod at 19.83 feet; THENCE leaving the Bridges line and creating two new lines through the Royster Turkey Farm property North 78 degrees 14 minutes 36 seconds East for a distance of 380.59 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 78 degrees 28 minutes 10 seconds East for a distance of 587.75 feet to the point of BEGINNING.
Containing 2.84 acres more or less.

Traet 3

BEGINNING at a 1.5" pipe said corner being the Southern most corner of the Hamilton and Joan Eaker property as described in Deed book 15-T Page 51 of the Cleveland County Registry and also being the Northwestern corner of the Patricia Whitaker property as described in Deed Book 12-C Page 315 of the Cleveland County Registry and running with the Eaker property line North 07 degrees 08 minutes 29 seconds West for a distance of 68.08 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Eaker line and creating five new lines through the Royster Turkey Farm Property as described in Deed Book 1180 Page 113 of the Cleveland County Registry South 69 degrees 02 minutes 56 seconds West for a distance of 341.30 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 19 degrees 23 minutes 44 seconds West for a distance of 433.43 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 79 degrees 52 minutes 00 seconds East for a distance of 166.52 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 20 degrees 45 minutes 18 seconds East for a distance of 387.36 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 70 degrees 18 minutes 22 seconds East for a distance of 189.32 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Western line of the Whitaker property; THENCE with the Whitaker line North 07 degrees 06 minutes 40 seconds West for a distance of 67.11 feet to the point of BEGINNING.
Containing 2.38 acres more or less.

Book 1585 Page 306

Tract 4

Commencing on a large nail in the intersection of Stick Elliott Road and Fletcher Road and running South 23 degrees 34 minutes 33 seconds East for a distance of 621.29 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Eastern edge of the right-of-way of Stick Elliott Road said iron marking the point of BEGINNING; THENCE four new lines through the Royster Turkey Farm property as recorded in Deed Book 16-Z Page 522 of the Cleveland County Registry North 57 degrees 51 minutes 28 seconds East for a distance of 323.61 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 14 degrees 50 minutes 15 seconds East for a distance of 152.66 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 61 degrees 56 minutes 52 seconds West for a distance of 303.36 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Eastern edge of the right-of-way of Stick Elliott Road; THENCE with the edge of the right-of-way of Stick Elliott Road North 21 degrees 01 minutes 33 seconds West for a distance of 126.49 feet to the point of BEGINNING.
Containing 0.98 acres more or less.

Tract 5

Commencing on the terminus of the first call of Tract 4 and running North 57 degrees 51 minutes 28 seconds East for a distance of 31.42 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE fourteen new lines through the Royster Turkey Farm property North 57 degrees 51 minutes 28 seconds East for a distance of 109.84 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 25 degrees 25 minutes 42 seconds East for a distance of 351.32 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 32 degrees 02 minutes 04 seconds East for a distance of 420.90 feet to a No.5 rebar set with a cap stamped Conservation Easement; ; THENCE North 04 degrees 08 minutes 22 seconds West for a distance of 102.38 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 58 degrees 26 minutes 25 seconds West for a distance of 581.60 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 33 degrees 04 minutes 28 seconds East for a distance of 158.03 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 58 degrees 03 minutes 07 seconds East for a distance of 678.88 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 73 degrees 20 minutes 29 seconds East for a distance of 270.76 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 38 degrees 00 minutes 24 seconds West for a distance of 185.22 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 85 degrees 21 minutes 11 seconds West for a distance of 137.89 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 36 degrees 31 minutes 22 seconds West for a distance of 432.75 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 18 degrees 21 minutes 21 seconds West for a distance of 412.43 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 61 degrees 56 minutes 52 seconds West for a distance of 234.83 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 14 degrees 50 minutes 15 seconds West for a distance of 154.97 feet to the point of BEGINNING.
Containing 7.08 acres more or less.

Tract 6

Combined with Tract 5

Tract 7

Commencing on the terminus of the third call of Tract 6 and running North 58 degrees 26 minutes 25 seconds West for a distance of 30.01 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE seven new lines through the Royster Turkey Farm property North 58 degrees 26 minutes 25 seconds West for a distance of 89.66 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 06 degrees 30 minutes 55 seconds East for a distance of 194.20 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 78 degrees 21 minutes 38 seconds West for a distance of 484.23 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Eastern edge of the right-of-way of Stick Elliott Road; THENCE with the eastern edge of Stick Elliott Road North 00 degrees 13 minutes 53 seconds East for a distance of 237.18 feet to a No.5 rebar set with a cap stamped Conservation Easement in the edge of the right-of-way of Stick Elliott Road; THENCE leaving the right-of-way and running South 72 degrees 40 minutes 18 seconds East for a distance of 647.41 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 00 degrees 55 minutes 03 seconds West for a distance of 249.35 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 33 degrees 04 minutes 28 seconds West for a distance of 158.23 feet to the point of BEGINNING. Containing 3.53 acres more or less.

Tract 8

Commencing on the terminus of the sixth call of tract 6 and running South 73 degrees 20 minutes 29 seconds East for a distance of 32.21 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE sixteen new lines through the Royster Turkey Farm property South 73 degrees 20 minutes 29 seconds East for a distance of 59.09 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 78 degrees 40 minutes 58 seconds East for a distance of 275.85 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 06 degrees 45 minutes 06 seconds West for a distance of 474.00 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 72 degrees 20 minutes 47 seconds East for a distance of 149.29 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 04 degrees 13 minutes 52 seconds East for a distance of 305.53 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 26 degrees 51 minutes 11 seconds East for a distance of 161.88 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 66 degrees 55 minutes 24 seconds East for a distance of 176.20 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Northern edge of the right-of-way of Royster Farm Road; THENCE with the Northern edge of Royster Farm Road for the next five calls, running along a curve to the right and having a radius of 1043.74 feet and an arc length of 217.41 feet, being subtended by a chord of South 34 degrees 28 minutes 55 seconds West for a distance of 217.02 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE running along a curve to the right and having a radius of 154.04 feet and an arc length of 138.98 feet, being subtended by a chord of South 66 degrees 17 minutes 52 seconds West for a distance of 134.32 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE running along a curve to the left and having a radius of 788.57 feet and an arc length of 156.00 feet, being subtended by a chord of South 86 degrees 28 minutes 43 seconds West for a distance of 155.74 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 80 degrees 48 minutes 42 seconds West for a distance of 86.39 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE running along a curve to the left and having a radius of 233.73 feet and an arc length of 190.28 feet, being subtended by a chord of South 57 degrees

29 minutes 20 seconds West for a distance of 185.07 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the edge of Royster Farm Road North 75 degrees 11 minutes 34 seconds West for a distance of 166.73 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 20 degrees 51 minutes 36 seconds East for a distance of 145.72 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 85 degrees 21 minutes 11 seconds West for a distance of 28.63 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 38 degrees 00 minutes 24 seconds East for a distance of 177.20 feet to the point of BEGINNING.
Containing 5.71 acres more or less.

Tract 9

Commencing on the terminus of the third call of tract 8 and running North 06 degrees 45 minutes 06 seconds West for a distance of 30.55 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE thirty new lines through the Royster Turkey farm property North 06 degrees 45 minutes 06 seconds West for a distance of 236.99 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 32 degrees 26 minutes 41 seconds West for a distance of 409.14 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 69 degrees 12 minutes 18 seconds West for a distance of 422.14 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 45 degrees 52 minutes 28 seconds West for a distance of 99.52 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 32 degrees 59 minutes 26 seconds East for a distance of 161.99 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 47 degrees 21 minutes 06 seconds East for a distance of 53.20 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 68 degrees 41 minutes 46 seconds East for a distance of 224.30 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 03 degrees 06 minutes 30 seconds West for a distance of 370.05 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 05 degrees 55 minutes 16 seconds East for a distance of 202.36 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 60 degrees 24 minutes 37 seconds West for a distance 318.62 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 36 degrees 27 minutes 01 seconds East for a distance of 138.79 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 58 degrees 56 minutes 09 seconds East for a distance of 234.95 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 10 degrees 14 minutes 41 seconds East for a distance of 392.68 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 02 degrees 20 minutes 19 seconds East for a distance 310.68 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 68 degrees 02 minutes 06 seconds East for a distance of 160.34 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 05 degrees 01 minutes 28 seconds East for a distance of 167.89 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 84 degrees 33 minutes 34 seconds East for a distance of 61.95 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 04 degrees 16 minutes 42 seconds East for a distance of 121.73 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 85 degrees 31 minutes 56 seconds West for a distance of 38.01 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 15 degrees 54 minutes 14 seconds West for a distance of 544.41 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 11 degrees 36 minutes 28 seconds East for a distance of 122.26 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 11 degrees 38 minutes 32 seconds West for a distance of 223.44 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 08 degrees 28 minutes 37 seconds

East for a distance of 261.38 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 52 degrees 11 minutes 05 seconds East for a distance of 242.49 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 39 degrees 41 minutes 17 seconds East for a distance of 101.34 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 53 degrees 26 minutes 31 seconds East for a distance of 139.76 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 39 degrees 30 minutes 32 seconds West for a distance of 202.46 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 32 degrees 00 minutes 42 seconds East for a distance of 206.89 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 04 degrees 13 minutes 52 seconds East for a distance of 219.61 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 72 degrees 20 minutes 47 seconds West for a distance of 150.67 feet to the point of BEGINNING.
Containing 10.93 acres more or less.

Tract 10

Commencing on the terminus of the fourth call of Tract 9 and running North 45 degrees 52 minutes 28 seconds West for a distance of 30.58 feet to a No.5 rebar set with a cap stamped Conservation Easement and said iron marking the point of BEGINNING; THENCE four new lines through the Royster Turkey Farm property North 45 degrees 52 minutes 28 seconds West for a distance of 475.92 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 58 degrees 30 minutes 47 seconds East for a distance of 152.44 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 47 degrees 21 minutes 06 seconds East for a distance of 407.05 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 32 degrees 59 minutes 26 seconds West for a distance of 161.19 feet to the point of BEGINNING.
Containing 1.55 acres more or less.

Tract 11

Commencing on the fourteenth call of Tract 9 and running North 02 degrees 20 minutes 19 seconds East for a distance of 30.00 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE two new lines through the Royster Turkey Farm property North 02 degrees 20 minutes 19 seconds East for a distance of 78.71 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 07 degrees 07 minutes 16 seconds West for a distance of 378.38 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron being in the Southern line of the Harold Bumgardner property as described in Deed Book 1441 Page 1607 of the Cleveland County Registry; THENCE with the southern line of the Bumgardner property North 88 degrees 59 minutes 34 seconds East for a distance of 153.67 feet to a steel fence post said iron being a common corner of the Bumgardner property and the Royster Turkey Farm property; THENCE leaving the Bumgardner line and creating two new lines through the Royster Turkey Farm property South 05 degrees 01 minutes 28 seconds East for a distance of 398.44 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 67 degrees 32 minutes 20 seconds west for a distance of 156.74 feet to the point of BEGINNING.
Containing 1.43 acres more or less.

Tract 12

Commencing on the terminus of the seventeenth call of Tract 9 and running North 84 degrees 33 minutes 34 seconds East for a distance of 30.01 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE a new line through the Royster Turkey Farm property North 84 degrees 33 minutes 34 seconds East for a

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distance of 247.77 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Southern line of the Harold Bumgardner property as described in Deed Book 1441 Page 1607 of the Cleveland County Registry; THENCE with the Bumgardner line South 34 degrees 47 minutes 43 seconds East for a distance of 107.66 feet to a steel fence post said iron being a common corner of the Royster Turkey Farm property and the Bumgardner property and the Jerry and Donna Silver property as described in Deed Book 1524 Page 1134 of the Cleveland County Registry; THENCE with the Silver property South 06 degrees 32 minutes 23 seconds East for a distance of 33.55 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Silver property and creating two new lines through the Royster Turkey Farm property South 85 degrees 31 minutes 56 seconds West for a distance of 303.71 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 04 degrees 16 minutes 42 seconds West for a distance of 122.24 feet to the point of BEGINNING.
Containing 0.81 acres more or less.

Tract 13

Commencing on the terminus of the twenty-fifth call of Tract 9 and running North 39 degrees 41 minutes 17 seconds East for a distance of 30.05 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE two new lines through the Royster Turkey Farm property North 39 degrees 41 minutes 17 seconds East for a distance of 137.36 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 47 degrees 25 minutes 45 seconds East for a distance of 323.92 feet to a tall No.5 rebar said iron being the Northwestern corner of the Amy Lutz property as described in Deed Book 1143 Page 1345 of the Cleveland County Registry; THENCE with the Lutz property South 06 degrees 32 minutes 23 seconds East for a distance of 229.32 feet to a steel fence post said iron being the Southwestern corner of the Lutz property; THENCE three new lines through the Royster Turkey Farm property South 61 degrees 29 minutes 54 seconds West for a distance of 188.75 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 39 degrees 30 minutes 32 seconds West for a distance of 116.79 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 53 degrees 27 minutes 12 seconds West for a distance of 139.67 feet to the point of BEGINNING
Containing 1.39 acres more or less.

Tract 14

BEGINNING at a No.5 rebar set with a cap stamped Conservation Easement in the Southern edge of the right-of-way of Royster Farm Road and running along the Southern edge of mention right-of-way North 31 degrees 20 minutes 12 seconds East for a distance of 165.85 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Southern edge of the right-of-way of Royster Farm Road; THENCE leaving the right-of-way and creating three new lines through the Royster Turkey Farm property South 55 degrees 12 minutes 16 seconds East for a distance of 141.28 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 42 degrees 30 minutes 59 seconds West for a distance of 163.30 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 57 degrees 09 minutes 39 seconds West for a distance of 109.40 feet to the point of BEGINNING.
Containing 0.47 acres more or less.

Tract 15

Commencing on the terminus of the second call of Tract 14 and running South 55 degrees 12 minutes 17 seconds East for a distance of 30.27 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE nineteen new lines through the Royster Turkey Farm property South 55 degrees 12 minutes 16 seconds East for a distance of 86.28 feet to a No.5 rebar set with a cap stamped Conservation Easement;

THENCE North 70 degrees 19 minutes 22 seconds East for a distance of 252.30 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 01 degrees 40 minutes 32 seconds West for a distance of 235.84 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 04 degrees 18 minutes 21 seconds East for a distance of 522.89 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 68 degrees 51 minutes 21 seconds East for a distance of 204.72 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 04 degrees 37 minutes 30 seconds West for a distance of 838.31 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 78 degrees 35 minutes 57 seconds East for a distance of 392.62 feet to an unmarked point; THENCE North 89 degrees 38 minutes 48 seconds East for a distance of 306.34 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 22 degrees 12 minutes 28 seconds West for a distance of 165.72 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 87 degrees 35 minutes 14 seconds West for a distance of 107.70 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 87 degrees 41 minutes 25 seconds West for a distance of 349.10 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 65 degrees 43 minutes 07 seconds West for a distance of 442.03 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 49 degrees 30 minutes 43 seconds West for a distance of 86.97 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 31 degrees 15 minutes 30 seconds East for a distance of 35.33 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 49 degrees 25 minutes 30 seconds West for a distance of 158.45 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 38 degrees 13 minutes 43 seconds West for a distance of 81.76 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 11 degrees 58 minutes 31 seconds West for a distance of 94.90 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 57 degrees 09 minutes 35 seconds West for a distance of 124.44 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 42 degrees 30 minutes 59 seconds East for a distance of 162.25 to the point of BEGINNING.

Containing 8.43 acres more or less.

Tract 16

Commencing on the terminus of the fourth call of Tract 15 and running North 04 degrees 18 minutes 21 seconds East for a distance of 31.34 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE three new lines through the Royster Turkey Farm property North 04 degrees 18 minutes 21 seconds East for a distance of 272.93 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Southeastern edge of the right-of-way of Royster Farm Road; THENCE with the edge of the right-of-way North 26 degrees 59 minutes 22 seconds East for a distance of 190.79 feet to a No.5 rebar set with a cap stamped Conservation Easement in the edge of the right-of-way; THENCE leaving the right-of-way South 67 degrees 12 minutes 05 seconds East for a distance of 2.77 feet to a number 5 rebar with a cap stamped Conservation Easement set in the Western line of the Linda Marie Scott Property as recorded in deed book 1104 at page 2106 of the Cleveland County Registry and in the line of the Royster Turkey Farm property; Thence with two common lines of the Royster Turkey Farm and the Scott property South 05 degrees 51 minutes 09 seconds West for a distance of 135.19 feet to an angle iron; THENCE South 66 degrees 12 minutes 18 seconds East for a distance of 133.04 feet to a 0.5" pipe found; THENCE two new lines though the Royster Turkey Farm property South 04 degree 37 minutes 30 seconds West for a distance of 327.93 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 68

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degrees 51 minutes 21 seconds West for a distance of 204.90 feet to the point of BEGINNING. Containing 1.57 acres more or less.

Tract 17

Commencing on the terminus of the eighth call of Tract 15 and running North 89 degrees 38 minutes 48 seconds East for a distance of 32.49 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE two new lines through the Royster Turkey Farm property North 89 degrees 38 minutes 48 seconds East for a distance of 74.06 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 00 degrees 26 minutes 22 seconds West for a distance of 308.14 feet to a bent No.5 rebar said iron being a common corner of Royster Turkey Farm property and the Martha Carroll property as described in Deed Book 1203 Page 213 of the Cleveland County Registry; THENCE with the Carroll property for the next three calls South 46 degrees 35 minutes 04 seconds East for a distance of 49.49 feet to a 1.5" pipe; THENCE South 27 degrees 13 minutes 16 seconds East for a distance of 749.35 feet to a No.5 rebar; THENCE South 11 degrees 41 minutes 29 seconds East for a distance of 290.15 feet to an unmarked point in the creek said point being a common corner of the Carroll property and the Jonathan and Amy Rowland property as described in Deed Book 1279 Page 1091 of the Cleveland County Registry and passing over an iron at 189.48 feet; THENCE with the Rowland property South 38 degrees 09 minutes 44 seconds West for a distance of 87.28 feet to a No.5 rebar set with a cap stamped Conservation Easement and passing over a No.4 rebar at 55.49 feet; THENCE leaving the Rowland property line and creating three new lines through the Royster Turkey Farm property North 33 degrees 10 minutes 43 seconds West for a distance of 714.06 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 87 degrees 35 minutes 14 seconds West for a distance of 126.78 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 22 degrees 12 minutes 28 seconds East for a distance of 164.45 to the point of BEGINNING. Containing 4.26 acres more or less.

Tract 18

Commencing on the terminus of the fourteenth call of Tract 15 and running South 31 degrees 15 minutes 30 seconds East for a distance of 32.10 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE South 31 degrees 15 minutes 30 seconds East for a distance of 521.58 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 32 degrees 32 minutes 06 seconds West for a distance of 538.69 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Northern line of the David Palmer property as described in Deed Book 1508 Page 744 of the Cleveland County Registry; THENCE with the Palmer property for the next three calls North 51 degrees 51 minutes 22 seconds West for a distance of 219.93 feet to an unmarked point in the creek and passing over an iron at 143.84 feet; THENCE with the creek for the next two calls South 54 degrees 20 minutes 19 seconds West for a distance of 54.00 feet to an unmarked point; THENCE South 85 degrees 26 minutes 28 seconds West for a distance of 67.92 feet to an unmarked point; THENCE leaving the creek and creating five new lines through the Royster Turkey Farm property North 47 degrees 19 minutes 08 seconds East for a distance of 485.82 feet to a No.5 rebar set with a cap stamped Conservation Easement and passing over a No.5 rebar set with a cap at 106.28 feet; THENCE North 39 degrees 43 minutes 10 seconds West for a distance of 192.46 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 15 degrees 45 minutes 15 seconds East for a distance of 124.14 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 38 degrees 13 minutes 43 seconds West for a distance of 131.95 feet to a No.5 rebar set with a cap stamped Conservation Easement;

THENCE North 49 degrees 25 minutes 30 seconds East for a distance of 154.55 feet to the point of BEGINNING.
Containing 4.27 acres more or less.

Tract 19

BEGINNING at an unmarked point in a ditch in the western line of Lot 12 of Plat Book 20 Page 199 of the Cleveland County Registry and running with the western line of lot 12 North 17 degrees 00 minutes 51 seconds West for a distance of 89.61 feet to an unmarked point in the creek and passing over a 0.75" pipe at 49.81 feet; THENCE with the creek for the next seven calls South 79 degrees 34 minutes 32 seconds West for a distance of 57.87 feet to an unmarked point; THENCE North 29 degrees 43 minutes 25 seconds West for a distance of 43.04 feet to an unmarked point; THENCE North 45 degrees 43 minutes 23 seconds West for a distance of 55.09 feet to an unmarked point; THENCE North 55 degrees 31 minutes 48 seconds East for a distance of 33.31 feet to an unmarked point; THENCE South 61 degrees 15 minutes 57 seconds East for a distance of 39.84 feet to an unmarked point; THENCE North 67 degrees 10 minutes 58 seconds East for a distance of 21.96 feet to an unmarked point; THENCE North 31 degrees 54 minutes 29 seconds West for a distance of 59.62 feet to an unmarked point; THENCE leaving the creek and creating three new lines through the Royster Turkey Farm Property South 69 degrees 38 minutes 44 seconds East for a distance of 501.89 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 04 degrees 34 minutes 43 seconds East for a distance of 171.80 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 70 degrees 51 minutes 04 seconds West for a distance of 414.42 feet to the point of BEGINNING and passing over a No.5 rebar set with a cap at 394.07 feet.
Containing 1.79 acres more or less.

Tract 20

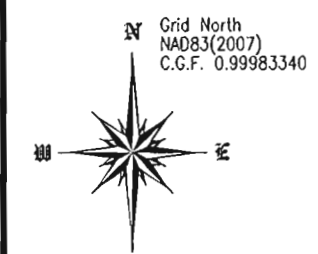
Commencing on the terminus of the ninth call of Tract 19 and running South 69 degrees 38 minutes 44 seconds East for a distance of 33.08 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE ten new lines through the Royster Turkey Farm South 69 degrees 38 minutes 44 seconds East for a distance of 25.83 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 74 degrees 40 minutes 40 seconds East for a distance of 427.64 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Western edge of the right-of-way of Stick Elliott Road; THENCE with the right-of-way South 12 degrees 15 minutes 58 seconds East for a distance of 268.51 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Western edge of the right-of-way of Stick Elliott Road South 04 degrees 44 minutes 27 seconds West for a distance of 674.49 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 35 degrees 30 minutes 00 seconds West for a distance of 104.51 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 65 degrees 53 minutes 06 seconds West for a distance of 192.19 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 35 degrees 08 minutes 45 seconds East for a distance of 83.90 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 08 degrees 34 minutes 30 seconds East for a distance of 580.28 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 84 degrees 21 minutes 34 seconds West for a distance of 325.21 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 04 degrees 34 minutes 43 seconds West for a distance of 163.26 feet to the point of BEGINNING.
Containing 5.30 acres more or less.

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Tract 21

Commencing on the terminus of the fifth call of Tract 20 and running South 35 degrees 30 minutes 00 seconds West for a distance of 30.60 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE a new line South 35 degrees 30 minutes 00 seconds West for a distance of 327.05 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Northern line of the Edwin and Jane Harrill property as described in Deed Book 1415 Page 2030 of the Cleveland County Registry; THENCE with the Harrill property line North 69 degrees 26 minutes 28 seconds West for a distance of 192.64 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Harrill property line and creating two new lines North 35 degrees 08 minutes 45 seconds East for a distance of 338.83 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 65 degrees 53 minutes 06 seconds East for a distance of 192.00 feet to the point of BEGINNING.

Containing 1.43 acres more or less.



HAMILTON EAKER
JOAN H EAKER
Bk. 151 Pg. 051
3287-1-6U

Bk 33 Pg 143
RECORDING FEE \$ **21.00**
See Pg. 33 Page 73
For Access Point

I, D. Dobbins Lattimore certify one of the following as marked

- a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;
- b. that the survey is located in such portion of a county or a municipality that is unregulated as to an ordinance that regulates parcels of land;
- c. that the survey is of an existing parcel or parcels of land;
- d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;
- e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (a) through (d) above.

Detail of Alum. Cap
State of North Carolina
Conservation Easement

CANDICE APRIL POWELL
Bk. 00E Pg. 136
Bk. 1212 Pg. 691
3287-1-59

ROYSTER TURKEY FARM
Bk. 1180 Pg. 113
3287-1-68U

PATRICIA G. WHITAKER
Bk. 12,C Pg. 315
3287-1-14

JOHN BOWMAN
GLORIA BOWMAN
Bk. 1189 Pg. 1399
3287-1-9

477.97 AC. total acreage Royster Turkey Farm
- 68.49 AC. conservation easement acreage
409.48 AC. remaining acreage
Access easement containing 0.44 acres not included in conservation easement acreage

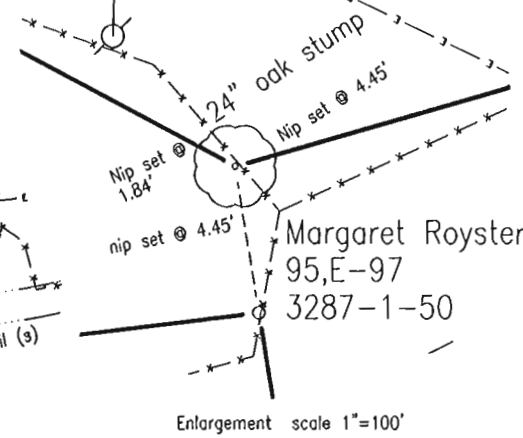
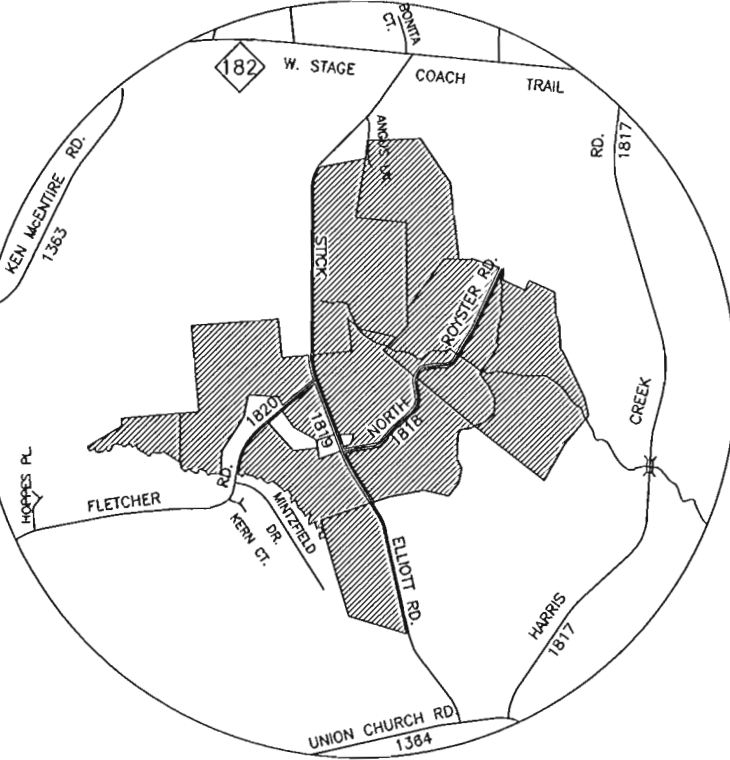
STEVE E MCINTYRE
WANDA MCINTYRE
Bk. 12,Q Pg. 303
3287-1-12

RODNEY H. POWELL
Bk. 1113 Pg. 516
3287-1-10

ROYSTER TURKEY FARM
Bk. 1180 Pg. 113
3287-1-68U

EDWIN S. ROYSTER
Bk. 1561 Pg. 746
3287-1-60

ROYSTER TURKEY FARM
Bk. 16Z Pg. 522 PARCEL 6
3287-1-13UL



Bk 33 Pg 143

FINAL PLAT

Filed in CLEVELAND County, NC
on Sep 18 2009 at 09:40:37 PM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 33 Page 143

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-AB
EEP SITE ID NUMBER: 739
NAME OF PROJECT: BIG HARRIS CREEK
CURRENT OWNER: Royster Turkey Farm, Inc

SHEET 1 OF 5
SEE SHEET 5 FOR CALL TABLES

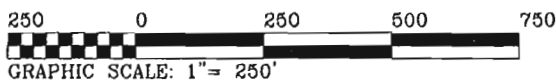
OWNER CONTACT INFO:
Owner: Royster Turkey Farm, Inc.
Contact person: Edwin Royster

Deed Ref: 16,Z-522
Tax Map Ref: 3287-1-13
Township: No.8
County: Cleveland
State: North Carolina
Plat Prepared: 8/1/2009
Scale 1" = 250'
Dates of Field Survey 2008-2009

- GENERAL NOTES
- NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
 - PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
 - UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
 - NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
 - INC DOT R/W'S ARE APPROXIMATE UNLESS OTHERWISE NOTED.
 - ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
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 - IF THIS MAP DOES NOT HAVE AN ORIGINAL SIGNATURE IT IS NOT VALID.
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We hereby certify that we are the owners of the property shown and described herein and that we hereby adopt this Conservation Easement for the Ecosystem Enhancement Program.

9-16-09 *Edwin S Royster*
Date Royster Turkey Farm, INC.
Edwin S. Royster, President



Call Table Legend
L-xxx represents short calls along property boundary
R-xxx represents short calls along Conservation easements
C-xxx represents curve calls
T-xxx represents calls along crossing through the conservation easements

LEGEND	
-x-x-	FENCE LINE
-c-c-	ELECTRIC LINE
-bc-bc-	BURIED ELECTRIC LINE
-w-w-	WATER LINE
-g-g-	GAS LINE
-ss-ss-	SAN SEWER LINE
-t-t-	TELEPHONE LINE
○	HYDRANT
⊠	GAS METER
⊞	WATER METER
⊞	POWER POLE
⊞	TELEPHONE BOX
○	NEW IRON PIN (NIP)
●	EXISTING IRON PIN (EIP)
+	UNMONUMENTED POINT
•	MAGNAIL
⊠	CONCRETE MONUMENT
△	R.R. SPIKE SET
▲	R.R. SPIKE FOUND
()	FOUND
(s)	SET
■	STONE
⊙	TREE
⊙	WELL

State of North Carolina
County of Cleveland
I, *RONALD JORDAN* Review Officer of
Cleveland County certify that the map or plat to which this certification is affixed meets all statutory requirements for recording.
Ronald Jordan 09-16-09 Date
Review Officer



Certificate of Survey and Accuracy

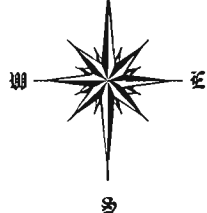
I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in see plat; that the boundaries not surveyed are clearly indicated as drawn from information found in see plat; that the ratio of precision as calculated is 1:12,000+; that this plat was prepared in accordance with G.S.47-30 as amended. Witness my original signature, registration number and seal this 15th day of September 2009.

D. Dobbins Lattimore
License Number L-3336 Surveyor

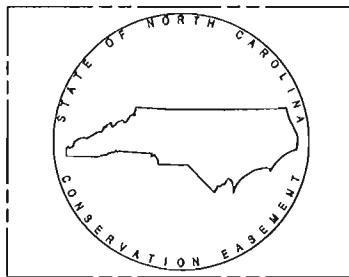


LATTIMORE & PEELER SURVEYING
103 LONDON ROAD (704) 538-3443 D.F. # rtfarm2009
LAWDALE, NORTH CAROLINA 28090 C.F. # RTFARM2007
DRAWING # 08-157B

Grid North
NAD83(2007)
C.G.F. 0.99983340



State of North Carolina
County of Cleveland
RONALD JORDAN Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.
Ronald Jordan 09-16-09
Review Officer Date



Detail of Alum. Cop
State of North Carolina
Conservation Easement

JO ELLEN S. CORNWELL
Bk. 18,X Pg. 455
3287-1-52U

ELLIOTT'S MEMORIAL CHURCH
C/O ANDY MEADE JR
Bk. 7B Pg. 352
3287-1-16

GENERAL NOTES
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Filed in CLEVELAND County, NC
on Sep 18 2009 at 03:41:36 PM
by **BONNIE E. REECE**
REGISTER OF DEEDS
Book 33 Page 144

FINAL PLAT

CONSERVATION EASEMENT SURVEY FOR THE STATE OF
NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION
ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

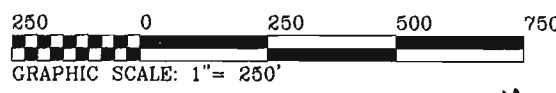
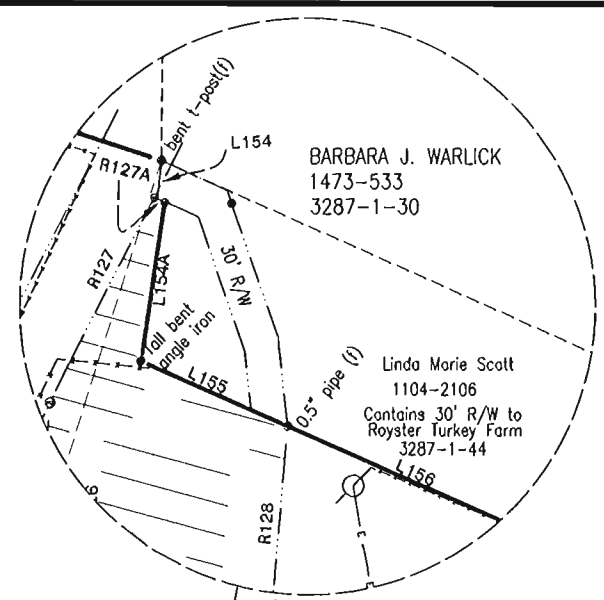
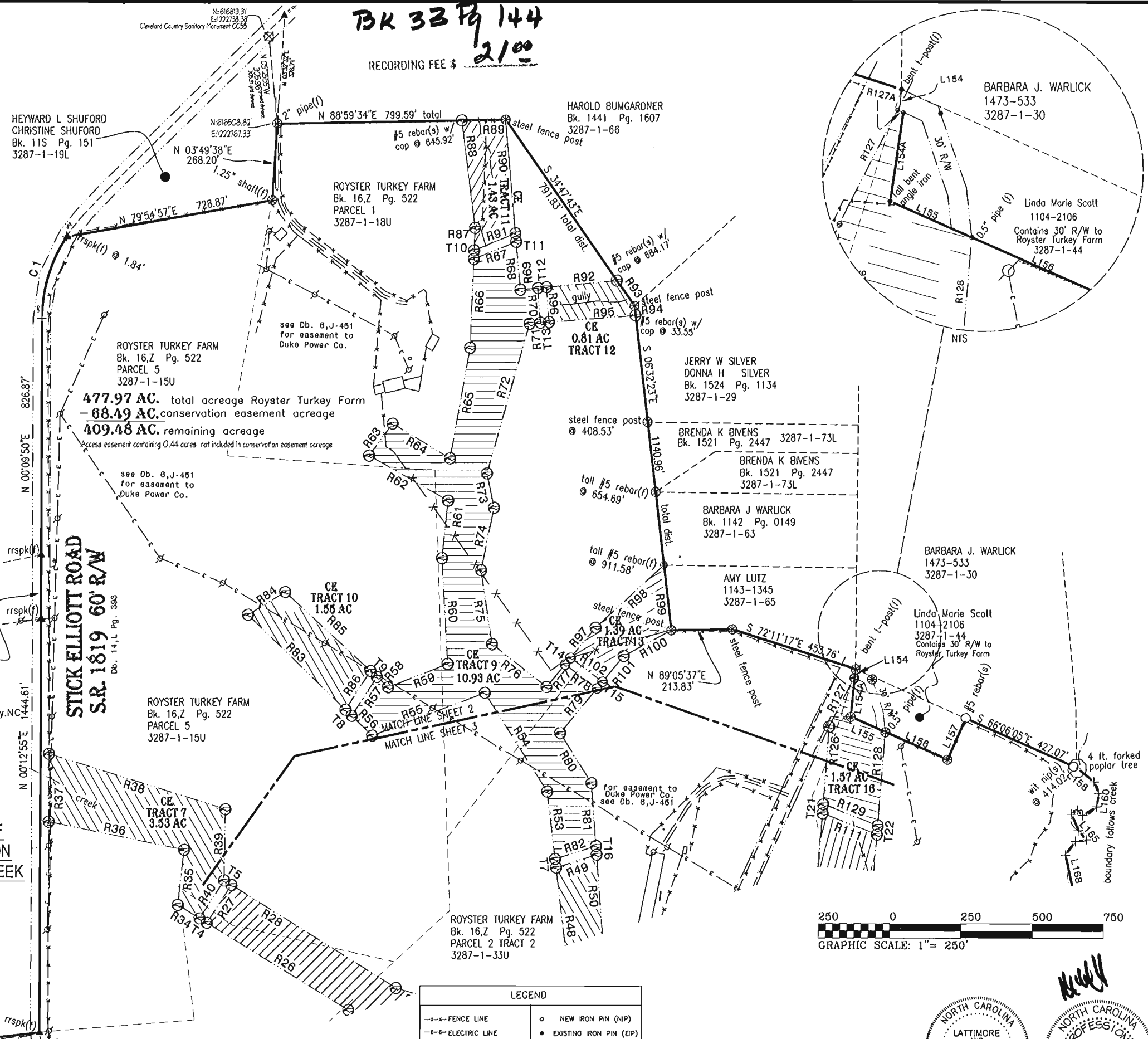
SPO FILE NUMBER: 023-AB
EEP SITE ID NUMBER: 739
NAME OF PROJECT: BIG HARRIS CREEK
CURRENT OWNER: Royster Turkey Farm, Inc
OWNER CONTACT INFO:
Owner: Royster Turkey Farm, Inc.
Contact person: Edwin Royster

Deed Ref: 16,Z-522
Tax Map Ref: 3287-1-13
Township: No.8
County: Cleveland
State: North Carolina
Plat Prepared: 8/1/2009
Scale 1" = 250'
Dates of Field Survey 2008-2009

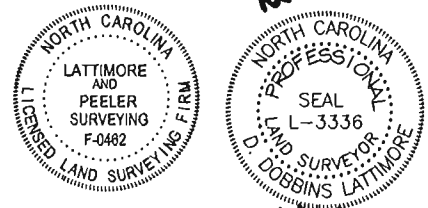
SHEET 2 OF 5
SEE SHEET 5 FOR CALL TABLES

Call Table Legend
L-xxx represents short calls along
property boundary
R-xxx represents short calls along
Conservation easements
C-xxx represents curve calls
T-xxx represents calls along crossing
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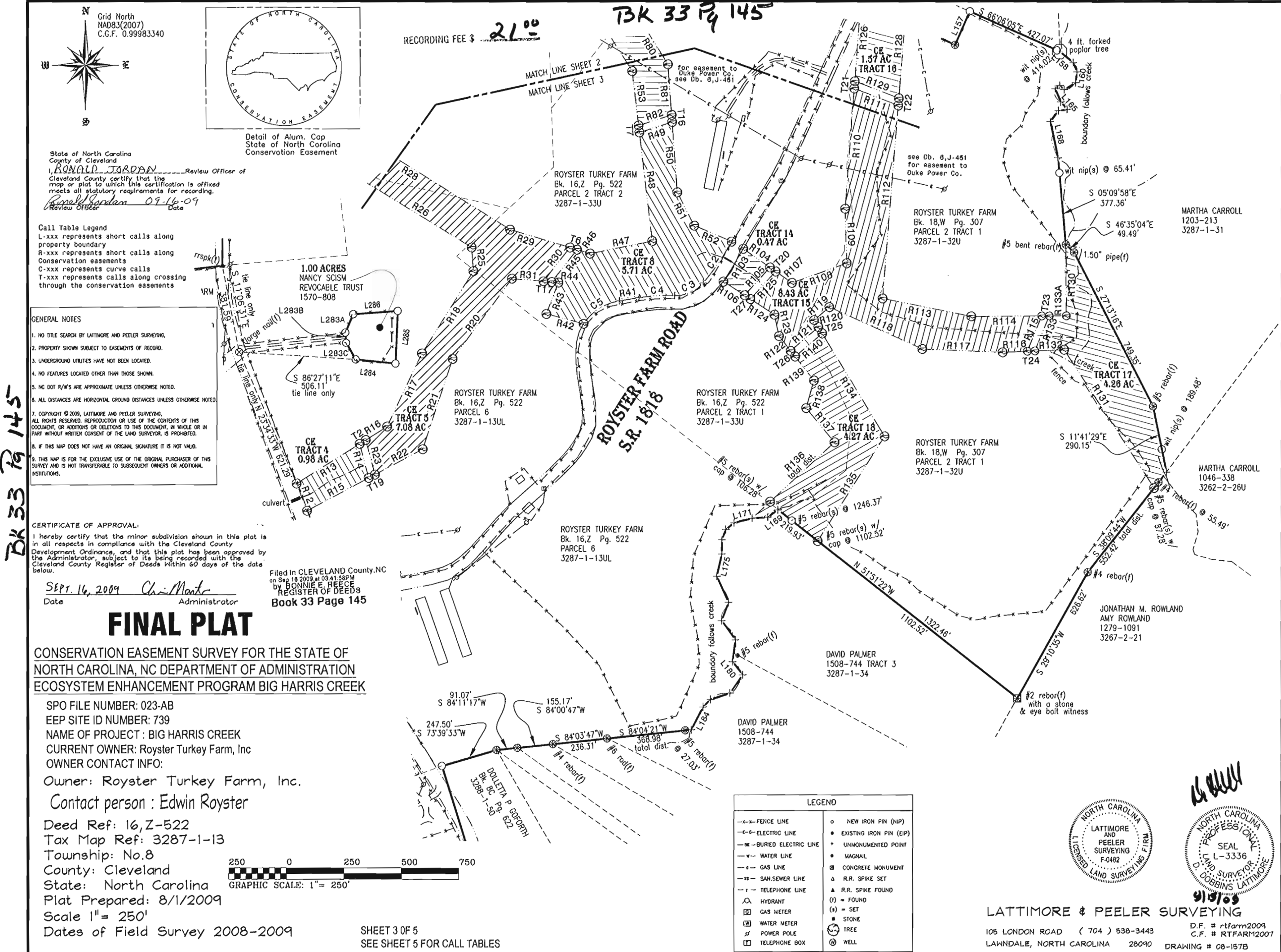
BK 33 Pg 144
RECORDING FEE \$ **21.00**



LEGEND	
-x-x- FENCE LINE	o NEW IRON PIN (NIP)
-e-e- ELECTRIC LINE	• EXISTING IRON PIN (EIP)
-w-w- BURIED ELECTRIC LINE	+ UNMONUMENTED POINT
-g-g- GAS LINE	• MAGNAIL
-s-s- SAN SEWER LINE	⊠ CONCRETE MONUMENT
-t-t- TELEPHONE LINE	Δ R.R. SPIKE SET
○ HYDRANT	▲ R.R. SPIKE FOUND
⊠ GAS METER	(f) = FOUND
⊠ WATER METER	(s) = SET
⊠ POWER POLE	■ STONE
⊠ TELEPHONE BOX	⊙ TREE
	⊙ WELL



LATTIMORE & PEELER SURVEYING
106 LONDON ROAD (704) 538-3443 D.F. # rtfarm2009
LAWDALE, NORTH CAROLINA 28090 C.F. # RTFARM2007
DRAWING # 08-157B



Grid North
NAD83(2007)
C.G.F. 0.99983340



Detail of Alum. Cap
State of North Carolina
Conservation Easement

State of North Carolina
County of Cleveland
I, RONALD JORDAN Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.
Ronald Jordan 09-16-09
Review Officer Date

Call Table Legend
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GENERAL NOTES

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CERTIFICATE OF APPROVAL:

I hereby certify that the minor subdivision shown in this plat is in all respects in compliance with the Cleveland County Development Ordinance, and that this plat has been approved by the Administrator, subject to its being recorded with the Cleveland County Register of Deeds within 60 days of the date below.

SEPT. 16, 2009 Ch. Monte
Date Administrator

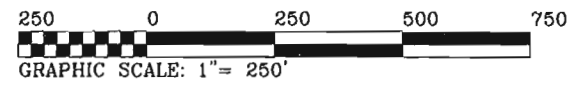
Filed in CLEVELAND County, NC
on Sep 16 2009 at 03:41:58 PM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 33 Page 145

FINAL PLAT

CONSERVATION EASEMENT SURVEY FOR THE STATE OF
NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION
ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-AB
EEP SITE ID NUMBER: 739
NAME OF PROJECT : BIG HARRIS CREEK
CURRENT OWNER: Royster Turkey Farm, Inc
OWNER CONTACT INFO:
Owner: Royster Turkey Farm, Inc.
Contact person : Edwin Royster

Deed Ref: 16,Z-522
Tax Map Ref: 3287-1-13
Township: No.8
County: Cleveland
State: North Carolina
Plat Prepared: 8/1/2009
Scale 1" = 250'
Dates of Field Survey 2008-2009



SHEET 3 OF 5
SEE SHEET 5 FOR CALL TABLES

LEGEND	
-x-x-	FENCE LINE
-e-e-	ELECTRIC LINE
-b-b-	BURIED ELECTRIC LINE
-w-w-	WATER LINE
-g-g-	GAS LINE
-s-s-	SAN/SEWER LINE
-t-t-	TELEPHONE LINE
○	HYDRANT
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⊞	WATER METER
⊡	POWER POLE
⊞	TELEPHONE BOX
○	NEW IRON PIN (NIP)
●	EXISTING IRON PIN (EIP)
•	UNMONUMENTED POINT
•	MAGNAIL
⊠	CONCRETE MONUMENT
▲	R.R. SPIKE SET
▲	R.R. SPIKE FOUND
(f)	FOUND
(s)	SET
⊞	STONE
⊞	TREE
⊞	WELL



LATTIMORE & PEELER SURVEYING
105 LONDON ROAD (704) 538-3443
LAWDALE, NORTH CAROLINA 28090
DRAWING # 08-157B
D.F. # rtfarm2009
C.F. # RTFARM2007



BK 33 Pg 146

RECORDING FEE \$ 21.00

ROYSER TURKEY FARM
Bk. 16Z Pg. 522
PARCEL 6
3287-1-13UL

ROYSER TURKEY FARM
Bk. 16Z Pg. 522
PARCEL 6
3287-1-13UL

DAVID PALMER
1508-744 TRACT 3
3287-1-34

DAVID PALMER
1508-744
3287-1-34

KIMBERLY ANN COSTNER
Bk. 1300 Pg. 0001
3288-1-121
PB. 22 PG. 14 LOT IV

ROGER KEITH COSTNER
Bk. 1441 Pg. 768
3288-1-122
PB. 22 PG. 14 LOT III

ROGER BRADLEY
WANDA BRADLEY
Bk. 1300 Pg. 7
Bk. 1281 Pg. 2057
3288-1-58 & 43

FRANCES R POWELL
Bk. 7X Pg. 411
3288-1-42

EDWIN R HARRILL JR
JANE H WINTER
Bk. 1415 Pg. 2030 Tract 2
3288-1-40

- ① PB. 20 PG. 199 LOT 1 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-85
- ② PB. 20 PG. 199 LOT 2 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-86
- ③ PB. 20 PG. 199 LOT 3 DANNY GOLD D.B. 1436 Pg. 151 3288-1-87L
- ④ PB. 20 PG. 199 LOT 4 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-88
- ⑤ PB. 20 PG. 199 LOT 5 HUGH RICHARD SHEHAN D.B. 1407 Pg. 82 3288-1-89L
- ⑥ PB. 20 PG. 199 LOT 6 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-90
- ⑦ PB. 20 PG. 199 LOT 7 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-91
- ⑧ PB. 20 PG. 199 LOT 8 LOYD BROWN JR D.B. 1414 Pg. 958 3288-1-92
- ⑨ PB. 20 PG. 199 LOT 9 LOYD BROWN JR D.B. 1335 Pg. 568 3288-1-93L
- ⑩ PB. 20 PG. 199 LOT 10 BRENDA DANIELL BROWN D.B. 1414 Pg. 1067 3288-1-94
- ⑪ PB. 20 PG. 199 LOT 11 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-95
- ⑫ PB. 20 PG. 199 LOT 12 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-96
- ⑬ P.B. 20 PG. 200 LOT 13 CRYSTAL FARMER GREGG D.B. 1437 Pg. 1254 3288-1-97L
- ⑭ P.B. 20 PG. 200 LOT 14 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-98
- ⑮ P.B. 20 PG. 200 LOT 15 COPPERFIELD OF NC INC D.B. 1450 Pg. 1321 3288-1-99
- ⑯ P.B. 20 PG. 200 LOT 16 COPPERFIELD OF NC INC D.B. 1450 Pg. 1321 3288-1-100
- ⑰ P.B. 20 PG. 200 LOT 17 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-101
- ⑱ P.B. 20 PG. 200 LOT 18 COPPERFIELD OF NC INC D.B. 1247 Pg. 1844 3288-1-102L
- ⑲ P.B. 20 PG. 200 LOT 19 REBECCA H HANEY CHRISTOPHER LEE HANEY Bk. 1491 Pg. 691 3288-1-103

State of North Carolina
County of Cleveland
I, RONALD JORDAN, Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.
Ronald Jordan 09-16-09
Review Officer Date

Filed in CLEVELAND County, NC
on Sep 19 2009 at 03:42:19PM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 33 Page 146

FINAL PLAT

CONSERVATION EASEMENT SURVEY FOR THE STATE OF
NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION
ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-AB
EEP SITE ID NUMBER: 739
NAME OF PROJECT: BIG HARRIS CREEK
CURRENT OWNER: Royster Turkey Farm, Inc
OWNER CONTACT INFO:
Owner: Royster Turkey Farm, Inc.
Contact person: Edwin Royster

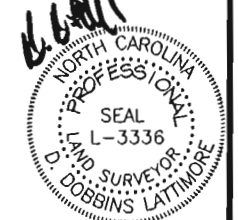
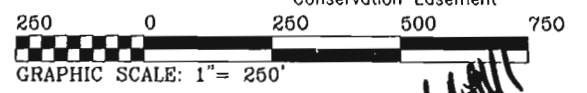
Deed Ref: 16,Z-522
Tax Map Ref: 3287-1-13
Township: No.8
County: Cleveland
State: North Carolina
Plat Prepared: 8/1/2009
Scale 1" = 250'
Dates of Field Survey 2008-2009

SHEET 4 OF 5
SEE SHEET 5 FOR CALL TABLES

Call Table Legend
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property boundary
R-xxx represents short calls along
Conservation easements
C-xxx represents curve calls
T-xxx represents calls along crossing
through the conservation easements

LEGEND	
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-be- BURIED ELECTRIC LINE	• UNMONUMENTED POINT
-w- WATER LINE	• MAGNAIL
-g- GAS LINE	■ CONCRETE MONUMENT
-ss- SAN-SEWER LINE	▲ R.R. SPIKE SET
-t- TELEPHONE LINE	▲ R.R. SPIKE FOUND
o HYDRANT	(f) = FOUND
o GAS METER	(s) = SET
o WATER METER	o STONE
o POWER POLE	o TREE
o TELEPHONE BOX	o WELL

GENERAL NOTES
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LATTIMORE & PEELER SURVEYING
105 LONDON ROAD (704) 538-3443 D.F. # rtfarm2009
LAWDALE, NORTH CAROLINA 28090 C.F. # RTFARM2007
DRAWING # 08-157B

BK 33 Pg 146



RECORDING FEE \$ 2100

TRACT 1 table with columns Course, Bearing, Distance

TRACT 2 table with columns Course, Bearing, Distance

TRACT 3 table with columns Course, Bearing, Distance

TRACT 4 table with columns Course, Bearing, Distance

TRACT 5 table with columns Course, Bearing, Distance

TRACT 6 table with columns Course, Bearing, Distance

TRACT 7 table with columns Course, Bearing, Distance

TRACT 8 table with columns Course, Bearing, Distance

TRACT 9 table with columns Course, Bearing, Distance

TRACT 10 table with columns Course, Bearing, Distance

TRACT 11 table with columns Course, Bearing, Distance

TRACT 12 table with columns Course, Bearing, Distance

TRACT 13 table with columns Course, Bearing, Distance

TRACT 14 table with columns Course, Bearing, Distance

TRACT 15 table with columns Course, Bearing, Distance

TRACT 16 table with columns Course, Bearing, Distance

TRACT 17 table with columns Course, Bearing, Distance

TRACT 18 table with columns Course, Bearing, Distance

TRACT 19 table with columns Course, Bearing, Distance

TRACT 20 table with columns Course, Bearing, Distance

TRACT 21 table with columns Course, Bearing, Distance

TRACT 22 table with columns Course, Bearing, Distance

30' CROSSING CALLS table with columns Course, Bearing, Distance

Main table with columns Course, Bearing, Distance (L1-L90)

Main table with columns Course, Bearing, Distance (L91-L175)

Table with columns Course, Bearing, Distance (L176-L186)

Table with columns Curve, Radius, Length, Chord, Chord Bear.

GENERAL NOTES: 1. NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING...

State of North Carolina County of Cleveland Review Officer of Cleveland County...

Call Table Legend: L-xxx represents short calls along property boundary...

LEGEND table with symbols for FENCE LINE, ELECTRIC LINE, WATER LINE, etc.

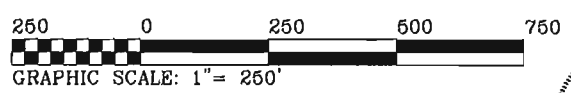
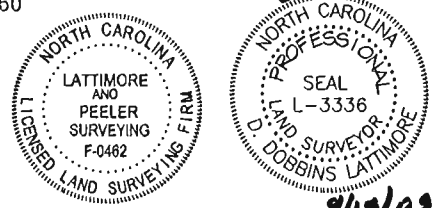


Table with columns Course, Bearing, Distance (L283A-L286)



LATTIMORE & PEELER SURVEYING 105 LONDON ROAD (704) 538-3443

Bk 33 Pg 147

FINAL PLAT

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-AB EEP SITE ID NUMBER: 739 NAME OF PROJECT: BIG HARRIS CREEK

Filed in CLEVELAND County, NC on Sep 16 2009 at 03:42:48 PM by BONNIE E. REFOE REGISTER OF DEEDS Book 33 Page 147

Owner: Royster Turkey Farm, Inc. Contact person: Edwin Royster Deed Ref: 16,Z-522 Tax Map Ref: 3287-1-13

12

135507

Issued May 07 2010
\$3.00
by BONNIE E. REECE
REGISTER OF DEEDS ID.20861
State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

Filed in CLEVELAND County, NC
on May 07 2010 at 01:48:53 PM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 1595 Page 2121

RECORDING FEE \$ 52.00 REVENUES 300.-

Return to: Deaton, Biggers + Hoza
STATE OF NORTH CAROLINA
CLEVELAND COUNTY

CONSERVATION EASEMENT
AND RIGHT OF ACCESS

SPO File Number 023-J
EEP Site ID :739
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS, pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 19th day of April, 2010, by Elliott's Memorial Baptist Church, ("Grantor"), whose mailing address is 3939 Stick Elliott Rd. Lawndale NC 28090, Christine D. Shuford, (widower), ("Grantor"), whose mailing address is 1720 West Stage Coach Rd. Lawndale NC 28090, Jo Ellen Cornwell and spouse Joseph Cornwell, ("Grantor"), whose mailing address is 1720 West Stage Coach Rd. Lawndale NC 28090, and Thomas Clinton Shuford and spouse Laura Beam Shuford, ("Grantor"), whose mailing address is 4417 Hoover Rd. Lawndale, NC 28090 to the State of North Carolina, ("**Grantee**") , whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

UN

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

Book 1595 Page 2122

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in No. 8 Township, Cleveland County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 1.51 acres and being conveyed to the Grantor by deed as recorded in **Deed Book 17-X at Page 714** of the Cleveland County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement and Right of Access over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept said Easement and Access Rights. The Conservation Easement shall be for the protection and benefit of the waters of Big Harris Creek.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with a general Right of Access.

The Easement Area consists of the following:

Conservation Easement Area containing a total of .42 acres as shown on the plat of survey entitled Conservation Easement Survey for the State of North Carolina, North Carolina Department of Administration, Ecosystem Enhancement Program Big Harris Creek, Big Harris Creek SPO File No. 023-J, EEP Site No. 739, Property of Elliott Memorial Baptist Church dated July 22, 2009 by D. Dobbin Lattimore, PLS Number 3336 and recorded in the Cleveland County, North Carolina Register of Deeds at **Plat Book 34 Pages 20**
Dated 3/17/2010.

See attached "**Exhibit A**", Legal Description.

The purposes of this Conservation Easement are to maintain, restore, enhance, construct, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

Book 1595 Page 2123

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement and Right of Access shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

- A. **Recreational Uses.** Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.
- B. **Educational Uses.** The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.
- C. **Vegetative Cutting.** Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.
- D. **Industrial, Residential and Commercial Uses.** All are prohibited in the Easement Area.
- E. **Agricultural Use.** All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

Book 1595 Page 2124

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area after the stream restoration construction is complete may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped recreational and educational uses of the Easement Area.

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation

Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

Book 1595 Page 2125

III. GRANTEE RESERVED USES

A. Right of Access, Construction, and Inspection. The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Easement Area over the Property at reasonable times to undertake any activities to restore, construct, manage, maintain, enhance, and monitor the stream, wetland and any other riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterranean water flow.

C. Signs. The Grantee shall be permitted to place signs on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the holder of the Conservation Easement.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

Book 1595 Page 2126

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown herein or to other addresses as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement. The U.S. Army Corps of Engineers

must be notified 60 days in advance of any amendment to this Conservation Easement or transfer of property interest.

Book 1595 Page 2127

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

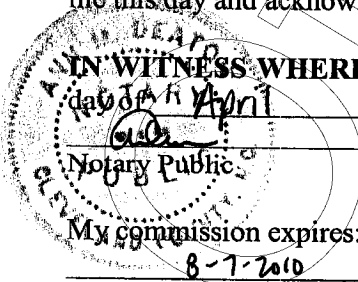
IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

Buren C. Meade (Seal)
Buren C. Meade, Trustee

NORTH CAROLINA
COUNTY OF Cleveland

I, ^{and} ~~Buren C. Meade~~ *Ann M. Deaton* a Notary Public in and for the County and State aforesaid, do hereby certify that Buren C. Meade, Trustee, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 19th day of April, 2010.

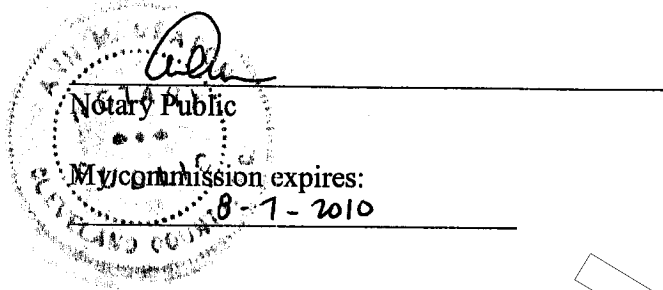


Christine D. Shuford (Seal)
Christine D. Shuford

NORTH CAROLINA
COUNTY OF Cleveland

I, Ann M. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that Christine D. Shuford, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 22nd day of April, 2010.



Book 1595 Page 2128

Jo Ellen Cornwell (Seal)
Jo Ellen Cornwell

Joseph Cornwell (Seal)
Joseph Cornwell

NORTH CAROLINA
COUNTY OF Cleveland

I, Ann M. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that Joe Ellen Cornwell and spouse Joseph Cornwell, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 22nd day of April, 2010.

Ann M. Deaton
Notary Public

My commission expires:

8-7-2010

Book 1595 Page 2129

Thomas Clinton Shuford (Seal)
Thomas Clinton Shuford

Laura Beam Shuford (Seal)
Laura Beam Shuford

NORTH CAROLINA
COUNTY OF CLEVELAND

I, Ann M. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that Thomas Clinton Shuford and spouse Laura Beam Shuford, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 22nd day of April, 2010.

Ann M. Deaton
Notary Public

My commission expires:
8-7-2010

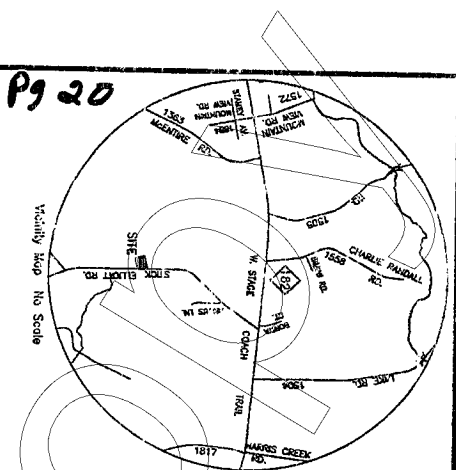
Book 1595 Page 2130

Exhibit A

Elliott's Memorial Church project

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616813.36 feet E= 1222738.37 feet; THENCE South 23 degrees 44 minutes 08 seconds West for a grid distance of 1979.73 feet to a railroad spike in the centerline of Stick Elliott road said corner having the grid coordinates of N= 615001.09 feet E= 1221941.49 feet said corner being the Northeastern most corner of the Elliott's Memorial Church property as described in Deed Book 17-X page 714 and Deed Book 7-B Page 352 of the Cleveland County Registry and running with the Southern line of the Jo Ellen Cornwell property as described in Deed Book 18-X page 455 of the Cleveland County Registry South 78 degrees 24 minutes 10 seconds West for a distance of 294.51 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the point of BEGINNING; THENCE a new line though the Elliott Memorial Church property South 24 degrees 35 minutes 25 seconds East for a distance of 213.61 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Northern line of the Hamilton and Joan Eaker property as described in Deed Book 15-T page 51 of the Cleveland County Registry; THENCE with the Eaker property South 66 degrees 32 minutes 57 seconds West for a distance of 101.99 feet to a No.5 rebar set on the bank of the branch said iron being a common corner with the Cornwell property; THENCE with the Cornwell property for the next two calls and running with the center of the branch North 14 degrees 33 minutes 58 seconds West for a distance of 229.40 feet to an unmarked point in the branch; THENCE leaving the branch North 78 degrees 24 minutes 10 seconds East for a distance of 27.96 feet to a No.5 rebar set; THENCE North 78 degrees 24 minutes 10 seconds East for a distance of 35.71 feet to the point of BEGINNING.
Containing 0.42 Acres more or less.

Book 1595 Page 2131



1. I, D. Deaton, Licensee certify that I have personally supervised the field work on this survey and that the boundaries and acreage are correctly shown on the plat hereon. I certify that the survey is a true and correct survey of the land shown thereon.

2. I, D. Deaton, Licensee certify that I am a duly licensed and qualified surveyor in the State of North Carolina and that I am duly bonded for the performance of my duties as a surveyor.

3. I, D. Deaton, Licensee certify that I have no pecuniary interest in the land shown on the plat hereon.

FIGURE OF SURVEY AND COUNTY, N.C.
 THIS SURVEY IS FILED FOR RECORD IN THE REGISTERED PLATS OFFICE OF THE CLERK OF SUPERIOR COURT, CLERK OF SUPERIOR COURT, COUNTY OF GAVIN AND COUNTY, N.C.
BOOK 34 PAGE 20

GENERAL NOTES

- The site shown on this plan is shown as a potential site for a building and is not to be construed as a site plan or any other type of plan.
- Dimensions are given in feet and inches.
- Distances are given in feet and inches.
- All distances are measured between survey points unless otherwise noted.
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- Distances are given in feet and inches.
- All distances are measured between survey points unless otherwise noted.
- Dimensions are given in feet and inches.
- Distances are given in feet and inches.
- All distances are measured between survey points unless otherwise noted.

State of North Carolina
 County of Cleveland
 D. Deaton, Licensee
 Survey Office of
 D. Deaton, Licensee
 11/7/2008
 3:15 PM

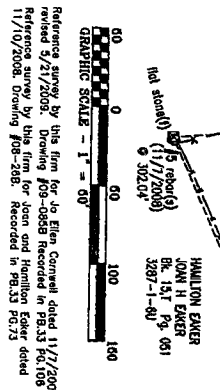
We hereby certify that we are the owners of the property shown and described hereon and that we have adopted this Conservation Easement for the Ecosystem Enhancement Program.

3-17-2010 Deaton & West
 Date Title

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 0234
 EEP SITE ID NUMBER: 739
 NAME OF PROJECT: BIG HARRIS CREEK
 CURRENT OWNER: ELLIOTS MEMORIAL CHURCH
 OWNER CONTACT INFO:

Owner: Elliotts Memorial Church
 Address: 3939 Stick Elliott Rd.
 Lenoirville, NC 28090
 Deed Ref: 7-B-352, 17X-714
 Tax Map Ref: 3287-1-16
 Township: No. 8
 County: Cleveland
 State: North Carolina
 Plat Prepared: July 22, 2009
 Scale 1" = 50'



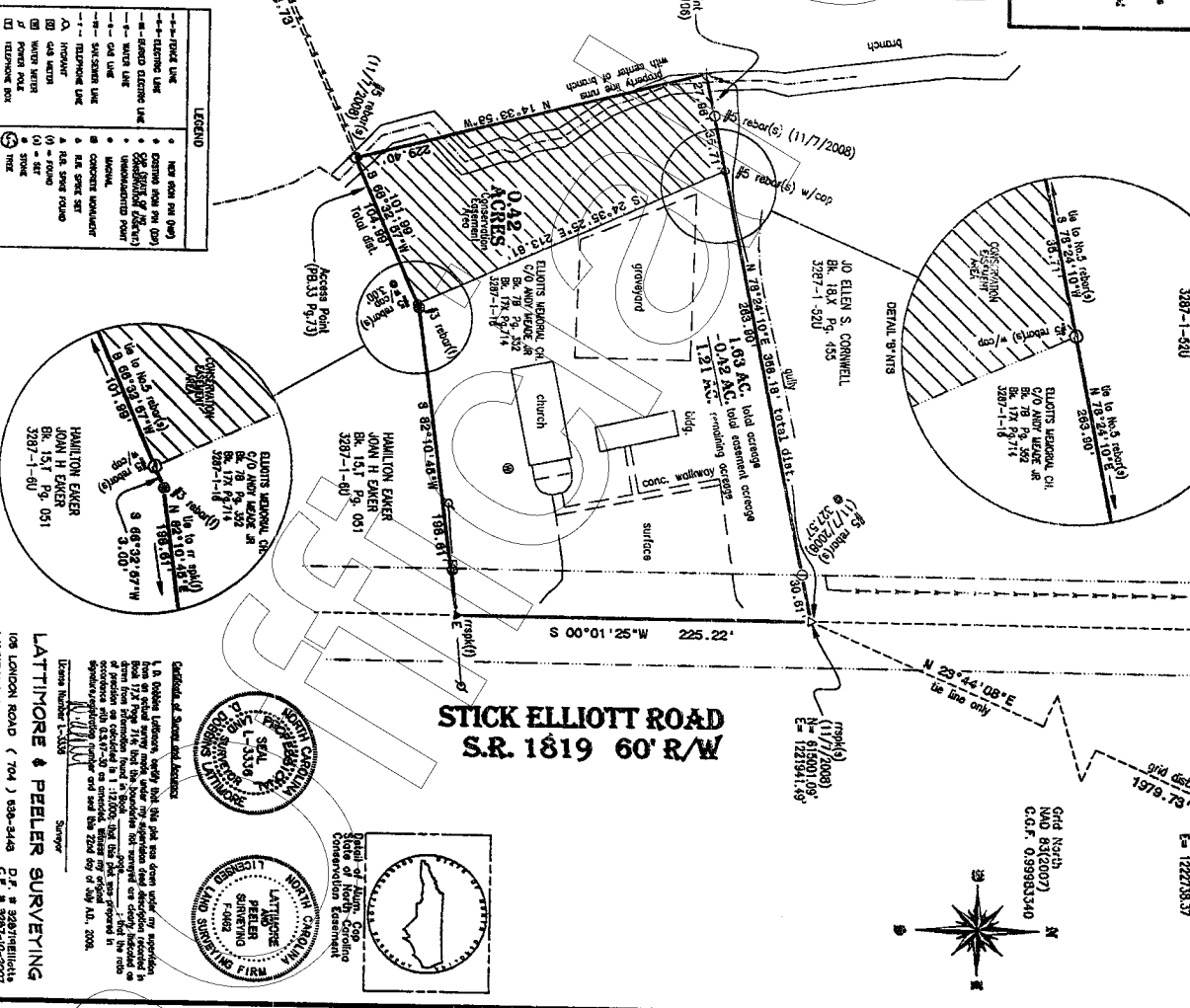
Book 1595 Page 2132

LEGEND

---+---+---	TRUCK LANE	●	NEW SURVEY POINT
---+---+---	TRUCK LANE	○	EXISTING SURVEY POINT
---+---+---	TRUCK LANE	○	EXISTING SURVEY POINT
---+---+---	TRUCK LANE	○	EXISTING SURVEY POINT
---	TRUCK LANE	○	EXISTING SURVEY POINT
---	TRUCK LANE	○	EXISTING SURVEY POINT
---	TRUCK LANE	○	EXISTING SURVEY POINT
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---	TRUCK LANE	○	EXISTING SURVEY POINT
---	TRUCK LANE	○	EXISTING SURVEY POINT
---	TRUCK LANE	○	EXISTING SURVEY POINT

BOOK 34 PAGE 20

BOOK 34 PAGE 20



J.O. ELLEN S. CORNWELL
 BK. 18X Pg. 435
 3287-1-501

ELLIOTS MEMORIAL CH.
 BK. 17X Pg. 552
 BK. 17X Pg. 552
 3287-1-18

J.O. ELLEN S. CORNWELL
 BK. 18X Pg. 435
 3287-1-520

HAMILTON ENKER
 JOHN H. ENKER
 BK. 15T Pg. 051
 3287-1-40

HAMILTON ENKER
 JOHN H. ENKER
 BK. 15T Pg. 051
 3287-1-40



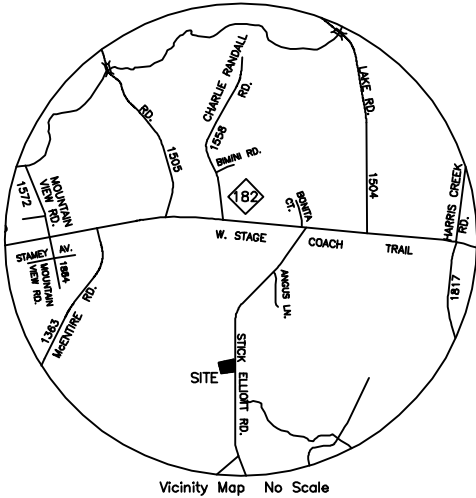
Cleveland Survey
 Dated: 11/7/2008
 N = 516813.36
 E = 1222738.37

**STICK ELLIOTT ROAD
 S.R. 1819 60' R/W**



LATTIMORE & PEELER SURVEYING
 108 LENOIR ROAD (704) 888-3448
 LENOIRVILLE, NORTH CAROLINA 28090
 DRAWING NO. 04-0678
 P.E. & REGISTERED LAND SURVEYOR
 C.F. & REGISTERED LAND SURVEYOR
 11/7/2008

City of Lenoirville
 State of North Carolina
 Department of Public Safety
 Conservation Easement
 License Number: F-4923



Vicinity Map No Scale

I, D. Dobbin Lattimore certify one of the following as marked:

- a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;
- b. that the survey is located in such portion of a county or a municipality that is unregulated as to an ordinance that regulates parcels of land;
- c. that the survey is of an existing parcel or parcels of land;
- d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;
- e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (a) through (d) above.

GENERAL NOTES

1. NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
2. PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
3. UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
4. NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
5. NO DOT #/1/5 ARE APPROXIMATE UNLESS OTHERWISE NOTED.
6. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
7. COPYRIGHT © 2009, LATTIMORE AND PEELER SURVEYING, INC. ALL RIGHTS RESERVED. NO PART OF THIS SURVEY MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM LATTIMORE AND PEELER SURVEYING, INC.
8. THIS MAP IS FOR THE EXCLUSIVE USE OF THE ORIGINAL PURCHASER OF THIS SURVEY AND NOT FOR ANY OTHER PURPOSES, INCLUDING ANY FUTURE SURVEYS.

State of North Carolina
County of Cleveland

I, _____ Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.

Review Officer _____ Date _____

We hereby certify that we are the owners of the property shown and described hereon and that we hereby adopt this Conservation Easement for the Ecosystem Enhancement Program.

Date _____ Trustee _____

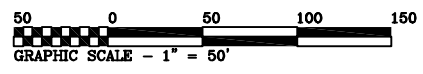
Date _____ Pastor _____

JO ELLEN S. CORNWELL
Bk. 18,X Pg. 455
3287-1-52U

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

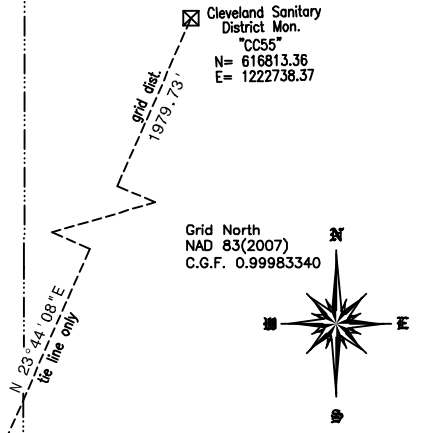
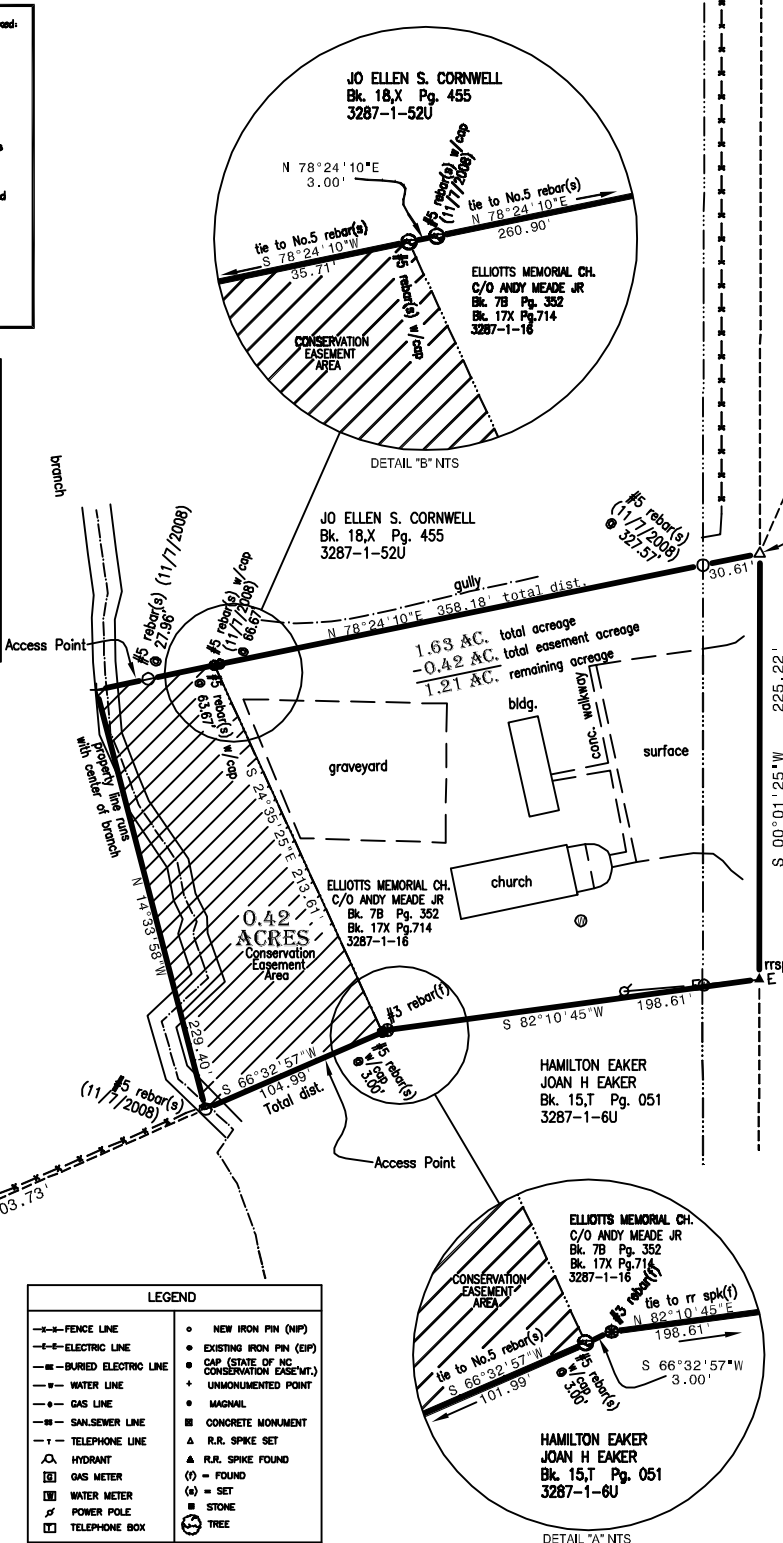
SPO FILE NUMBER: 023-J
EEP SITE ID NUMBER: 739
NAME OF PROJECT : BIG HARRIS CREEK
CURRENT OWNER: Elliotts Memorial Church
OWNER CONTACT INFO:

Owner: Elliotts Memorial Church
Address: 3939 Stick Elliott Rd.
Lawndale, NC 28090
Deed Ref: 7,B-352; 17,X-714
Tax Map Ref: 3287-1-16
Township: No. 8
County: Cleveland
State: North Carolina
Plat Prepared: July 22, 2009
Scale 1" = 50'



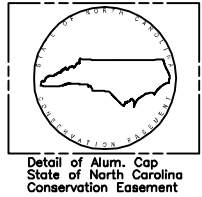
Reference survey by this firm for Jo Ellen Cornwell dated 11/7/2008 revised 5/21/2009. Drawing #09-085B
Reference survey by this firm for Joan and Hamilton Eaker dated 11/10/2008. Drawing #08-26B. Recorded in PB.33 PG.73

LEGEND			
—+—+—	FENCE LINE	●	NEW IRON PIN (NIP)
—E—E—	ELECTRIC LINE	●	EXISTING IRON PIN (EIP)
—B—B—	BURIED ELECTRIC LINE	—	CAP (SEAL) OF NC CONSERVATION EASEMENT
—W—W—	WATER LINE	+	UNIONMENT POINT
—G—G—	GAS LINE	—	MAGNAIL
—S—S—	SAWSEWER LINE	■	CONCRETE MONUMENT
—T—T—	TELEPHONE LINE	▲	R.R. SPIKE SET
⊙	HYDRANT	▲	R.R. SPIKE FOUND
⊙	GAS METER	(f)	FOUND
⊙	WATER METER	(s)	SET
⊙	POWER POLE	⊙	STONE
⊙	TELEPHONE BOX	⊙	TREE



rrspk(s)
(11/7/2008)
N= 615001.09'
E= 1221941.49'

STICK ELLIOTT ROAD
S.R. 1819 60' R/W



Certificate of Survey and Accuracy

I, D. Dobbin Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision and description recorded in Book 17,X Page 714; that the boundaries not surveyed are clearly indicated as drawn from information found in Book _____, page _____; that the ratio of precision as calculated is 1:12,000; that this plat was prepared in accordance with G.S.47-30 as amended. Witness my original signature, registration number and seal this 22nd day of July A.D., 2009.

License Number L-3336 Surveyor
LATTIMORE & PEELER SURVEYING
105 LONDON ROAD (704) 536-3448 D.F. # 3287/1/ELLIOTTS
LAWDALE, NORTH CAROLINA 28090 C.F. # 3287-10-2007
DRAWING # 09-087B

Filed in CLEVELAND County, NC
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by BONNIE E. REECE
REGISTER OF DEEDS
Book 1561 Page 690
Issued Aug 07 2009
\$13.00
by BONNIE E. REECE
REGISTER OF DEEDS ID.19687
State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

126254

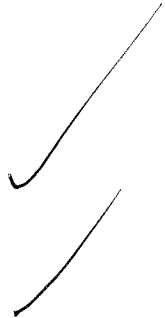
* Susan Biggers

STATE OF NORTH CAROLINA

CONSERVATION EASEMENT
AND ACCESS EASEMENT

RECORDING FEE \$ 41.⁰⁰ REVENUES 13.⁰⁰

Cleveland County
SPO File Number: 023-V
EEP Site ID Number 739
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321



THIS CONSERVATION EASEMENT AND ACCESS EASEMENT, pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 6th day of August, 2009, by John Joseph Kernohan and wife Dixie L. Kernohan, ("Grantor"), whose mailing address is 3752 Harris Creek Rd. Lawndale, NC 28090, to the State of North Carolina, ("Grantee"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in **No. 8 Township, Cleveland County, North Carolina** (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately **8.47 acres** and being conveyed to the Grantor by deed as recorded in **Deed Book 1199 at Page 2399** of the **Cleveland County Registry**, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of the waters of **Big Harris Creek**

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with access easement, of the nature and character and to the extent hereinafter set forth, over a described area of the Property, referred to hereafter as the "**Easement Area**", for the benefit of the people of North Carolina, and being all of the tract of land as identified as **Conservation Easement Area 1.89** on plat of survey entitled "**Revision of PB.33 Page 56 Conservation Easement Survey for the State of NC, Department of Administration Ecosystem Enhancement Program Big Harris Creek**" dated **July 17, 2009**, certified by **Dobbin L. Lattimore License Number L-3336**, and recorded in **Map Book 33 Page 108 Cleveland County Registry**.

Easement Area is more particularly described on attached **Exhibit A**

The purposes of this Conservation Easement are to maintain, restore, enhance, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped recreational and educational uses of the Easement Area. Existing roads, trails or paths may be maintained with loose gravel or permanent vegetation to stabilize or cover the surfaces.

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

O. Utilities. Duke Energy Corporation reserves a utility easement being 30 feet in total width. Utility easement extends 15 feet on both sides of the existing power line for maintenance within the reserved easement area. Vehicles used for maintenance shall stay outside of the conservation easement area to the greatest extent possible.

P. Vegetation Planting. The conservation easement area located under overhead poles shall be planted with vegetation approved in the Duke Energy Distribution Line Right of Way page:www.duke-energy.com/safety/right-of-way-maintenance/distribution.asp.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Ingress, Egress, and Inspection. The Grantee, its employees and agents, successors and assigns, receive the perpetual right of unlimited and repeated ingress and egress to the Easement Area over the Property at reasonable times to undertake any activities to restore, manage, maintain, enhance, and monitor the wetland and riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterranean water flow.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate

relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown above or to other address(es) as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

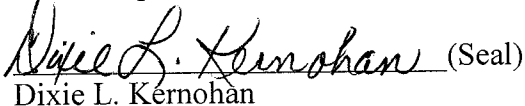
Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

 (Seal)
John Joseph Kernohan

 (Seal)
Dixie L. Kernohan

NORTH CAROLINA

COUNTY OF Cleveland

I, Ann M. Deabm, a Notary Public in and for the County and State aforesaid, do hereby certify that John Joseph Kernohan and wife Dixie L.Kernohan, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 6th day of August, 2009.

Notary Public

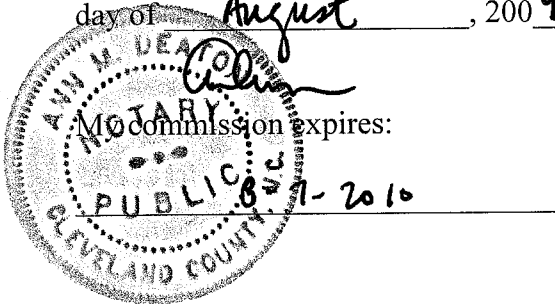


Exhibit A
Legal Description for
John Joseph Kernohan and wife Dixie L. Kernohan

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616813.36 feet E= 1222738.37 feet; THENCE South 39 degrees 40 minutes 36 seconds East for a grid distance of 6642.48 feet to a pk-nail found in the centerline of Harris Creek Road and in the center of a bridge over Big Harris Creek said nail having the North Carolina Grid Coordinates (NAD 83) of N= 611700.92 feet E= 1226979.30 feet and said nail also being the Southwestern corner of the Charles and Donna Holtzclaw property as described in Deed Book 1202 Page 656 of the Cleveland County Registry and also being the Northern corner of the Jennifer Meade and Jerri Wilson property as described in Estate file 04 Page 127 of the Cleveland County registry; THENCE North 88 degrees 20 minutes 15 seconds East for a distance of 13.61 feet to an unmarked point said point being the corner of the Meade and Wilson property and in the Southern line of the Holtzclaw property; THENCE North 88 degrees 20 minutes 15 seconds East for a distance of 16.43 feet to an unmarked point in Big Harris Creek and said point being the point of BEGINNING; THENCE with the Holtzclaw property and the center of Big Harris Creek for the next seventeen calls North 88 degrees 20 minutes 15 seconds East for a distance of 111.25 feet to an unmarked point; THENCE South 36 degrees 21 minutes 57 seconds East for a distance of 117.41 feet to an unmarked point; THENCE South 34 degrees 38 minutes 37 seconds East for a distance of 138.23 feet to an unmarked point; THENCE South 63 degrees 09 minutes 14 seconds East for a distance of 73.68 feet to an unmarked point; THENCE South 76 degrees 42 minutes 01 seconds East for a distance of 29.52 feet to an unmarked point; THENCE South 68 degrees 23 minutes 40 seconds East for a distance of 67.41 feet to an unmarked point; THENCE South 11 degrees 09 minutes 15 seconds East for a distance of 134.52 feet to an unmarked point; THENCE South 19 degrees 06 minutes 15 seconds East for a distance of 49.76 feet to an unmarked point; THENCE South 33 degrees 50 minutes 42 seconds East for a distance of 60.89 feet to an unmarked point; THENCE South 52 degrees 02 minutes 23 seconds East for a distance of 43.36 feet to an unmarked point; THENCE North 81 degrees 35 minutes 01 seconds East for a distance of 74.76 feet to an unmarked point; THENCE South 79 degrees 19 minutes 01 seconds East for a distance of 29.18 feet to an unmarked point; THENCE South 62 degrees 39 minutes 31 seconds East for a distance of 25.60 feet to an unmarked point; THENCE South 27 degrees 35 minutes 06 seconds East for a distance of 60.96 feet to an unmarked point; THENCE South 05 degrees 50 minutes 27 seconds West for a distance of 88.94 feet to an unmarked point; THENCE South 25 degrees 37 minutes 24 seconds East for a distance of 80.93 feet to an unmarked point; THENCE South 38 degrees 16 minutes 03 seconds East for a distance of 25.23 feet to an unmarked point said point being the Southeastern corner of the Holtzclaw property and being in the Western line of The Kailing Living Trust property as described in Deed Book 1214 Page 26 of the Cleveland County registry; THENCE with the Kailing Living Trust property South 23 degrees 26 minutes 14 seconds West for a distance of 68.50 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Kailing Living Trust line and creating five new lines through the Kernohan property North 20 degrees 39 minutes 44 seconds West for a distance of 258.74 feet to an unmarked point in the present creek; THENCE North 28 degrees 30 minutes 59 seconds West for a distance of 98.13 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 60 degrees 31 minutes 38 seconds West for a distance of 233.11 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 11 degrees 26 minutes 35

seconds West for a distance of 114.07 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 55 degrees 35 minutes 18 seconds West for a distance of 257.00 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 66 degrees 38 minutes 10 seconds West for a distance of 169.85 feet to an axle at the edge of a branch said corner being a common corner of the Meade and Wilson property; THENCE with the Meade and Wilson property for the next three calls North 41 degrees 42 minutes 41 seconds East for a distance of 93.43 feet to an unmarked point in the branch; THENCE North 22 degrees 47 minutes 31 seconds East for a distance of 22.25 feet to an No.5 rebar set with a cap stamped Conservation Easement; THENCE North 26 degrees 42 minutes 29 seconds West for a distance of 183.54 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Eastern edge of the right-of-way of Harris Creek Road; THENCE running with the right-of-way of Harris Creek Road North 03 degrees 09 minutes 32 seconds East for a distance of 29.90 feet to the point of BEGINNING.

Containing 1.89 acres more or less.

126255

RECORDING FEE \$ 23.00 REVENUES -0-

Prepared by and return to:
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321
SPO File No. 023-V
Cleveland County

★ Susan Biggers

TEMPORARY CONSTRUCTION EASEMENT

This Agreement, made this 6 th day of August 2009, between John Joseph Kernohan and Dixie L. Kernohan hereinafter designated as **Grantor**, and the **State of North Carolina**, acting by and through the **Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program)**, hereinafter designated **Grantee**, does hereby grant unto the **Grantee**, its successors, assigns, agents, contractors, subcontractors and employees the exclusive right to perform those certain construction activities necessary to perform a stream restoration, enhancement and/or wetlands restoration, enhancement or creation project, hereinafter designated **Project**, along with the to right of reasonable ingress and egress to the **Project** along Big Harris Creek in Cleveland County for the benefit of the Grantor.

Whereas Grantor executed a permanent Conservation Easement to the State of North Carolina on a portion of its property located East side of Harris Creek Road (S.R.1817),), bounded on the South side of Horn, on the North by Howard, the West by Wilson and said road. Said Conservation Easement is recorded in Deed Book 1581 at Page 690 and Plat Book 33 Page 108 in the Cleveland County Registry for a stream restoration project on tributaries to the Big Harris Creek. This Temporary Construction Easement is to allow for haul roads and stockpiling/spoil areas on portions of said property (Parcel # 44069) outside of permanent Conservation Easement Area 1.89 acre as shown on the attached exhibit map.

Grantor, for the true and actual consideration of Ten Dollars and other valuable consideration in the amount of **\$600.00** does convey to **Grantee**, its successors and assigns, a **Temporary Construction Easement**, hereinafter **Easement**, for a specified work area on the property identified as for a specified work area on the property identified as being an approximate 8.47 acre tract or parcel of land located in Number Eight (8) Township, Cleveland County, and being located on the East side of Harris C reek Road (S.R.1817), bounded on the South side of Horn, on the North by Howard, the West by Wilson and said road. This parcel is further identified in a deed recorded in Deed Book 1199, Page 2329, Cleveland County Registry, and Title Reference is found in Book 1128, Page 2069, Cleveland County Registry.

Grantor agrees the consideration recited herein is just compensation for the **Easement**, including any and all damages to Grantor's remaining property, if any, which may result from the acquisition or use of said property and said **Project**.

The **Grantor** also grants to the **Grantee**, its successors, assigns, agents, contractors, and employees the right to erect and use construction equipment at the site of the **Easement** herein described.

IT IS UNDERSTOOD that the **Easement** rights herein granted shall automatically terminate 2 years from the date rendered hereof or upon completion of the above referenced **Project**, whichever is sooner.

The **Grantee**, its successors, and assigns agree to the following conditions of this **Easement**:

1. The **Grantee** shall exercise care to avoid damaging the property in any manner not consistent with the purpose for which this agreement is issued.
2. The **Grantee** shall at all times cooperate with **Grantor** and comply with reasonable requests not inconsistent with the purpose for which this agreement is issued.
3. The **Grantee** if necessary, shall perform felling, bucking, and decking of merchantable timber according to acceptable logging practices with a minimum of breakage, damage, and waste. Utilization of heavy equipment to grade, fill, and prepare the soil, including modification of the hydrology of the site.
4. The **Grantee**, at a minimum, shall spread material uniformly over the construction site for uniform topography and seed with grass. Such material may include the planting of trees, shrubs and herbaceous vegetation. **Grantee** shall fertilize all areas. Upon completion of the **Project**, **Grantee** shall clean all the ground occupied of all rubbish, excess material, temporary structures, and equipment.
5. **Grantee** shall leave all parts of the **Project** site in acceptable condition.

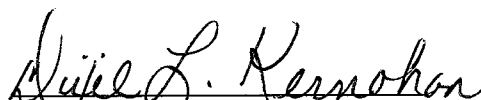
Said **Conservation Easement** area runs as the stream meanders, extending for the widths from the centerline of said **newly re-aligned** stream as specified below, on both sides of stream where physically possible.

The **Conservation Easement** will cover the entire parcel from the top of the bank on both sides the newly aligned stream, except in areas where existing buildings lie, and runs as the stream meanders.

Grantor reserves the right to donate the underlying fee to a qualified non-profit.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written,


John Joseph Kernohan


Dixie L. Kernohan

NORTH CAROLINA

COUNTY OF CLEVELAND

, Ann M. Deaton, a Notary Public in and for the County and State aforesaid,

do hereby certify that John Joseph Kernohan and Dixie L. Kernohan, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

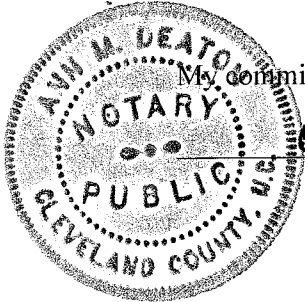
6th IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the

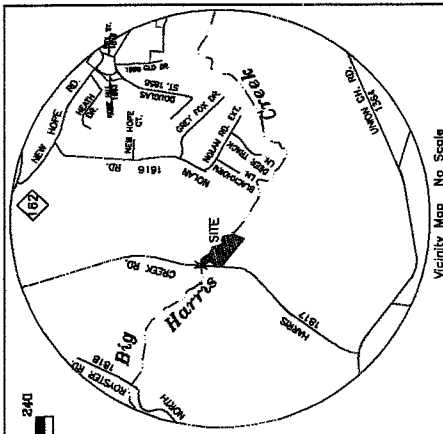
day of August, 2009

Ann M. Deaton
Notary Public

My commission expires:

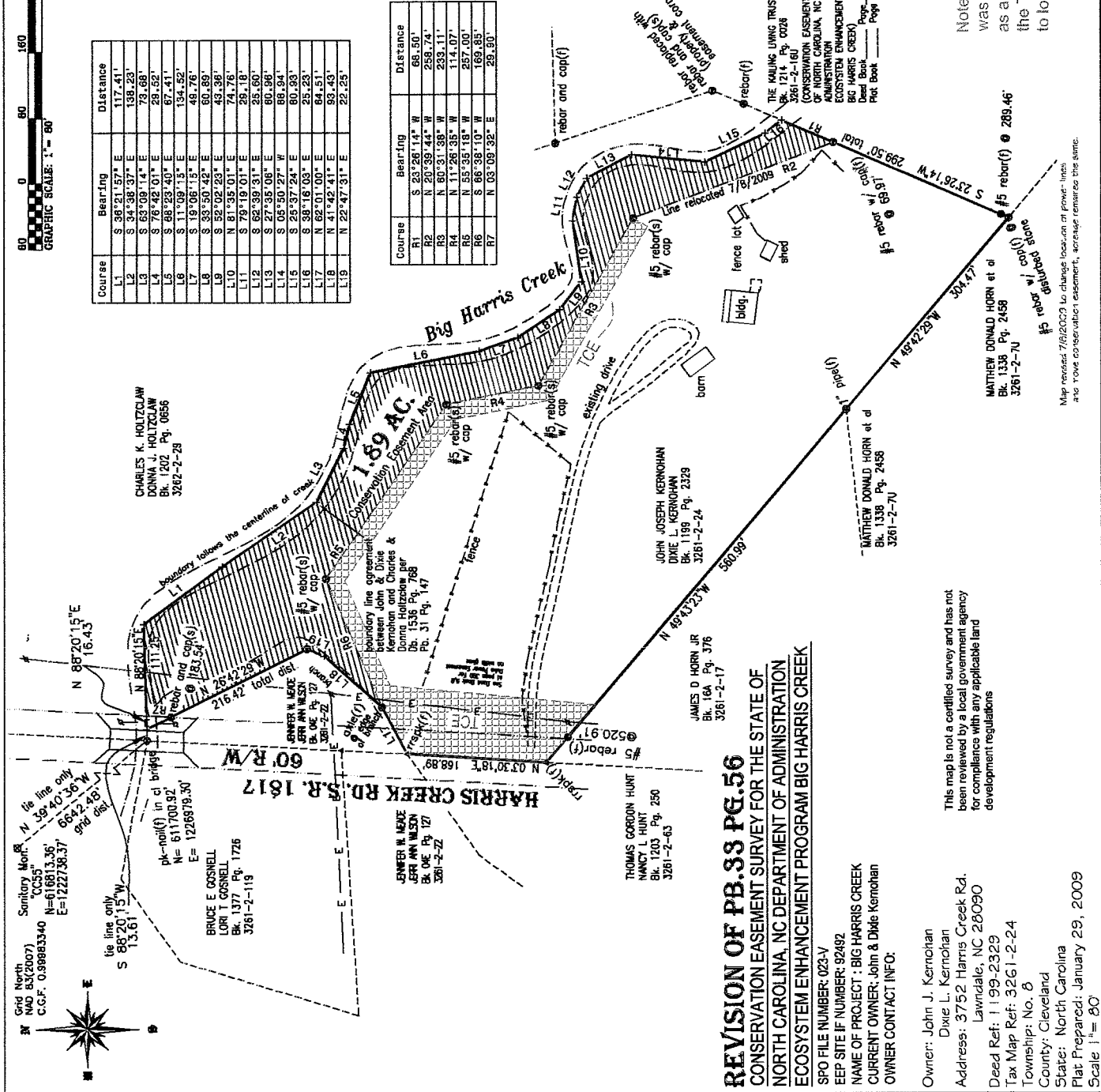
8-7-2010





Course	Bearing	Distance
L1	S 38° 21' 57" E	117.41'
L2	S 34° 38' 37" E	138.23'
L3	S 63° 09' 14" E	73.68'
L4	S 76° 42' 01" E	29.52'
L5	S 68° 23' 40" E	67.41'
L6	S 11° 09' 15" E	134.52'
L7	S 19° 06' 15" E	48.76'
L8	S 33° 50' 42" E	60.88'
L9	S 52° 02' 29" E	43.38'
L10	N 81° 35' 01" E	74.76'
L11	S 79° 19' 01" E	25.18'
L12	S 62° 39' 31" E	25.60'
L13	S 27° 35' 08" E	60.96'
L14	S 05° 50' 27" W	88.94'
L15	S 25° 37' 24" E	60.33'
L16	S 39° 16' 03" E	25.23'
L17	N 62° 01' 00" E	64.51'
L18	N 41° 42' 41" E	53.43'
L19	N 22° 47' 31" E	22.25'

Course	Bearing	Distance
R1	S 23° 28' 14" W	65.50'
R2	N 20° 35' 44" W	258.74'
R3	N 80° 31' 38" W	233.11'
R4	N 11° 28' 35" W	114.07'
R5	N 53° 55' 18" W	257.00'
R6	S 68° 38' 10" W	169.85'
R7	N 03° 09' 32" E	291.90'



TCE = Temporary Conservation Easement
Map revised 7/15/2009 to show TCE

REVISION OF PB.33 PG.56
CONSERVATION EASEMENT SURVEY FOR THE STATE OF
NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION
ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-V
 EEP SITE IF NUMBER: S2492
 NAME OF PROJECT: BIG HARRIS CREEK
 CURRENT OWNER: John & Dixie Kernohan
 OWNER CONTACT INFO:

Owner: John J. Kernohan
 Dixie L. Kernohan
 Address: 3752 Harris Creek Rd.
 Lawndale, NC 28090
 Deed Ref: 1199-2329
 Tax Map Ref: 3261-2-24
 Township: No. 6
 County: Cleveland
 State: North Carolina
 Plat Prepared: January 29, 2009
 Scale 1" = 80'

This map is not a certified survey and has not been reviewed by a local government agency for compliance with any applicable land development regulations

Note: The TCE shown on this map was not surveyed and it is shown only as a graphical aid to the location of the TEC. No surveying was performed to locate this area.

Map revised 7/15/2009 to change location of power lines and to show conservation easement, acreage remains the same.

THE KAULING LIVING TRUST
 BK. 1214 Pg. 0028
 3261-2-16U
 (CONSERVATION EASEMENT FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM)
 BK. HARRIS CREEK
 Page _____
 Plat Book _____

MATTHEW DONALD HORN et al
 BK. 1338 Pg. 2458
 3261-2-7U
 #5 rebar(f) @ 289.46'

MATTHEW DONALD HORN et al
 BK. 1338 Pg. 2458
 3261-2-7U

JOHN JOSEPH KERNOHAN
 DIXIE L. KERNOHAN
 BK. 1189 Pg. 2329
 3261-2-24

JAMES D HORN JR
 BK. 16A Pg. 376
 3261-2-17

THOMAS GORDON HUNT
 NANCY L HUNT
 BK. 1203 Pg. 280
 3261-2-63

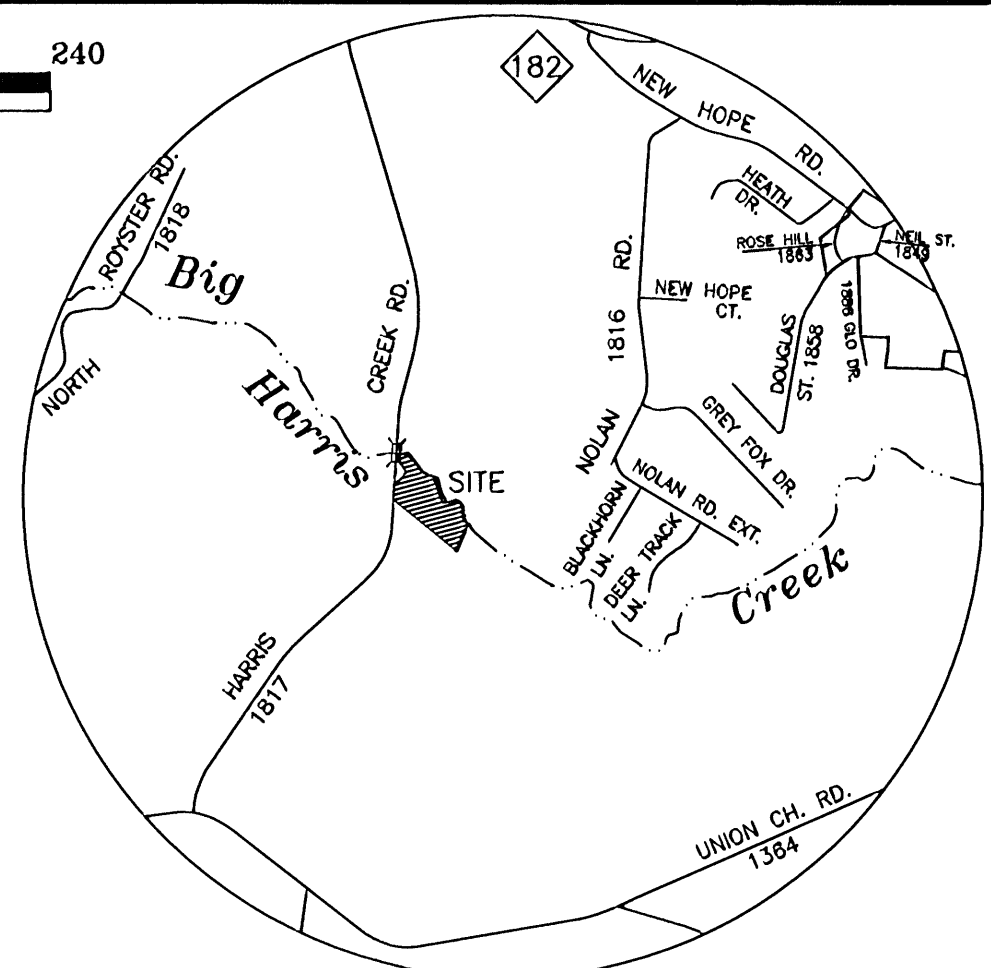
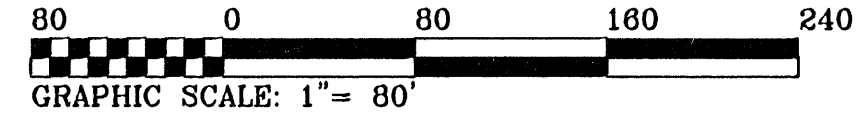
CHARLES K. HOLTCLAW
 DONNA J. HOLTCLAW
 BK. 1202 Pg. 0656
 3262-2-28

BRUCE E GOSNELL
 LORI T GOSNELL
 BK. 1377 Pg. 1726
 3261-2-119

LEWIS W. WEADE
 LERRI ANN WEADE
 BK. 04E Pg. 127
 3261-2-22

Boundary line agreement between John & Dixie Kernohan and Charles & Lori Gosnell
 BK. 1539 Pg. 1478
 Pg. 31 Pg. 147

Bk 33 Pg 108



Course	Bearing	Distance
L1	S 38°21'57" E	117.41'
L2	S 34°38'37" E	138.23'
L3	S 63°09'14" E	73.88'
L4	S 78°42'01" E	29.52'
L5	S 68°23'40" E	67.41'
L6	S 11°09'15" E	134.52'
L7	S 19°08'15" E	49.76'
L8	S 33°50'42" E	60.89'
L9	S 52°02'23" E	43.36'
L10	N 81°35'01" E	74.76'
L11	S 79°19'01" E	29.18'
L12	S 62°39'31" E	25.60'
L13	S 27°35'08" E	60.96'
L14	S 05°50'27" W	88.94'
L15	S 25°37'24" E	80.93'
L16	S 38°16'03" E	25.23'
L17	N 62°01'00" E	64.51'
L18	N 41°42'41" E	93.43'
L19	N 22°47'31" E	22.25'

Course	Bearing	Distance
R1	S 23°26'14" W	68.50'
R2	N 20°39'44" W	258.74'
R3	N 60°31'38" W	233.11'
R4	N 11°28'35" W	114.07'
R5	N 55°35'18" W	257.00'
R6	S 66°38'10" W	169.85'
R7	N 03°09'32" E	29.90'

State of North Carolina
County of Cleveland
I, Pam McLure Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.
Pam McLure 7-17-2009
Review Officer Date

We hereby certify that we are the owners of the property shown
and described hereon and that we hereby adopt this Conservation
Easement for the Ecosystem Enhancement Program.

Date _____ Owner _____
Date _____ Owner _____

I, D. Dobbins Lattimore certify one of the following as marked:

- a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;
- b. that the survey is located in such portion of a county or a municipality that is unregulated as to an ordinance that regulates parcels of land;
- c. that the survey is of an existing parcel or parcels of land;
- d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;
- e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (a) through (d) above.

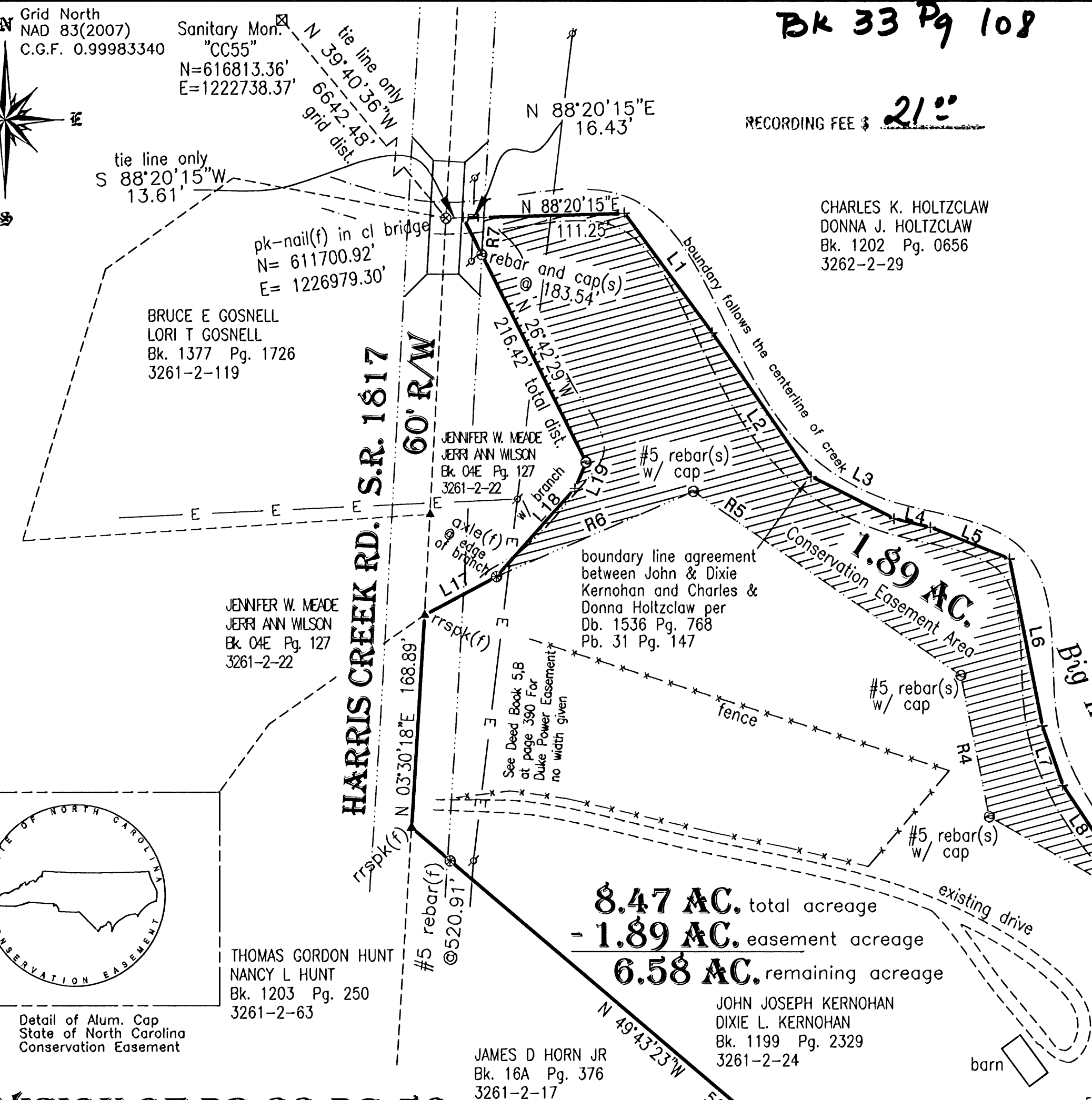
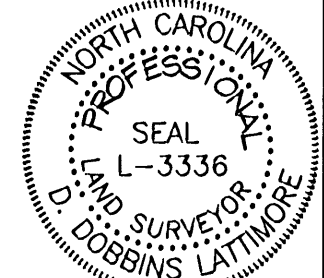
DL

Certificate of Survey and Accuracy

I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book 1199, Page 2329; that the boundaries not surveyed are clearly indicated as drawn from information found in Book _____, page _____; that the ratio of precision as calculated is 1:12,000; that this plat was prepared in accordance with G.S.47-30 as amended. Witness my original signature, license number and seal this 29th day of January A.D., 2009.

License Number L-3336 Surveyor

LATTIMORE & PEELER SURVEYING
105 LONDON ROAD (704) 538-3443 D.F. # Holtzclaw_Kernohan2009_rev
LAWNDALE, NORTH CAROLINA 28090 C.F. # HC2007
DRAWING # 09-015B



RECORDING FEE \$ 21.00

CHARLES K. HOLTZCLAW
DONNA J. HOLTZCLAW
Bk. 1202 Pg. 0656
3262-2-29

BRUCE E GOSNELL
LORI T GOSNELL
Bk. 1377 Pg. 1726
3261-2-119

JENNIFER W. MEADE
JERRI ANN WILSON
Bk. 04E Pg. 127
3261-2-22

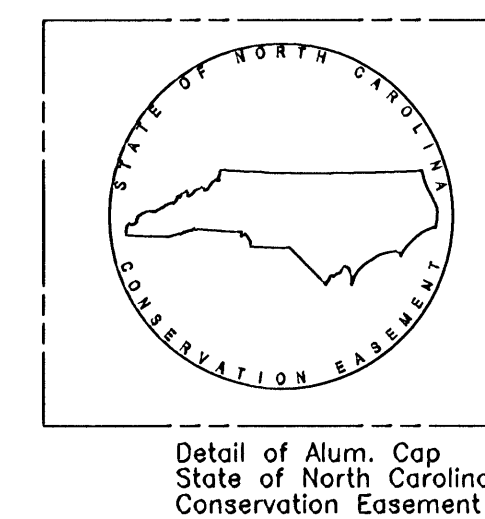
THOMAS GORDON HUNT
NANCY L. HUNT
Bk. 1203 Pg. 250
3261-2-63

JAMES D HORN JR
Bk. 16A Pg. 376
3261-2-17

JOHN JOSEPH KERNOHAN
DIXIE L. KERNOHAN
Bk. 1199 Pg. 2329
3261-2-24

MATTHEW DONALD HORN et al
Bk. 1338 Pg. 2458
3261-2-7U

MATTHEW DONALD HORN et al
Bk. 1338 Pg. 2458
3261-2-7U



REVISION OF PB.33 PG.56
CONSERVATION EASEMENT SURVEY FOR THE STATE OF
NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION
ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-V
EEP SITE ID NUMBER: 92492
NAME OF PROJECT : BIG HARRIS CREEK
CURRENT OWNER: John & Dixie Kernohan
OWNER CONTACT INFO:

Filed in CLEVELAND County, NC
on Jul 17 2009 at 02:02:41 PM
by BONNIE E REEB
REGISTER OF DEEDS
Book 33 Page 108

Owner: John J. Kernohan
Dixie L. Kernohan
Address: 3752 Harris Creek Rd.
Lawn Dale, NC 28090
Deed Ref: 1199-2329
Tax Map Ref: 3261-2-24
Township: No. 8
County: Cleveland
State: North Carolina
Plat Prepared: January 29, 2009
Scale 1" = 80'

LEGEND	
-x-x- FENCE LINE	o NEW IRON PIN (NIP)
-E-E- ELECTRIC LINE	• EXISTING IRON PIN (EIP)
-BE- BURIED ELECTRIC LINE	• CAP (STATE OF NC CONSERVATION EASEMENT)
-W- WATER LINE	+ UNMONUMENTED POINT
-G- GAS LINE	• MAGNAIL
-SS- SAN-SEWER LINE	■ CONCRETE MONUMENT
-T- TELEPHONE LINE	▲ R.R. SPIKE SET
○ HYDRANT	▲ R.R. SPIKE FOUND
□ GAS METER	(f) = FOUND
□ WATER METER	(s) = SET
□ POWER POLE	■ STONE
□ TELEPHONE BOX	○ TREE

GENERAL NOTES

- NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
- PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
- UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
- NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
- NO DOT R/W'S ARE APPROXIMATE UNLESS OTHERWISE NOTED.
- ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
- COPYRIGHT © 2009, LATTIMORE AND PEELER SURVEYING. ALL RIGHTS RESERVED. REPRODUCTION OR USE OF THE CONTENTS OF THIS DOCUMENT, OR ADDITIONS OR DELETIONS TO THIS DOCUMENT, IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF THE LAND SURVEYOR, IS PROHIBITED.
- IF THIS MAP DOES NOT HAVE AN ORIGINAL SIGNATURE IT IS NOT VALID.
- THIS MAP IS FOR THE EXCLUSIVE USE OF THE ORIGINAL PURCHASER OF THIS SURVEY AND IS NOT TRANSFERABLE TO SUBSEQUENT OWNERS OR ADDITIONAL INSTITUTIONS.

Map revised 7/8/2009 to change location of power lines and move conservation easement, acreage remained the same.

Filed in CLEVELAND County, NC
on Dec 03 2009, at 02:50:54 PM

by BONNIE E. REECE
REGISTER OF DEEDS

Book 1587 Page 1735

Issued Dec 03 2009
\$18.00

by BONNIE E. REECE
REGISTER OF DEEDS ID. 20220
State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

130303

RECORDING FEE \$ 49.⁰⁰ Revenue 18.⁰⁰

* Deaton Giggers + HOZA

STATE OF NORTH CAROLINA
CLEVELAND COUNTY

CONSERVATION EASEMENT
AND RIGHT OF ACCESS

SPO File Number: 023-W
EEP SITE ID: 739
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321



THIS DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 3rd day of December, 2009, by Charles K. Holtzclaw and wife, Donna J. Holtzclaw, ("Grantor"), whose mailing address is 3806 Harris Creek Rd. Shelby, NC 28150, to the State of North Carolina, ("Grantee"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in No.8 Township, Cleveland County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately **7.622** acres and being conveyed to the Grantor by deed as recorded in **Deed Book 1202 at Page 656** of the Cleveland County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement and Right of Access over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept said Easement and Access Rights. The Conservation Easement shall be for the protection and benefit of the waters of **Big Harris Creek**

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with a general Right of Access.

The Easement Area consists of the following:

Conservation Easement Area totaling **2.56 acres** as shown on the plat of survey **entitled Plat, Revisions of PB 33, PG 55, Sheets One , Conservation Easement Survey For the State of North Carolina, NC Department of Administration, Ecosystem Enhancement Program, Project Name: Big Harris Creek SPO File No. 23-W, EEP Site No. 739, Property of Charles K. Holtzclaw and wife Donna J. Holtzclaw**, dated January 29, 2009 by Dobbins Lattimore, PLS Number 33936 and recorded in the Cleveland County, North Carolina Register of Deeds at **Plat Book 33 Pages 107.**

See attached "Exhibit A", Legal Description.

The purposes of this Conservation Easement are to maintain, restore, enhance, construct, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural

condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement and Right of Access shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads. Grantor will be allowed to hand pan for gold in the Creek providing there is no digging, shoveling, dredging, or sluicing in the Easement Area. The Grantor will replace all disturbed facilities, features, and vegetation in accordance with all applicable local, state and federal regulations in the Easement Area such that the Protected Property achieves a rapid recovery.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area after the stream restoration construction is complete may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped recreational and education uses of the Easement Area

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may be used for good cause as needed, including; the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Right of Access, Construction, and Inspection. The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Easement Area over the Property at reasonable times to undertake any activities to restore, construct, manage, maintain, enhance, and monitor the stream, wetland and any other riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterranean water flow.

C. Signs. The Grantee shall be permitted to place signs on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the holder of the Conservation Easement.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The

Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee

provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown herein or to other addresses as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement. The U.S. Army Corps of Engineers must be notified 60 days in advance of any amendment to this Conservation Easement or transfer of property interest.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

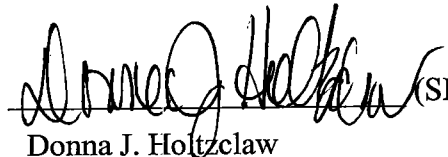
TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent easement herein granted; that the same are free from encumbrances, except as shown on Exhibit B attached hereto and incorporated herein by reference, and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

 (SEAL)

Charles K. Holtzclaw

 (SEAL)

Donna J. Holtzclaw

NORTH CAROLINA
COUNTY OF Cleveland

I, Ann M. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that **Charles K. Holtzclaw and wife Donna J. Holtzclaw**, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 3rd day of December, 2009.



My commission expires:

8-7-2010

Exhibit A

Legal Description for
Charles K. Holtzclaw and wife Donna J. Holtzclaw

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616813.36 feet E= 1222738.37 feet; THENCE South 39 degrees 40 minutes 36 seconds East for a grid distance of 6642.48 feet to a pk-nail found in the centerline of Harris Creek Road and in the center of a bridge over Big Harris Creek said nail having the North Carolina Grid Coordinates (NAD 83) of N= 611700.92 feet E= 1226979.30 feet and said nail also being the Northern corner of the Jennifer Meade and Jerri Wilson property as described in Estate file 04 Page 127 of the Cleveland County registry; THENCE North 88 degrees 20 minutes 15 seconds East for a distance of 13.61 feet to an unmarked point said point being a common corner of the Meade and Wilson property and the John and Dixie Kernohan Property as described in Deed Book 1199 Page 2329 of the Cleveland County registry; THENCE with the Kernohan property North 88 degrees 20 minutes 15 seconds East for a distance of 16.43 feet to an unmarked point in Big Harris Creek and said point being the point of BEGINNING; THENCE with the Kernohan property and the center of Big Harris Creek for the next seventeen calls North 88 degrees 20 minutes 15 seconds East for a distance of 111.25 feet to an unmarked point; THENCE South 36 degrees 21 minutes 57 seconds East for a distance of 117.41 feet to an unmarked point; THENCE South 34 degrees 38 minutes 37 seconds East for a distance of 138.23 feet to an unmarked point; THENCE South 63 degrees 09 minutes 14 seconds East for a distance of 73.68 feet to an unmarked point; THENCE South 76 degrees 42 minutes 01 seconds East for a distance of 29.52 feet to an unmarked point; THENCE South 68 degrees 23 minutes 40 seconds East for a distance of 67.41 feet to an unmarked point; THENCE South 11 degrees 09 minutes 15 seconds East for a distance of 134.52 feet to an unmarked point; THENCE South 19 degrees 06 minutes 15 seconds East for a distance of 49.76 feet to an unmarked point; THENCE South 33 degrees 50 minutes 42 seconds East for a distance of 60.89 feet to an unmarked point; THENCE South 52 degrees 02 minutes 23 seconds East for a distance of 43.36 feet to an unmarked point; THENCE North 81 degrees 35 minutes 01 seconds East for a distance of 74.76 feet to an unmarked point; THENCE South 79 degrees 19 minutes 01 seconds East for a distance of 29.18 feet to an unmarked point; THENCE South 62 degrees 39 minutes 31 seconds East for a distance of 25.60 feet to an unmarked point; THENCE South 27 degrees 35 minutes 06 seconds for a distance of 60.96 feet to an unmarked point; THENCE South 05 degrees 50 minutes 27 seconds West for a distance of 88.94 feet to an unmarked point; THENCE South 25 degrees 37 minutes 24 seconds East for a distance of 80.93 feet to an unmarked point; THENCE South 38 degrees 16 minutes 03 seconds East for a distance of 25.23 feet to an unmarked point said point being the Northeastern corner of the Kernohan property and being in the Western line of The Kailing Living Trust property as described in Deed Book 1214 Page 26 of the Cleveland County registry; THENCE with the Kailing Living Trust property for the next two calls North 23 degrees 26 minutes 14 seconds West for a distance of 90.97 feet to a No.5 rebar set with a cap stamped Conservation Easement and passing over a rebar at 49.78 feet; THENCE North 18 degrees 29 minutes 49 seconds West for a distance of 200.25 feet to a No.5 rebar set with a cap stamped Conservation Easement said corner being the Northwestern corner of the Kailing Living Trust property and the Southwestern corner of the Phillip H. Jones property

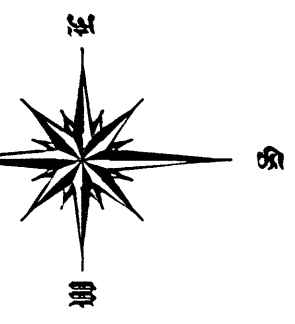
as described in Deed Book 9-H Page 418 of the Cleveland County registry; THENCE with the Jones property North 18 degrees 29 minutes 49 seconds West for a distance of 377.18 feet to a No.5 rebar said corner being a common corner of the Jones property and the Martha and C. Jack Howard property as described in Deed Book 19-K Page 723 of the Cleveland County registry; THENCE with the southern line of the Howard property North 35 degrees 52 minutes 07 seconds West for a distance of 21.48 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Howard line and being eight new lines through the Charles and Donna Holtzclaw property as described in Deed Book 1202 Page 656 of the Cleveland County registry South 21 degrees 35 minutes 35 seconds West for a distance of 73.36 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 68 degrees 24 minutes 25 second East for a distance of 30.00 feet and crossing a branch to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 40 degrees 01 minutes 41 seconds West for a distance of 15.81 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 68 degrees 24 minutes 25 seconds West for a distance of 25.00 feet and crossing a branch to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 21 degrees 35 minutes 35 seconds West for a distance of 67.47 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 52 degrees 19 minutes 10 seconds West for a distance of 473.43 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 82 degrees 29 minutes 24 seconds West for a distance of 129.31 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Eastern edge of the right-of-way of Harris Creek road; THENCE with the edge of the right-of-way of Harris Creek road South 03 degrees 06 minutes 29 seconds West for a distance of 42.23 feet to the point of BEGINNING.

Containing 2.56 acres more or less.

EXHIBIT "B"

1. Deed of Trust from Charles K. Holtzclaw and wife, Donna J. Holtzclaw to HomeTrust Bank and its successors in interest dated February 20, 2008 and in the principal amount of One Hundred Fifty Five Thousand (\$155,000.00) Dollars and recorded in Book 1545 at Page 810 in the Cleveland County Registry of Deeds.

Grid North
NAD 83(2007)
C.G.F. 0.99983340



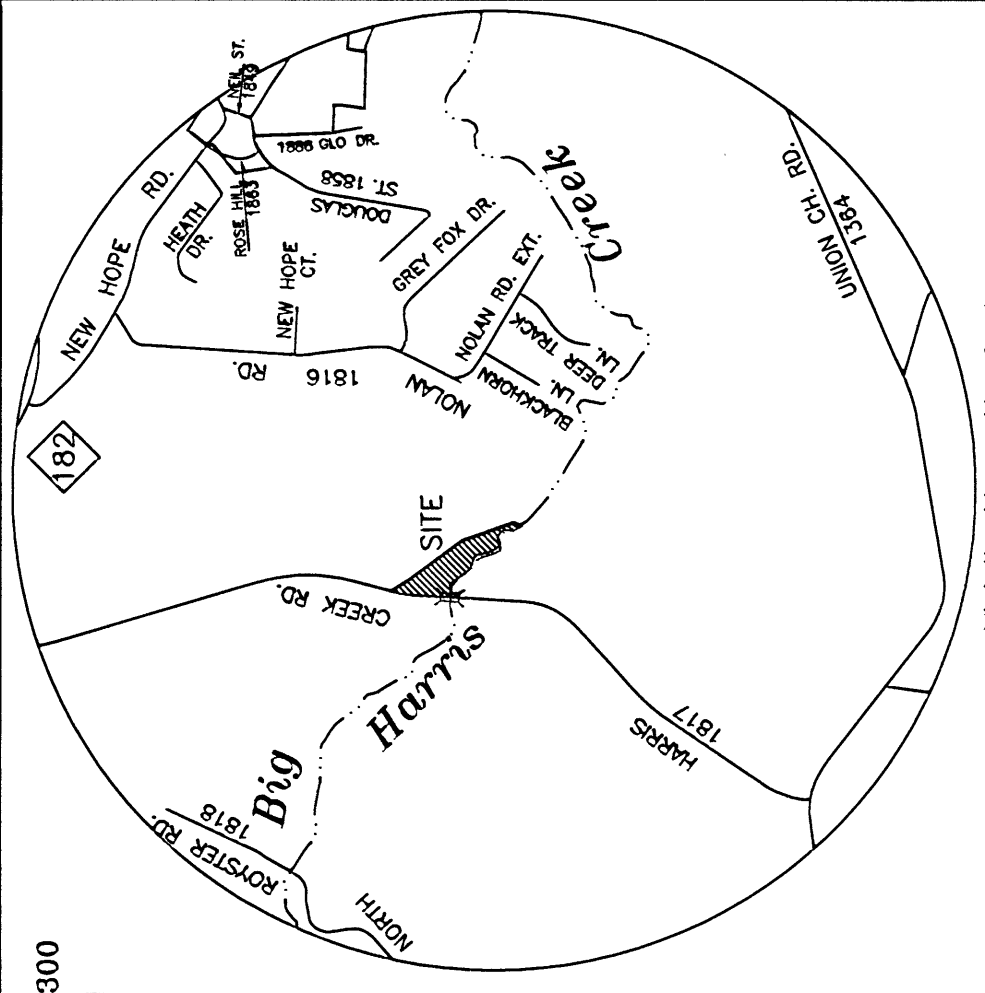
Bk 33 Pg 107

RECORDING FEE \$ 21.00

Curve	Radius	Length	Chord	Chord Bear.
C1	1152.68'	202.54'	202.28'	S 07°52'49" W

Course	Bearing	Distance
L1	S 38°21'57" E	117.41'
L2	S 34°38'37" E	138.23'
L3	S 63°09'14" E	73.68'
L4	S 76°42'01" E	29.52'
L5	S 68°23'40" E	67.41'
L6	S 11°09'15" E	134.52'
L7	S 33°50'42" E	49.78'
L8	S 33°50'42" E	60.89'
L9	S 52°02'23" E	43.38'
L10	N 81°35'01" E	74.78'
L11	S 79°19'01" E	29.18'
L12	S 62°39'31" E	25.60'
L13	S 27°35'08" E	60.96'
L14	S 06°50'27" W	88.94'
L15	S 25°37'24" E	80.93'
L16	S 38°16'03" E	25.23'

Course	Bearing	Distance
R1	S 21°36'36" W	73.38'
R2	S 88°24'25" E	30.00'
R3	S 40°01'41" W	15.81'
R4	N 88°24'25" W	25.00'
R5	S 21°36'36" W	67.47'
R6	N 82°29'24" W	129.31'
R7	S 03°06'29" W	42.23'



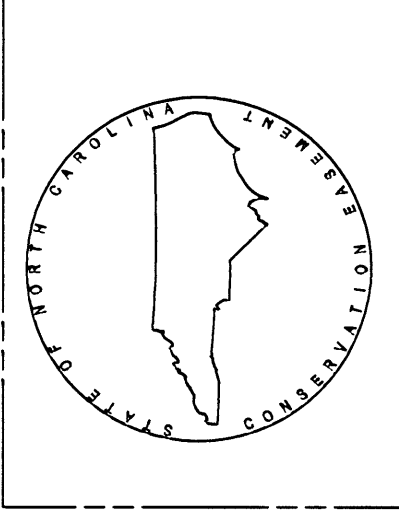
Vicinity Map No Scale

State of North Carolina
County of Cleveland
I, Alan McCuley, Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.
Review Officer: Alan McCuley Date: 7-17-2009

We hereby certify that we are the owners of the property shown
and described hereon and that we hereby adopt this Conservation
Easement for the Ecosystem Enhancement Program.

Date	Owner

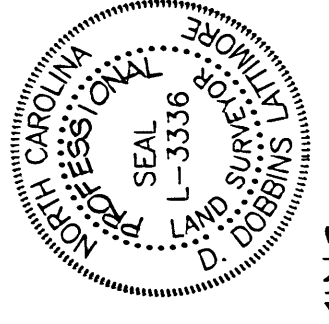
I, D. Dobbins Lattimore certify one of the following as marked:
 a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;
 b. that the survey is located in such portion of a county or a municipality that is unregulated as to an ordinance that regulates parcels of land;
 c. that the survey is of an existing parcel or parcels of land;
 d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;
 e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (d) through (d) above.



Detail of Alum. Cap
State of North Carolina
Conservation Easement

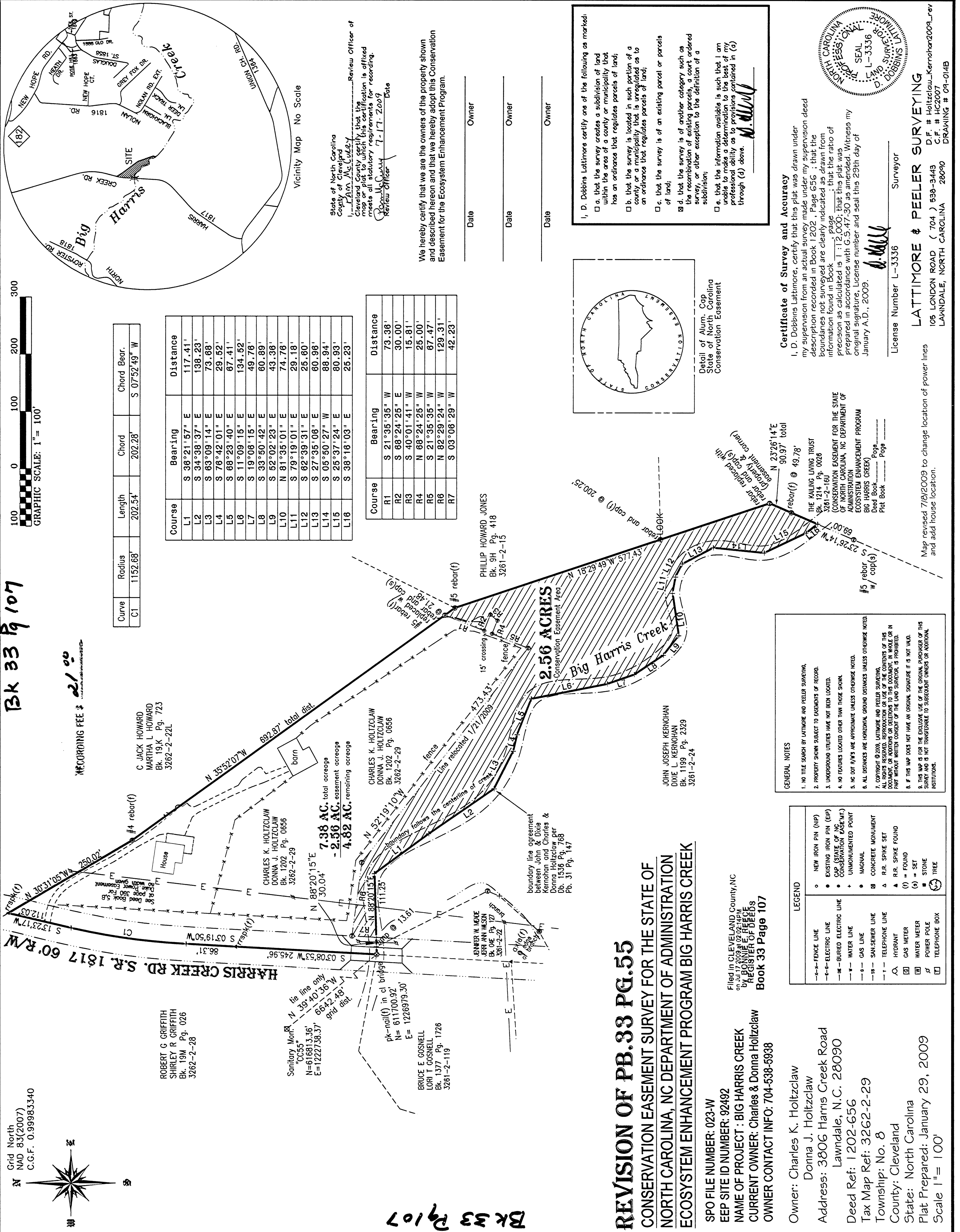
Certificate of Survey and Accuracy

I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book 1202, Page 656; that the boundaries not surveyed are clearly indicated as drawn from information found in Book _____ page _____; that the ratio of precision as calculated is 1:12,000; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, License number and seal this 29th day of January A.D., 2009.



License Number L-3336
Surveyor

LATTIMORE & PEELER SURVEYING
105 LONDON ROAD (704) 538-3445
LAUNDALE, NORTH CAROLINA 28090
D.F. # HC2007
C.F. # HC2007
DRAWING # 01-014B



HARRIS CREEK RD. S.R. 1817 60' R/W
S 15°33'17" W 112.03'
S 03°19'50" W 86.31'
S 05°08'53" W 245.96'
N 35°52'07" W 692.87' total dist.
N 30°31'05" W 250.02'
N 88°20'15" E 30.04'
N 52°19'10" W 111.23'
N 88°20'15" E 111.23'
N 35°40'36" W 6642.48' dist.
pk-nail(t) in cl bridge
N= 611700.92'
E= 1226979.30'
BRUCE E GOSNELL
LORI T GOSNELL
Bk. 1377 Pg. 1726
3261-2-119

ROBERT G GRIFFITH
SHIRLEY R GRIFFITH
Bk. 19M Pg. 026
3262-2-28

Sanitary Manhole
"CC55"
N=616813.36'
E=1222738.37'

CHARLES K. HOLTZCLAW
DONNA J. HOLTZCLAW
Bk. 1202 Pg. 0656
3262-2-29

CHARLES K. HOLTZCLAW
DONNA J. HOLTZCLAW
Bk. 1202 Pg. 0656
3262-2-29

boundary line agreement
between John & Dixie
Kernohan and Charles &
Donna Holtzclaw per
Db. 1536 Pg. 768
Pg. 31 Pg. 147

PHILLIP HOWARD JONES
Bk. 9H Pg. 418
3261-2-15

JOHN JOSEPH KERNOHAN
DIXIE L. KERNOHAN
Bk. 1199 Pg. 2329
3261-2-24

REVISION OF PB.33 PG.55
CONSERVATION EASEMENT SURVEY FOR THE STATE OF
NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION
ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-W
EEP SITE ID NUMBER: 92492
NAME OF PROJECT : BIG HARRIS CREEK
CURRENT OWNER: Charles & Donna Holtzclaw
OWNER CONTACT INFO: 704-538-5938

Owner: Charles K. Holtzclaw
Donna J. Holtzclaw
Address: 3806 Harris Creek Road
Lawndale, N.C. 28090
Deed Ref: 1202-656
Tax Map Ref: 3262-2-29
Township: No. 8
County: Cleveland
State: North Carolina
Plat Prepared: January 29, 2009
Scale 1" = 100'

LEGEND

---+---	ENCE LINE	○	NEW IRON PIN (NIP)
---	ELECTRIC LINE	●	EXISTING IRON PIN (EIP)
---	BURIED ELECTRIC LINE	●	CAP (STATE OF NC CONSERVATION EASEMENT)
---	WATER LINE	+	UNMONUMENTED POINT
---	GAS LINE	+	MAGNANAL
---	SAN-SEWER LINE	⊗	CONCRETE MONUMENT
---	TELEPHONE LINE	▲	R.R. SPIKE SET
○	HYDRANT	()	FOUND
□	GAS METER	()	SET
□	WATER METER	■	STONE
□	POWER POLE	⊗	TREE
□	TELEPHONE BOX		

GENERAL NOTES

- NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
- PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
- UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
- NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
- NO DISTANCES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
- ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
- CORRECT © 2009, LATTIMORE AND PEELER SURVEYING. ALL RIGHTS RESERVED. REPRODUCTION OR USE OF THE CONTENTS OF THIS DOCUMENT, OR ADDITIONS OR DELETIONS TO THIS DOCUMENT, IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF THE LAND SURVEYOR, IS PROHIBITED.
- IF THIS MAP DOES NOT HAVE AN ORIGINAL SIGNATURE IT IS NOT VALID.
- THIS MAP IS FOR THE EXCLUSIVE USE OF THE ORIGINAL PURCHASER OF THIS SURVEY AND IS NOT TRANSFERABLE TO SUCCESSOR OWNERS OR ADDITIONAL INSTITUTIONS.

Map revised 7/8/2009 to change location of power lines and add house location.

Map revised 7/8/2009 to change location of power lines and add house location.

13
114403

* Susan Biggers
RECORDING FEE \$ 50.00 REVENUES 83.00

Filed in CLEVELAND County, NC
on Sep 19 2008, at 02:43:08 PM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 1561 Page 1462

STATE OF NORTH CAROLINA

CONSERVATION EASEMENT

CLEVELAND COUNTY
SPO File Number 023-X
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office: Blane Rice
1321 Mail Service Center
Raleigh, NC 27699-1321

Issued Sep 19 2008
\$83.00
by BONNIE E. REECE
REGISTER OF DEEDS ID.18472
State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

THIS CONSERVATION EASEMENT DEED, pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 19th day of September, 2008, by Donald Jones and wife Melinda Jones, J. Robert Jones and wife Vickie Jones, and The Kailing Living Trust, (Dated September 29, 1997) Gerald R. Kailing and Brenda J. Kailing, Co-Trustees, (" Grantor "), whose mailing address is C/O Don Jones 1925 Metcalf Rd. Shelby, NC 28150, to the State of North Carolina, (Grantee), whose mailing address is 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in

Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

Book 1561 Page 1463

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in **Township, No. 8 Cleveland County, North Carolina** (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately **18.68** acres and being conveyed to the Grantor by deed as recorded in, **Deed Book 9-H Page 421; 1214 Page 0026** of the Cleveland County Register of Deeds Office.

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of the waters of **(Big Harris Creek II)**

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement of the nature and character and to the extent hereinafter set forth, over a described area of the Property, referred to hereafter as the "**Easement Area**", for the benefit of the people of North Carolina, and being all of the tract of land as identified as **Conservation Easement Area 12.11 acres** as shown on a plat of survey entitled "**Conservation Easement Survey for the State of NC, NC Department of Administration Ecosystem Enhancement Program, Big Harris Creek dated January 21, 2008 certified by D. Dobbin Lattimore License Number L-3336.**" The Conservation Easement Area being more particularly described as follows:

**See Exhibit A and
Exhibit B (CE plat)**

The purposes of this Conservation Easement are to maintain, restore, enhance, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

Book 1561 Page 1464

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

Grantor will be allowed to hand pan for gold in the Creek providing there is no digging, shoveling, dredging, or sluicing in the Easement Area. The Grantor will replace all disturbed facilities, features, and vegetation in accordance with all applicable local, state and federal regulations in the Easement area such that the Protected Property achieves a rapid recovery

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped recreational and educational uses of the Easement Area. Existing roads, trails or paths may be maintained with loose gravel or permanent vegetation to stabilize or cover the surfaces. Grantor reserves the right for stream crossings across easement area running along southeast property boundary as depicted on attached Exhibit "B."

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for watering as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Ingress, Egress, and Inspection. The Grantee, its employees and agents, successors and assigns, receive the perpetual right of unlimited and repeated ingress and egress to the Easement Area over the Property at reasonable times to undertake any activities to restore, manage, maintain, enhance, and monitor the wetland and riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement: Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown above or to other address(es) as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this

Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

Donald Jones (SEAL)
Donald Jones

Melinda Jones (SEAL)
Melinda Jones (spouse)

Book 1561 Page 1469

NORTH CAROLINA

COUNTY OF *Cleveland*

I, *Ann M. Deaton*, a Notary Public in and for the County and State aforesaid, do hereby certify that Donald Jones and wife, Melinda Jones, (1/3 interest) Grantor, personally appeared before me this day, and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the *19th* day of *September*, 200*8*.

Ann M. Deaton
Notary Public

My commission expires:

8-7-2010



J. Robert Jones (SEAL)
J. Robert Jones

Vickie V. Jones (SEAL)
Vickie Jones (spouse)

NORTH CAROLINA

COUNTY OF Cleveland

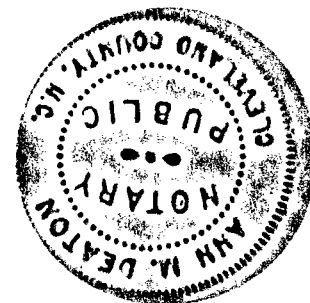
I, Ann M. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that J. Robert Jones and wife Vickie Jones, (1/3 interest) Grantor, personally appeared before me this day, and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 19th day of September, 2008.

Ann M. Deaton
Notary Public

My commission expires:

8-7-2010



Brenda J. Kailing (SEAL)
Brenda J. Kailing (Co-Trustee for the Kailing Living Trust)

Gerald R. Kailing (SEAL)
Gerald R. Kailing (Co-Trustee for the Kailing Living Trust)

Book 1561 Page 1471

~~NORTH CAROLINA~~ GEORGIA

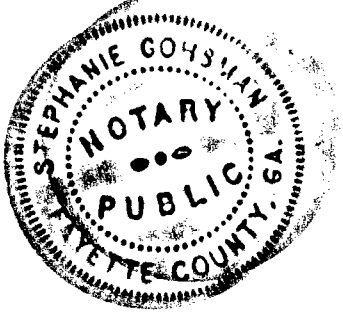
COUNTY OF Fayette

I, Stephanie Gohsman, a Notary Public in and for the County and State aforesaid, do hereby certify that Brenda J. Kailing and Gerald R. Kailing, (Co-Trustees for the Kailing Living Trust) (1/3 interest) Grantor, personally appeared before me this day, and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 15th day of September, 2008.

[Signature]
Notary Public

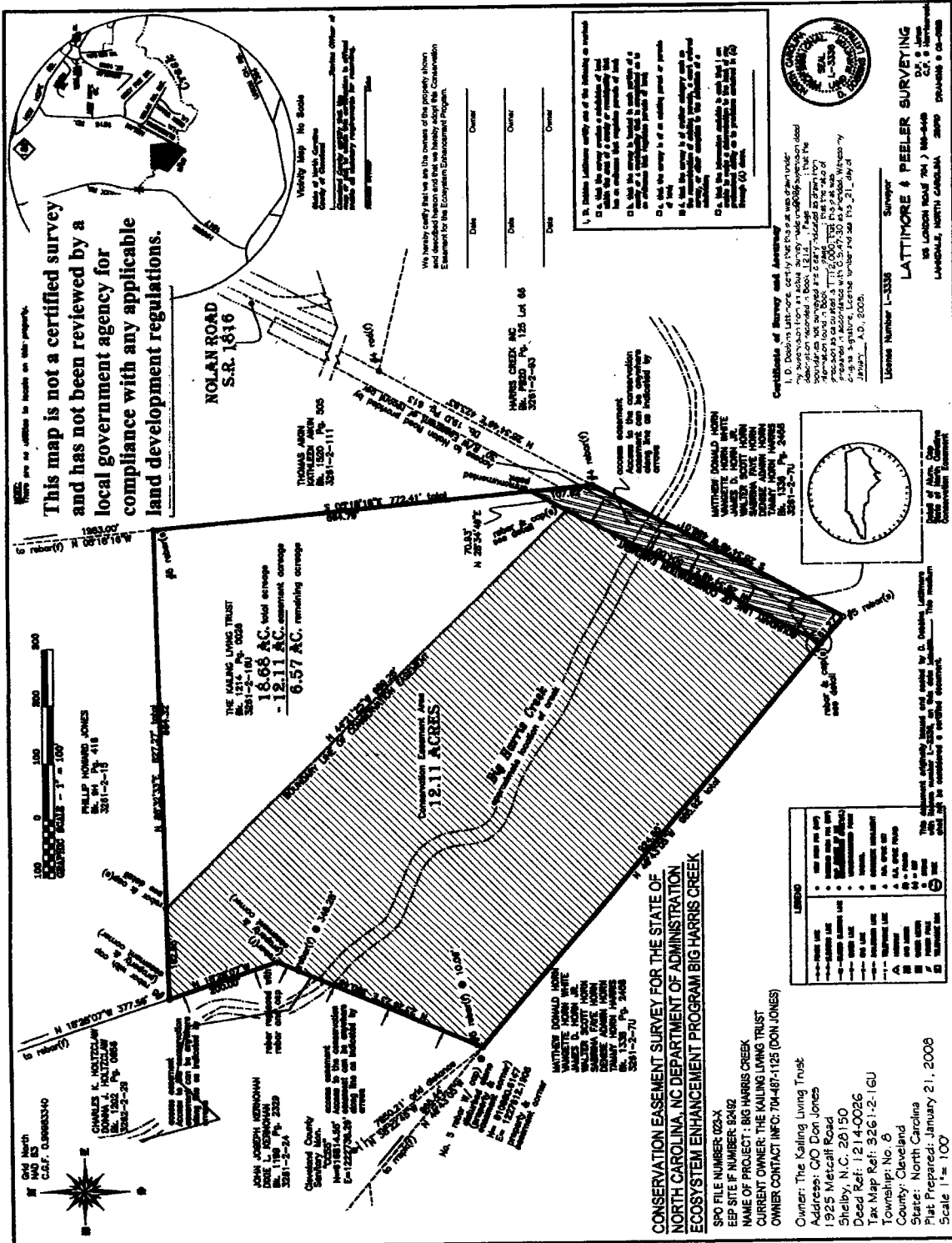
My commission expires:
Notary Public, Fayette County, Georgia
My Commission Expires June 27th, 2011



Commencing on Cleveland County Sanitary District Monument "CC55" having North Carolina Grid Coordinates of NAD 83 (86) of N= 616814.55 feet and E= 1222738.29 feet; THENCE South 38 degrees 22 minutes 45 seconds for a grid distance 7850.21 feet to a No. 5 rebar and cap stamped Conservation Easement set replacing existing rebar at a disturbed stone said corner being the Southeastern most corner of the John J. Kernohan and wife Dixie L. Kernohan property as recorded in deed book 1199 at page 2329 of the Cleveland County Registry and said corner having North Carolina Grid Coordinates of (NAD 83) of N= 610660.61 feet and E= 1227612.19 feet, a corner located South 49 degrees 43 minutes 05 seconds for a distance of 865.44 feet from a railroad spike(found) a corner in the John J. Kernohan and Dixie L. Kernohan property; THENCE from this point of beginning North 23 degrees 26 minutes 23 seconds East passing a witness No. 5 rebar(found) at 10.06 feet and a witness rebar(found) at 349.28 feet for a total distance of 390.46 feet to a rebar with cap stamped Conservation Easement marking the common corner between the Charles Holtzclaw and wife Donna Holtzclaw property as recorded in deed book 1202 at page 656 of the Cleveland County Registry and the property of The Kailing Living Trust as recorded in deed book 1214 at page 26 of the Cleveland County Registry; THENCE along the common boundary between the Holtzclaw property and The Kailing Living Trust property North 18 degrees 28 minutes 07 seconds for a total distance of 200.00 feet to No. 5 rebar(set) with cap stamped Conservation Easement the Southwestern corner of the Phillip H. Jones as recorded in deed book 9,H at page 418, said corner being located South 18 degrees 28 minutes 07 seconds for a distance of 377.56 feet to a rebar(found) a corner in the property of Holtzclaw; THENCE along the common boundary between Phillip Jones and The Kailing Living Trust North 88 degrees 32 minutes 33 seconds for a distance of 162.95 feet to a rebar with cap(set) stamped Conservation Easement; THENCE a new line through The Kailing Living Trust property and marking the Northeastern most line of the Conservation Easement Area South 44 degrees 21 minutes 25 seconds for a distance of 989.28 feet to a rebar with cap(set) stamped Conservation Easement; THENCE another new line through The Kailing Living Trust property, said line located sixty feet measured perpendicularly from the Eastern most property line of the said property and also marking the Eastern most line of the Conservation Easement South 28 degrees 34 minutes 49 seconds for a distance of 504.00 feet to a rebar with cap(set) stamped Conservation Easement in the common boundary between the property of The Kailing Living Trust and the property of Matthew D. Horn et al as recorded in deed book 1338 at page 2458 of the Cleveland County Registry, said corner located North 49 degrees 43 minutes 05 seconds for a distance of 61.27 feet from a No. 5 rebar set the common corner of the Matthew D.

Horn et al property and The Kailing Living Trust property; THENCE along the common line between Matthew D. Horn et al and The Kailing Living Trust North 49 degrees 43 minutes 05 seconds for a distance of 924.65 feet to the place of beginning containing 12.11 acres. The above description is according to a survey by D. Dobbins Lattimore on the 21st of January 2008 and recorded in the Cleveland County Registry at Plat Book 32 Page 114.

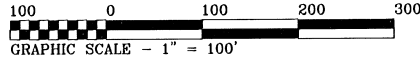
Book 1561 Page 1473



PB 32 PAGE 114

BK 32 Pg 114

Grid North
NAD 83
C.G.F. 0.99983340



PHILLIP HOWARD JONES
Bk. 9H Pg. 418
3261-2-15

CHARLES K. HOLTZCLAW
DONNA J. HOLTZCLAW
Bk. 1202 Pg. 0656
3262-2-29

JOHN JOSEPH KERNOHAN
DIXIE L. KERNOHAN
Bk. 1199 Pg. 2329
3261-2-24

Cleveland County
Sanitary Mon.

"CC55"
N=616814.55'
E=1222738.29'

access easement
Access to the conservation
easement can be anywhere
along line as indicated by
arrows

No. 5 rebar W/ cap
disturbed stone
easement corner
N= 610660.6147
E= 1227612.1906
property &
easement corner

MATTHEW DONALD HORN
VANGETTE HORN WHITE
JAMES D. HORN JR.
WALTER SCOTT HORN
SABRINA FAYE HORN
DENISE ADAWN HORN
TAMMY HORN HARRIS
Bk. 1338 Pg. 2458
3261-2-7U

THE KAILING LIVING TRUST
Bk. 1214 Pg. 0026
3261-2-16U

18.68 AC. total acreage
- 12.11 AC. easement acreage
6.57 AC. remaining acreage

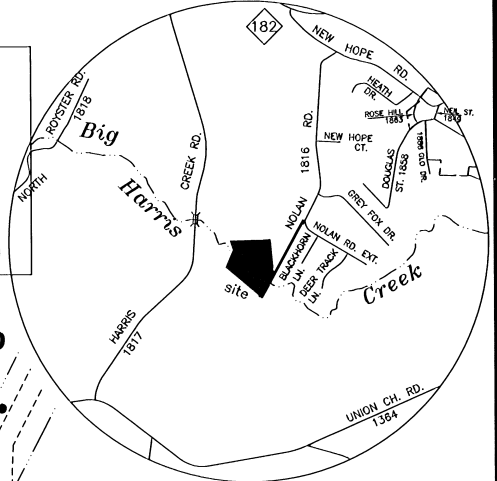
Conservation Easement Area
12.11 ACRES

Big Harris Creek
approximate location of creek

NOTE:
There are no utilities to locate on this property.

GENERAL NOTES

1. NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
2. PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
3. UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
4. NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
5. NC DOT R/W'S ARE APPROXIMATE UNLESS OTHERWISE NOTED.
6. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
7. ALL IMPROVEMENTS SHOWN ON THIS MAP WERE MEASURED ON GROUND OR TAKEN FROM AERIAL PHOTOGRAPHY.



Vicinity Map No Scale
State of North Carolina
County of Cleveland
RONALD JORDAN Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording
Ronald Jordan 07-30-08
Review Officer Date

We hereby certify that we are the owners of the property shown
and described hereon and that we hereby adopt this Conservation
Easement for the Ecosystem Enhancement Program.

5/29/2008 Date *Don Jones* Owner

Date Owner

Date Owner

HARRIS CREEK INC
Bk. PB20 Pg. 125 Lot 66
3261-2-93

MATTHEW DONALD HORN
VANGETTE HORN WHITE
JAMES D. HORN JR.
WALTER SCOTT HORN
SABRINA FAYE HORN
DENISE ADAWN HORN
TAMMY HORN HARRIS
Bk. 1338 Pg. 2458
3261-2-7U

CONSERVATION EASEMENT SURVEY FOR THE STATE OF
NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION
ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-X
EEP SITE IF NUMBER: 92492
NAME OF PROJECT : BIG HARRIS CREEK
CURRENT OWNER: THE KAILING LIVING TRUST
OWNER CONTACT INFO: 704-487-1125 (DON JONES)

FILED in CLEVELAND County, NC
on Jul 30 2008 at 11:48:03 AM
by BONNIE E. REECE
REGISTER OF DEEDS
BOOK 32 PAGE 114

Owner: The Kailing Living Trust
Address: C/O Don Jones
1925 Metcalf Road
Shelby, N.C. 28150
Deed Ref: 1214-0026
Tax Map Ref: 3261-2-16U
Township: No. 8
County: Cleveland
State: North Carolina
Plat Prepared: January 21, 2008
Scale 1"= 100'

LEGEND	
-x-x-	FENCE LINE
-e-e-	ELECTRIC LINE
-w-w-	BURIED ELECTRIC LINE
-w-w-	WATER LINE
-g-g-	GAS LINE
-s-s-	SAN-SEWER LINE
-t-t-	TELEPHONE LINE
△	HYDRANT
□	GAS METER
□	WATER METER
⊕	POWER POLE
□	TELEPHONE BOX
○	NEW IRON PIN (NIP)
●	EXISTING IRON PIN (EIP)
○	OP (STATE OF NC CONSERVATION EASEMENT)
+	UNMONUMENTED POINT
⊕	MAGNAIL
⊕	CONCRETE MONUMENT
△	R.R. SPIKE SET
△	R.R. SPIKE FOUND
(f)	= FOUND
(s)	= SET
■	STONE
⊕	TREE



Detail of Alum. Cap
State of North Carolina
Conservation Easement

I, D. Dobbins Lattimore certify one of the following as marked:

- a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;
- b. that the survey is located in such portion of a county or a municipality that is unregulated as to an ordinance that regulates parcels of land;
- c. that the survey is of an existing parcel or parcels of land;
- d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;
- e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (a) through (d) above.

Certificate of Survey and Accuracy
I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book 1214, Page 0026, that the boundaries not surveyed are clearly indicated as drawn from information found in Book 1214, Page 0026, that the ratio of precision as calculated is 1:12,000; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my hand and signature, license number and seal this 21 day of May A.D., 2008.



License Number L-3336 Surveyor

LATTIMORE & PEELER SURVEYING
D.F. # Jones
C.F. # Harris Creek
105 LONDON ROAD # 704 | 530-3443
LAWDALE, NORTH CAROLINA 28090 DRAWING # 08-013B

12

125965

Filed in CLEVELAND County, NC
on Jul 30 2009, at 02:26:25 PM

By BONNIE E. REECE
REGISTER OF DEEDS

Book 1580 Page 2053

Issued Jul 30 2009

\$83.00

By BONNIE E. REECE
REGISTER OF DEEDS ID 19653

State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

RECORDING FEE \$ 47.⁰⁰ REVENUES 83.⁰⁰

**STATE OF NORTH CAROLINA
EASEMENT**

**CONSERVATION
AND ACCESS
EASEMENT**

* *Susan Priggen*

**CLEVELAND COUNTY
SPO File Number 023-ZG
EEP Site ID Number 739**

Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office: Blane Rice
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT AND ACCESS EASEMENT,
pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this
29th day of July, 2009, by Hamilton Eaker and wife, Joan H. Eaker, ("Grantor"), whose mailing address is 148 Ridgecrest Dr. Forest City, NC 28043, to the State of North Carolina, ("Grantee"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in **No. 8** Township, **Cleveland** County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately **72.710** acres and being conveyed to the Grantor by deed as recorded in **Deed Book 15T at Page 051** of the **Cleveland County** Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of the waters of ***Big Harris Creek***

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement of the nature and character and to the extent hereinafter set forth, over a described area of the Property, referred to hereafter as the "**Easement Area**", for the benefit of the people of North Carolina, and being all of the tract of land as identified as **Conservation Easement Area 23.63** acres and **Conservation Easement Area 0.79 acres** totaling **24.42 together along with a 30' wide access easement containing 0.14 acres** as shown on a plat of survey entitled "**Conservation Easement Survey for the State of North Carolina, NC Department of Administration Ecosystem Enhancement Program Big Harris Creek**" dated **04.21.09, certified by Dobbins Lattimore, and recorded in Map Book 33, Page 73, Cleveland County Registry.** Conservation Easement Area being more particularly described as follows:

See Attached Exhibit B

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Grantee reserves the rights to acquire Conservation Easement in area defined on survey titled Conservation Easement Survey for the State of North Carolina, Department of Administration, Ecosystem Enhancement Program, Big Harris Creek dated 04-21.2009, but not disturb the trees located in specific area noted on attached Exhibit A as 3.93 acres, until the expiration of “Conservation Reserve Program Contract # 615 expiration date of September 30,2011 During the existence of the Conservation Reserve Program contract the trees in the designated 3.93 area cannot be thinned, harvested or removed. The trees in this area are described as loblolly pines, and are not to be damaged, or removed in any manner until expiration of the Conservation Reserve Program (CRP contract). After expiration of Conservation Reserve Program contract of September 30, 2011, CRP contract #615, Grantor will be prohibited from any development or usage that would impair or interfere with the purposes of the Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native

plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped recreational and educational uses of the Easement Area. Existing roads, trails or paths may be maintained with loose gravel or permanent vegetation to stabilize or cover the surfaces.

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no

subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Ingress, Egress, and Inspection. The Grantee, its employees and agents, successors and assigns, receive the perpetual right of unlimited and repeated ingress and egress to the Easement Area over the Property at reasonable times to undertake any activities to restore, manage, maintain, enhance, and monitor the wetland and riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the

conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is

found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown above or to other address(es) as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are

free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

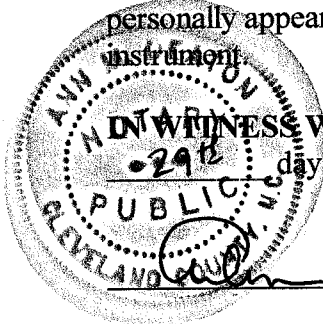
Yates H. Eaker (SEAL)
Hamilton Eaker

Joanne H Eaker (SEAL)
Joan H. Eaker

NORTH CAROLINA

COUNTY OF Cleveland

I, Ann M Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that Hamilton Eaker and wife Joan H. Eaker, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.



IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 29th day of July, 2009.

Notary Public

My commission expires:

8-7-2010

Exhibit B
Legal Description for Conservation Easement
Hamilton Eaker and Joan H. Eaker

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616813.36 feet E= 1222738.37 feet; THENCE South 62 degrees 51 minutes 04 seconds West for a grid distance of 5476.39 feet to a two inch pipe said corner having the North Carolina Grid Coordinates (NAD 83) and said corner being the Northwest corner of the Hamilton and Joan Eaker property as described in Deed book 15-T page 51 of the Cleveland County registry and being the Southwestern corner of the David and Peter Gold property as described in Deed book 1106 page 917 of the Cleveland County registry and also being in the western line of the Kenneth and Clara McEntire property as described in Deed book 1333 page 581 of the Cleveland County registry; THENCE with the Gold line North 84 degrees 47 minutes 47 seconds East for a distance of 1181.71 feet to a No.5 rebar set with a cap stamped Conservation Easement said corner being the point of BEGINNING; THENCE thirteen new lines through the Eaker property South 28 degrees 08 minutes 40 seconds East for a distance of 272.73 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 68 degrees 09 minutes 28 seconds East for a distance of 256.87 feet to a No.5 rebar

set with a cap stamped Conservation Easement; THENCE South 87 degrees 29 minutes 31 seconds East for a distance of 422.65 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 89 degrees 48 minutes 42 seconds East for a distance of 466.79 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 60 degrees 58 minutes 28 seconds East for a distance of 607.01 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 83 degrees 13 minutes 02 seconds East for a distance of 305.78 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 25 degrees 50 minutes 15 seconds West for distance of 121.74 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 71 degrees 49 minutes 14 seconds East for a distance of 223.11 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 41 degrees 01 minutes 49 seconds East for a distance of 173.96 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 75 degrees 35 minutes 08 seconds East for a distance of 367.38 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 13 degrees 49 minutes 49 seconds East for a distance of 119.39 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 22 degrees 27 minutes 19 seconds West for a distance of 140.20 feet to an unmarked point said point being the Northwestern most point of a 30 foot access easement; THENCE with the northern line of the 30 foot access easement South 86 degrees 11 minutes 38 seconds East for a distance of 202.61 feet to an unmarked point in the Eastern line of the Eaker tract said unmarked point being located N 00 degrees 13 minutes 52 seconds East for a distance of 21.02 feet from a rail road spike said corner being the Southeastern corner of the Eaker tract; THENCE North 00 degrees 13 minutes 52 seconds East for a distance of 774.80 feet to a rail road spike in Stick Elliott road said corner being the Northeastern corner of the Eaker property and the Southeastern corner of the Elliott's Memorial Church as described in Deed book 7-B page 352 of the Cleveland County registry; THENCE with the Elliott's Memorial Church property South 82 degrees 10 minutes 45 seconds West for a distance of 198.61 feet to a No.3 rebar and passing over a No.5 rebar set with a cap stamped Conservation Easement at 30.38 feet; THENCE South 66 degrees 32 minutes 57 seconds West for a distance of 408.72 feet to a flat stone said corner being a common corner of the Jo Ellen Cornwell property as described in Deed book 18-X page 455 of the Cleveland County registry and the Eaker property; THENCE South 86 degrees 01 minutes 07 seconds West for a distance of 2223.74 feet to a one inch bent pipe in the Gold property line; THENCE South 84 degrees 47 minutes 47 seconds West for a distance of 110.08 feet to the point of BEGINNING.

Containing **23.63** acres more or less.

Commencing on the terminus of the twelfth call of the 23.63 acre tract as described above said point being the Northwestern point of the 30 foot access easement and being located South 22 degrees 27 minutes 19 seconds West for a distance of 140.20 feet from a No.5 rebar set with a cap stamped Conservation Easement; THENCE with the 30 foot access easement for the next two calls South 22 degrees 27 minutes 19 seconds West for a distance of 13.53 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 45 degrees 33 minutes 27 seconds West for a distance of 23.02 feet to an unmarked point said point being the point of BEGINNING; THENCE two new lines

through the Hamilton and Joan Eaker property as described in Deed book 15-T Page 51 of the Cleveland County registry South 45 degrees 33 minutes 27 seconds West for a distance of 322.54 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 69 degrees 22 minutes 21 seconds West for a distance of 42.70 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Eaker and Royster Turkey Farm property line said corner being located South 07 degrees 05 minutes 24 seconds East for a distance of 98.77 feet from a No.5 rod said corner being the common corner of the Eaker and Royster Turkey Farm property as described in Deed book 1180 Page 113 of the Cleveland County Registry; THENCE with the Royster Turkey Farm property South 07 degrees 05 minutes 24 seconds East for a distance of 68.08 feet to a 1.5 inch bent pipe said corner being a common corner of the Royster Turkey Farm property and the Patricia Whitaker property as described in Deed book 12-C page 315 of the Cleveland County registry; THENCE with the Whitaker property for the next 2 calls North 55 degrees 12 minutes 04 seconds East for a distance of 499.36 feet to a 1 inch pipe; THENCE North 76 degrees 51 minutes 39 seconds East for a distance of 46.58 feet to a No.5 rebar set with a cap stamped Conservation Easement said corner being a Southeastern corner of the 30 foot access easement; THENCE with the 30 foot access easement North 86 degrees 11 minutes 38 seconds West for a distance of 194.00 feet to the point of BEGINNING.

Containing 0.79 acres more or less.

30' Access Easement

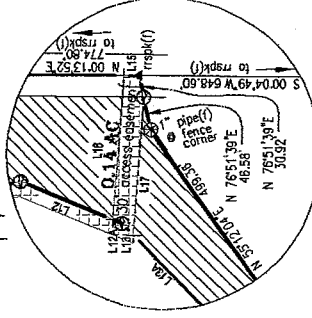
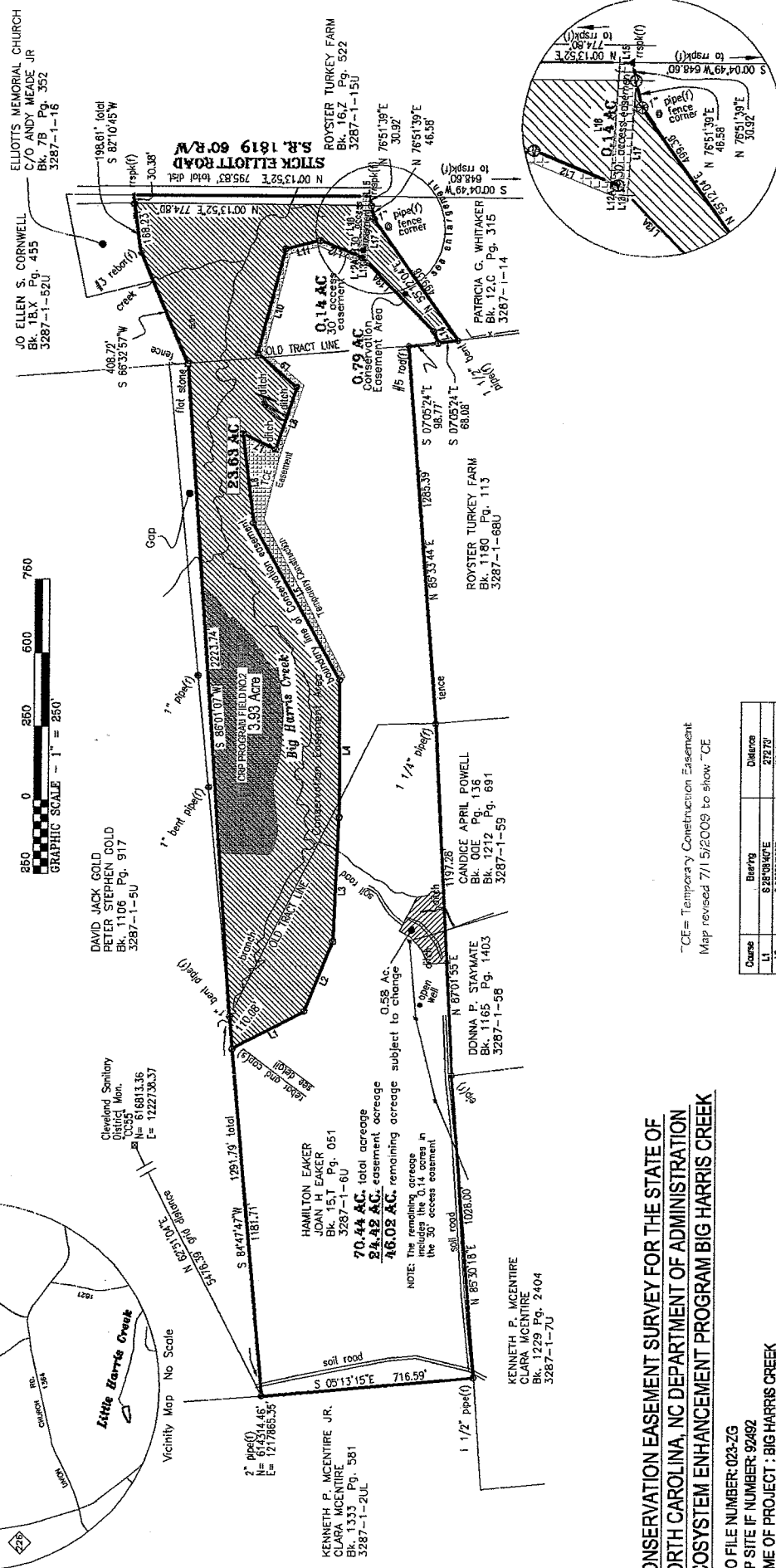
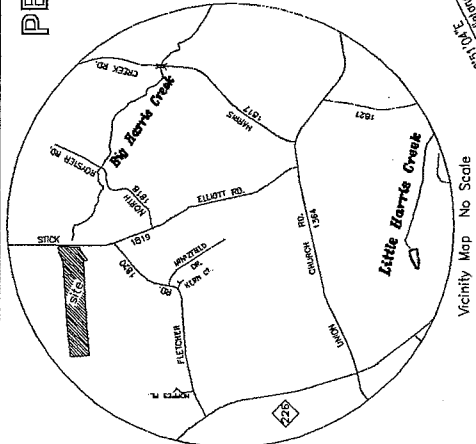
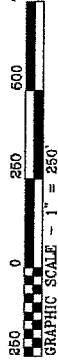
BEGINNING on the terminus of the twelfth call of the 23.63 acre tract as described above said point being the Southwestern point of the above mentioned tract and being located South 22 degrees 27 minutes 19 seconds West for a distance of 140.20 feet from a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 22 degrees 27 minutes 19 seconds West for a distance of 13.53 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 45 degrees 33 minutes 27 seconds West for a distance of 23.02 feet to an unmarked point said point being located North 45 degrees 33 minutes 27 seconds East for a distance of 322.54 from a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 86 degrees 11 minutes 38 seconds East for a distance of 194.00 feet to a No.5 rebar set with a cap stamped Conservation Easement in the line of the Hamilton and Joan Eaker property as described in Deed book 15-T Page 51 of the Cleveland County Registry and the Patricia Whitaker property as described in Deed book 12-C page 315 of the Cleveland County registry; THENCE with the northern line of the Whitaker property N 76 degrees 51 minutes 39 seconds East for a distance of 30.92 feet to a rail road spike in Stick Elliott road; THENCE leaving the Whitaker property line and running with the center of Stick Elliott road North 00 degrees 13 minutes 52 seconds East for a distance of 21.02 feet to an unmarked point; THENCE North 86 degrees 11 minutes 38 seconds West for a distance of 202.61 feet to the point of BEGINNING.

Containing 0.14 acres more or less

PB.33 PG.73

THIS MAP IS NOT A CERTIFIED SURVEY AND HAS NOT BEEN REVIEWED BY A LOCAL GOVERNMENT AGENCY FOR COMPLIANCE WITH ANY APPLICABLE LAND DEVELOPMENT REGULATIONS.

Crd North
NAD 83(2007)
C.G.F. 0.99985340



ENLARGEMENT OF '30' ACCESS EASEMENT NOT TO SCALE

Note: The TCE shown on this map was not surveyed and it is shown only as a graphical aid to the location of the TEC. No surveying was performed to locate this area.

TCE = Temporary Construction Easement
Map revised 7/15/2009 to show "CE"

Course	Bearing	Distance
L1	S 28°08'40"E	272.79'
L2	S 60°00'26"E	256.07'
L3	S 67°28'51"E	422.05'
L4	N 89°48'42"E	468.79'
L5	N 80°39'28"E	807.01'
L6	N 83°13'02"E	305.78'
L7	S 25°50'15"W	127.4'
L8	S 71°40'44"E	228.11'
L9	N 41°01'49"E	173.98'
L10	S 75°35'06"E	307.39'
L11	S 13°49'46"E	119.39'
L12	S 22°21'19"W	140.20'
L13	S 45°33'27"W	19.33'
L14	S 45°33'27"W	23.02'
L15	S 85°22'11"W	322.84'
L16	N 00°19'52"E	42.70'
L17	S 89°11'59"W	202.61'
L18	S 89°11'59"W	194.00'

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-2G
EEP SITE IF NUMBER: 92482
NAME OF PROJECT : BIG HARRIS CREEK
CURRENT OWNER: HAMILTON EAKER AND JOAN H. EAKER
OWNER CONTACT INFO: 828-245-4472

Owner: Hamilton Eaker and Joan H. Eaker
Address: 146 Ridgcrest Dr. ForestT
City N.C. 28043
Deed Ref: 15.T-051
Tax Map Ref: 3287-1-6U
Township: No. 8
County: Cleveland
State: North Carolina
Plat Prepared: November 10, 2008
Scale 1"=250'

HAMILTON EAKER
JOAN H. EAKER
Bk. 51 Pg. 051
3287-1-6U
70.44 AC: total acreage
24.42 AC: easement acreage
46.02 AC: remaining acreage
NOTE: The remaining acreage shown is in the 30' access easement

DAVID JACK GOLD
PETER STEPHEN GOLD
Bk. 1106 Pg. 917
3287-1-5U
3.93 Acre
DEPROGRAM FIELDNO.

JO ELLEN S. CORNWELL
Bk. 18X Pg. 455
3287-1-52U
0.14 AC
3 easements
0.70 AC
3 easements
0.14 AC
3 easements
0.70 AC
3 easements

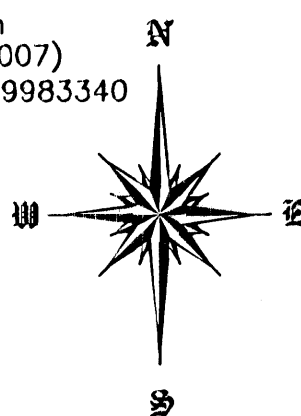
ELLIOTT MEMORIAL CHURCH
C/O ANDY MCJADE JR
Bk. 79 Pg. 352
3287-1-16
ROYSTER TURKEY FARM
Bk. 16Z Pg. 522
3287-1-15U
PATRICIA G. WHITAKER
Bk. 12C Pg. 315
3287-1-14
ROYSTER TURKEY FARM
Bk. 1180 Pg. 113
3287-1-68U
CANDICE APRIL POWELL
Bk. 00E Pg. 136
1212 Pg. 691
3287-1-59
DONNA P. STAYMATE
Bk. 1165 Pg. 1403
3287-1-58
KENNETH P. MCENTIRE
CLARA MCENTIRE
Bk. 1229 Pg. 2404
3287-1-7U

We hereby certify that we are the owners of the property shown and described hereon and that we hereby adopt this Conservation Easement for the Ecosystem Enhancement Program.

BK 33 Pg 73

RECORDING FEE \$ 21.00

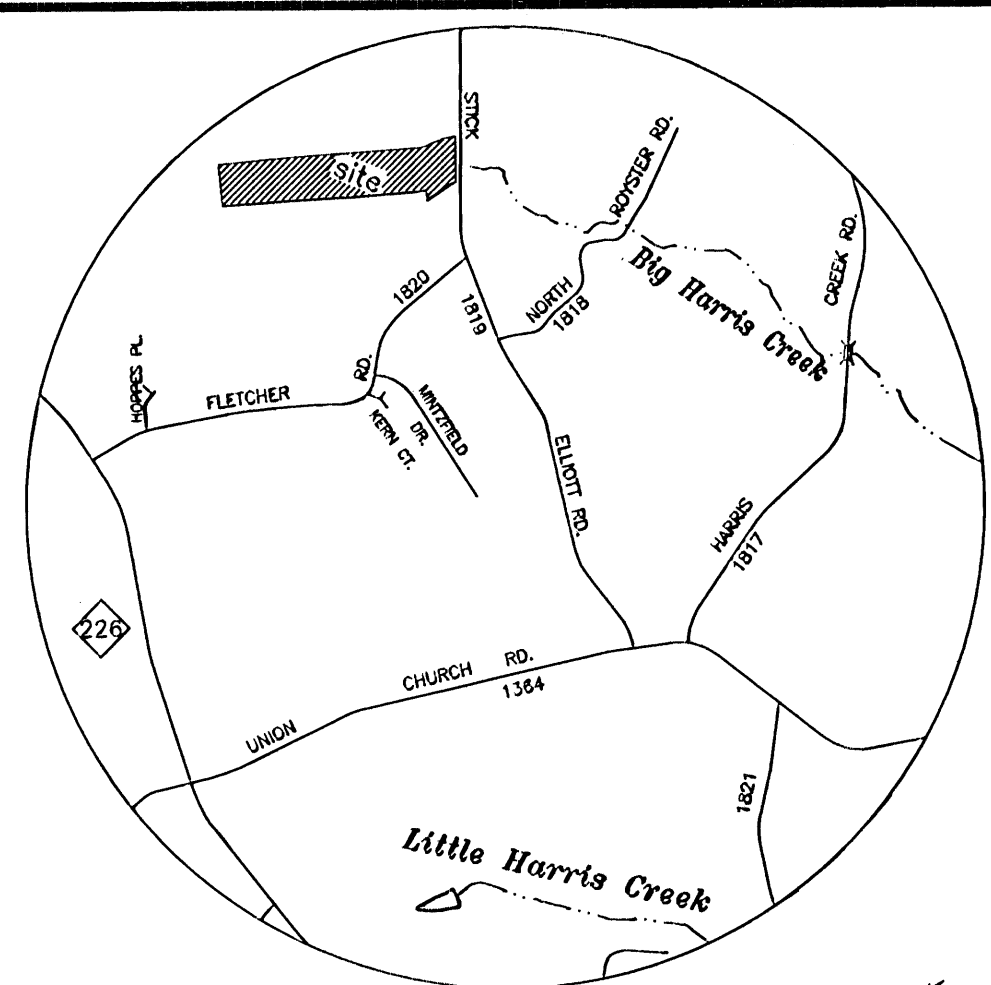
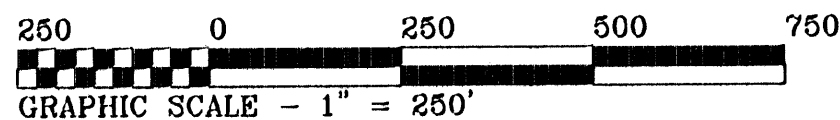
Grid North
NAD 83(2007)
C.G.F. 0.99983340



4/1/09 Y. N. Eaker
Date Owner

State of North Carolina
County of Cleveland
I, RONALD JORDAN, Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.
Ronald Jordan 04-21-09
Review Officer Date

Date Owner



Vicinity Map No Scale

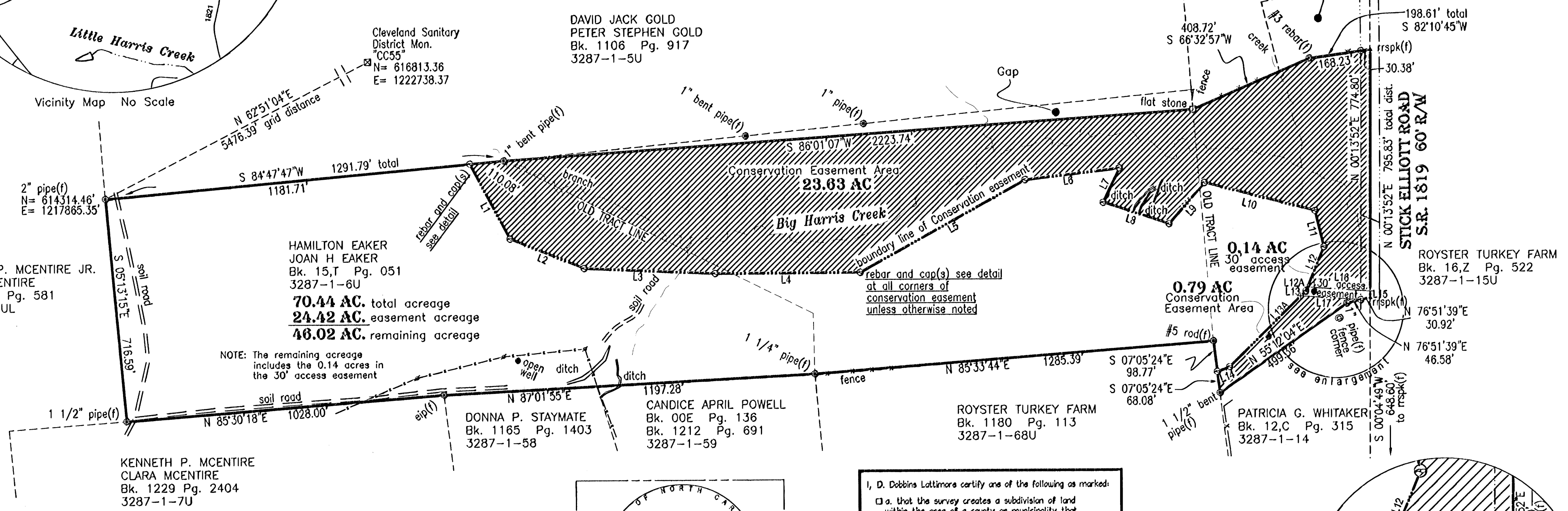
DAVID JACK GOLD
PETER STEPHEN GOLD
Bk. 1106 Pg. 917
3287-1-5U

Cleveland Sanitary
District Mon.
"CC55"
N= 616813.36
E= 1222738.37

JO ELLEN S. CORNWELL
Bk. 18,X Pg. 455
3287-1-52U

ELLIOTT'S MEMORIAL CHURCH
C/O ANDY MEADE JR
Bk. 7B Pg. 352
3287-1-16

BK 33 Pg 73



HAMILTON EAKER
JOAN H EAKER
Bk. 15,T Pg. 051
3287-1-6U
70.44 AC. total acreage
24.42 AC. easement acreage
46.02 AC. remaining acreage

NOTE: The remaining acreage includes the 0.14 acres in the 30' access easement

KENNETH P. MCENTIRE JR.
CLARA MCENTIRE
Bk. 1333 Pg. 581
3287-1-2UL

DONNA P. STAYMATE
Bk. 1165 Pg. 1403
3287-1-58

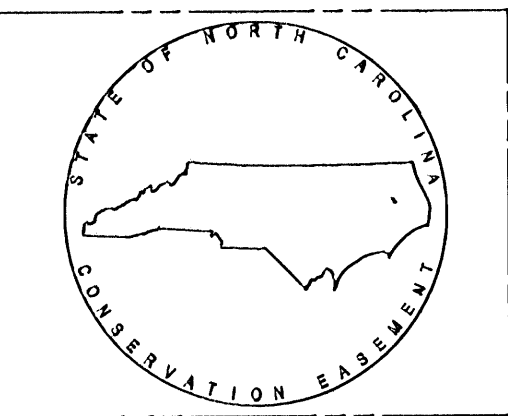
CANDICE APRIL POWELL
Bk. 00E Pg. 136
Bk. 1212 Pg. 691
3287-1-59

ROYSTER TURKEY FARM
Bk. 1180 Pg. 113
3287-1-68U

PATRICIA G. WHITAKER
Bk. 12,C Pg. 315
3287-1-14

ROYSTER TURKEY FARM
Bk. 16,Z Pg. 522
3287-1-15U

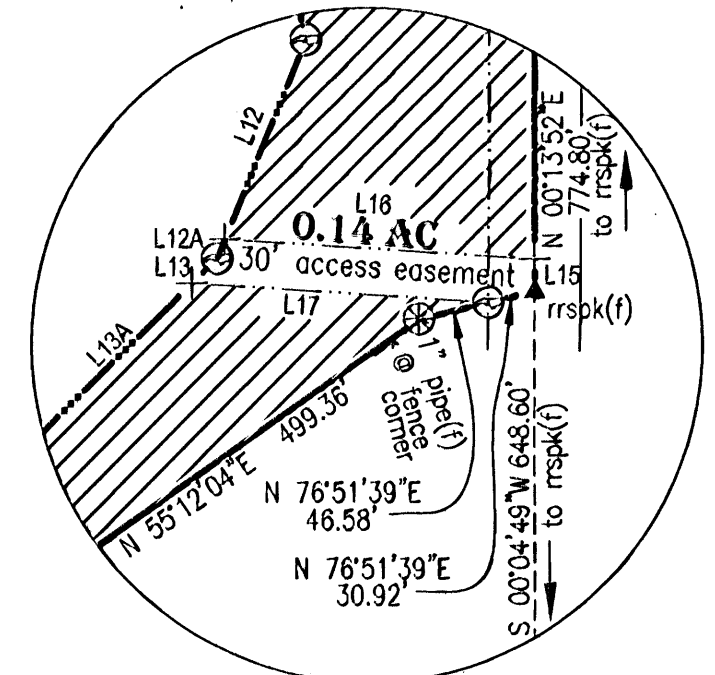
Filed in CLEVELAND County, NC
on Apr 21 2009 at 04:01:09PM
by DONNIE E. REECE
REGISTER OF DEEDS
Book 33 Page 73



Detail of Alum. Cap
State of North Carolina
Conservation Easement

I, D. Dobbins Lattimore certify one of the following as marked:

- a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;
- b. that the survey is located in such portion of a county or a municipality that is unregulated as to an ordinance that regulates parcels of land;
- c. that the survey is of an existing parcel or parcels of land;
- d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;
- e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (a) through (d) above.



ENLARGEMENT OF 30' ACCESS EASEMENT
NOT TO SCALE

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-ZG
EEP SITE NUMBER: 92492
NAME OF PROJECT : BIG HARRIS CREEK
CURRENT OWNER: HAMILTON EAKER AND JOAN H. EAKER
OWNER CONTACT INFO: 828-245-4472

Owner: Hamilton Eaker and Joan H. Eaker
Address: 148 Ridgcrest Dr. Forest T
City N.C. 28043
Deed Ref: 15,T-051
Tax Map Ref: 3287-1-6U
Township: No. 8
County: Cleveland
State: North Carolina
Plat Prepared: November 10, 2008
Scale 1"=250'

LEGEND	
-x-x- FENCE LINE	o NEW IRON PIN (NIP)
-e-e- ELECTRIC LINE	o EXISTING IRON PIN (EIP)
-be- BURIED ELECTRIC LINE	o CAP (STATE OF NC CONSERVATION EASEMENT)
-w- WATER LINE	+ UNMONUMENTED POINT
-g- GAS LINE	o MAGNAIL
-ss- SANSEWER LINE	o CONCRETE MONUMENT
-t- TELEPHONE LINE	o R.R. SPIKE SET
o HYDRANT	o R.R. SPIKE FOUND
o GAS METER	(f) = FOUND
o WATER METER	(s) = SET
o POWER POLE	o STONE
o TELEPHONE BOX	o TREE

Course	Bearing	Distance
L1	S 28°08'40" E	272.73'
L2	S 68°09'28" E	258.87'
L3	S 87°29'31" E	422.85'
L4	N 89°48'42" E	468.79'
L5	N 60°58'28" E	607.01'
L6	N 83°13'02" E	305.78'
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L8	S 71°49'14" E	223.11'
L9	N 41°01'49" E	173.96'
L10	S 75°35'08" E	387.38'
L11	S 13°49'49" E	119.39'
L12	S 22°27'19" W	140.20'
L12A	S 22°27'19" W	13.53'
L13	S 45°33'27" W	23.02'
L13A	S 45°33'27" W	322.54'
L14	S 69°22'21" W	42.70'
L15	N 00°13'52" E	21.02'
L16	N 88°11'38" W	202.81'
L17	S 86°11'38" E	194.00'

GENERAL NOTES

- NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
- PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
- UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
- NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
- NC DOT R/W'S ARE APPROXIMATE UNLESS OTHERWISE NOTED.
- ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
- COPYRIGHT © 2008, LATTIMORE AND PEELER SURVEYING, ALL RIGHTS RESERVED. REPRODUCTION OR USE OF THE CONTENTS OF THIS DOCUMENT, OR ADDITIONS OR DELETIONS TO THIS DOCUMENT, IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF THE LAND SURVEYOR, IS PROHIBITED.
- IF THIS MAP DOES NOT HAVE AN ORIGINAL SIGNATURE IT IS NOT VALID.
- THIS MAP IS FOR THE EXCLUSIVE USE OF THE ORIGINAL PURCHASER OF THIS SURVEY AND IS NOT TRANSFERABLE TO SUBSEQUENT OWNERS OR ADDITIONAL INSTITUTIONS.

Certificate of Survey and Accuracy

I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book 15,T Page 51; that the boundaries not surveyed are clearly indicated as drawn from information found in Book _____ page _____; that the ratio of precision as calculated is 1:12,000; that this plat was prepared in accordance with G.S.47-30 as amended. Witness my original signature, registration number and seal this 10th day of November A.D., 2008.

D. Dobbins Lattimore
Surveyor
License Number L-3336

LATTIMORE & PEELER SURVEYING
105 LONDON ROAD (704) 538-3443 D.F. # 32871/EAKER
LAWDALE, NORTH CAROLINA 28090 C.F. # 3287-10-2007
DRAWING # 08-26B

8

133999

Filed in CLEVELAND County, NC
on Mar 24 2010, at 04:28:49 PM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 1593 Page 994



RECORDING FEE \$ 40.⁰⁰ REVENUES 71.⁰⁰

Issued Mar 24 2010
\$71.00
by BONNIE E. REECE
REGISTER OF DEEDS ID.20645
State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

Excise Tax \$	Recording Time, Book and Page
Tax Lot No. _____	Parcel Identifier No. _____
Verified by _____	County on the ____ day of _____, 20__
by _____	

*
Mail after recording to A. Susan Biggers, P.O. Box 458, Shelby, North Carolina 28151
This instrument was prepared by A. Susan Biggers, Attorney at Law

Brief Description for the index

NORTH CAROLINA GENERAL WARRANTY DEED

THIS DEED made this 24th day of March, 2010, by and between:

GRANTOR	GRANTEE
EDWIN R. HARRILL, JR. and wife, PAMELA M. HARRILL 3419 Yates Road Shelby, North Carolina 28150 and JANE H. WINTER and husband, MICHAEL B. WINTER 3041 River Road Shelby, North Carolina 28150 and	THE STATE OF NORTH CAROLINA, ITS SUCCESSORS AND ASSIGNS c/o Ann Matthews Post Office Box 629 Raleigh, North Carolina 27602

The designation Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that the Grantor, for a valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey unto the Grantee in fee simple, all that certain lot or parcel of land situated in Number Eight (#8) Township, Cleveland County, North Carolina and more particularly described as follows:

FOR A FULL DESCRIPTION OF THE PROPERTY, SEE ATTACHED EXHIBIT "A".

This property is subject to all restrictions as outlined on attached Exhibit "B".

Tax Map Reference: 3288-1-40, Plat Book 33 at Page 57.

Title Reference: See Book 1415 at Page 2030 of the Cleveland County Register of Deeds..

This is not the primary residence of the Grantee.

Book 1593 Page 995

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in fee simple.

And the Grantor covenants with the Grantee, that Grantor is seized of the premises in fee simple, has the right to convey the same in fee simple, that title is marketable and free and clear of all encumbrances, and that Grantor will warrant and defend the title against the lawful claims of all persons whomsoever except for the exceptions hereinafter stated.

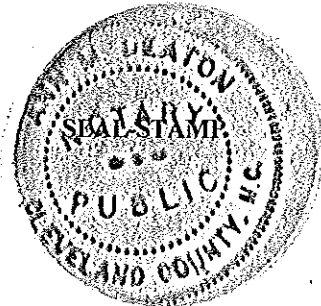
IN WITNESS WHEREOF, the Grantor has hereunto set his hand and seal, or if corporate, has caused this instrument to be signed in its corporate name by its duly authorized officers and its seal to be hereunto affixed by authority of its Board of Directors, the day and year first above written.

Edwin R. Harrill, Jr. (SEAL)
Edwin R. Harrill, Jr.

Pamela M. Harrill (SEAL)
Pamela M. Harrill

Jane H. Winter (SEAL)
Jane H. Winter

Michael B. Winter (SEAL)
Michael B. Winter

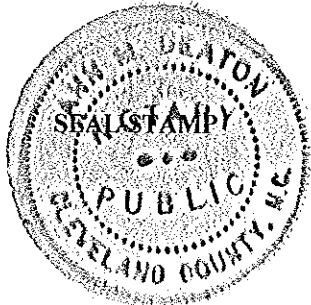


NORTH CAROLINA, Cleveland County.

I, Ann M. Deaton, the undersigned, a Notary Public of the County and State aforesaid, certify that Edwin R. Harrill, Jr. Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

Witness my hand and official stamp or seal, this 24th day of March, 2010.

My commission expires: 8-7-2010 Adm
Notary Public

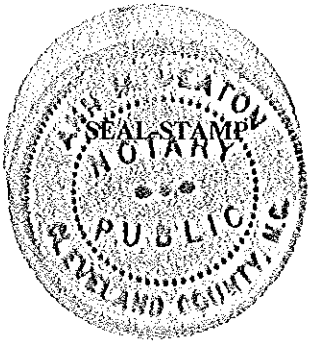


NORTH CAROLINA, Cleveland County.

I, Ann M. Deaton, the undersigned, a Notary Public of the County and State aforesaid, certify that Pamela M. Harrill Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

Witness my hand and official stamp or seal, this 24th day of March, 2010.

My commission expires: 8-7-2010 Adm
Notary Public



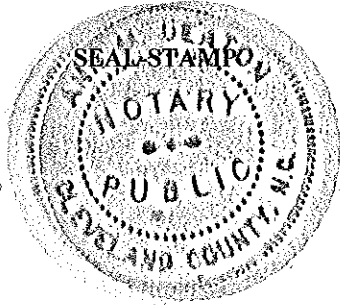
NORTH CAROLINA, Cleveland County.

I, Ann M. Deaton, the undersigned, a Notary Public of the County and State aforesaid, certify that **Jane H. Winter** Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

Witness my hand and official stamp or seal, this 24th day of March, 2010.

My commission expires: 8-7-2010

Notary Public



NORTH CAROLINA, Cleveland County.

I, Ann M. Deaton, the undersigned, a Notary Public of the County and State aforesaid, certify that **Michael B. Winter** Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

Witness my hand and official stamp or seal, this 24th day of March, 2010.

My commission expires: 8-7-2010

Notary Public

Book 1593 Page 996

Fee Simple Purchase (Harrill property)

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616813.36 feet E= 1222738.37 feet; THENCE South 06 degrees 41 minutes 10 seconds West for a grid distance of 7238.13 feet to a bent shaft said corner having the grid coordinates of N= 609624.44 feet E= 1221895.75 feet and said corner being the Northwestern most corner of the Edwin and Jane Harrill property as described in Deed book 1415 page 2030 of the Cleveland County Registry and being the Northeastern most corner of the Janet B. Whisnant property as described in Deed book 1265 page 1725 of the Cleveland County Registry and said corner being in the southern line of the James and Linda Bridges property as described in Deed book 1202 page 1854 of the Cleveland County Registry and said corner being the point of BEGINNING; THENCE with the Whisnant and Harrill line South 01 degrees 40 minutes 49 seconds West for a distance of 583.18 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Whisnant and Harrill line; THENCE five new lines through the Harrill Property South 81 degrees 58 minutes 58 seconds East for a distance of 134.54 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 65 degrees 45 minutes 00 seconds East for a distance of 354.98 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 85 degrees 26 minutes 23 seconds East for a distance of 257.85 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 54 degrees 38 minutes 33 seconds East for a distance of 99.07 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 41 degrees 20 minutes 24 seconds East for a distance of 137.50 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Northern line of the Harrill property and in the Southern line of the Royster Turkey Farm property as recorded in Deed book 16-Z page 522 of the Cleveland County Registry and also being a corner in the southern line of the 30 foot access easement; THENCE with the Harrill and Royster Turkey Farm line North 69 degrees 26 minutes 28 seconds West for a distance of 261.03 feet to a holly tree and passing over an unmarked point at 32.09 feet said point being the Southeastern corner of the 30 foot access easement and passing over an iron at 254.16 feet and said tree being the common corner of the Royster Turkey Farm property and the Rebecca and Christopher Haney property as described in Deed book 1491 Page 691 of the Cleveland County Registry; THENCE North 73 degrees 38 minutes 31 seconds West for a distance of 650.36 feet to the BEGINNING.
Containing 7.09 acres more or less.

Book 1593 Page 997

EXHIBIT B

DEED RESTRICTIONS Big Harris Creek-EEP Site 739 Book 1593 Page 998

The State of North Carolina has received funding from the N.C. Ecosystem Enhancement Program for acquisition of the Property as conveyed and described in this Deed. In consideration of this funding and the restoration project at **Big Harris Creek**, the State and related State Agencies recognize the following reserved uses and restricted activities over the Property, hereinafter identified as the ("**Restricted Area**"). The Restricted Area is specifically identified as an area totaling **7.09 acres** as shown on the plat of survey entitled "**Revision of PB 33, PG. 57, Conservation Easement Survey For the State of North Carolina, NC Department of Administration, Ecosystem Enhancement Program, Project Name: Big Harris Creek SPO File No. 023-ZH, EEP Site No. 739, Property of Edwin R. Harrill and spouse Pamela M. Harrill, and Jane H. Winter and spouse Michael B. Winter.**" Revised 9/28/2009 by Dobbins Lattimore, PLS Number 33936 and recorded in the Cleveland County Register of Deeds at **Plat Book 33 Pages 57**.

The Restricted Area as defined is subject to the restrictions as recited below and will be forever conserved and managed in a manner that will improve and protect the quality of the waters **Big Harris Creek** and otherwise promote the public purposes authorized under the provisions of N.C. General Statute § 143-214.8.

The purposes of these Deed Restrictions are to maintain, restore, enhance, create and preserve wetland and/or riparian resources within the Restricted Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Restricted Area in its natural condition, consistent with these purposes; and to prevent any use of the Restricted Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

RESERVED USES AND RESTRICTED ACTIVITES

A. Motorized Vehicles. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads for the purposes recited above.

B. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs destabilizes or renders unsafe the Restricted Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

C. Industrial, Agricultural, Residential and Commercial Uses. All are prohibited in the Restricted Area.

D. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Restricted Area.

Book 1593 Page 999

E. Roads and Trails. There shall be no new construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area may be maintained in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped recreational and educational uses of the Restricted Area. Existing roads, trails or paths may be maintained with loose gravel or permanent vegetation to stabilize or cover the surfaces.

F. Signs. No signs shall be permitted in the Restricted Area except interpretive signs describing restoration activities and the conservation values of the Restricted Area, signs identifying the owner of the Property, signs giving directions, or signs prescribing rules and regulations for the use of the Restricted Area may be allowed.

G. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Restricted Area is prohibited.

H. Grading, Mineral Use, Excavation, Dredging. Unless related to approved restoration activities, there shall be no grading, filling, excavation, dredging, mining, or drilling within the Restricted Area.

I. Water Quality and Drainage Patterns. Unless related to approved restoration activities, there shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water in the Restricted Area. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. Any use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Restricted Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

J. Subdivision and Conveyance. No further subdivision, partitioning, or dividing of the Restricted Area is allowed.

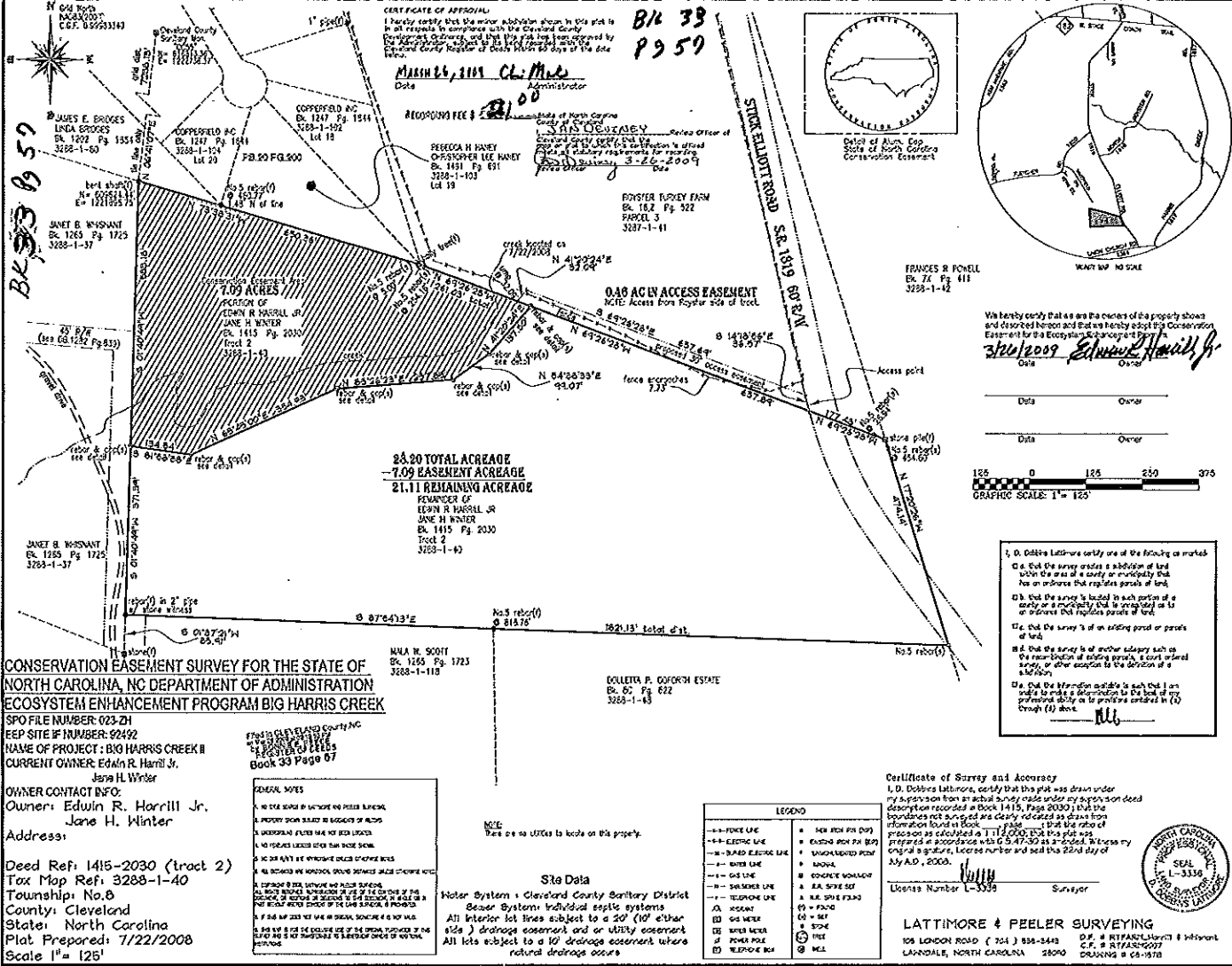
K. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Restricted Area or any intentional introduction of non-native plants, trees and/or animal species is prohibited.

L. Restoration Activities Are Permitted. Includes but not limited to planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to

direct in-stream, above ground, and subterranean water flow according to a restoration plan as provided, contracted, or managed by the N.C. Ecosystem Enhancement Program.

M. Permission to vary from the above restrictions may be granted for good cause shown, provided that any such request is consistent with the purposes of these Deed Restrictions. Permission and approval to vary must be obtained in writing from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

Book 1593 Page 1000



CERTIFICATE OF APPROVAL
 I hereby certify that the minor subdivision shown in this plat is in all respects in compliance with the Cleveland County Subdivision Ordinance, and that this plat has been approved by the Cleveland County Register of Deeds. Witness my hand and the seal of my office this 22nd day of March, 2009.
Cl. Mills
 Administrator

RECORDING FEE \$ 21.00

BK 33 Pg 59

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-2H
 EEP SITE # NUMBER: 02492
 NAME OF PROJECT: BIG HARRIS CREEK II
 CURRENT OWNER: Edwin R. Hamill Jr.
 Janae H. Winter

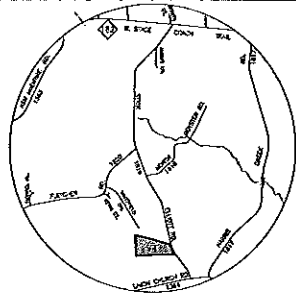
OWNER CONTACT INFO:
 Owner: Edwin R. Hamill Jr.
 Janae H. Winter
 Address:

Deed Ref: 1415-2030 (tract 2)
 Tax Map Ref: 3288-1-40
 Township: No. 8
 County: Cleveland
 State: North Carolina
 Plat Prepared: 7/22/2008
 Scale 1" = 125'

GENERAL NOTES
 1. NO DEEDS IN RECORD ON PEELER ESTATE.
 2. PROPERTY DEED SUBJECT TO EGRESS OF ALDUS.
 3. UNDEVELOPED FUTURE TRACT NOT BEING SURVEYED.
 4. NO UNDEVELOPED LOTS OFFER FOR SALE.
 5. NO DEEDS ON FILE IN RECORDS OF DEEDS IN RECORD.
 6. ALL DISTANCES ARE HORIZONTAL UNLESS OTHERWISE NOTED.
 7. UNDEVELOPED LOTS OFFER FOR SALE.
 8. ALL DISTANCES ARE HORIZONTAL UNLESS OTHERWISE NOTED.
 9. ALL DISTANCES ARE HORIZONTAL UNLESS OTHERWISE NOTED.
 10. ALL DISTANCES ARE HORIZONTAL UNLESS OTHERWISE NOTED.
 11. ALL DISTANCES ARE HORIZONTAL UNLESS OTHERWISE NOTED.
 12. ALL DISTANCES ARE HORIZONTAL UNLESS OTHERWISE NOTED.

Site Data
 Water System: Cleveland County Sanitary District
 Sewer System: Individual septic systems
 All interior lot lines subject to a 20' (10' either side) drainage easement and/or utility easement.
 All lots subject to a 10' drainage easement where natural drainage occurs.

LEGEND	
—+—+—+—	IRON PIPE PER DEED
—+—+—+—	PAVING PER DEED
—+—+—+—	UNDEVELOPED PER DEED
—+—+—+—	UNDEVELOPED PER DEED
—+—+—+—	UNDEVELOPED PER DEED
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—+—+—+—	UNDEVELOPED PER DEED
—+—+—+—	UNDEVELOPED PER DEED



FRANCIS R POWELL
 Esq. 711 Pg. 411
 3288-1-42

We hereby certify that we are the owners of the property shown and described herein and that we hereby adopt the Conservation Easement for the Ecosystem Enhancement Program.
3/20/2009 *Edwin Hamill Jr.*
 Owner

Date _____ Owner _____
 Date _____ Owner _____

125 0 125 250 375
 GRAPHIC SCALE: 1" = 125'

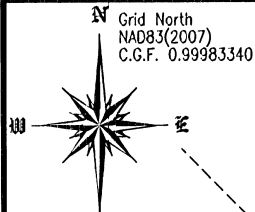
I, D. Debbie Lattimore certify one of the following as marked:
 A. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land.
 B. that the survey is located in each portion of a county or municipality that is organized as to an ordinance that regulates parcels of land.
 C. that the survey is of an existing parcel or parcels of land.
 D. that the survey is of another category such as the recombination of adjoining parcels, a court-ordered survey, or other exception to the definition of a subdivision.
 E. that the information available to me such that I am unable to make a determination to the best of my professional ability as to the provisions contained in (A) through (D) above.

Certificate of Survey and Accuracy
 I, D. Debbie Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my personal deed description recorded in Book 1415, Page 2030; that the boundaries here surveyed are clearly marked as drawn from information found in Book _____; that the plat was prepared in accordance with G.S. 47-30 as amended, unless my original signature, license number and date the 22nd day of July A.D., 2008.

License Number L-3336
 Surveyor



LATTIMORE & PEELER SURVEYING
 108 LONDON ROAD (704) 858-3443 D.P. # RIFARZ/LEWIS & HARRIS
 LAYNDALE, NORTH CAROLINA 28020 C.P. # RIFARZ/0077
 DOLLING IN 08-1878



CERTIFICATE OF APPROVAL: I hereby certify that the minor subdivision shown in this plat is in all respects in compliance with the Cleveland County Development Ordinance...

BK 33 P 959

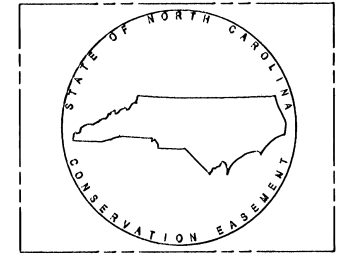
MARCH 26, 2009 CL Mac Date Administrator

RECORDING FEE \$ 21.00

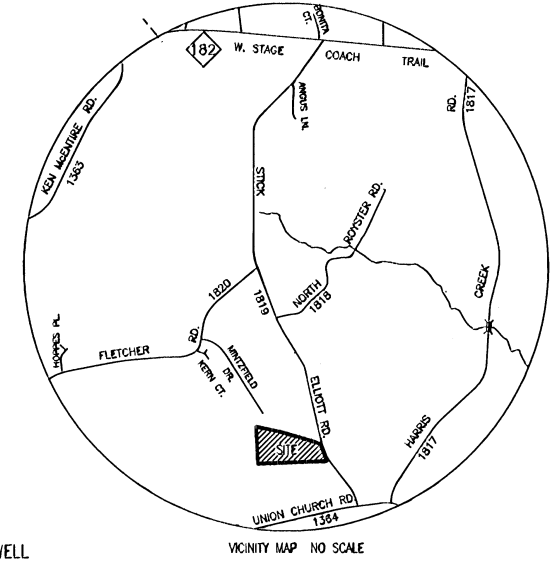
State of North Carolina County of Cleveland I, SANDOUBEY Review Officer of Cleveland County certify that the map or plat to which this certification is affixed meets all statutory requirements for recording.

REBECCA H HANEY CHRISTOPHER LEE HANEY Bk. 1491 Pg. 691 3288-1-103 Lot 19

ROYSTER TURKEY FARM Bk. 16, Z Pg. 522 PARCEL 3 3287-1-41



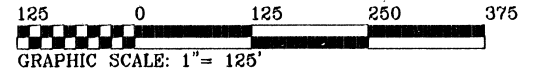
Detail of Alum. Cap State of North Carolina Conservation Easement



FRANCES R POWELL Bk. 7X Pg. 411 3288-1-42

We hereby certify that we are the owners of the property shown and described hereon and that we hereby adopt this Conservation Easement for the Ecosystem Enhancement Program. 3/26/2009 Edwin R Harrill, Jr. Date Owner

Date Owner Date Owner



JAMES E. BRIDGES LINDA BRIDGES Bk. 1202 Pg. 1854 3288-1-80

bent shaft(f) N= 609624.44' E= 1221895.75'

JANET B. WHISNANT Bk. 1265 Pg. 1725 3288-1-37

45' R/W (see DB. 1282 Pg. 639)

JANET B. WHISNANT Bk. 1265 Pg. 1725 3288-1-37

COPPERFIELD INC Bk. 1247 Pg. 1844 3288-1-104 Lot 20

COPPERFIELD INC Bk. 1247 Pg. 1844 3288-1-102 Lot 18

Conservation Easement Area 7.09 ACRES PORTION OF EDWIN R HARRILL JR JANE H WINTER Bk. 1415 Pg. 2030 Tract 2 3288-1-40

0.46 AC IN ACCESS EASEMENT NOTE: Access from Royster side of tract.

28.20 TOTAL ACREAGE - 7.09 EASEMENT ACREAGE = 21.11 REMAINING ACREAGE

REMAINDER OF EDWIN R HARRILL JR JANE H WINTER Bk. 1415 Pg. 2030 Tract 2 3288-1-40

MALA W. SCOTT Bk. 1265 Pg. 1723 3288-1-118

DOLLETTA P. GOFORTH ESTATE Bk. 8C Pg. 622 3288-1-48

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-ZH EEP SITE IF NUMBER: 92492 NAME OF PROJECT: BIG HARRIS CREEK II CURRENT OWNER: Edwin R. Harrill Jr. Jane H. Winter

OWNER CONTACT INFO: Owner: Edwin R. Harrill Jr. Jane H. Winter Address:

Deed Ref: 1415-2030 (tract 2) Tax Map Ref: 3288-1-40 Township: No. 8 County: Cleveland State: North Carolina Plat Prepared: 7/22/2008 Scale 1" = 125'

Filed in CLEVELAND County, NC on Mar 29 2009 at 02:13:50 PM by BONNIE E. REECE REGISTER OF DEEDS Book 33 Page 57

- GENERAL NOTES 1. NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING. 2. PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD. 3. UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED. 4. NO FEATURES LOCATED OTHER THAN THOSE SHOWN. 5. NC DOT R/W'S ARE APPROXIMATE UNLESS OTHERWISE NOTED. 6. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED. 7. COPYRIGHT © 2008, LATTIMORE AND PEELER SURVEYING. ALL RIGHTS RESERVED. REPRODUCTION OR USE OF THE CONTENTS OF THIS DOCUMENT, OR ADDITIONS OR DELETIONS TO THIS DOCUMENT, IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF THE LAND SURVEYOR, IS PROHIBITED. 8. IF THIS MAP DOES NOT HAVE AN ORIGINAL SIGNATURE IT IS NOT VALID. 9. THIS MAP IS FOR THE EXCLUSIVE USE OF THE ORIGINAL PURCHASER OF THIS SURVEY AND IS NOT TRANSFERABLE TO SUBSEQUENT OWNERS OR ADDITIONAL INSTITUTIONS.

NOTE: There are no utilities to locate on this property.

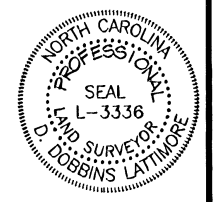
Site Data Water System: Cleveland County Sanitary District Sewer System: Individual septic systems All interior lot lines subject to a 20' (10' either side) drainage easement and or utility easement All lots subject to a 10' drainage easement where natural drainage occurs

LEGEND table with symbols for fence line, electric line, buried electric line, water line, gas line, sewer line, telephone line, hydrant, gas meter, water meter, power pole, telephone box, new iron pin, existing iron pin, unmonumented point, magnail, concrete monument, R.R. spike set, R.R. spike found, found, set, stone, tree, well.

Certificate of Survey and Accuracy

I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book 1415, Page 2030; that the boundaries not surveyed are clearly indicated as drawn from information found in Book 1415, page 2030; that the ratio of precision as calculated is 1:12,000; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, License number and seal this 22nd day of July A.D., 2008.

License Number L-3336 Surveyor



LATTIMORE & PEELER SURVEYING 105 LONDON ROAD (704) 538-3443 LAWNSDALE, NORTH CAROLINA 28090 D.F. # RTFARM_Harrill # Whisnant C.F. # RTFARM2007 DRAWING # 08-157B

12

126828

Filed in CLEVELAND County, NC
on Aug 25 2009 at 11:13:35 AM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 1582 Page 322
Issued Aug 25 2009
\$25.00
by BONNIE E. REECE
REGISTER OF DEEDS ID.19761
State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

RECORDING FEE \$ 47.⁰⁰ REVENUES 25.⁰⁰

STATE OF NORTH CAROLINA

Completed by:
* Deaton + Biggers

CONSERVATION EASEMENT
AND ACCESS EASEMENT

Cleveland County
SPO File Number 023-ZI
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT AND ACCESS EASEMENT, pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 19th day of August, 2009, by E. Ruth Langley, ("Grantor"), whose mailing address is 3334 Charlie Elliott Rd. Lawndale, NC 28090, to the State of North Carolina, ("Grantee"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in No. 8 Township, Cleveland County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 20.11 acres and being conveyed to the Grantor by deed as recorded in **Deed Book 1231 at Page 1247** Cleveland County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of the waters of Big Harris Creek

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with access easement, of the nature and character and to the extent hereinafter set forth, over a described area of the Property, referred to hereafter as the "**Easement Area**", for the benefit of the people of North Carolina, and being all of the tract of land as identified as Conservation Easement area 3.67 acres total as shown on a survey entitled "Conservation Easement Survey for the State of North Carolina , Department of Administration Ecosystem Enhancement Program Big Harris Creek" dated March 26, 2009, certified by D Dobbins Lattimore, and recorded in Map Book 33, Page 54, Cleveland County Registry. Easement Areas being more particularly described as follows:

See Attached Exhibit A and Exhibit B

The purposes of this Conservation Easement are to maintain, restore, enhance, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped

recreational and educational uses of the Easement Area. Existing roads, trails or paths may be maintained with loose gravel or permanent vegetation to stabilize or cover the surfaces.

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Ingress, Egress, and Inspection. The Grantee, its employees and agents, successors and assigns, receive the perpetual right of unlimited and repeated ingress and egress to the Easement Area over the Property at reasonable times to undertake any activities to restore, manage, maintain, enhance, and monitor the wetland and riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown above or to other address(es) as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the

interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

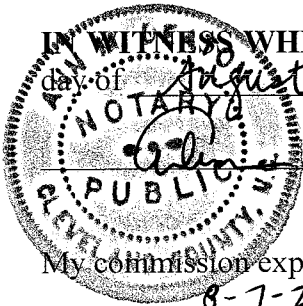
E. Ruth Langley
E. Ruth Langley

NORTH CAROLINA

COUNTY OF CLEVELAND

I, Ann M. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that **E. Ruth Langley**, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 19th day of August, 2009.



Notary Public

My commission expires: 8-7-2010

Exhibit A
Conservation Easement Area Legal Description
E. Ruth Langley

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616813.36 feet E= 1222738.37 feet; THENCE South 20 degrees 00 minutes 33 seconds West for a grid distance of 5613.69 feet to a p-k nail found in the centerline of Fletcher Road over top of a culvert and said nail having the North Carolina Grid Coordinates (NAD 83) of N=611538.53 feet E= 1220817.52 feet; THENCE leaving the center line North 89 degrees 22 minutes 46 seconds West for a distance of 30.38 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Western edge of the right-of-way of Fletcher Road said iron also being the point and place of the BEGINNING; THENCE running with the Western edge of Fletcher Road South 09 degrees 17 minutes 33 seconds West for a distance of 48.84 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE four new lines through the Ruth Langley Property as described in Deed Book 1194 Page 2100 and also in Deed Book 1231 Page 1247 of the Cleveland County Registry North 84 degrees 41 minutes 49 seconds West for a distance of 729.99 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 49 degrees 55 minutes 15 seconds West for a distance of 382.65 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 87 degrees 55 minutes 49 seconds West for a distance of 80.74 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 06 degrees 03 minutes 59 seconds East for a distance of 72.19 feet to an unmarked point in the center of the creek said point being in the Southern line of the Royster Turkey Farm Property as described in Deed Book 1180 Page 113 of the Cleveland County Registry; THENCE with the Royster Turkey Farm property and the center of the branch for the next thirty-nine calls North 75 degrees 33 minutes 33 seconds East for a distance of 40.10 feet to an unmarked point in the creek; THENCE South 84 degrees 17 minutes 12 seconds East for a distance of 40.06 feet to an unmarked point in the creek; THENCE South 62 degrees 00 minutes 52 seconds East for a distance of 62.20 feet to an unmarked point in the creek; THENCE South 38 degrees 15 minutes 16 seconds East for a distance of 74.02 feet to an unmarked point in the creek; THENCE South 61 degrees 52 minutes 34 seconds East for a distance of 76.54 feet to an unmarked point in the creek; THENCE South 86 degrees 24 minutes 02 seconds East for a distance of 82.89 feet to an unmarked point in the creek; THENCE South 50 degrees 49 minutes 02 seconds East for a distance of 19.60 feet to an unmarked point in the creek; THENCE South 40 degrees 24 minutes 23 seconds West for a distance of 59.84 feet to an unmarked point in the creek; THENCE South 26 degrees 43 minutes 10 seconds East for a distance of 24.54 feet to an unmarked point in the creek; THENCE South 03 degrees 41 minutes 54 seconds West for a distance of 35.19 feet to an unmarked point in the creek; THENCE South 57 degrees 26 minutes 57 seconds East for a distance of 29.41 feet to an unmarked point in the creek; THENCE South 88 degrees 07 minutes 29 seconds East for a distance of 32.13 feet to an unmarked point in the creek; THENCE South 55 degrees 29 minutes 10 seconds East for a distance of 26.23 feet to an unmarked point in the creek; THENCE North 52 degrees 18 minutes 52 seconds East for a distance of 31.14 feet to an unmarked point in the creek; THENCE North 09 degrees 08 minutes 42 seconds East for a distance of 24.80 feet to an unmarked point in the

creek; THENCE South 78 degrees 09 minutes 49 seconds East for a distance of 47.10 feet to an unmarked point in the creek; THENCE South 19 degrees 18 minutes 58 seconds East for a distance 38.62 feet to an unmarked point in the creek; THENCE South 75 degrees 57 minutes 30 seconds East for a distance of 12.43 feet to an unmarked point in the creek; THENCE North 77 degrees 47 minutes 09 seconds East for a distance of 20.14 feet to an unmarked point in the creek; THENCE South 73 degrees 51 minutes 28 seconds East for a distance of 47.06 feet to an unmarked point in the creek; THENCE North 64 degrees 44 minutes 11 seconds East for a distance of 23.20 feet to an unmarked point in the creek; THENCE North 08 degrees 21 minutes 33 seconds East for a distance of 21.38 feet to an unmarked point in the creek; THENCE North 36 degrees 47 minutes 35 seconds West for a distance of 15.87 feet to an unmarked point in the creek; THENCE North 33 degrees 21 minutes 15 seconds East for a distance of 16.09 feet to an unmarked point in the creek; THENCE South 72 degrees 33 minutes 46 seconds East for a distance of 24.18 feet to an unmarked point in the creek; THENCE South 87 degrees 21 minutes 57 seconds East for a distance of 37.73 feet to an unmarked point in the creek; THENCE South 48 degrees 01 minutes 39 seconds East for a distance of 91.41 feet to an unmarked point in the creek; THENCE North 83 degrees 17 minutes 56 seconds East for a distance of 46.03 feet to an unmarked point in the creek; THENCE South 81 degrees 43 minutes 19 seconds East for a distance of 101.20 feet to an unmarked point in the creek; THENCE South 88 degrees 50 minutes 36 seconds East for a distance of 4.30 feet to an unmarked point in the creek; THENCE South 76 degrees 53 minutes 09 seconds East for a distance of 64.64 feet to an unmarked point in the creek; THENCE South 68 degrees 46 minutes 14 seconds East for a distance of 20.06 feet to an unmarked point in the creek; THENCE South 35 degrees 02 minutes 10 seconds East for a distance of 18.68 feet to an unmarked point in the creek; THENCE South 65 degrees 01 minutes 16 seconds East for a distance of 13.00 feet to an unmarked point in the creek; THENCE South 76 degrees 58 minutes 23 seconds East for a distance of 15.41 feet to an unmarked point in the creek; THENCE North 72 degrees 19 minutes 39 seconds East for a distance of 33.69 feet to an unmarked point in the creek; THENCE North 87 degrees 40 minutes 57 seconds East for a distance of 13.33 feet to an unmarked point in the creek; THENCE South 86 degrees 37 minutes 57 seconds East for a distance of 28.91 feet to an unmarked point in the creek; THENCE North 79 degrees 42 minutes 08 seconds East for a distance of 47.83 feet to the point and place of the BEGINNING.

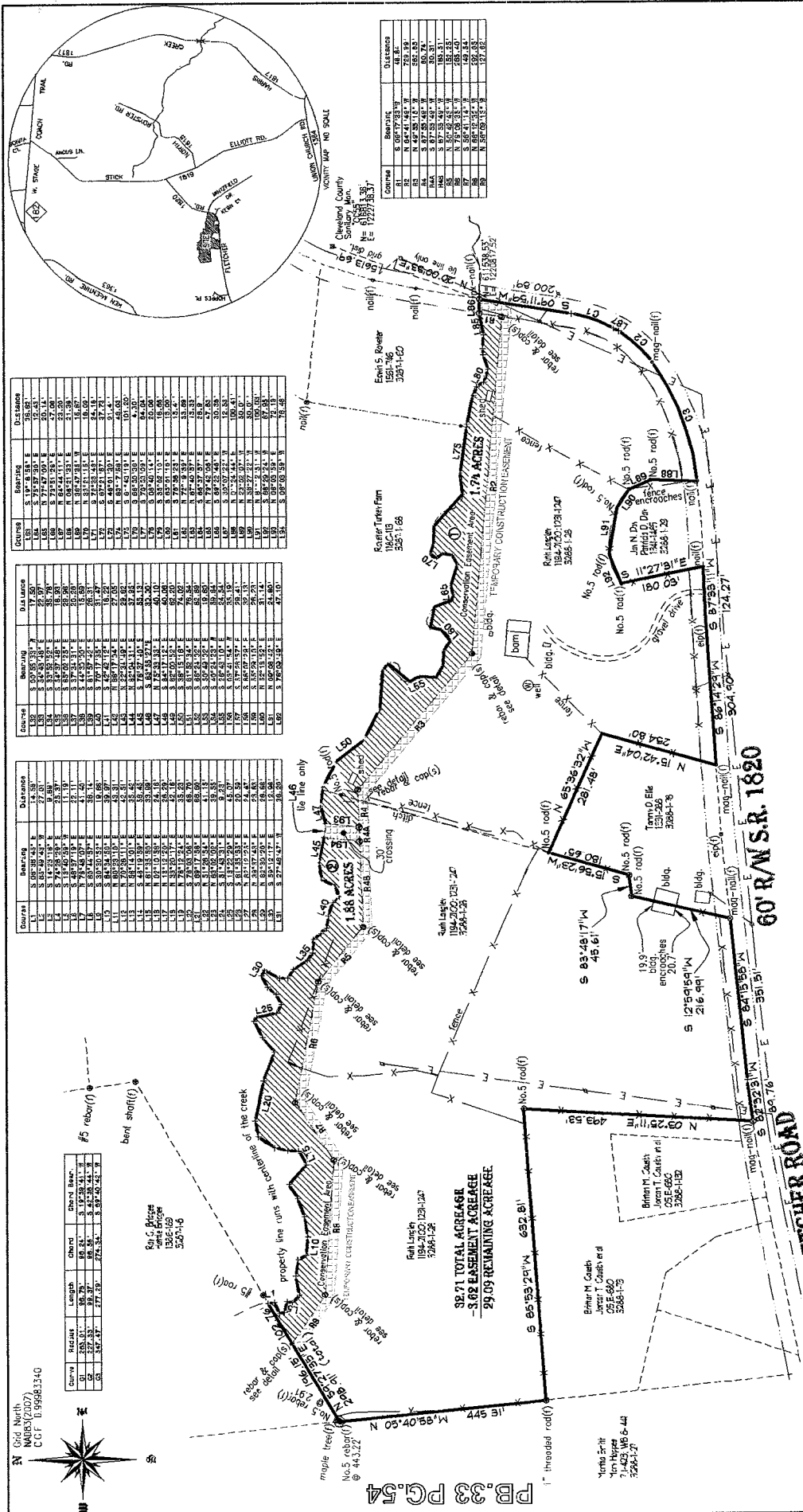
Containing 1.74 acres more or less.

Commencing on the terminus of the fourth call of tract 1 as described above and running South 87 degrees 55 minutes 49 seconds West for a distance of 30.31 feet to a No.5 rebar set with a cap stamped Conservation Easement said corner marking the place of BEGINNING; THENCE creating six new lines through the Langley Property South 87 degrees 55 minutes 49 seconds West for a distance of 185.51 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 50 degrees 42 minutes 43 seconds West for a distance of 152.25 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 79 degrees 08 minutes 35 seconds West for a distance of 265.40 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 56 degrees 41 minutes 14 seconds West for a distance of 149.54 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 86 degrees 12 minutes 32 seconds West for a distance of 292.05 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 56 degrees 09 minutes 13 seconds West for a distance of 127.62 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Southern line of the Ray and Hattie Bridges Property as described in Deed Book 1386 Page 189

of the Cleveland County Registry said corner being located North 59 degrees 27 minutes 35 seconds East for a distance of 196.15 feet from a maple tree said tree being a common corner of Langley and Bridges and being in the Eastern line of the Martha Smith and Mary Hoppes property as described in Will Book 8 Page 441 and also described in Deed Book 7-I Page 423 of the Cleveland County Registry; THENCE with the Bridges line North 59 degrees 27 minutes 35 seconds East for a distance of 102.76 feet to an unmarked point in the creek said point being a common corner of the Royster Turkey Farm Property as described in Deed Book 1180 Page 113 of the Cleveland County Registry; THENCE leaving the Bridges line and running with the property of Royster Turkey Farm and the centerline of the creek for the next forty-five calls South 06 degrees 36 minutes 45 seconds East for a distance of 14.58 feet to an unmarked point in the creek; THENCE South 65 degrees 49 minutes 43 seconds West for a distance of 27.01 feet to an unmarked point in the creek; THENCE South 14 degrees 23 minutes 18 seconds East for a distance of 9.89 feet to an unmarked point in the creek; THENCE South 74 degrees 28 minutes 29 seconds East for a distance of 25.37 feet to an unmarked point in the creek; THENCE South 13 degrees 40 minutes 59 seconds West for a distance of 11.19 feet to an unmarked point in the creek; THENCE South 46 degrees 37 minutes 19 seconds East for a distance of 22.11 feet to an unmarked point in the creek; THENCE North 78 degrees 48 minutes 07 seconds East for a distance of 41.40 feet to an unmarked point in the creek; THENCE South 80 degrees 44 minutes 57 seconds East for a distance of 36.14 feet to an unmarked point in the creek; THENCE South 30 degrees 30 minutes 52 seconds East for a distance of 19.66 feet to an unmarked point in the creek; THENCE South 84 degrees 34 minutes 50 seconds East for a distance of 39.97 feet to an unmarked point in the creek; THENCE North 80 degrees 23 minutes 10 seconds East for a distance of 43.31 feet to an unmarked point in the creek; THENCE North 70 degrees 28 minutes 11 seconds East for a distance of 42.51 feet to an unmarked point in the creek; THENCE North 58 degrees 14 minutes 01 seconds East for a distance of 35.42 feet to an unmarked point in the creek; THENCE South 48 degrees 19 minutes 59 seconds East for a distance of 56.45 feet to an unmarked point in the creek; THENCE North 61 degrees 35 minutes 50 seconds East for a distance of 33.99 feet to an unmarked point in the creek; THENCE North 02 degrees 10 minutes 56 seconds East for a distance of 24.16 feet to an unmarked point in the creek; THENCE North 13 degrees 12 minutes 20 seconds East for a distance of 28.29 feet to an unmarked point in the creek; THENCE North 33 degrees 20 minutes 17 seconds East for a distance of 42.16 feet to an unmarked point in the creek; THENCE North 78 degrees 12 minutes 24 seconds East for a distance of 35.23 feet to an unmarked point in the creek; THENCE South 78 degrees 03 minutes 08 seconds East for a distance of 88.70 feet to an unmarked point in the creek; THENCE South 69 degrees 17 minutes 58 seconds East for a distance of 66.60 feet to an unmarked point in the creek; THENCE North 51 degrees 26 minutes 54 seconds East for a distance of 41.15 feet to an unmarked point in the creek; THENCE North 63 degrees 02 minutes 02 seconds East for a distance of 39.55 feet to an unmarked point in the creek; THENCE South 51 degrees 43 minutes 31 seconds East for a distance of 9.23 feet to an unmarked point in the creek; THENCE South 13 degrees 22 minutes 29 seconds East for a distance of 45.07 feet to an unmarked point in the creek; THENCE South 61 degrees 55 minutes 55 seconds East for a distance of 20.59 feet to an unmarked point in the creek; THENCE North 62 degrees 12 minutes 25 seconds East for a distance of 24.47 feet to an unmarked point in the creek; THENCE North 39 degrees 37 minutes 43 seconds East for a distance of 23.83 feet to an unmarked point in the creek; THENCE North 62 degrees 30 minutes 20 seconds East for a distance of 28.86 feet to an unmarked point in the creek; THENCE South 59 degrees 12 minutes 17 seconds East for a distance of 12.98 feet to an unmarked point in the creek; THENCE South 27 degrees 46 minutes 47 seconds West for a distance of 36.20 feet to an unmarked point in the creek; THENCE South 00 degrees 55 minutes

33 seconds West for a distance of 17.50 feet to an unmarked point in the creek; THENCE South 54 degrees 46 minutes 48 seconds East for a distance of 22.97 feet to an unmarked point in the creek; THENCE South 33 degrees 52 minutes 52 seconds East for a distance of 35.78 feet to an unmarked point in the creek; THENCE South 54 degrees 37 minutes 46 seconds East for a distance of 18.93 feet to an unmarked point in the creek; THENCE South 85 degrees 02 minutes 25 seconds East for a distance of 29.96 feet to an unmarked point in the creek; THENCE South 37 degrees 34 minutes 31 seconds East for a distance of 20.26 feet to an unmarked point in the creek; THENCE South 44 degrees 30 minutes 00 seconds East for a distance of 15.89 feet to an unmarked point in the creek; THENCE South 81 degrees 57 minutes 42 seconds East for a distance of 26.31 feet to an unmarked point in the creek; THENCE South 70 degrees 17 minutes 35 seconds East for a distance of 31.47 feet to an unmarked point in the creek; THENCE South 42 degrees 42 minutes 12 seconds East for a distance of 18.22 feet to an unmarked point in the creek; THENCE North 68 degrees 17 minutes 04 seconds East for a distance of 27.05 feet to an unmarked point in the creek; THENCE North 22 degrees 34 minutes 49 seconds East for a distance 29.62 feet to an unmarked point in the creek; THENCE North 82 degrees 04 minutes 31 seconds East for a distance of 37.95 feet to an unmarked point in the creek; THENCE South 78 degrees 37 minutes 40 seconds East for a distance of 55.13 feet to an unmarked point in the creek; THENCE leaving the creek and Royster Turkey Farm Property and creating a new line through the Langley property South 06 degrees 03 minutes 59 seconds West for a distance of 76.48 feet to the place of BEGINNING.

Containing 1.88 acres more or less.



CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

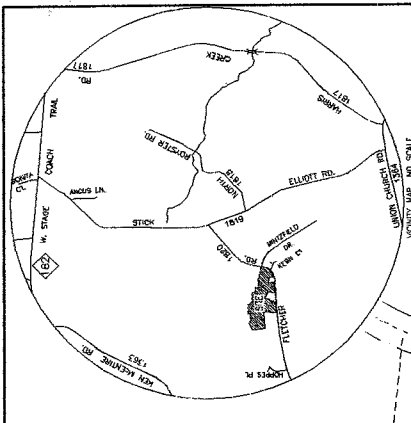
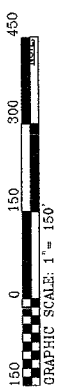
SPO FILE NUMBER: 023-21
 EEP SITE ID NUMBER: 92492
 NAME OF PROJECT: BIG HARRIS CREEK II
 CURRENT OWNER: Ruth Langley
 OWNER CONTACT INFO:
 Owner: Ruth E. Langley
 Address:

Deed Ref: 1194-2100; 1231-1247
 Tax Map Ref: 3288-11-28
 Township: No.8
 County: Cleveland
 Scale 1" = 150'

THIS MAP IS NOT A CERTIFIED SURVEY AND HAS NOT BEEN REVIEWED BY A LOCAL GOVERNMENT AGENCY FOR COMPLIANCE WITH ANY APPLICABLE LAND DEVELOPMENT REGULATIONS.

Note: The TCE shown on this map was not surveyed and it is shown only as a graphical aid to the location of the TEC. No surveying was performed to locate this area.

TCE = Temporary Construction Easement
 Map revised 7/15/2009 to show TCE



Cleveland County Sanitary Map, N = 122° 37' 33.37"

Course	Bearing	Distance
B1	S 05° 17' 33.37" E	48.85'
B2	N 44° 50' 14.7" E	52.83'
B3	S 07° 58' 44.7" E	65.74'
B4	S 07° 58' 44.7" E	65.74'
B5	S 07° 58' 44.7" E	65.74'
B6	N 50° 52' 45.1" E	158.23'
B7	S 56° 41' 14.4" E	48.93'
B8	N 56° 19' 35.7" E	59.03'
B9	N 56° 19' 35.7" E	59.03'

PB.33 PG.54

CLEVELAND COUNTY Tax Bill
 Roll Back Tax Bill for 2009 100 2688489 2006

Today's Date: 9/01/2009 Due Date: 1/05/2007 Amt. Assessed: 8,742
 Tax District: 51 Taxpayer Id: 12777501 Exempt:
 Description: 1400 FLETCHER RD Appraised:
 Receipt: 2009 100 3062300 2688489 Parcel Id: 34361
 REAL AND PERSONAL

	Tax Rates(2006)	Tax Owed	Additional Charges Owed
COUNTY GENERAL	.58000	50.70	3/4 MONTHLY 16.36
CONSOLIDATED SC	.15000	13.11	2 PERCENT IN 1.36
COUNTY FIRE	.03000	2.62	
CLEV CO SANITAR	.02000	1.75	
Total	.78000	68.18	17.72

Total Collected to Date .00
 Total Due as of 9/01/2009 85.90

Deposit Date Created: 9/02/2009

LANGLEY HAROLD EDWARD
 LANGLEY E RUTH
 3334 CHARLIE ELLIOTT RD
 LAUNDALE, NC 28090

RETURN THIS STATEMENT AND PAYMENT TO:
 TAX COLLECTOR
 CLEVELAND COUNTY
 PO BOX 370
 SHELBY NC 28151-0370

CUSTOMER COPY

CLEVELAND COUNTY Tax Bill
 Roll Back Tax Bill for 2009 100 2688489 2007

Today's Date: 9/01/2009 Due Date: 1/05/2008 Amt. Assessed: 8,742
 Tax District: 51 Taxpayer Id: 1232895 Exempt:
 Description: 1400 FLETCHER RD Appraised:
 Receipt: 2009 100 3062301 2688489 Parcel Id: 34361
 REAL AND PERSONAL

	Tax Rates(2007)	Tax Owed	Additional Charges Owed
COUNTY GENERAL	.58000	50.70	3/4 MONTHLY 10.23
CONSOLIDATED SC	.15000	13.11	2 PERCENT IN 1.36
COUNTY FIRE	.03000	2.62	
CLEV CO SANITAR	.02000	1.75	
Total	.78000	68.18	11.59

Total Collected to Date .00
 Total Due as of 9/01/2009 79.77

Deposit Date Created: 9/02/2009

LANGLEY E RUTH
 3334 CHARLIE ELLIOTT RD
 LAUNDALE, NC 28090

RETURN THIS STATEMENT AND PAYMENT TO:
 TAX COLLECTOR
 CLEVELAND COUNTY
 PO BOX 370
 SHELBY NC 28151-0370

CUSTOMER COPY

CLEVELAND COUNTY Tax Bill
Roll Back Tax Bill for 2009 100 2688489 2008

Today's Date: 9/01/2009 Due Date: 1/05/2009 Amt. Assessed: 10,453
Tax District: 51 Taxpayer Id: 1232895 Exempt:
Description: 1400 FLETCHER RD Appraised:
Receipt: 2009 100 3062302 2688489 Parcel Id: 34261
REAL AND PERSONAL

	Tax Rates(2009)	Tax Owed	Additional Charges Owed
COUNTY GENERAL	.57000	59.58	3/4 MONTHLY 4.83
CONSOLIDATED SC	.15000	15.68	2 PERCENT IN 1.61
COUNTY FIRE	.03000	3.14	
CLEV CO SANITAR	.02000	2.09	
Total	.77000	80.49	6.44

Total Collected to Date .00
Total Due as of 9/01/2009 86.93

Deposit Date Created: 9/02/2009

LANGLEY E RUTH
3334 CHARLIE ELLIOTT RD
LAWNDALE, NC 28090

RETURN THIS STATEMENT AND PAYMENT TO:
TAX COLLECTOR
CLEVELAND COUNTY
PO BOX 370
SHELBY NC 28151-0370

CUSTOMER COPY

CLEVELAND COUNTY Tax Bill
Roll Back Tax Bill for 2009 100 2688489 2009

Today's Date: 9/01/2009 Due Date: 1/05/2010 Amt. Assessed: 10,453
Tax District: 51 Taxpayer Id: 1232895 Exempt:
Description: 1400 FLETCHER RD Appraised:
Receipt: 2009 100 3062303 2688489 Parcel Id: 34361
REAL AND PERSONAL

	Tax Rates(2009)	Tax Owed	Additional Charges Owed
COUNTY GENERAL	.57000	59.58	
CONSOLIDATED SC	.15000	15.68	
COUNTY FIRE	.03000	3.14	
CLEV CO SANITAR	.02000	2.09	
Total	.77000	80.49	.00

Total Collected to Date .00
Total Due as of 9/01/2009 80.49

Deposit Date Created: 9/02/2009

LANGLEY E RUTH
3334 CHARLIE ELLIOTT RD
LAWNDALE, NC 28090

RETURN THIS STATEMENT AND PAYMENT TO:
TAX COLLECTOR
CLEVELAND COUNTY
PO BOX 370
SHELBY NC 28151-0370

Grid North
NAD83(2007)
C.G.F. 0.99983340

BK 33 Pg 54

Curve	Radius	Length	Chord	Chord Bear.
C1	265.01'	98.79'	98.24'	S 19°39'41" W
C2	227.33'	99.37'	98.58'	S 42°34'44" W
C3	547.47'	277.23'	274.34'	S 69°40'42" W

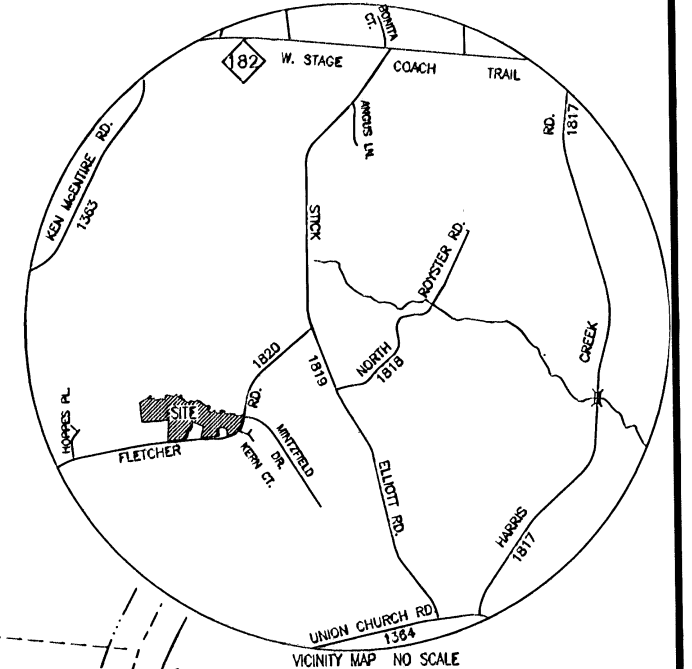
RECORDING FEE \$ 2100

Roy C. Bridges
Hattie Bridges
1386-189
3287-1-3

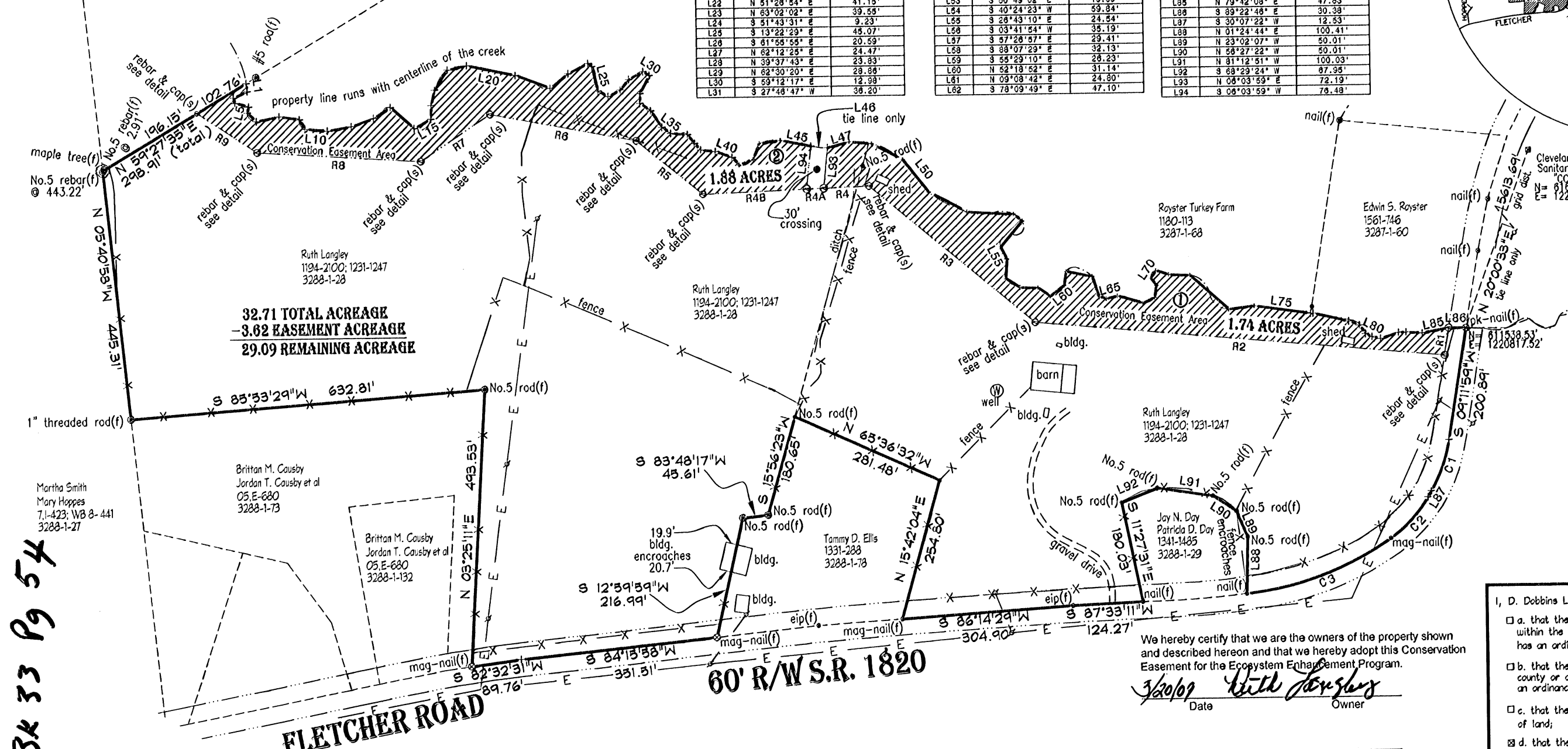
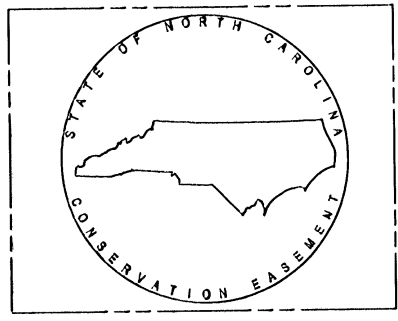
Course	Bearing	Distance
L1	S 06°38'45" E	14.58'
L2	S 65°49'43" W	27.01'
L3	S 14°23'18" E	9.39'
L4	S 74°28'23" E	25.37'
L5	S 13°40'59" W	11.19'
L6	S 48°37'19" E	22.11'
L7	N 78°49'07" E	41.40'
L8	S 80°44'57" E	38.14'
L9	S 50°30'52" E	19.58'
L10	S 84°34'50" E	39.97'
L11	N 80°23'10" E	43.31'
L12	N 70°28'11" E	42.51'
L13	N 58°14'01" E	35.42'
L14	S 19°19'59" E	58.45'
L15	N 81°38'50" E	33.99'
L16	N 02°10'58" E	24.16'
L17	N 13°12'20" E	28.29'
L18	N 33°20'17" E	42.18'
L19	N 78°12'24" E	35.23'
L20	S 78°03'03" E	89.70'
L21	S 69°17'58" E	68.60'
L22	N 51°28'54" E	41.15'
L23	N 63°02'02" E	39.59'
L24	S 51°43'31" E	9.23'
L25	S 13°22'29" E	45.07'
L26	S 61°58'58" E	20.59'
L27	N 62°12'25" E	24.47'
L28	N 39°37'43" E	23.83'
L29	N 62°30'20" E	28.88'
L30	S 59°12'17" E	12.98'
L31	S 27°48'47" W	36.20'

Course	Bearing	Distance
L32	S 00°55'33" W	17.50'
L33	S 54°40'48" E	22.97'
L34	S 33°52'52" E	35.78'
L35	S 54°37'48" E	18.33'
L36	S 85°02'23" E	29.98'
L37	S 37°34'31" E	20.28'
L38	S 44°30'00" E	15.89'
L39	S 81°87'42" E	26.31'
L40	S 70°17'36" E	31.47'
L41	S 42°42'12" E	18.22'
L42	N 68°17'04" E	27.05'
L43	N 23°34'49" E	29.92'
L44	N 82°04'31" E	37.95'
L45	S 78°37'40" E	55.13'
L46	S 83°55'27" E	30.00'
L47	N 75°33'33" E	40.10'
L48	S 84°17'12" E	40.08'
L49	S 62°50'52" E	62.20'
L50	S 38°15'18" E	74.02'
L51	S 61°52'34" E	78.54'
L52	S 88°24'02" E	82.89'
L53	S 50°49'02" E	19.50'
L54	S 40°24'23" W	59.84'
L55	S 28°49'10" E	24.94'
L56	S 03°41'54" W	35.19'
L57	S 87°26'57" E	29.41'
L58	S 88°07'29" E	32.13'
L59	S 55°29'10" E	28.23'
L60	N 52°18'52" E	31.14'
L61	N 08°03'59" E	24.80'
L62	S 78°09'49" E	47.10'

Course	Bearing	Distance
L63	S 19°18'58" E	38.62'
L64	S 75°57'30" E	12.43'
L65	N 77°47'09" E	20.14'
L66	S 73°51'28" E	47.08'
L67	N 84°44'11" E	23.20'
L68	N 08°21'33" E	21.39'
L69	N 38°47'35" W	15.87'
L70	N 33°21'15" E	18.09'
L71	S 72°33'48" E	24.18'
L72	S 87°21'39" E	37.73'
L73	S 48°01'39" E	91.41'
L74	N 83°17'58" E	48.03'
L75	S 81°43'19" E	101.20'
L76	S 38°50'38" E	4.30'
L77	S 78°53'09" E	84.84'
L78	S 68°48'14" E	20.08'
L79	S 38°02'10" E	18.68'
L80	S 68°01'18" E	13.00'
L81	S 78°58'23" E	15.41'
L82	N 72°19'39" E	33.69'
L83	N 87°10'57" E	13.33'
L84	S 88°37'57" E	28.31'
L85	N 79°42'08" E	47.83'
L86	S 89°22'48" E	30.38'
L87	S 30°07'22" W	12.33'
L88	N 01°24'44" E	100.41'
L89	N 23°02'07" W	50.91'
L90	N 87°27'22" W	50.01'
L91	N 81°12'51" W	100.03'
L92	S 68°29'24" W	87.35'
L93	N 08°03'59" E	72.19'
L94	S 08°03'59" W	78.48'



Course	Bearing	Distance
R1	S 03°17'33" W	48.84'
R2	N 84°41'43" W	729.99'
R3	N 49°55'15" W	382.65'
R4	S 87°55'49" W	80.74'
R4B	S 87°55'49" W	30.31'
R5	N 60°42'43" W	152.25'
R6	N 79°08'35" W	265.40'
R7	S 59°41'14" W	149.54'
R8	N 58°12'33" W	292.05'
R9	N 58°09'13" W	127.62'



We hereby certify that we are the owners of the property shown and described hereon and that we hereby adopt this Conservation Easement for the Ecosystem Enhancement Program.

Ruth Langley
Date: 3/20/09 Owner

I, D. Dobbins Lattimore certify one of the following as marked:

a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;

b. that the survey is located in such portion of a county or a municipality that is unregulated as to an ordinance that regulates parcels of land;

c. that the survey is of an existing parcel or parcels of land;

d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;

e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (a) through (d) above.

DL

State of North Carolina
County of Cleveland
I, **JAN DEVINEY**, Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.

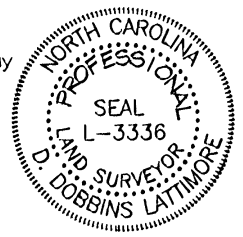
JAN DEVINEY 3-26-2009
Date

CERTIFICATE OF APPROVAL:
I hereby certify that the minor subdivision shown in this plat is in all respects in compliance with the Cleveland County Development Ordinance, and that this plat has been approved by the Administrator, subject to its being recorded with the Cleveland County Register of Deeds within 60 days of the date below.

Chi Mat
Date: 3/26/09 Administrator

Certificate of Survey and Accuracy
I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book See, Page Map; that the boundaries not surveyed are clearly indicated as drawn from information found in Book See, page See; that the ratio of precision as calculated is 1:2,000; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, license number and seal this 19th day of December A.D., 2008.

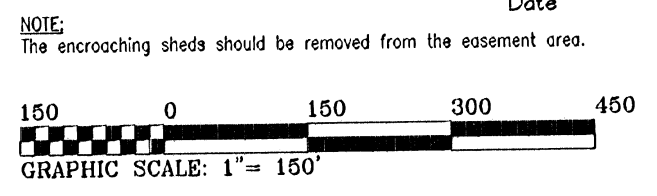
DL
License Number L-3336 Surveyor



LATTIMORE & PEELER SURVEYING
105 LONDON ROAD (704) 538-3443 D.F. # RTFARM1Langley
LAWDALE, NORTH CAROLINA 28090 C.F. # RTFARM12007
DRAWING # 08-259B

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK
SPO FILE NUMBER: 023-ZI
EEP SITE IF NUMBER: 92492
NAME OF PROJECT: BIG HARRIS CREEK II
CURRENT OWNER: Ruth Langley
OWNER CONTACT INFO:
Owner: Ruth E. Langley
Address:
Deed Ref: 1194-2100; 1231-1247
Tax Map Ref: 3288-1-28
Township: No.8
County: Cleveland
State: North Carolina
Plat Prepared: 12/19/2008
Scale 1" = 150'

GENERAL NOTES
1. NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
2. PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
3. UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
4. NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
5. NO DOT R/W'S ARE APPROXIMATE UNLESS OTHERWISE NOTED.
6. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
7. COPYRIGHT © 2008, LATTIMORE AND PEELER SURVEYING. ALL RIGHTS RESERVED. REPRODUCTION OR USE OF THE CONTENTS OF THIS DOCUMENT OR ADDITIONS OR DELETIONS TO THIS DOCUMENT, IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF THE LAND SURVEYOR, IS PROHIBITED.
8. IF THIS MAP DOES NOT HAVE AN ORIGINAL SIGNATURE IT IS NOT VALID.
9. THIS MAP IS FOR THE EXCLUSIVE USE OF THE ORIGINAL PURCHASER OF THIS SURVEY AND IS NOT TRANSFERABLE TO SUBSEQUENT OWNERS OR ADDITIONAL INSTITUTIONS.



Site Data
Water System: Cleveland County Sanitary District
Sewer System: Individual septic systems
All interior lot lines subject to a 20' (10' either side) drainage easement and or utility easement
All lots subject to a 10' drainage easement where natural drainage occurs

LEGEND	
-x-x-	FENCE LINE
-e-e-	ELECTRIC LINE
-be-be-	BURIED ELECTRIC LINE
-w-w-	WATER LINE
-g-g-	GAS LINE
-ss-ss-	SAN/SEWER LINE
-t-t-	TELEPHONE LINE
○	NEW IRON PIN (NIP)
●	EXISTING IRON PIN (EIP)
+	UNMONUMENTED POINT
⊙	MAGNAIL
⊠	CONCRETE MONUMENT
△	R.R. SPIKE SET
▲	R.R. SPIKE FOUND
(f)	FOUND
(s)	SET
⊞	STONE
⊞	STONE
⊞	TREE
⊞	WELL

8

129414

Filed in CLEVELAND County, NC
on Nov 05 2009, at 03:21:19 PM

by BONNIE E. REECE
REGISTER OF DEEDS

Book 1586 Page 622

Issued Nov 05 2009

\$12.00

by BONNIE E. REECE
REGISTER OF DEEDS ID.20096

State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

RECORDING FEE \$ 40⁰⁰ Reus \$12⁰⁰

* Susan Biggers
STATE OF NORTH CAROLINA

**CONSERVATION EASEMENT
AND ACCESS EASEMENT**

Cleveland COUNTY
SPO File Number 023-ZJ
EEP Site ID Number: 739
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT AND ACCESS EASEMENT, pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 1st day of October, 2009, by Janet B. Whisnant, (" Grantor "), whose mailing address is 1338-1 Union Church Rd. Lawndale, NC 28090 (Grantee"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in Number 8 Township, Cleveland County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 28 acres and being conveyed to the Grantor by deed as recorded in Deed Book 1265 Page 1725 of the Cleveland County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of the waters of (Big Harris Creek).

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement of the nature and character and to the extent hereinafter set forth, over a described area of the Property, referred to hereafter as the "**Conservation Easement Area**" 1.67 acres for the benefit of the people of North Carolina, and being all of the tract of land as identified as Conservation Easement Area as shown on a plat of survey entitled "Conservation Easement Survey for the State of North Carolina, Department of Administration Ecosystem Enhancement Program Big Harris Creek" dated October 21, 2008, certified by D.Dobbins Lattimore, License # L-3336 and recorded March 28, 2009 Registry: **Conservation Easement Area** being more particularly described as follows:

See Exhibit A Attached

The purposes of this Conservation Easement are to maintain, restore, enhance, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped

recreational and educational uses of the Easement Area. Existing roads, trails or paths may be maintained with loose gravel or permanent vegetation to stabilize or cover the surfaces.

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Ingress, Egress, and Inspection. The Grantee, its employees and agents, successors and assigns, receive the perpetual right of unlimited and repeated ingress and egress to the Easement Area over the Property at reasonable times to undertake any activities to restore, manage, maintain, enhance, and monitor the wetland and riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights. Grantees access rights are further granted and described in Easement Agreement recorded in Deed Book 1282 and recorded in Page 639 dated October 25th 2000.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their

successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown above or to other address(es) as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the

transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

Janet B. Whisnant (SEAL)
Janet B. Whisnant

NORTH CAROLINA

COUNTY OF CLEVELAND

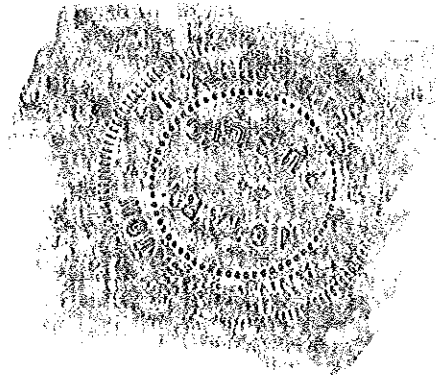
I, Ann M. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that Janet B. Whisnant, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 1st day of October, 2009.

Ann M. Deaton
Notary Public

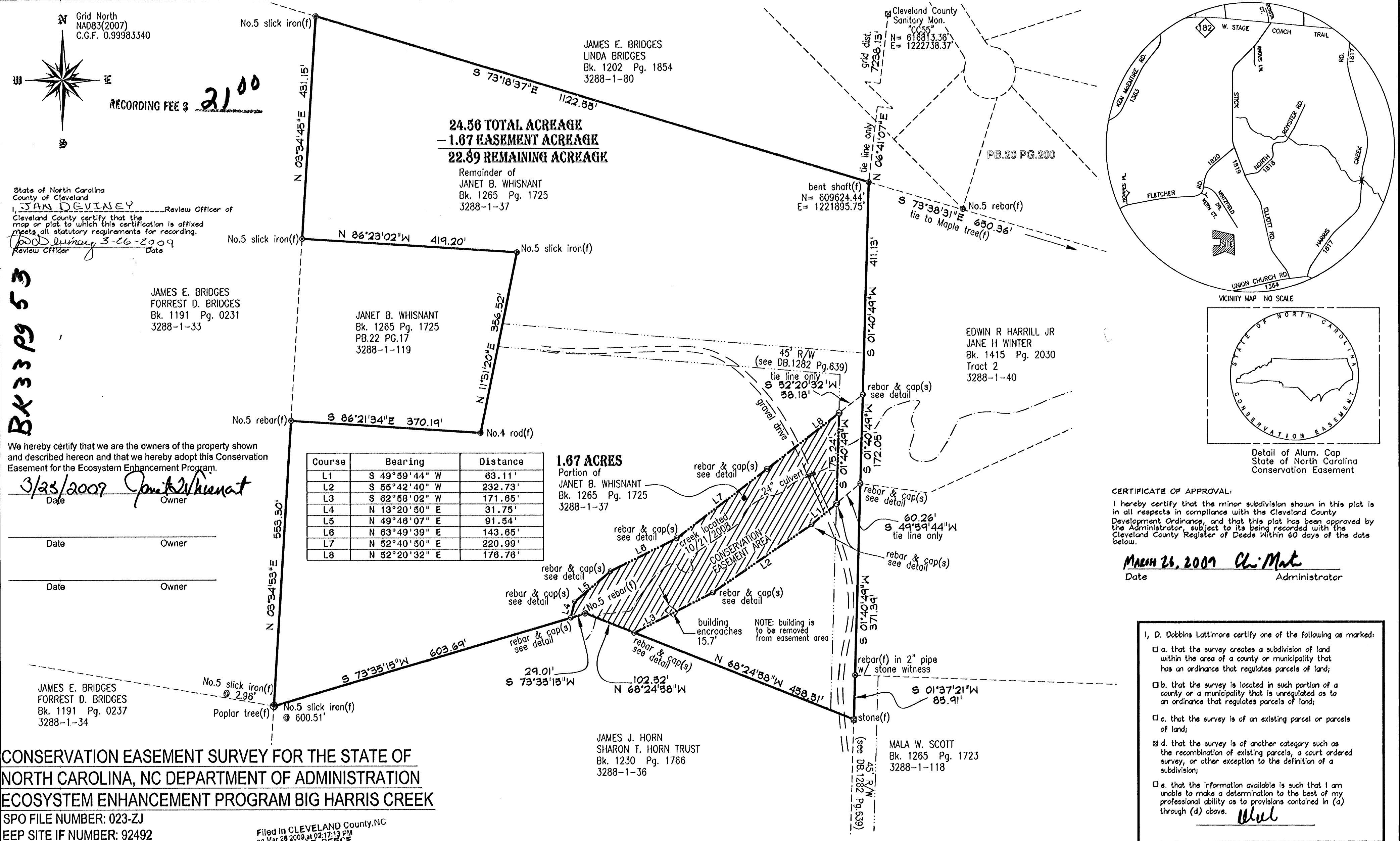
My commission expires:

8-1-2010



**Exhibit A:
Legal Description for Janet Whisnant Conservation Easement**

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616813.36 feet E= 1222738.37 feet; THENCE South 06 degrees 41 minutes 10 seconds West for a grid distance of 7238.13 feet to a bent shaft said corner having the grid coordinates of N= 609624.44 feet E= 1221895.75 feet and said corner being the Northwestern most corner of the Edwin and Jane Harrill property as described in Deed book 1415 page 2030 of the Cleveland County Registry and being the Northeastern most corner of the Janet B. Whisnant property as described in Deed book 1265 page 1725 of the Cleveland County Registry and said corner being in the southern line of the James and Linda Bridges property as described in Deed book 1202 page 1854 of the Cleveland County Registry; THENCE with the Harrill and Whisnant South 01 degrees 40 minutes 49 seconds West for a distance of 411.13 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Harrill and Whisnant property line South 52 degrees 20 minutes 32 seconds West for a distance of 58.18 feet to a No.5 rebar set with a cap stamped Conservation Easement said corner being in the western line of a 45 foot right-of-way said right-of-way described in Deed book 1282 page 639 of the Cleveland County Registry and said corner being the BEGINNING of the Conservation Easement; THENCE with the 45 foot right-of-way as mentioned above South 01 degrees 40 minutes 49 seconds West for a distance of 175.24 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the right-of way and being three new lines through the Whisnant property South 49 degrees 59 minutes 44 seconds West for a distance of 63.11 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 55 degrees 42 minutes 40 seconds West for a distance of 232.73 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 62 degrees 58 minutes 02 seconds West for a distance of 171.65 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Southern line of the Whisnant property and being in the northern line of the James and Sharon Horn property as described in Deed book 1230 page 1766 of the Cleveland County Registry; THENCE with the Horn property North 68 degrees 24 minutes 58 seconds West for a distance of 102.52 feet to a No.5 rebar found said corner being a common corner of the Horn and Whisnant property; THENCE with the Horn property South 73 degrees 35 minutes 15 seconds West for a distance of 29.01 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Horn and Whisnant property line and being five new lines through the Whisnant property North 13 degrees 20 minutes 50 seconds East for a distance of 31.75 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 49 degrees 46 minutes 07 seconds East for a distance of 91.54 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 63 degrees 49 minutes 39 seconds East for a distance of 143.65 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 52 degrees 40 minutes 50 seconds East for a distance of 220.99 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 52 degrees 20 minutes 32 seconds East for a distance of 176.76 feet to the point of BEGINNING.
Containing 1.67 acres more or less.



Grid North
NAD83(2007)
C.G.F. 0.99983340

RECORDING FEE \$ 21.00

State of North Carolina
County of Cleveland
I, JAN DEVINEY Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.
Jan Deviney 3-26-2009
Review Officer Date

BK 33 PG 53

JAMES E. BRIDGES
FORREST D. BRIDGES
Bk. 1191 Pg. 0231
3288-1-33

We hereby certify that we are the owners of the property shown
and described hereon and that we hereby adopt this Conservation
Easement for the Ecosystem Enhancement Program.

3/25/2009 Janet Whisnant
Date Owner

Date Owner

Date Owner

Course	Bearing	Distance
L1	S 49°59'44" W	63.11'
L2	S 55°42'40" W	232.73'
L3	S 62°58'02" W	171.65'
L4	N 13°20'50" E	31.75'
L5	N 49°48'07" E	91.54'
L6	N 63°49'39" E	143.65'
L7	N 52°40'50" E	220.99'
L8	N 52°20'32" E	176.76'

1.67 ACRES
Portion of
JANET B. WHISNANT
Bk. 1265 Pg. 1725
3288-1-37

JAMES E. BRIDGES
FORREST D. BRIDGES
Bk. 1191 Pg. 0237
3288-1-34

**CONSERVATION EASEMENT SURVEY FOR THE STATE OF
NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION
ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK**

SPO FILE NUMBER: 023-ZJ
EEP SITE IF NUMBER: 92492
NAME OF PROJECT: BIG HARRIS CREEK II
CURRENT OWNER: Janet B. Whisnant
OWNER CONTACT INFO:

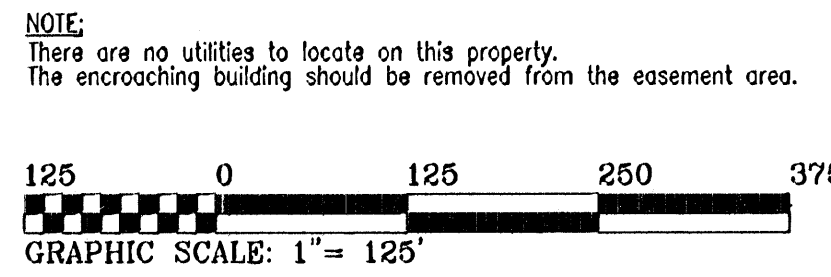
Owner: Janet B. Whisnant

Address:

Deed Ref: 1265-1725
Tax Map Ref: 3288-1-37
Township: No.8
County: Cleveland
State: North Carolina
Plat Prepared: 10/21/2008
Scale 1" = 125'

Filed in CLEVELAND County, NC
on Mar 29 2009 at 02:17:13 PM
by BONNIE E. PEELER
REGISTER OF DEEDS
Book 33 Page 53

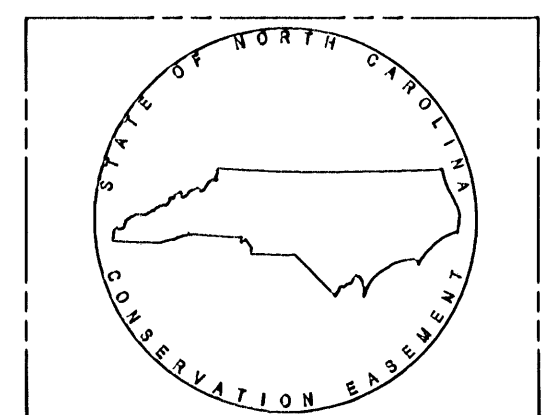
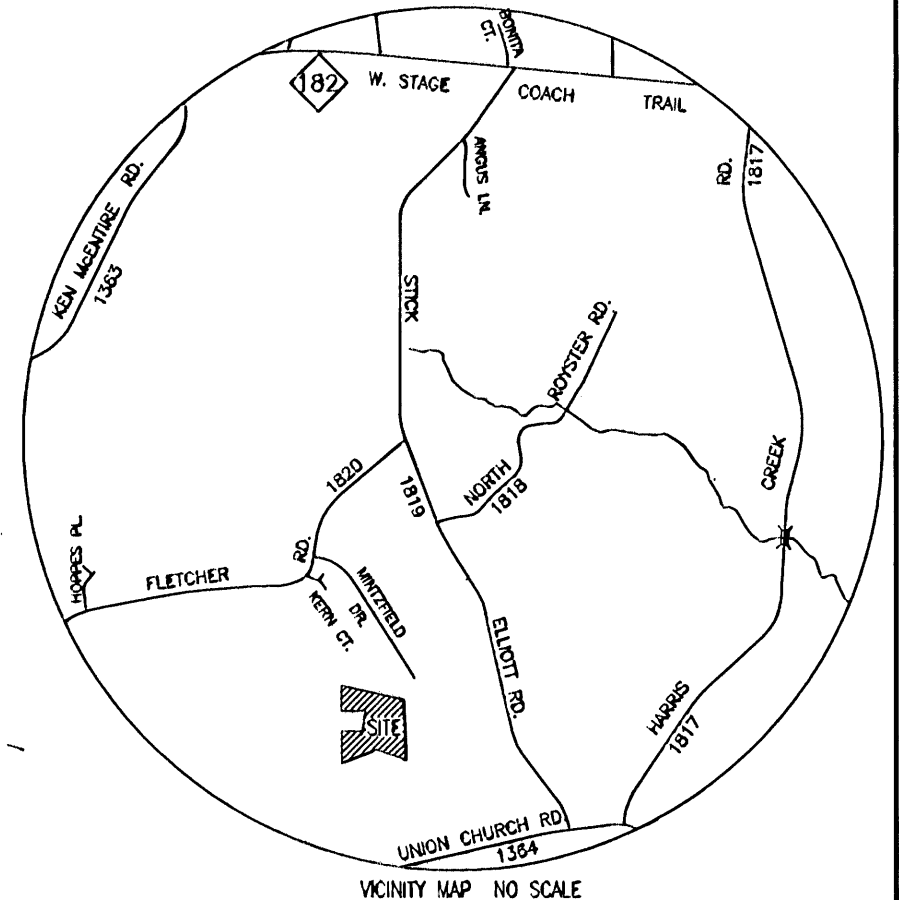
- GENERAL NOTES**
- NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
 - PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
 - UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
 - NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
 - NO DOT R/W'S ARE APPROXIMATE UNLESS OTHERWISE NOTED.
 - ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
 - COPYRIGHT © 2008, LATTIMORE AND PEELER SURVEYING. ALL RIGHTS RESERVED. REPRODUCTION OR USE OF THE CONTENTS OF THIS DOCUMENT, OR ADDITIONS OR DELETIONS TO THIS DOCUMENT, IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF THE LAND SURVEYOR, IS PROHIBITED.
 - IF THIS MAP DOES NOT HAVE AN ORIGINAL SIGNATURE IT IS NOT VALID.
 - THIS MAP IS FOR THE EXCLUSIVE USE OF THE ORIGINAL PURCHASER OF THIS SURVEY AND IS NOT TRANSFERABLE TO SUBSEQUENT OWNERS OR ADDITIONAL INSTITUTIONS.



Site Data
Water System : Cleveland County Sanitary District
Sewer System: Individual septic systems
All interior lot lines subject to a 20' (10' either side) drainage easement and or utility easement
All lots subject to a 10' drainage easement where natural drainage occurs

LEGEND

-x-x- FENCE LINE	o NEW IRON PIN (NIP)
-e-e- ELECTRIC LINE	• EXISTING IRON PIN (EIP)
-be-be- BURIED ELECTRIC LINE	+ UNMONUMENTED POINT
-w-w- WATER LINE	o MAGNOL
-g-g- GAS LINE	■ CONCRETE MONUMENT
-ss- SAN-SEWER LINE	Δ R.R. SPIKE SET
-t-t- TELEPHONE LINE	▲ R.R. SPIKE FOUND
o HYDRANT	(f) = FOUND
o GAS METER	(s) = SET
o WATER METER	■ STONE
o POWER POLE	o TREE
o TELEPHONE BOX	o WELL



CERTIFICATE OF APPROVAL:
I hereby certify that the minor subdivision shown in this plat is in all respects in compliance with the Cleveland County Development Ordinance, and that this plat has been approved by the Administrator, subject to its being recorded with the Cleveland County Register of Deeds within 60 days of the date below.

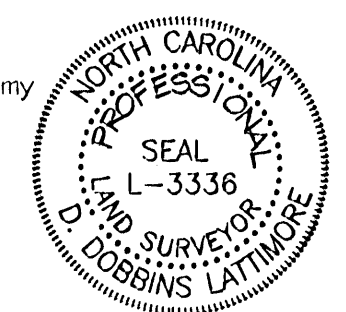
MARCH 26, 2009 Chi-Mark
Date Administrator

- I, D. Dobbins Lattimore certify one of the following as marked:
- a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;
 - b. that the survey is located in such portion of a county or a municipality that is unregulated as to an ordinance that regulates parcels of land;
 - c. that the survey is of an existing parcel or parcels of land;
 - d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;
 - e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (a) through (d) above.
- Wul

Certificate of Survey and Accuracy

I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book 1265, Page 1725; that the boundaries not surveyed are clearly indicated as drawn from information found in Book _____, page _____; that the ratio of precision as calculated is 1 : 12,000; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, license number and seal this 21st day of October A.D., 2008.

Dull
License Number L-3336 Surveyor



LATTIMORE & PEELER SURVEYING
105 LONDON ROAD (704) 538-3443 D.F. # RTFARM_Harrill # Whisnant
LAWNDALE, NORTH CAROLINA 28090 C.F. # RTFARM2007
DRAWING # 08-225B

132459

12

Filed in CLEVELAND County, NC
on Feb 10 2010 at 02:14:25 PM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 1591 Page 175

Issued Feb 10 2010
\$103.00
by BONNIE E. REECE
REGISTER OF DEEDS ID. 20479
State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

RECORDING FEE \$ 52.⁰⁰ REVENUES 103.⁰⁰

* Deaton Biggers + Hoza

STATE OF NORTH CAROLINA

CONSERVATION EASEMENT

CLEVELAND COUNTY
SPO File Number 023: ZN
EEP Site # 739

Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT DEED, pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 5th day of February, 2010, by **Forest Donald Bridges and wife Kathryn B. Bridges, Co-tenants with a marital interest and James E. Bridges and wife Linda D. Bridges, Co-tenants with a marital interest** (" Grantor "), whose mailing address is 131 Appian Way, Shelby NC and 1357 Fletcher Rd. Shelby NC respectively, ("**Grantee**"), whose mailing address is to the State of North Carolina State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in No. 8 Township, Cleveland County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 47 acres and 53 acres and being conveyed to the Grantor by deed as recorded in Deed Book 1191 Page 237 and Deed Book 1191 Page 0231 respectively of the Cleveland County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of the waters of **(Big Harris Creek)**.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement of the nature and character and to the extent hereinafter set forth, 15.03 acres of a described area of the Property, referred to hereafter as the "**Easement Area**", for the benefit of the people of North Carolina, and being all of the tract of land as identified as Conservation Easement as shown on a plat of survey entitled "Conservation Easement Survey for the State of North Carolina, NC Department of Administration, Ecosystem Enhancement Program Big Harris Creek" dated July 7, 2009, certified by D. Dobbins Lattimore with Lattimore & Peeler Surveying and recorded December 28, 2009 in Book 33, Page 185 of the Cleveland County Registry: **Conservation Easement Area** being more particularly described as follows:

[See Attached Exhibit A)

The purposes of this Conservation Easement are to maintain, restore, enhance, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat,

and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped recreational and educational uses of the Easement Area. Existing roads, trails or paths may be maintained with loose gravel or permanent vegetation to stabilize or cover the surfaces.

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation

Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Ingress, Egress, and Inspection. The Grantee, its employees and agents, successors and assigns, receive the perpetual right of unlimited and repeated ingress and egress to the Easement Area over the Property at reasonable times to undertake any activities to restore, manage, maintain, enhance, and monitor the wetland and riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterranean water flow.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown above or to other address(es) as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the

interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

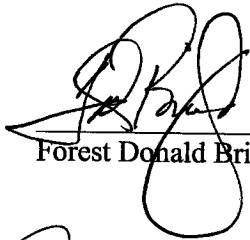
VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

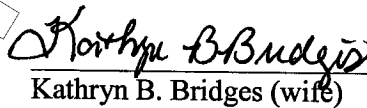
TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.




Forest Donald Bridges (SEAL)



Kathryn B. Bridges (wife) (SEAL)



James E. Bridges (Seal)



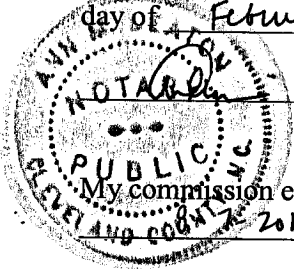
Linda D. Bridges (wife) (Seal)

NORTH CAROLINA

COUNTY OF Cleveland

I, Ann m. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that Forest D. Bridges and wife Kathryn B. Bridges, Co-Tenants with a Marital Interest, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 5th day of February, 2000.



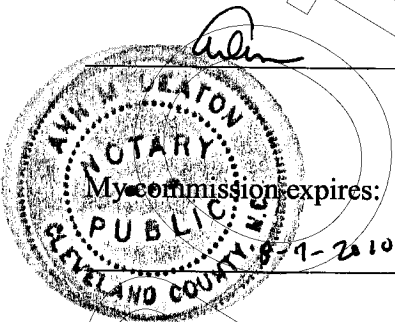
Notary Public

NORTH CAROLINA

COUNTY OF Cleveland

I, Ann m. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that James E. Bridges and wife Linda D. Bridges, Co-Tenants with a Marital Interest, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 5th day of February, 2000.



Notary Public

Exhibit A

Conservation Easement (Bridges property)

Tract 1

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616813.36 feet E= 1222738.37 feet; THENCE South 15 degrees 36 minutes 15 seconds West for a grid distance of 7129.34 feet to a No.5 slick iron said corner having the grid coordinates of N= 609946.78 feet E= 1220820.66 feet said corner being in the Southern line of the James E. Bridges property as described in Deed Book 1084 Page 1874 and Deed Book 1202 Page 1854 of the Cleveland County Registry and being the Northwestern corner of the Janet Whisnant property as described in Deed Book 1265 Page 1725 of the Cleveland County Registry and running with the Janet Whisnant property for the next three calls South 03 degrees 34 minutes 45 seconds West for a distance of 431.15 feet to a No.5 slick iron; thence South 03 degrees 37 minutes 10 seconds West for a distance of 352.98 feet to a No.5 rebar; thence South 03 degrees 34 minutes 53 seconds West for a distance of 500.09 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the place of BEGINNING; THENCE six new lines through the James and Forrest Bridges property as described in Deed Book 1191 Page 231 and Deed Book 1191 Page 237 of the Cleveland County Registry North 35 degrees 26 minutes 19 seconds West for a distance of 638.87 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 62 degrees 47 minutes 05 seconds West for a distance of 125.52 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 21 degrees 33 minutes 49 seconds East for a distance of 498.58 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 82 degrees 06 minutes 37 seconds West for a distance of 117.93 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 22 degrees 23 minute 55 seconds West for a distance for 166.31 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 84 degrees 58 minutes 35 seconds East for a distance of 468.24 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Western line of the James and Sharon Horn property as described in Deed Book 1047 Page 24 and Deed Book 1084 Page 1191 and Deed Book 1230 Page 1766 of the Cleveland County Registry; THENCE with the Horn property North 04 degrees 11 minutes 31 seconds East for a distance of 126.39 feet to a poplar tree said tree being a common corner between the Horn and Whisnant property; THENCE with the Whisnant property North 03 degrees 34 minutes 53 seconds East for a distance of 53.21 feet to the place of BEGINNING.
Containing 4.16 acres more or less.

Tract 2

Commencing on the terminus of the fourth call of the 4.16 acre tract described above and running North 82 degrees 06 minutes 37 seconds West for a distance of 31.04 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron being the place of BEGINNING; THENCE two new lines through the James and Forrest Bridges property North 82 degrees 06 minutes 37 seconds West for a distance of 718.42 feet to a No.5 rebar set with a cap stamped

Conservation Easement; THENCE North 25 degrees 50 minutes 02 seconds West for a distance of 1014.09 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron being the Southeastern corner of the Eula Bridges property and the Northeastern corner of the Rachel Elliott property as described in Deed Book 1112 Page 1026 of the Cleveland County Registry; THENCE running with the Elliott property South 05 degrees 02 minutes 56 seconds West for a distance of 422.40 feet to a 1 inch pipe said corner being the Southeastern corner of the Elliott property and the Northwestern corner of the Rachel Elliott property as described in Deed Book 19-J Page 157 of the Cleveland County Registry; THENCE with the Elliott property South 05 degrees 03 minutes 47 seconds West for a distance of 38.91 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Elliott property and running six new lines through the Bridges property South 35 degrees 07 minutes 23 seconds East for a distance of 681.66 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 44 degrees 42 minutes 30 seconds West for a distance of 242.27 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 37 degrees 42 minutes 51 seconds East for a distance of 164.39 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 36 degrees 02 minutes 59 seconds East for a distance of 260.01 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 84 degrees 58 minutes 35 seconds East for a distance for 657.62 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 22 degrees 18 minutes 30 seconds East for a distance of 167.85 feet to the place of BEGINNING.

Containing 7.64 acres more or less.

Tract 3

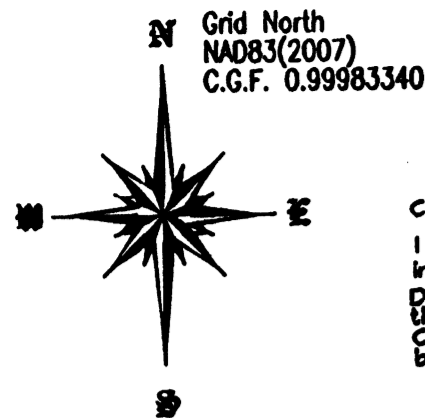
Commencing on the terminus of the sixth call of the 7.64 acre tract described above and running South 44 degrees 42 minutes 30 seconds West for a distance of 30.26 feet to a No.5 rebar set with a cap stamped Conservation Easement said iron marking the place of BEGINNING; THENCE running a new line through the James and Forrest Bridges property South 44 degrees 42 minutes 30 seconds West for a distance of 410.41 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Eastern line of the James Bridges property as described in Deed Book 981 Page 305 of the Cleveland County Registry; THENCE with the Bridges property South 04 degrees 43 minutes 00 seconds West for a distance of 236.65 feet to a 1.25 inch pipe said iron being the Southeastern corner of the Bridges property and the Northeastern corner of the Raymon Walker property as described in Deed Book 1089 Page 209 of the Cleveland County Registry; THENCE with the Walker property South 05 degrees 16 minutes 47 seconds West for a distance of 364.06 feet to a tack in a pipe said iron being the Northwestern corner of the Cleveland County Board of Education property as described in Deed Book 1078 Page 900 and Deed Book 1080 Page 2041 of the Cleveland County Registry; THENCE South 85 degrees 13 minutes 32 seconds East for a distance of 132.97 feet to a No.5 rebar set with a cap stamped Conservation Easement and passing over a 0.75 inch pipe at 49.92 feet; THENCE leaving the Cleveland County Board of Education property and running three new lines through the Bridges property North 07 degrees 21 minutes 03 seconds West for a distance of 289.31 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 36 degrees 02 minutes 59 seconds East for a distance of 594.15 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 37 degrees 42 minutes 51 seconds West for a distance of 169.13 feet to the place of BEGINNING.

Containing 3.23 acres more or less.

Also included in tract 3 is a 50 foot drainage easement as described in Deed Book 1084 Page 1193 of the Cleveland County Registry from Walter Bridges, Lillian Bridges, James Bridges, Linda Bridges, Clara Bridges, Forest Bridges and Kathryn Bridges to the Cleveland County Board of Education.

20' Access Easement

Beginning at a tack found in a pipe said corner being the Northeastern corner of the Cleveland County Board of Education property as described in Deed Book 1078 Page 900 and Deed Book 1080 Page 2041 of the Cleveland County Registry and also being the Northeastern corner of the 60 foot right of way from the Cleveland County Board of Education to Walter Bridges, Lillian Bridges, James Bridges, Linda Bridges, Clara Bridges, Forest Bridges and Kathryn Bridges as described in Deed Book 1085 Page 296 of the Cleveland County Registry said corner also being the point of BEGINNING; THENCE with the western line of the James and Sharon Horn property as described in Deed Book 1047 Page 24 and Deed Book 1084 Page 1191 and Deed Book 1230 Page 1766 of the Cleveland County Registry North 04 degrees 11 minutes 31 seconds East for a distance of 1034.63 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE leaving the Horn property and running along the Southern line of the 4.16 acre tract described above North 84 degrees 58 minutes 35 seconds West for a distance of 20.00 feet to an unmarked point; THENCE a new line through the Bridges property South 04 degrees 11 minutes 31 seconds West for a distance of 1034.72 feet to an unmarked point in the Northern line of the Cleveland County Board of Education property; THENCE South 85 degrees 13 minutes 32 seconds East for a distance of 20.00 feet to the point of BEGINNING. Containing 0.48 acres more or less.



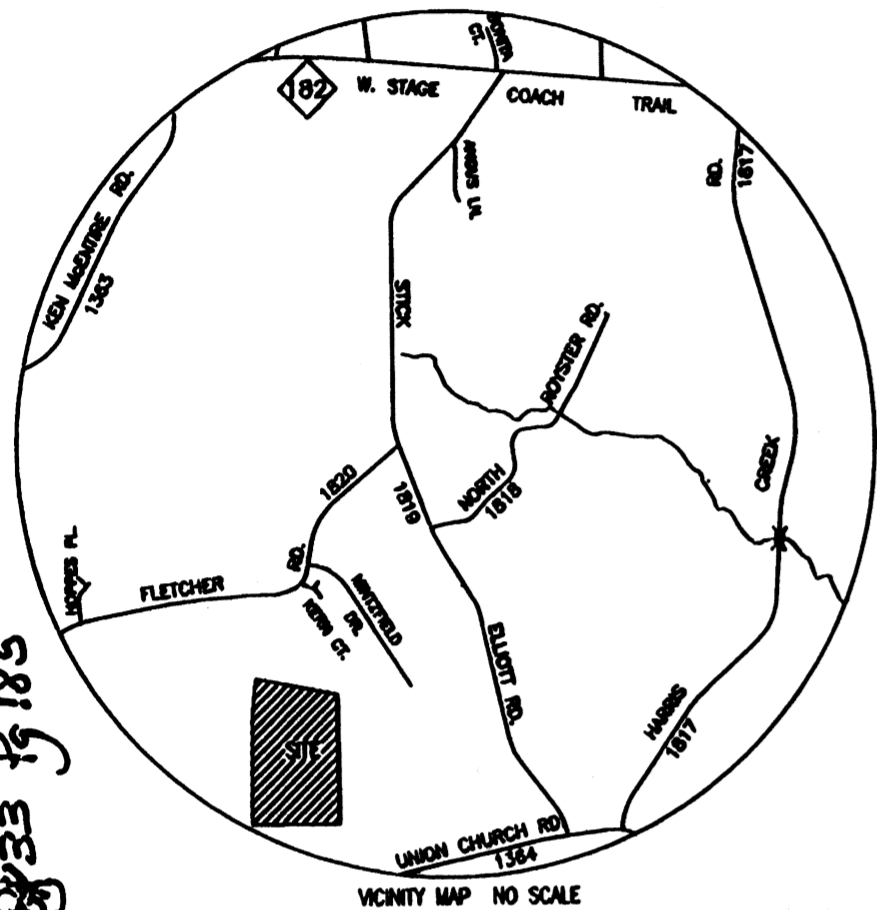
RECORDING FEE \$ 21.00

CERTIFICATE OF APPROVAL:

I hereby certify that the minor subdivision shown in this plat is in all respects in compliance with the Cleveland County Development Ordinance, and that this plat has been approved by the Administrator subject to its being recorded with the Cleveland County Register of Deeds within 60 days of the date below.

12-28-2009 Chi-Maiti Date Administrator

State of North Carolina County of Cleveland Pam McCuey Review Officer of Cleveland County certify that the map or plat to which this certification is affixed meets all statutory requirements for recording. Pam McCuey 12-28-2009 Date Review Officer



We hereby certify that we are the owners of the property shown and described hereon and that we hereby adopt this Conservation Easement for the Ecosystem Enhancement Program.

12/28/09 James E. Bridges Date Owner

FINAL PLAT

CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-1N EEP SITE ID NUMBER: 739 NAME OF PROJECT: BIG HARRIS CREEK II CURRENT OWNER: James & Forrest Bridges OWNER CONTACT INFO:

Owner: James E. Bridges Forrest D. Bridges Address:

Deed Ref: 1191-231; 1191-237 Tax Map Ref: 3288-1-33 & 34 Township: No. 8 County: Cleveland State: North Carolina Plat Prepared: 7/31/2009 Scale 1" = 220'

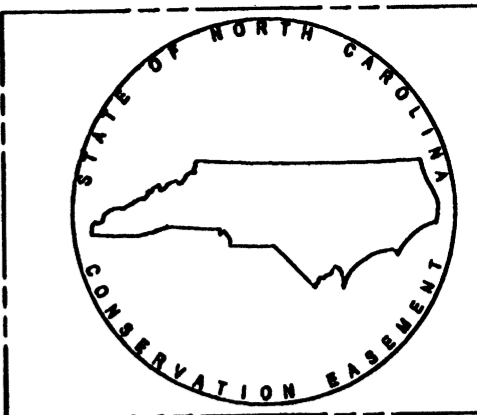
Call Table Legend L-xxx represents short calls along Conservation easements T-xxx represents calls along crossing through the conservation easements RW-xxx represents calls along 60' R/W

BK 33 Pg 185

Walter A. McIntyre Earlene D. McIntyre 1346-1596 3288-1-127U see survey by this firm dated 12-13-96

James E. Bridges 1084-1874 1202-1854 3288-1-80

Cleveland County Sanitary Mon. CC55 N= 616813.36 E= 1222738.37



Detail of Alum. Cap State of North Carolina Conservation Easement

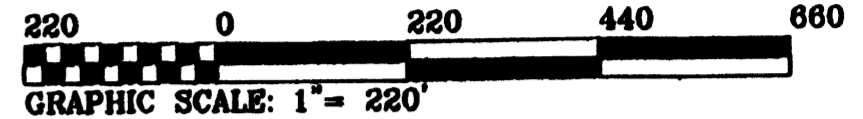


Table with 3 columns: Course, Bearing, Distance. Calls for CE Tract 1. Courses L1 through L8.

Table with 3 columns: Course, Bearing, Distance. Calls for CE Tract 2. Courses L9 through L18.

102.05 TOTAL ACREAGE - 15.03 EASEMENT ACREAGE 87.02 REMAINING ACREAGE

James E. Bridges Forrest D. Bridges 1191-0231 3288-1-33

Table with 3 columns: Course, Bearing, Distance. Calls for CE Tract 3. Courses L19 through L25.

Table with 3 columns: Course, Bearing, Distance. Calls for 30' crossings. Courses T1 through T4.

Table with 3 columns: Course, Bearing, Distance. Calls for 60' R/W. Courses RW1 through RW4.

Site Data

Water System: Cleveland County Sanitary District Sewer System: Individual septic systems All interior lot lines subject to a 20' (10' either side) drainage easement and or utility easement All lots subject to a 10' drainage easement where natural drainage occurs

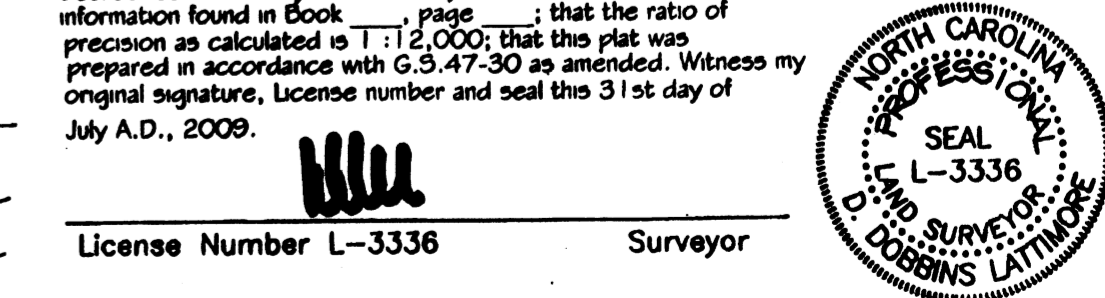
LEGEND table listing symbols for fence line, electric line, water line, gas line, etc.

- GENERAL NOTES: 1. NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING. 2. PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD. 3. UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.

- I, D. Dobbins Lattimore certify one of the following as marked: a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;



Certificate of Survey and Accuracy I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book See Page Map; that the boundaries not surveyed are clearly indicated as drawn from information found in Book page; that the ratio of precision as calculated is 1:12,000; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, license number and seal this 31st day of July A.D., 2009.



LATTIMORE & PEELER SURVEYING 105 LONDON ROAD (704) 538-3443 D.F. # RTFARM_BRIDGES2009 C.F. # RTFARM2007 LAWNDALE, NORTH CAROLINA 28090 DRAWING # 09-128B

111567

RECORDING FEE \$ 35.⁰⁰

FILED in CLEVELAND County, N.C.
on Jul 14 2008 at 11:31:35 AM
by: BONNIE E. REECE
REGISTER OF DEEDS
BOOK 1557 PAGE 139

STATE OF NORTH CAROLINA

CONSERVATION EASEMENT

CLEVELAND COUNTY

SPO File Number 023-ZP

Prepared by: Office of the Attorney General
Property Control Section

Return to: NC Department of Administration

State Property Office: **Blane Rice** ★
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT DEED, pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 11 day of July, 2008, by **Ralph Wayne Brazzell and wife Lesley McIntyre Brazzell**, ("Grantor"), whose mailing address is **172 Columns Circle Shelby NC. 28150**, ("Grantee"), to the State of North Carolina, whose mailing address is , **1321 Mail Service Center, Raleigh, NC 27699-1321**. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in

Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

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WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in **Township NO. 8, Cleveland County, North Carolina** (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 2.33 acres and being conveyed to the Grantor by deed as recorded in Deed Book 1120 Page 328 of the Cleveland County Registry of Deeds Office; and

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of the waters of (**Big Harris Creek**).

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement of the nature and character and to the extent hereinafter set forth, over a described area of the Property, referred to hereafter as the "**Easement Area**", for the benefit of the people of North Carolina, and being all of the tract of land as identified as **Conservation Easement 0.72 acres** as shown on a plat of survey entitled "Conservation Easement Survey for the State of North Carolina, NC Department of Administration, Ecosystem Enhancement Program; Big Harris Creek "dated April 9, 2008 certified by Dobbin Lattimore L-3336 and recorded May 28, 2008, in Book 32 Page 77, Cleveland County Registry of Deeds Office:

Conservation Easement Area being more particularly described as follows:

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616814.55 feet E= 1222738.29 feet; THENCE South 20 degrees 28 minutes 54 seconds West for a distance of 5267.37 feet(grid distance) to a nail in the centerline of Fletcher Road (S.R. 1820) said corner also being the Southeastern most corner of Steve and Wanda McIntyre property as recorded in Deed book 16-J at page 156 of the Cleveland County Registry and said corner having North Carolina Grid Coordinates (NAD 83) of N= 611880.16 feet and E= 1220895.19 feet, THENCE with the center of Fletcher Road for the next four calls South 22 degrees 03 minutes 26 seconds West for a distance of 15.16 feet to a nail; THENCE South 17 degrees 08 minutes 58 seconds West for a distance of 101.56 feet to a nail; THENCE South 11 degrees 11 minutes 54 seconds West for a distance of 95.41 feet to a nail; THENCE South 09 degrees 48 minutes 52 seconds West for a distance of 137.52 feet to a nail found over a culvert said corner being the Southwestern most corner of the Royster Turkey Farm property as recorded in Deed book 16-Z at page 522 of the Cleveland County Registry

and the Northwestern most corner of the Copperfield of NC Inc. property as recorded in Deed book 1247 Page 1844 of the Cleveland County Registry and the Northeastern most corner of the Ruth Langley property as recorded in Deed book 1231 Page 1247 of the Cleveland County Registry; THENCE with the Langley property and the centerline of the branch North 89 degrees 21 minutes 45 seconds West for a distance of 30.39 feet to a No.5 rebar set with a cap stamped Conservation Easement said corner being the point of BEGINNING of the Conservation Easement Area THENCE a new line running along the right of way of Fletcher road North 09 degrees 48 minutes 52 seconds East for a distance 118.54 feet to a No. 5 rebar set in the right of way of Fletcher road with a cap stamped Conservation Easement; THENCE a new line North 85 degrees 13 minutes 22 seconds West for a distance of 248.46 feet to a No.5 rebar set with a cap stamped Conservation Easement in the western line of the Brazzell property and in the line of the Royster Turkey Farm property as recorded in deed book 1180 at page 113 of the Cleveland County Registry; THENCE with the Brazzell and Royster Turkey Farm property South 09 degrees 05 minutes 54 seconds West for a distance of 110.16 feet to a point in the center of the creek and passing over a No.5 rod at 98.02 feet said point in the creek being in the line of the Ruth Langley property; THENCE with the center of the creek and the Langley property for the next ten calls: South 88 degrees 49 minutes 48 seconds East for a distance of 4.30 feet to an unmarked point; THENCE South 76 degrees 52 minutes 20 seconds East for a distance of 64.64 feet to an unmarked point; THENCE South 68 degrees 45 minutes 26 seconds East for a distance of 20.06 feet to an unmarked point; THENCE South 35 degrees 01 minutes 22 seconds East for a distance of 18.68 feet to an unmarked point; THENCE South 65 degrees 00 minutes 27 seconds East for a distance of 13.00 feet to an unmarked point; THENCE South 76 degrees 57 minutes 35 seconds East for a distance of 15.41 feet to an unmarked point; THENCE North 72 degrees 20 minutes 28 seconds East for a distance of 33.69 feet to an unmarked point; THENCE North 87 degrees 41 minutes 45 seconds East for a distance of 13.33 feet to an unmarked point; THENCE South 86 degrees 37 minutes 09 seconds East for a distance of 28.91 feet to an unmarked point; THENCE North 79 degrees 42 minutes 56 seconds East for a distance of 47.83 feet to the point of BEGINNING. Containing 0.72 acres more or less. **BOOK 1557 PAGE 141**

The purposes of this Conservation Easement are to maintain, restore, enhance, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

BOOK 1557 PAGE 142

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology, or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential, and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped recreational and educational uses of the Easement Area. Existing roads, trails, or paths may be maintained with loose gravel or permanent vegetation to stabilize or cover the surfaces.

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving

directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

BOOK 1557 PAGE 143

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration, or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees, and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Ingress, Egress, and Inspection. The Grantee, its employees and agents, successors and assigns, receive the perpetual right of unlimited and repeated ingress and egress to the Easement Area over the Property at reasonable times to undertake any activities to restore, manage, maintain, enhance, and monitor the wetland and riparian resources of the Easement

Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

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B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterranean water flow.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns that comes to the attention of the Grantee the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their

successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

BOOK 1557 PAGE 145

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings, or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown above or to other address (es) as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not

inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

BOOK 1557 PAGE 146

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

Ralph Wayne Brazzell (SEAL)
Ralph Wayne Brazzell

Lesley McIntyre Brazzell (SEAL)
Lesley McIntyre Brazzell

NORTH CAROLINA

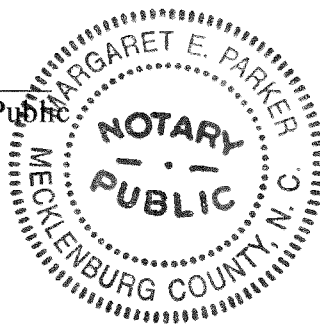
COUNTY OF Mecklenburg

I, Margaret E. Parker, a Notary Public in and for the County and State aforesaid, do hereby certify that Ralph Wayne Brazzell and Lesley McIntyre Brazzell Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 11 day of July, 2008.

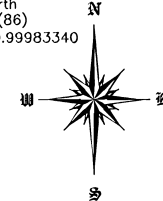
Margaret E. Parker

Notary Public

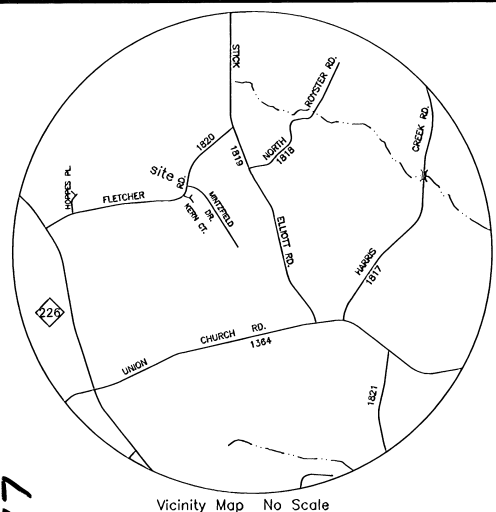


My commission expires:

11-12-09



RECORDING FEE \$ 219

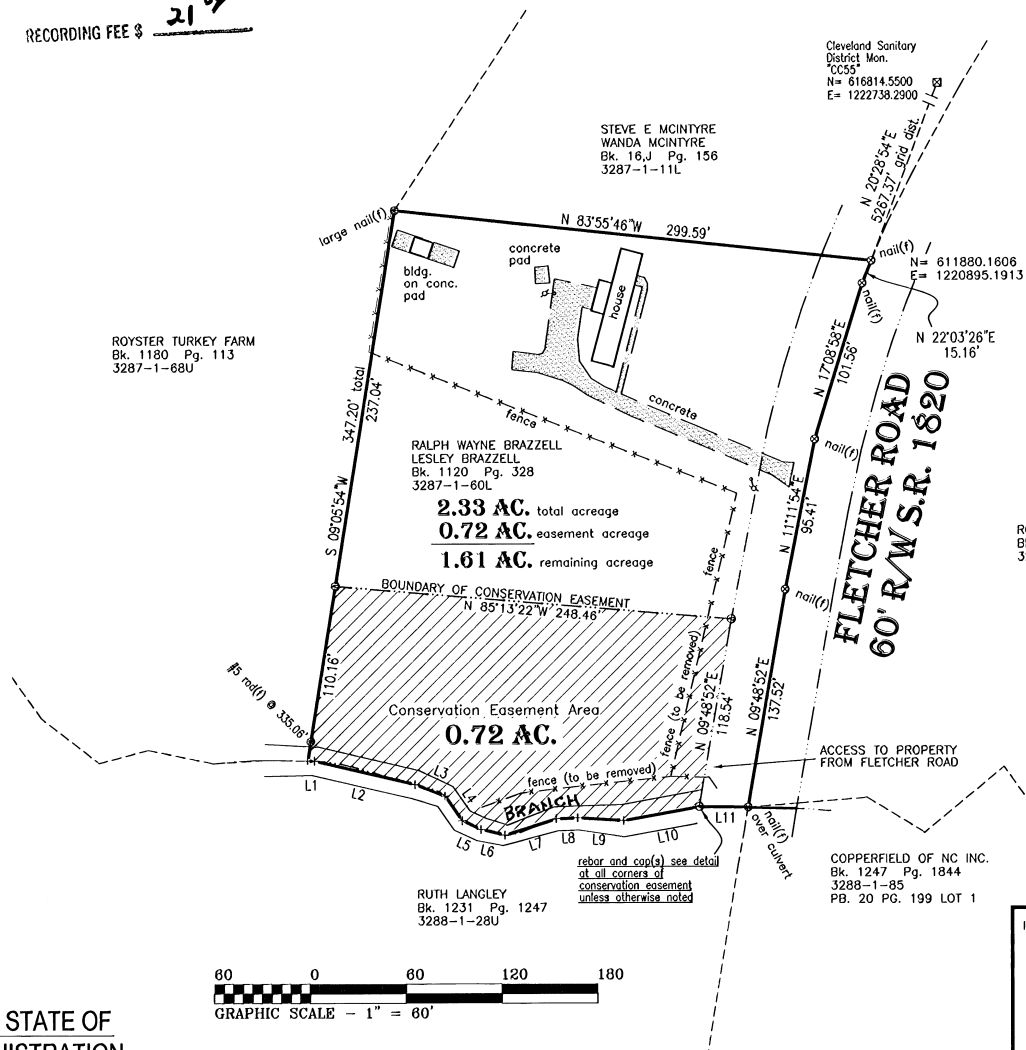


BK 32 Pg 77

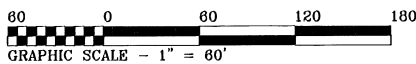
Course	Bearing	Distance
L1	S 88°49'48" E	4.30'
L2	S 76°52'20" E	64.64'
L3	S 68°45'26" E	20.06'
L4	S 35°01'22" E	18.68'
L5	S 65°00'27" E	13.00'
L6	S 76°57'35" E	15.41'
L7	N 72°20'28" E	33.69'
L8	N 87°41'45" E	13.33'
L9	S 86°37'09" E	28.91'
L10	N 79°42'56" E	47.83'
L11	S 89°21'45" E	30.39'

We hereby certify that we are the owners of the property shown and described hereon and that we hereby adopt this Conservation Easement for the Ecosystem Enhancement Program.

5-22-08 *Lesley Brazzell*
Date Owner
5-22-02 *Wayne Brazzell*
Date Owner



State of North Carolina
County of Cleveland
I, RONALD JORDAN Review Officer of Cleveland County certify that the map or plat to which this certification is affixed meets all statutory requirements for recording.
Ronald Jordan 05-29-08
Review Officer Date



CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-ZP
EEP SITE IF NUMBER: 92492
NAME OF PROJECT: BIG HARRIS CREEK
CURRENT OWNER: Ralph & Lesley Brazzell
OWNER CONTACT INFO: 704-466-3881

FILED in CLEVELAND County, NC
on May 29 2008 at 09:18:28 AM
by: BONNIE E. REECE
REGISTER OF DEEDS
BOOK 32 PAGE 77

Owner: Ralph Brazzell
Lesley Brazzell
Address: 1318 Fletcher Rd.
Lawndale, N.C. 28090
Deed Ref: 1120-328
Tax Map Ref: 3287-1-60L
Township: No. 8
County: Cleveland
State: North Carolina
Plat Prepared: April 9, 2008
Scale 1" = 60'

LEGEND	
-x-x- FENCE LINE	o NEW IRON PIN (NIP)
-e-e- ELECTRIC LINE	• EXISTING IRON PIN (EIP)
-w-w- BURIED ELECTRIC LINE	• CAP (STATE OF NC CONSERVATION EASEMENT)
-w- WATER LINE	• UNMONUMENTED POINT
-g- GAS LINE	• MAGNAIL
-ss- SAN-SEWER LINE	• CONCRETE MONUMENT
-t- TELEPHONE LINE	• R.R. SPIKE SET
o HYDRANT	• R.R. SPIKE FOUND
o GAS METER	(f) = FOUND
o WATER METER	(s) = SET
o POWER POLE	• STONE
o TELEPHONE BOX	o TREE

GENERAL NOTES

- NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
- PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
- UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
- NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
- NO DOT R/W'S ARE APPROXIMATE UNLESS OTHERWISE NOTED.
- ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
- COPYRIGHT © 2008, LATTIMORE AND PEELER SURVEYING. ALL RIGHTS RESERVED. REPRODUCTION OR USE OF THE CONTENTS OF THIS DOCUMENT, OR ADDITIONS OR DELETIONS TO THIS DOCUMENT, IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF THE LAND SURVEYOR, IS PROHIBITED.
- IF THIS MAP DOES NOT HAVE AN ORIGINAL SIGNATURE IT IS NOT VALID.
- THIS MAP IS FOR THE EXCLUSIVE USE OF THE ORIGINAL PURCHASER OF THIS SURVEY AND IS NOT TRANSFERABLE TO SUBSEQUENT OWNERS OR ADDITIONAL INSTITUTIONS.

I, D. Dobbins Lattimore certify one of the following as marked:

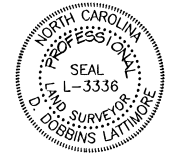
- a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;
- b. that the survey is located in such portion of a county or municipality that is unregulated as to an ordinance that regulates parcels of land;
- c. that the survey is of an existing parcel or parcels of land;
- d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;
- e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (a) through (d) above.

DLL

Certificate of Survey and Accuracy

I, D. Dobbins Lattimore, certify that this plat was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book 1120 Page 328; that the boundaries not surveyed are clearly indicated as drawn from information found in Book _____ page _____; that the ratio of precision as calculated is 1:12,000; that this plat was prepared in accordance with G.S. 47-39 as amended. Witness my original signature, registration number and seal this 9th day of April A.D., 2008.

DLL
License Number L-3336 Surveyor



LATTIMORE & PEELER SURVEYING
105 LONDON ROAD 704) 538-3443
LAWNDALE, NORTH CAROLINA 28090
D.F. # 328719C
C.F. # 3287-10G
DRAWING # 08-72B

Filed in CLEVELAND County, NC
on Aug 03 2009 at 03:21:07 PM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 1561 Page 158

Issued Aug 03 2009
\$46.00

by BONNIE E. REECE
REGISTER OF DEEDS ID: 19677
State Of CLEVELAND
North Carolina County
Real Estate Excise Tax

126/16

RECORDING FEE \$ 44⁰⁰ REVENUES 46⁰⁰

* Susan Biggers
STATE OF NORTH CAROLINA

**CONSERVATION EASEMENT
AND ACCESS EASEMENT**

CLEVELAND COUNTY
SPO File Number: 023-ZZB
EEP Site ID Number 739
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT AND ACCESS EASEMENT, pursuant to the provisions of N.C. General Statutes Chapter 121, Article 4 and made this 31st day of July, 2009, by Jo Ellen Cornwell and husband, Joseph W. Cornwell, ("Grantor"), whose mailing address is 1720 West Stage Coach Rd. Lawndale, NC 28090, to the State of North Carolina, ("Grantee"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources has approved acceptance of this instrument; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003. This MOA recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in **No. 8 Township, Cleveland County**, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately **45.25** acres and being conveyed to the Grantor by deed as recorded in **Deed Book 18X at Page 455** of the **Cleveland County** Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of the waters of **Big Harris Creek**.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with Access Easement, of the nature and character and to the extent hereinafter set forth, over a described area of the Property, referred to hereafter as the "**Easement Area**", for the benefit of the people of North Carolina, and being all of those tracts of land as identified as Conservation Easement Area, 5.69 acres and Conservation Easement Area 1.02 acres, along with a 0.47 acre Access Easement. Easement Area contains 6.71 acres in conservation easement and 0.47 acres in access easement as shown on a plat of survey entitled "**Revision of PB 33, PG 56, Conservation Easement Survey for the State of NC, Department of Administration, Ecosystem Enhancement Program, Big Harris Creek**", certified by Dobbin L. Lattimore License Number L-3336, and recorded in Map Book 33, Page 106, Cleveland County Registry.

Easement Area is more particularly described on attached **Exhibit A** and Exhibit B

The purposes of this Conservation Easement are to maintain, restore, enhance, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof. Usage of motorized vehicles in the Easement Area is prohibited, except as they are used exclusively for management, maintenance, or stewardship purposes, and on existing trails, paths or roads.

B. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

C. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, and vegetation that obstructs, destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

D. Industrial, Residential and Commercial Uses. All are prohibited in the Easement Area.

E. Agricultural Use. All agricultural uses within the Easement Area including any use for cropland, waste lagoons, or pastureland are prohibited.

F. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

G. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area. Existing roads or trails located in the Easement Area may be maintained by Grantor in order to minimize runoff, sedimentation and for access to the interior of the Property for management, maintenance, stewardship purposes, or undeveloped

recreational and educational uses of the Easement Area. Existing roads, trails or paths may be maintained with loose gravel or permanent vegetation to stabilize or cover the surfaces.

H. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area may be allowed.

I. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances or machinery, or other material in the Easement Area is prohibited.

J. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, or drilling; no removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

K. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production.

L. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying fee that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee for the Easement Area and the rights as conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

M. Development Rights. All development rights are removed from the Easement Area and shall not be transferred.

N. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is consistent with the purposes of this Conservation Easement. The Grantor shall not vary from the above restrictions without first obtaining written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Ingress, Egress, and Inspection. The Grantee, its employees and agents, successors and assigns, receive the perpetual right of unlimited and repeated ingress and egress to the Easement Area over the Property at reasonable times to undertake any activities to restore, manage, maintain, enhance, and monitor the wetland and riparian resources of the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterranean water flow.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features of the Easement Area that may have been damaged by such activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, their successors or assigns, that comes to the attention of the Grantee, the Grantee shall, except as provided below, notify the Grantor, their successors or assigns in writing of such breach. The Grantor shall have ninety (90) days after receipt of such notice to correct the conditions constituting such breach. If the breach remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by appropriate legal proceedings including damages, injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief if the breach of the term of this Conservation Easement is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement. The Grantor and Grantee acknowledge that under such circumstances damage to the Grantee would be irreparable and remedies at law will be inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor, their successors or assigns are complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor, their successors or assigns, for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood,

storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, damage to property or harm to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, their successors or assigns, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown above or to other address(es) as either party establishes in writing upon notification to the other.

C. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees to make any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

D. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

E. This Conservation Easement may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement.

F. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area.

TO HAVE AND TO HOLD the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same are free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

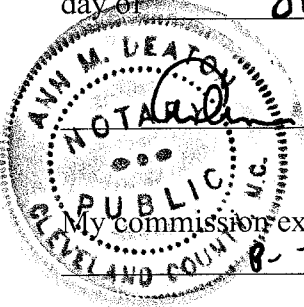
Jo Ellen Cornwell (SEAL)
Jo Ellen Cornwell

Joseph W. Cornwell (SEAL)
Joseph W. Cornwell

NORTH CAROLINA
COUNTY OF Cleveland

I, Ann M. Deaton, a Notary Public in and for the County and State aforesaid, do hereby certify that Jo Ellen Cornwell and husband, Joseph W. Cornwell, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 31st day of July, 2009.



Notary Public

My commission expires: 8-7-2010

Exhibit A

Easement Area

Jo Ellen Cornwell and husband Joseph W. Cornwell, marital interest

Commencing on Cleveland County Sanitary District Monument "CC 55" having the North Carolina Grid Coordinates (NAD 83) of N= 616813.36 feet E= 1222738.37 feet; THENCE North 35 degrees 38 minutes 54 seconds East for a grid distance of 90.19 feet to a rail road spike found in Stick Elliott Road and said corner having the North Carolina Grid Coordinates (NAD 83) of N= 616886.65 feet E= 1222790.93 feet and said corner being the eastern most corner of the Cornwell tract and also being the Southeastern most corner of the Jerry Bumgarner property as described in Deed book 1164 Page 1509 of the Cleveland County registry; THENCE North 80 degrees 56 minutes 53 seconds West for a distance of 403.16 feet to a one inch bent pipe said corner being a common corner of the Cornwell and Bumgarner property; THENCE North 04 degrees 14 minutes 19 seconds East for a distance of 247.86 feet to a 1.25 inch pipe said corner being a common corner of the Cornwell property and the Ruth Brackett property as described in Deed book 1282 Page 2166 of the Cleveland County registry and being in the line of the Bumgarner property; THENCE with the Brackett property line South 77 degrees 08 minutes 43 seconds West for a distance of 1248.86 feet to a No.5 rebar set; THENCE with the Brackett property line South 02 degrees 36 minutes 20 seconds East for a distance of 244.14 feet to a 0.5 inch pipe said corner being a common corner of the Brackett property and the George Baba property as described in Deed book 18-D Page 525 of the Cleveland County registry; THENCE South 04 degrees 30 minutes 41 seconds East for a distance of 230.25 feet to a No.5 rebar set with a cap stamped Conservation Easement said corner being the BEGINNING of the Conservation Easement; THENCE South 04 degrees 30 minutes 41 seconds East for a distance of 237.39 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE seven new lines through the Cornwell property South 52 degrees 23 minutes 10 seconds East for a distance of 111.11 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 02 degrees 22 minutes 12 seconds East for a distance of 496.95 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE South 13 degrees 54 minutes 56 seconds East for a distance of 481.49 feet to an unmarked point said point being the northwestern corner of a 30 foot access easement; THENCE with the 30 foot access easement South 79 degrees 49 minutes 44 seconds East for a distance of 180.19 feet to an unmarked point; THENCE leaving the access easement North 03 degrees 32 minutes 58 seconds West for a distance of 429.94 feet to a No.5 rebar set with a cap stamped Conservation Easement; THENCE North 14 degrees 32 minutes 01 seconds West for a distance of 781.00 feet to a No 5 rebar set with a cap stamped Conservation Easement; THENCE North 59 degrees 48 minutes 48 seconds West for a distance of 228.82 feet to the point and place of the BEGINNING.

Containing 5.69 acres more or less

Commencing on the terminus of the fourth call of the above described 5.69 acre tract said point being the Northwestern corner of a 30 foot access easement and being located South 13 degrees 54 minutes 56 seconds West for a distance of 481.49 feet from a No.5 rebar set with a cap stamped Conservation Easement; THENCE with the western edge of the 30 foot access easement South 13 degrees 54 minutes 56 seconds West for a distance of 32.86 feet to an unmarked point said point being the place of BEGINNING; THENCE a new line through the Jo Ellen Cornwell property as described in Deed book 18-X page 455 of the Cleveland County registry South 13

degrees 54 minutes 56 seconds East for a distance of 478.80 feet to a No.5 rebar set with a cap stamped Conservation Easement said corner being in the Southern line of the Cornwell property and in the Northern line of the Hamilton and Joan Eaker property as recorded in Deed book 15-T page 51 of the Cleveland County registry; THENCE with the Eaker line North 66 degrees 32 minutes 57 seconds East for a distance of 64.67 feet to a No.5 rebar set with a cap stamped Conservation Easement said point being the Southwestern corner of the Elliott's Memorial Church property as described in Deed book 7-B Page 352; THENCE with the Elliott's Memorial Church property for the next three calls North 14 degrees 33 minutes 58 seconds West for a distance of 229.40 feet to an unmarked point in the center of the creek; THENCE North 78 degrees 24 minutes 10 seconds East for a distance of 27.96 feet to a No.5 rebar set; THENCE North 78 degrees 24 minutes 10 seconds East for a distance of 38.71 feet to a No.5 rebar set with a cap stamped Conservation Easement in the Northern line of the Elliott's Memorial Church property; THENCE three new lines through the Cornwell property North 03 degrees 32 minutes 58 seconds West for a distance of 173.23 feet to an unmarked point said unmarked point being in the Southern line of the 30 foot access easement; THENCE with the Southern line of the 30 foot access easement running along a curve to the right having a radius of 76.38 feet and an arc length of 3.01 feet, being subtended by a chord of North 80 degrees 23 minutes 34 seconds West for a distance of 3.01 feet to an unmarked point in the Southern line of the 30 foot access easement; THENCE with the Southern line of the 30 foot access easement North 79 degrees 49 minutes 44 seconds West for a distance of 171.08 feet to the point of the BEGINNING.
Containing 1.02 acres more or less.

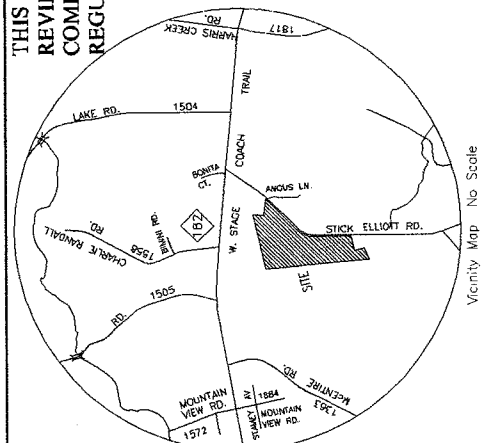
30 foot access easement

BEGINNING on the beginning point of the 1.02 acre tract as described above and running thence with the Northern boundary of the 1.02 acre tract for the next two calls South 79 degrees 49 minutes 44 seconds East for a distance of 171.08 feet to an unmarked point; THENCE running along a curve to the left having a radius of 76.38 feet and an arc length of 3.01 feet, being subtended by a chord of South 80 degrees 23 minutes 34 seconds East for a distance of 3.01 feet to an unmarked point said point being the Northeastern corner of the 1.02 acre tract as described above; THENCE eleven new lines through the Jo Ellen Cornwell property as described in Deed book 18-X page 455 of the Cleveland County registry, running along a curve to the left having a radius of 76.38 feet and an arc length of 41.81 feet, being subtended by a chord of North 82 degrees 11 minutes 54 seconds East for a distance of 41.28 feet to an unmarked point; THENCE running along a curve to the left having a radius of 46.12 feet and an arc length of 45.17 feet, being subtended by a chord of North 38 degrees 30 minutes 02 seconds East for a distance of 43.39 feet to an unmarked point; THENCE running along a curve to the right having a radius of 43.46 feet and an arc length of 44.28 feet, being subtended by a chord of North 39 degrees 37 minutes 45 seconds East for a distance of 42.39 feet to an unmarked point; THENCE North 68 degrees 49 minutes 12 seconds East for a distance of 17.16 feet to an unmarked point; THENCE running along a curve to the left having a radius of 100.50 feet and an arc length of 113.34 feet, being subtended by a chord of North 36 degrees 30 minutes 44 seconds East for a distance of 107.43 feet to an unmarked point; THENCE running along a curve to the left having a radius of 478.65 feet and an arc length of 68.58 feet, being subtended by a chord of North 00 degrees 05 minutes 59 seconds East for a distance of 68.52 feet; THENCE running along a curve to the right having a radius of 56.80 feet and an arc length of 24.31 feet, being subtended by a chord of North 08 degrees 15 minutes 22 seconds East for a distance of 24.13 feet; THENCE

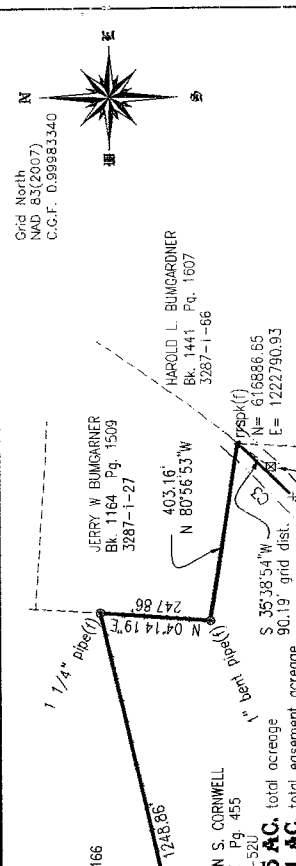
running along a curve to the right having a radius of 75.73 feet and an arc length of 18.05 feet, being subtended by a chord of North 27 degrees 20 minutes 43 seconds East for a distance of 18.01 feet to an unmarked point; THENCE running along a curve to the right having a radius of 131.07 feet and an arc length of 39.72 feet, being subtended by a chord of North 42 degrees 51 minutes 16 seconds East for a distance of 39.56 feet to an unmarked point; THENCE running along a curve to the right having a radius of 97.16 feet and an arc length of 30.73 feet, being subtended by a chord of North 60 degrees 35 minutes 44 seconds East for a distance of 30.60 feet to an unmarked point; THENCE North 69 degrees 39 minutes 20 seconds East for a distance of 61.12 feet to an unmarked point in the Eastern line of the Cornwell property said point being located North 00 degrees 09 minutes 58 seconds East for a distance of 452.72 feet from a rail road spike in Stick Elliott road said corner being the Northeastern most corner of the Elliott's Memorial Church property as described in Deed book 7-B page 352 of the Cleveland County registry; THENCE with the Eastern line of the Cornwell property North 00 degrees 09 minutes 58 seconds East for a distance of 32.03 feet to an unmarked point; THENCE twelve new lines through the Cornwell property South 69 degrees 39 minutes 20 seconds West for a distance of 72.35 feet to an unmarked point; THENCE running along a curve to the left having a radius of 127.16 feet and an arc length of 40.22 feet, being subtended by a chord of South 60 degrees 35 minutes 44 seconds West for a distance of 40.05 feet to an unmarked point; THENCE running along a curve to the left having a radius of 161.07 feet and an arc length of 48.81 feet, being subtended by a chord of South 42 degrees 51 minutes 16 seconds West for a distance of 48.62 feet to an unmarked point; THENCE running along a curve to the left having a radius of 105.73 feet and an arc length of 25.20 feet, being subtended by a chord of South 27 degree 20 minutes 43 seconds West for a distance of 25.14 feet to an unmarked point; THENCE running along a curve to the left having a radius of 86.80 feet and an arc length of 37.15 feet, being subtended by a chord of South 08 degrees 15 minutes 22 seconds West for a distance of 36.87 feet to an unmarked point; THENCE running along a curve to the right having a radius of 448.65 feet and an arc length of 64.28 feet, being subtended by a chord of South 00 degrees 05 minutes 59 seconds West for a distance of 64.23 feet to an unmarked point; THENCE running along a curve to the right having a radius of 70.50 feet and an arc length of 79.51 feet, being subtended by a chord of South 36 degrees 30 minutes 44 seconds West for a distance of 75.36 feet to an unmarked point; THENCE South 68 degrees 49 minutes 14 seconds West for a distance of 17.16 feet to an unmarked point; THENCE running along a curve to the left having a radius of 73.46 feet and an arc length of 74.85 feet, being subtended by a chord of South 39 degrees 37 minutes 45 seconds West for a distance of 71.65 feet to an unmarked point; THENCE running along a curve to the right having a radius of 16.12 feet and an arc length of 15.79 feet, being subtended by a chord of South 38 degrees 30 minutes 02 seconds West for a distance of 15.16 feet to an unmarked point; THENCE running along a curve the right having a radius of 46.38 feet and an arc length of 27.21, being subtended by a chord of South 83 degrees 22 minutes 00 seconds West for a distance of 26.82 feet to an unmarked point; THENCE North 79 degrees 49 minutes 44 seconds West for a distance of 4.30 feet to an unmarked point said point being the Southeastern point of the 5.69 acre tract described above; THENCE running with the Southern line of the 5.69 acre tract described above North 79 degrees 49 minutes 44 seconds West for distance of 180.19 feet to an unmarked point said point being the Southwestern point of the 5.69 acre tract described above; THENCE South 13 degrees 54 minutes 56 seconds East for a distance of 32.86 feet to the point of BEGINNING.

Access Easement contains 0.47 acres more or less.

THIS MAP IS NOT A CERTIFIED SURVEY AND HAS NOT BEEN REVIEWED BY A LOCAL GOVERNMENT AGENCY FOR COMPLIANCE WITH ANY APPLICABLE LAND DEVELOPMENT REGULATIONS.



TIE LINE ONLY		
Course	Bearing	Distance
L23	N 65°32'57" E	104.99'
L24	S 00°01'25" W	225.22'



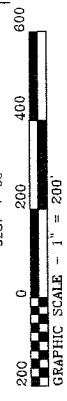
NOTE: remaining acreage includes the acreage found in the 30' access easement.

Course	Bearing	Distance
L1	N 66°32'57" E	239.06'
L1A	N 66°32'57" E	64.67'
L2	N 14°33'58" W	229.40'
L3A	N 78°24'10" E	27.96'
L3B	N 78°24'10" E	36.71'
L3C	N 78°24'10" E	291.51'
L4	N 00°09'58" E	452.72'
L4A	N 00°09'58" E	32.03'
L4B	N 00°09'58" E	342.22'
L5	N 43°19'46" E	134.65'
L6	N 45°06'37" E	341.48'
L7	N 46°09'20" E	348.05'
L8	S 52°23'10" E	111.11'
L9	S 02°22'12" E	496.95'
L10	S 13°54'36" E	481.49'
L10A	S 13°54'36" E	32.86'
L10B	S 13°54'36" E	478.80'
L11	N 03°32'58" W	173.23'
L13	N 03°32'58" W	30.62'
L14	N 03°32'58" W	429.94'
L15	N 59°48'48" W	228.82'
L16	S 69°39'20" W	72.35'
L17	S 68°49'14" W	17.16'
L18	N 79°49'44" W	4.30'
L19	N 79°49'44" W	180.19'
L20	N 79°49'44" W	171.08'
L21	N 68°49'12" E	17.16'
L22	N 69°39'20" E	61.12'

Curve	Radius	Length	Chord	Chord Bear.
C1	591.00'	307.45'	298.23'	N 16°37'48" E
C2	591.00'	307.45'	298.23'	N 38°22'42" E
C3	232.14'	171.65'	171.62'	N 44°16'51" E
C4	127.16'	40.22'	40.05'	S 60°35'44" W
C5	161.07'	48.61'	48.62'	S 42°51'16" W
C6	105.73'	25.20'	25.14'	S 27°20'43" W
C7	86.80'	37.15'	36.87'	S 09°15'22" W
C8	448.65'	64.28'	64.23'	S 00°03'29" W
C9	70.50'	74.51'	74.56'	S 39°37'45" W
C10	16.12'	15.79'	15.16'	S 38°30'02" W
C12	46.35'	27.21'	26.82'	S 83°22'00" W
C13	76.39'	3.01'	3.01'	S 60°23'34" E
C13A	76.39'	41.81'	41.28'	N 82°11'54" E
C14	46.12'	45.17'	43.39'	N 38°30'02" E
C15	43.46'	44.29'	42.39'	N 39°37'43" E
C16	100.59'	113.34'	107.43'	N 38°30'49" E
C17	478.63'	92.39'	94.13'	N 08°15'22" E
C18	75.93'	48.05'	48.01'	N 27°20'43" E
C20	131.07'	39.72'	39.56'	N 42°51'16" E
C21	97.16'	30.73'	30.60'	N 60°35'44" E

TCE = Temporary Construction Easement
Map revised 7/15/2009 to show TCE

Note: The TCE shown on this map was not surveyed and it is shown only as a graphical aid to the location of the TEC. No surveying was performed to locate this area.



Map revised 5/21/2009 to increase area of conservation easement.

**REVISION OF PB.33 PG.58
CONSERVATION EASEMENT SURVEY FOR THE STATE OF
NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION
ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK**

SPO FILE NUMBER: 023-22B
EEP SITE ID NUMBER: 92492
NAME OF PROJECT : BIG HARRIS CREEK
CURRENT OWNER: JO ELLEN CORNWELL
OWNER CONTACT INFO:

Owner: Jo Ellen Cornwell
Address: 1720 W Stagecoach Trail
Lowndale N.C. 28090-8064
Deed Ref: 18,X-455
Tax Map Ref: 3287-1-6U
Township: No. 8
County: Cleveland
State: North Carolina
Scale 1" = 200'

Conservation Easement Area
1.02 AC.

rebar and cap(s) see detail at all corners of conservation easement unless otherwise noted

DAVID JACK GOLD
PETER STEPHEN GOLD
Bk. 1108 Pg. 917
3287-1-5U

GEORGE JAMES BABA
Bk. 180 Pg. 525
3286-1-12U

Map revised 7/15/2009 to show TCE

ELLIOTTS MEMORIAL CHURCH
C/O ANDY MEADE JR
Bk. 7B Pg. 352
3287-1-10

ROISTER TURKEY FARM
Bk. 16Z Pg. 522
3287-1-15U

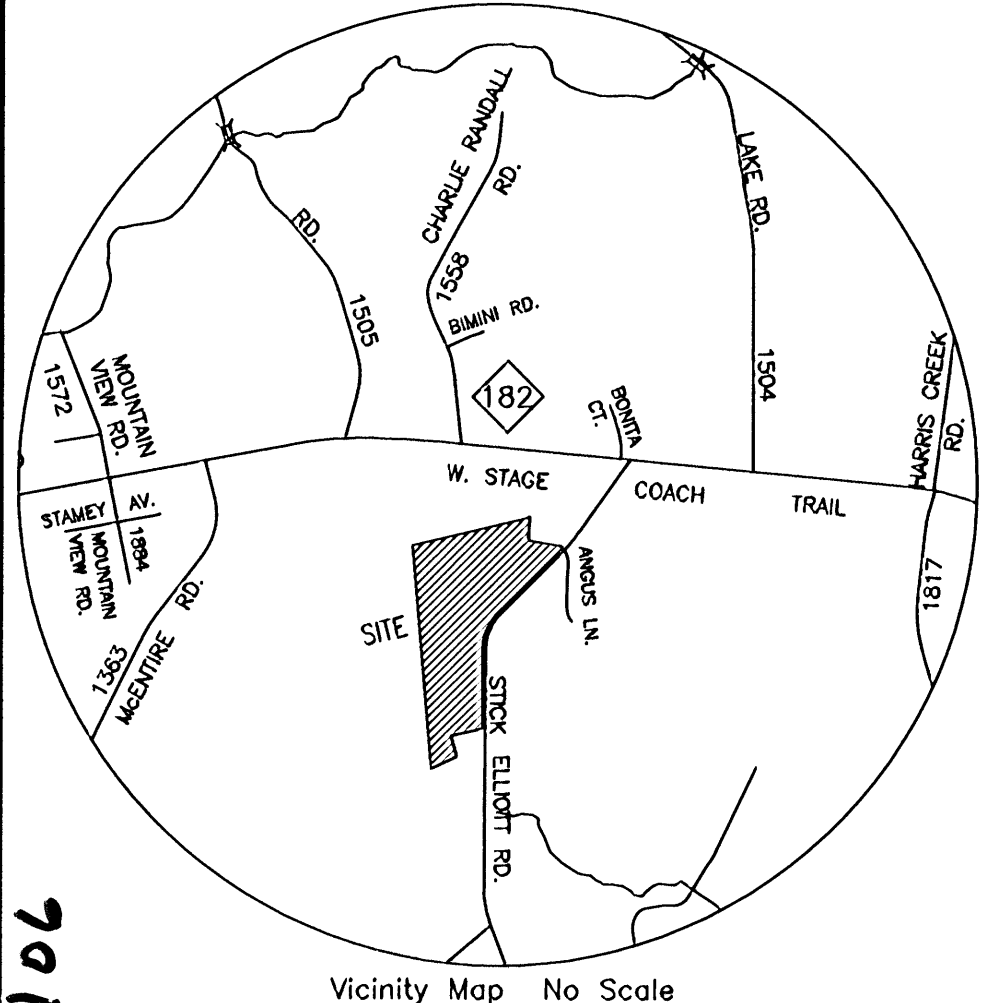
L HEYWARD SHUFORD
CHRISTINE SHUFORD
Bk. 11S Pg. 151
3287-1-19L

Cleveland Sanitary District Mon.
COSS
N= 616886.65
E= 1222790.93

HAROLD L. BUMGARDNER
Bk. 1441 Pg. 1607
3287-1-66

JERRY W BUMGARDNER
Bk. 1164 Pg. 1509
3287-1-27

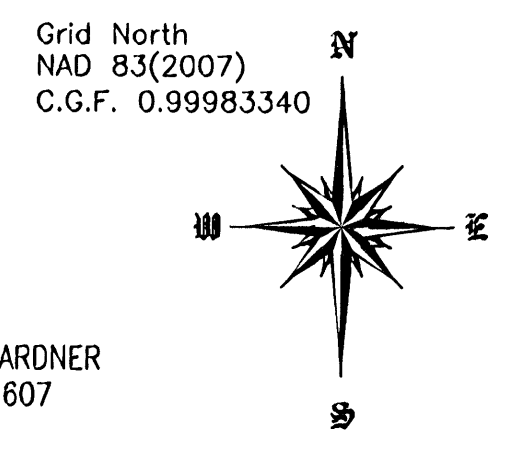
Grid North
NAD 83(2007)
C.C.F. 0.99983340



Vicinity Map No Scale

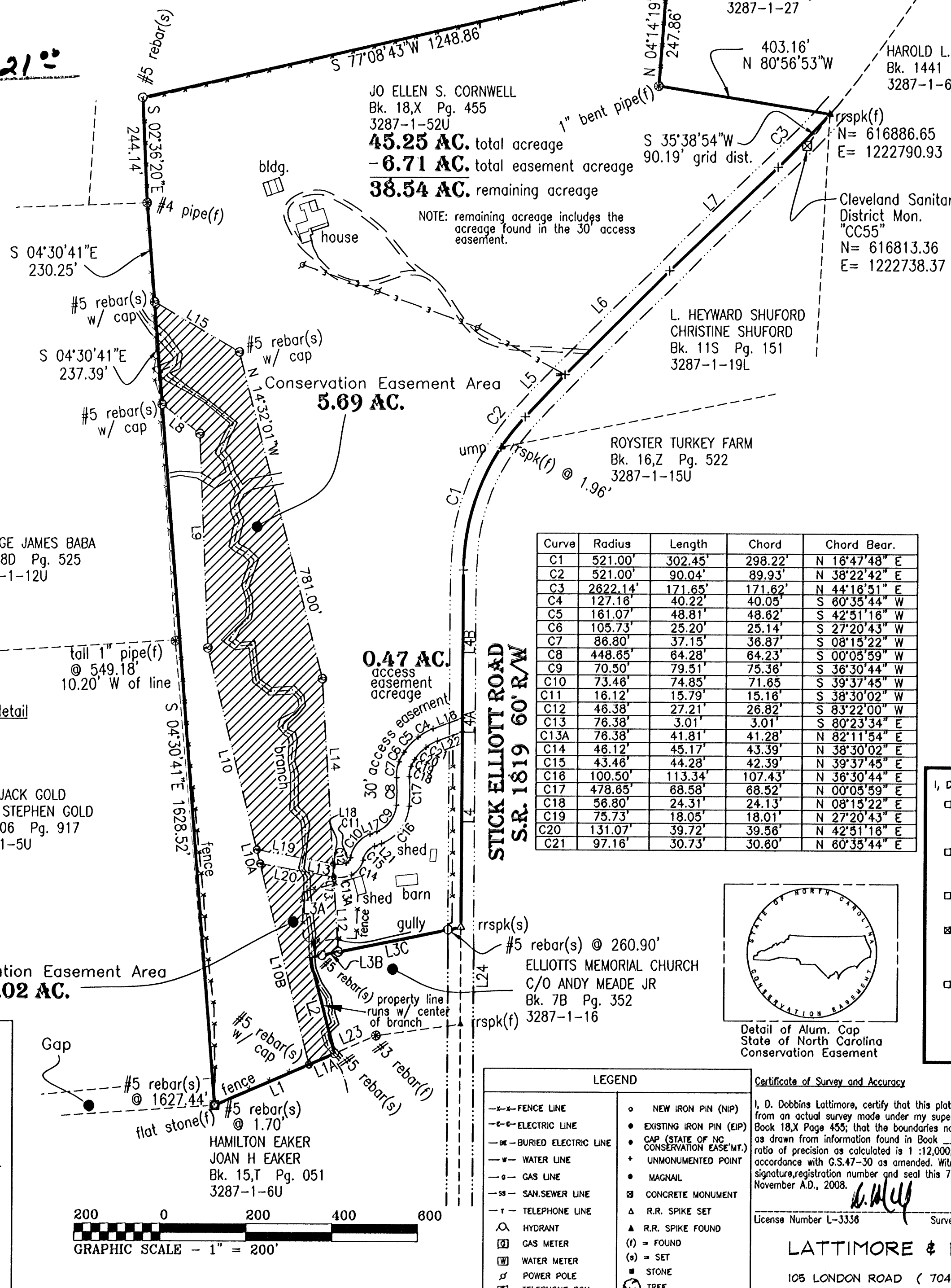
State of North Carolina
County of Cleveland
I, PAM McCURRY Review Officer of
Cleveland County certify that the
map or plat to which this certification is affixed
meets all statutory requirements for recording.
Pam McCurry 7-17-2009 Date
Review Officer

RUTH BRACKETT
Bk. 1282 Pg. 2166
3286-1-33U



RECORDING FEE \$ 21.00

BK 33 Pg 106



TIE LINE ONLY

Course	Bearing	Distance
L23	N 66°32'57" E	104.99'
L24	S 00°01'25" W	225.22'

We hereby certify that we are the owners of the property shown and described hereon and that we hereby adopt this Conservation Easement for the Ecosystem Enhancement Program.

Date	Owner

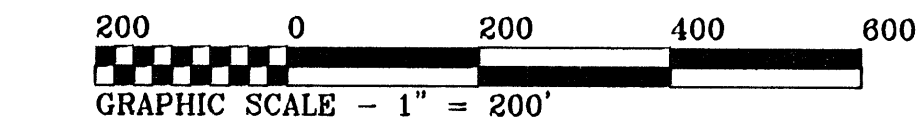
REVISION OF PB.33 PG.58
CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, NC DEPARTMENT OF ADMINISTRATION ECOSYSTEM ENHANCEMENT PROGRAM BIG HARRIS CREEK

SPO FILE NUMBER: 023-ZZB
EEP SITE ID NUMBER: 92492
NAME OF PROJECT : BIG HARRIS CREEK
CURRENT OWNER: JO ELLEN CORNWELL
OWNER CONTACT INFO:

Filed in CLEVELAND County, NC
on Jul 17 2009 at 02:01:43 PM
by BONNIE E. REECE
REGISTER OF DEEDS
Book 33 Page 106

- GENERAL NOTES**
- NO TITLE SEARCH BY LATTIMORE AND PEELER SURVEYING.
 - PROPERTY SHOWN SUBJECT TO EASEMENTS OF RECORD.
 - UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED.
 - NO FEATURES LOCATED OTHER THAN THOSE SHOWN.
 - NO DOT R/W'S ARE APPROXIMATE UNLESS OTHERWISE NOTED.
 - ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
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 - IF THIS MAP DOES NOT HAVE AN ORIGINAL SIGNATURE IT IS NOT VALID.
 - THIS MAP IS FOR THE EXCLUSIVE USE OF THE ORIGINAL PURCHASER OF THIS SURVEY AND IS NOT TRANSFERABLE TO SUBSEQUENT OWNERS OR ADDITIONAL INSTITUTIONS.

Owner: Jo Ellen Cornwell
Address: 1720 W Stagecoach Trail
Lawndale N.C. 28090-9064
Deed Ref: 18,X-455
Tax Map Ref: 3287-1-6U
Township: No. 8
County: Cleveland
State: North Carolina
Plat Prepared: November 7 2008
Scale 1" = 200'

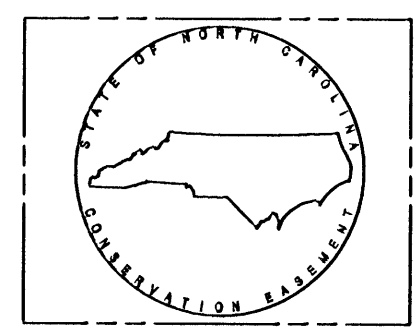


Map revised 5/21/2009 to increase area of conservation easement.

Curve	Radius	Length	Chord	Chord Bear.
C1	521.00'	302.45'	298.22'	N 16°47'48" E
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C6	105.73'	25.20'	25.14'	S 27°20'43" W
C7	86.80'	37.15'	36.87'	S 08°15'22" W
C8	448.65'	64.28'	64.23'	S 00°05'59" W
C9	70.50'	79.51'	75.36'	S 36°30'44" W
C10	73.46'	74.85'	71.65'	S 39°37'45" W
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C16	100.50'	113.34'	107.43'	N 36°30'44" E
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C19	75.73'	18.05'	18.01'	N 27°20'43" E
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L4B	N 00°09'58" E	342.22'
L5	N 43°19'46" E	134.65'
L6	N 45°06'37" E	341.48'
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L10	S 13°54'56" E	481.49'
L10A	S 13°54'56" E	32.86'
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L12	N 03°32'58" W	173.23'
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L14	N 03°32'58" W	429.94'
L15	N 59°48'48" W	228.82'
L16	S 69°39'20" W	72.35'
L17	S 68°49'14" W	17.16'
L18	N 79°49'44" W	4.30'
L19	N 79°49'44" W	180.19'
L20	N 79°49'44" W	171.08'
L21	N 68°49'12" E	17.16'
L22	N 69°39'20" E	61.12'

STICK ELLIOTT ROAD
S.R. 1819 60' R/W



Detail of Alum. Cap State of North Carolina Conservation Easement

I, D. Dobbins Lattimore certify one of the following as marked:

a. that the survey creates a subdivision of land within the area of a county or municipality that has an ordinance that regulates parcels of land;

b. that the survey is located in such portion of a county or a municipality that is unregulated as to an ordinance that regulates parcels of land;

c. that the survey is of an existing parcel or parcels of land;

d. that the survey is of another category such as the recombination of existing parcels, a court ordered survey, or other exception to the definition of a subdivision;

e. that the information available is such that I am unable to make a determination to the best of my professional ability as to provisions contained in (a) through (d) above.

D. Dobbins Lattimore

LEGEND

-x-x- FENCE LINE	o NEW IRON PIN (NIP)
-e-e- ELECTRIC LINE	o EXISTING IRON PIN (EIP)
-o-o- BURIED ELECTRIC LINE	o CAP (STATE OF NC CONSERVATION EASE-MT.)
-w-w- WATER LINE	+ UNMONUMENTED POINT
-g-g- GAS LINE	o MAGNAIL
-ss- SAN-SEWER LINE	o CONCRETE MONUMENT
-t-t- TELEPHONE LINE	o R.R. SPIKE SET
o HYDRANT	o R.R. SPIKE FOUND
o GAS METER	(f) = FOUND
o WATER METER	(s) = SET
o POWER POLE	o STONE
o TELEPHONE BOX	o TREE

Certificate of Survey and Accuracy

I, D. Dobbins Lattimore, certify that this plot was drawn under my supervision from an actual survey made under my supervision deed description recorded in Book 18,X Page 455; that the boundaries not surveyed are clearly indicated as drawn from information found in Book _____ page _____; that the ratio of precision as calculated is 1:12,000; that this plot was prepared in accordance with G.S.47-30 as amended. Witness my original signature, registration number and seal this 7th day of November A.D., 2008.

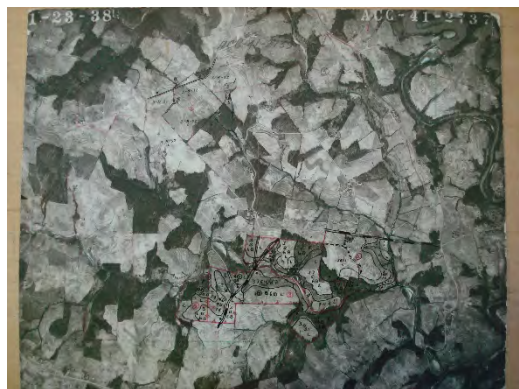
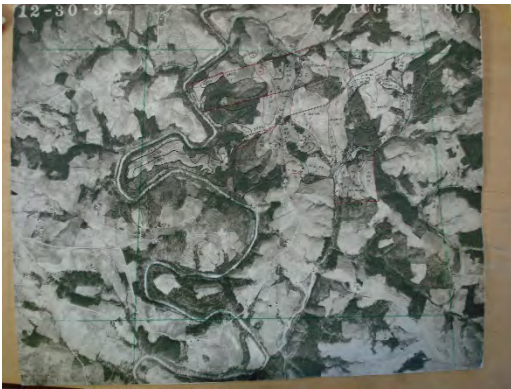
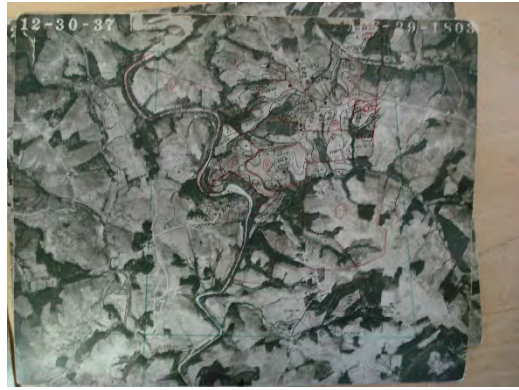
D. Dobbins Lattimore

License Number L-3336 Surveyor

LATTIMORE & PEELER SURVEYING
105 LONDON ROAD (704) 538-3443 D.F. # 328719CORNWELL2009
LAWDALE, NORTH CAROLINA 28090 C.F. # 3287-10-2007 DRAWING # 09-085B



1938



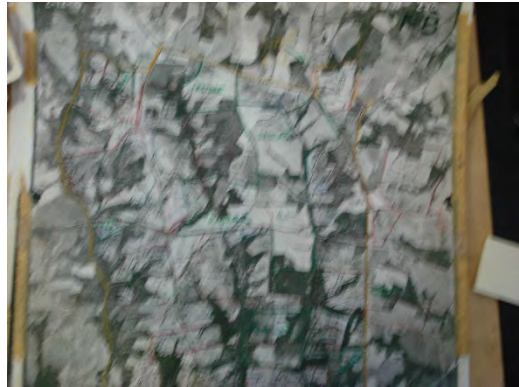
1951



1956



1968



1981



NC DWQ Stream Identification Form Version 4.11

Date: 3-24-15	Project/Site: Big Harris	Latitude: 35.402037°N
Evaluator: IE	County: Cleveland	Longitude: 81.59173°W
Total Points: <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other VT 3 to LBHC/ e.g. Quad Name: Old Reach 43

A. Geomorphology (Subtotal = <u>13</u>)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 11)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	(3)
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	(1.5)
24. Amphibians	0	0.5	1	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: 4 salamanders - large adults
 3 triangular cobble casing made out of flat bits of leaves
 5+ additional cobble casings
 3 crumpled casings / 2 actual connections

5+ aquatic weeds
 2 stonely

UT4 to Lower Big
Harris Creek

NC DWQ Stream Identification Form Version 4.11

Date: 3-24-15	Project/Site: Big Harris	Latitude: 35.39922243°N
Evaluator: IE/RD	County: Cleveland	Longitude: 81.59041224°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 35.5	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other S15 - Previously e.g. Quad Name: Unmapped

A. Geomorphology (Subtotal = 17.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 10)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Observed 10+ caddisfly casings 1 aquatic worm
5+ stonefly 1 salamander
5+ may fly

NC DWQ Stream Identification Form Version 4.11

Date: 2-25-15	Project/Site: Big Harris	Latitude: 35.409562°N
Evaluator: IE	County: Cleveland	Longitude: 81.619650°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 25	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Upper Big Harris e.g. Quad Name: Above UT1

A. Geomorphology (Subtotal = 12)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 5)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Didn't observe macroinvertebrates or amph. but low light (SPM) made collection difficult
 Continuous hydrology - although flow no apparent along many sections
 Limited habitat types - mainly leaf packs but no biota observed.

NC DWQ Stream Identification Form Version 4.11

Date: 3-9-15	Project/Site: Big Harris	Latitude: 35.41028241
Evaluator: JE/RD	County: Cleveland	Longitude: 81.61581553
Total Points: 35.5 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other UT 2 to UBHC e.g. Quad Name:

A. Geomorphology (Subtotal = 16.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	(3)
4. Particle size of stream substrate	0	1	2	(3)
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9.5)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 9.5)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	(2)	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	0	(0.5)	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Found unknown amphibian eggs. Several caddisfly casings.
1 crane fly larva.

NC DWQ Stream Identification Form Version 4.11

UT3 to UBHC

Date: 3/9/15	Project/Site: Big Harry	Latitude: 35.41011865
Evaluator: IE	County: Cleveland	Longitude: -81.6145007
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 24	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other 54 (old UT4) e.g. Quad Name:

A. Geomorphology (Subtotal = 10)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	(2)	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate mainly mush but some bedrock	0	1	(2)	3
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	1	(0.5)	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 6.5)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	3	(2)	1	0
20. Macroinvertebrates (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Observed 1 caddisfly larva, 3 aquatic worms, 1 crane fly

NC DWQ Stream Identification Form Version 4.11

Date: 2-13-15	Project/Site: Big Harris	Latitude: 35.406836
Evaluator: IE/RD	County: Cleveland	Longitude: 81.598884
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 38	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Carroll Creek e.g. Quad Name:

A. Geomorphology (Subtotal = 18)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^aartificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 11)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Few salamanders
2 crayfish
1 stonefly
Few caddisflies
1 dobsonfly

NC DWQ Stream Identification Form Version 4.11

Date: 2-13-15	Project/Site: Big Harris	Latitude: 35.407736
Evaluator: IE/RD	County: Cleveland	Longitude: 81.602173
Total Points: 28.5 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other Lower Scott Creek e.g. Quad Name: 01d 15b

A. Geomorphology (Subtotal = 17.5)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	(3)
4. Particle size of stream substrate	0	1	2	(3)
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	(1)	(2)	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	(1)	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 4)

12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 8)

18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	0.5	(1)	1.5
25. Algae	0	0.5	(1)	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Took several soil plugs but none where Chroma 2 or lower

Sketch: Strong intermittent.
Could find hydric soils in part due to rocky roots frequent.
substrate

NC DWQ Stream Identification Form Version 4.11

Date: 2-13-15	Project/Site: Big Harris	Latitude: 35.413832°N
Evaluator: IE/RD	County: Cleveland	Longitude: 81.606401°W
Total Points: 32 Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other Royster Creek e.g. Quad Name:

A. Geomorphology (Subtotal = 15.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	(3)
4. Particle size of stream substrate	0	1	2	(3)
5. Active/relict floodplain <i>Scour along banks</i>	0	(1)	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 8.5)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	0.5	1	(1.5)
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Due to saprolite, rocky soils, roots had to take several plugs to find hydric soils

Sketch: Abundant salamanders (juvenile & adults) southern dusky
2 crayfish

01b 5a, above crossing

NC DWQ Stream Identification Form Version 4.11

Date: 2-13-15	Project/Site: Big Harris	Latitude: 35.415323°N
Evaluator: IE/RD	County: Cleveland	Longitude: 81.606552°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 22.5	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other Royster Creek e.g. Quad Name: - Upper end

A. Geomorphology (Subtotal = 12)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	<u>3</u>
2. Sinuosity of channel along thalweg	0	<u>1</u>	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	<u>1</u> →	2	3
4. Particle size of stream substrate <i>few coarse riffles</i>	0	<u>1</u>	2	3
5. Active/relict floodplain	<u>0</u>	1	2	3
6. Depositional bars or benches	0	<u>1</u>	2	3
7. Recent alluvial deposits	0	<u>1</u>	2	3
8. Headcuts	0	1	<u>2</u>	3
9. Grade control	0	<u>0.5</u>	1	1.5
10. Natural valley	0	0.5	1	<u>1.5</u>
11. Second or greater order channel	<u>No = 0</u>		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
12. Presence of Baseflow	0	1	<u>2</u>	3
13. Iron oxidizing bacteria <i>traces along reach</i>	0	<u>1</u>	2	3
14. Leaf litter	1.5	1	<u>0.5</u>	0
15. Sediment on plants or debris	0	<u>0.5</u>	1	1.5
16. Organic debris lines or piles	0	<u>0.5</u>	1	1.5
17. Soil-based evidence of high water table?	<u>No = 0</u>		Yes = 3	

C. Biology (Subtotal = 6)	Absent	Weak	Moderate	Strong
18. Fibrous roots in streambed	3	<u>2</u>	1	0
19. Rooted upland plants in streambed	<u>3</u>	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	<u>1</u>	2	3
21. Aquatic Mollusks	<u>0</u>	1	2	3
22. Fish	<u>0</u>	0.5	1	1.5
23. Crayfish	<u>0</u>	0.5	1	1.5
24. Amphibians	<u>0</u>	0.5	1	1.5
25. Algae	0	<u>0.5</u>	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 <u>Other = 0</u>			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Observed 1 crayfish; 2 aquatic worms, heard frogs at d/s culvert but none observed

Sketch: Very weak biology
 Water in channel throughout reach w/ weak flow in few riffles
 Majority of soil plugs non-hydric but may be influenced by red bank material sloughing in bed.

NC DWQ Stream Identification Form Version 4.11

Date: 2-13-15	Project/Site: Big Harris	Latitude: 35.406529
Evaluator: JE/RD	County: Cleveland	Longitude: 81.607918
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 34	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other Scism Creek - e.g. Quad Name: Lower majority

A. Geomorphology (Subtotal = 15)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	1	2	(3)
5. Active/relict floodplain	(0)	1	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	(1)	2	3
9. Grade control <i>several bedrock steps</i>	0	0.5	1	(1.5)
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 10)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	(3)
21. Aquatic Mollusks	0	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 <u>Other = 0</u>			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Observed 5+ stonefly, 15 damselfly
 Several mayfly; caddisfly
 Several dragonfly
 3 crane flies

NC DWQ Stream Identification Form Version 4.11

Date: 2-16-15	Project/Site: Big Harris	Latitude: 35.404919
Evaluator: J Eckardt	County: Cleveland	Longitude: 81.609162
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 22.5	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other Scism Creek e.g. Quad Name:

A. Geomorphology (Subtotal = 10)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	(0)	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts 2 - large 6' at D/S; 2 cut at U/S	0	1	2	(3)
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 6)

12. Presence of Baseflow small pockets of steady flow	(0)	(1)	2	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table? 3/2	No = 0		Yes = 3	

C. Biology (Subtotal = 6.5)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Frozen water standing along reach
Water stained leaves
Cattle have trampled bed.

2' Headcut at U/S end of reach
6' headcut near D/S end.

NC DWQ Stream Identification Form Version 4.11

Date: 2-25-15	Project/Site: Big Harris	Latitude: 35.409475
Evaluator: IE/RD	County:	Longitude: -81.611770
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 31.5	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Eaker Creek e.g. Quad Name: -lower end

A. Geomorphology (Subtotal = 14.5)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7.5)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians Salamanders	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

Macros: absent 1 culvert casing; 1 canopy casing
Lower half is incised 4' below headcut, to confluence w/ Big Harris

NC DWQ Stream Identification Form Version 4.11

Date: 2-25-15	Project/Site: Big Harris	Latitude: 35.396866
Evaluator: JE/RO	County: Cleveland	Longitude: 81.650921
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 20.5	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other Upper Eakes e.g. Quad Name:

A. Geomorphology (Subtotal = 11.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	(0)	1	2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	1	(2)	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	0	1	(2)	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 5)

12. Presence of Baseflow	0	(1)	2	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	1	0.5	(0)
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 4)

18. Fibrous roots in streambed	3	2	(1)	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Section between headcuts w/ hydric soils, study H₂O throughout
No biology.
Bankfull bench along majority of LB.

NC DWQ Stream Identification Form Version 4.11

Date: 2-25-15	Project/Site: Big Harris	Latitude: 35.409243°N
Evaluator: IE	County: Cleveland	Longitude: 81.611638°W
Total Points: 21 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other UTI to e.g. Quad Name: Enkers Creek

A. Geomorphology (Subtotal = 7.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	(0)	1	2	3
4. Particle size of stream substrate	(0)	1	2	3
5. Active/relict floodplain	(0)	1	2	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	1	(2)	3
9. Grade control	(0)	0.5	1	1.5
10. Natural valley	0	(0.5)	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	(0)	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 6)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Incised channel that receives groundwater; roach-like ditch input.
Iron oxidizing bacteria present. Several deer carcasses present.

Sketch:

Blank area for sketch.

NC DWQ Stream Identification Form Version 4.11

Date: 2/25/15	Project/Site: Big Harris	Latitude: 35.414408 °N
Evaluator: IE / RD	County: Cleveland	Longitude: 81.613204 °W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 30	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other SI-UTI to e.g. Quad Name: Cornwell Creek

A. Geomorphology (Subtotal = 11)	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9)	Absent	Weak	Moderate	Strong
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 10)	Absent	Weak	Moderate	Strong
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: 3 salamanders - 1 dusky 1 aquatic worm
10+ caddisfly casings Algae in upper pool
2 mayflies

Sketch:
Short groundwater seep channel. Descent pool at head of system below bedrock knickpoint at system origin

NC DWQ Stream Identification Form Version 4.11

Date: 3/16/15	Project/Site: Big Harris	Latitude: 35.39973171 °N
Evaluator: IE	County: Cleveland	Longitude: -81.61047315 °W
Total Points: 38 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other Lower Fletcher e.g. Quad Name: C1edc

A. Geomorphology (Subtotal = 16)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	1	2	(3)
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	0	1	(2)	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	(No = 0)		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9.5)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		(Yes = 3)	

C. Biology (Subtotal = 12.5)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	(2)	3
21. Aquatic Mollusks	0	(1)	2	3
22. Fish	0	0.5	1	(1.5)
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	0.5	(1)	1.5
25. Algae	0	0.5	(1)	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5; Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Really found minnows in shallow pools; undercut banks.
 Few salamanders.
 Macros observed: 5 caddisfly, 3 mayflies, 1 stonefly.
 1 fingernail clam

NC DWQ Stream Identification Form Version 4.11

Date: 3-20-15	Project/Site: Big Harris	Latitude: 35.39203721°N
Evaluator: IE	County: Cleveland	Longitude: 81.62087400°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 33.5	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Top end of Upper Stride e.g. Quad Name: Elliot Creek - above Sta just below 10' headcut

A. Geomorphology (Subtotal = 16)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	0	1	(2)	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	1	2	(3)
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		Yes = 3	

^aartificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 8.5)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	0.5	(1)	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Heavy sedimentation from 10' headcut at start of reach has limited habitats. Observed couple midges. 2 large dusky salamanders

UTI to USEC

NC DWQ Stream Identification Form Version 4.11

Date: 3-20-15	Project/Site: Big Harris	Latitude: 35.39353057
Evaluator: IE/RO	County: Cleveland	Longitude: 81.62042851
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 25.5	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other 512 - Vine covered e.g. Quad Name: incised gully

A. Geomorphology (Subtotal = 12.5)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	0	1	2	(3)
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 5.5)

18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: 1 Salamander

NC DWQ Stream Identification Form Version 4.11

Date: 3/18/15	Project/Site: Big Harris	Latitude: 35.395864°N
Evaluator: IE	County: Cleveland	Longitude: 81.609104°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 33	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other <u>S8 - UT2 to Upper SE</u> e.g. Quad Name: (shown on scale map but no 20 mps)

A. Geomorphology (Subtotal = 17)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	<u>3</u>
2. Sinuosity of channel along thalweg	0	1	<u>2</u>	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	<u>3</u>
4. Particle size of stream substrate	0	1	2	<u>3</u>
5. Active/relict floodplain	0	1	<u>2</u>	3
6. Depositional bars or benches	0	1	<u>2</u>	3
7. Recent alluvial deposits	<u>0</u>	1	2	3
8. Headcuts	<u>0</u>	1	2	3
9. Grade control	0	<u>0.5</u>	1	1.5
10. Natural valley	0	0.5	1	<u>1.5</u>
11. Second or greater order channel	No = 0		Yes = 3	

^aartificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

12. Presence of Baseflow	0	1	2	<u>3</u>
13. Iron oxidizing bacteria	<u>0</u>	1	2	3
14. Leaf litter	1.5	<u>1</u>	0.5	0
15. Sediment on plants or debris	0	<u>0.5</u>	1	1.5
16. Organic debris lines or piles	<u>0</u>	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 8.5)

18. Fibrous roots in streambed	<u>3</u>	2	1	0
19. Rooted upland plants in streambed	<u>3</u>	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	<u>2</u>	3
21. Aquatic Mollusks	<u>0</u>	1	2	3
22. Fish	<u>0</u>	0.5	1	1.5
23. Crayfish	<u>0</u>	0.5	1	1.5
24. Amphibians	<u>0</u>	0.5	1	1.5
25. Algae	0	<u>0.5</u>	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: Observed 2 stoneflies
several caddisfly casing
2 caddisfly

NC DWQ Stream Identification Form Version 4.11

Date: 3-18-15	Project/Site: Big Harris	Latitude: 35.39623902°N
Evaluator: JIE	County: Cleveland	Longitude: -81.6086643°W
Total Points: <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i> 25.5	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other 57-UT3 e.g. Quad Name: Upper Side

just 1/5 of Royster property 1/2

A. Geomorphology (Subtotal = 9)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	<u>3</u>
2. Sinuosity of channel along thalweg	0	<u>1</u>	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	<u>1</u>	2	3
4. Particle size of stream substrate	<u>0</u>	1	2	3
5. Active/relict floodplain	0	<u>1</u>	2	3
6. Depositional bars or benches	<u>0</u>	1	2	3
7. Recent alluvial deposits	<u>0</u>	1	2	3
8. Headcuts	0	1	<u>2</u>	3
9. Grade control	<u>0</u>	0.5	1	1.5
10. Natural valley	0	0.5	<u>1</u>	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7)

12. Presence of Baseflow <i>steady H₂O throughout</i>	0	1	<u>2</u>	3
13. Iron oxidizing bacteria <i>w/ white flow at confluence</i>	0	<u>1</u>	2	3
14. Leaf litter	1.5	<u>1</u>	0.5	0
15. Sediment on plants or debris	<u>0</u>	0.5	1	1.5
16. Organic debris lines or piles	<u>0</u>	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 9.5)

18. Fibrous roots in streambed	<u>3</u>	2	1	0
19. Rooted upland plants in streambed	<u>3</u>	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	<u>2</u>	3
21. Aquatic Mollusks	0	<u>1</u>	2	3
22. Fish	<u>0</u>	0.5	1	1.5
23. Crayfish	<u>0</u>	0.5	1	1.5
24. Amphibians	0	<u>0.5</u>	1	1.5
25. Algae	<u>0</u>	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 <u>Other = 0</u>			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: *Highly incised channel (3-5') w/ moderate baseflow beginning at 3' headcut.*

Sketch: *Macros observed: 2 crane fly
2 caddisfly casings near confluence w/ main stem
5 aquatic worms
Couple amphibian eggs.*

NC DWQ Stream Identification Form Version 4.11

Date: 3-24-15	Project/Site: Big Harris	Latitude: 35.39553339°N
Evaluator: JE/RD	County: Cleveland	Longitude: 81.61665875°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 33	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other Bridges Creek e.g. Quad Name:

A. Geomorphology (Subtotal = 16.5)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7.5)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed <i>river cane</i>	3	2	1	0
20. Macroinvertebrates (note diversity and abundance) <i>in stream</i>	0	1	2	3
21. Aquatic Mollusks <i>upland plant?</i>	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Reach begins at confluence of 2 incised channels draining Wetland P.

Sketch: 2 Craneflies
1 Salamander
Amphibian eggs
Several aquatic worms
1 caddisfly casing
1 aquatic beetle

NC DWQ Stream Identification Form Version 4.11

Date: 3-24-15	Project/Site: Big Harris	Latitude: 35.39406420
Evaluator: IE	County: Cleveland	Longitude: 81.56752918
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other Bridges Creede e.g. Quad Name: above conf. Uti to Bridges Creede

25.5

UTI to Bridges Creede

A. Geomorphology (Subtotal = <u>11.5</u>)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	0	1	(2)	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = <u>7.5</u>)	Absent	Weak	Moderate	Strong
12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	(0)	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = <u>6.5</u>)	Absent	Weak	Moderate	Strong
18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Incised channel that begins at 2nd headcut. Channel above loses bed/bank as it transitions into wetland P

Sketch: 1 salamander

UT1 to Bridges Creek

NC DWQ Stream Identification Form Version 4.11

Date: 3-24-15	Project/Site: Big Harris	Latitude: 35.39465872°N
Evaluator: JE	County: Cleveland	Longitude: 81.59114796°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 24	Stream Determination (circle one) Ephemeral (intermittent) Perennial	Other 514 e.g. Quad Name:

A. Geomorphology (Subtotal = 10)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	0	1	(2)	3
9. Grade control	(0)	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	(0)	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 6.5)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

1 salamander

NC DWQ Stream Identification Form Version 4.11

Date: 3-20-15	Project/Site: Big Harris	Latitude: 35.39620763
Evaluator: IE/RD	County: Cleveland	Longitude: 81.62084735
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 33.5	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other <u>U/S end of</u> e.g. Quad Name: <u>Ellist Creek</u>

A. Geomorphology (Subtotal = 16)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	(3)
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 9.5)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	(2)	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	0	(0.5)	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	0	0.5	(1)	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: 2 dragonfly larva 2 caddisfly
 1 aquatic beetle 2 minnows
 4 stonefly
 3 mayfly

UTI to Ellist Creek

NC DWQ Stream Identification Form Version 4.11

Date: 3-20-15	Project/Site: Big Harris	Latitude: 35.39603475
Evaluator: IE	County: Cleveland	Longitude: 81.62051308
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 33.5	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other S13 - Old Reach 39 e.g. Quad Name:

A. Geomorphology (Subtotal = 13)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		Yes = 3	

^aartificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9.5)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 11)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	(2)	3
21. Aquatic Mollusks	0	(1)	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	(1)	1.5
25. Algae	0	0.5	(1)	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

3 salamanders
1 fingernail clam
6 caddis fly casings
1 crayfish
aquatic worm

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 2/16/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland A - DP1
 Investigator(s): Ian Eckardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.407427 Long: -81.607675 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Floodplain seep.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) _____ Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) _____ Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) _____ <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) _____	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
--	---

Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>1"</u> Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0" (at surface)</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland A - DP1

<u>Tree Stratum</u> (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liriodendron tulipifera</u>	<u>45</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>45</u> = Total Cover			
50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>			
<u>Sapling Stratum</u> (Plot size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ligustrum sinense</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Acer rubrum</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>40</u> = Total Cover			
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>			
<u>Shrub Stratum</u> (Plot size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Herb Stratum</u> (Plot size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Unknown moss</u>	<u>5</u>	<u>Yes</u>	<u>NI</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
<u>5</u> = Total Cover			
50% of total cover: <u>2.5</u> 20% of total cover: <u>1</u>			
<u>Woody Vine Stratum</u> (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>70</u>	x 4 = <u>280</u>
UPL species _____	x 5 = _____
Column Totals: <u>85</u> (A)	<u>325</u> (B)

Prevalence Index = B/A = 3.8

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

Majority of herb layer dormant and unable to identify. Area exhibits hydric soils and strong hydrology.

SOIL

Sampling Point: Wetland A - DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	2.5Y 2.5/1	100					silty sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input checked="" type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 2/16/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland B - DP2
 Investigator(s): IE/JM Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.407182 Long: -81.60738 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: 2 linear seeps that join; flow into main channel. The majority of the feature is devoid of vegetation. Listed vegetation occurs on the edges of the feature.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) _____ Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) _____ Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) _____ <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) _____	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>1"</u> Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): <u>-</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0" (at surface)</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland B - DP2

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Liriodendron tulipifera</u>	50	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	50 = Total Cover			
	50% of total cover: <u>25</u>		20% of total cover: <u>10</u>	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. <u>Ligustrum sinense</u>	20	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	20 = Total Cover			
	50% of total cover: <u>10</u>		20% of total cover: <u>4</u>	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>5'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC:				0 (A)
Total Number of Dominant Species Across All Strata:				2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC:				0 (A/B)
Prevalence Index worksheet:				
Total % Cover of:		Multiply by:		
OBL species	_____	x 1 =	_____	
FACW species	_____	x 2 =	_____	
FAC species	_____	x 3 =	_____	
FACU species	<u>70</u>	x 4 =	<u>280</u>	
UPL species	_____	x 5 =	_____	
Column Totals:	_____ (A)	_____ (B)		
Prevalence Index = B/A = <u>4</u>				
Hydrophytic Vegetation Indicators:				
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation				
<input type="checkbox"/> 2 - Dominance Test is >50%				
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹				
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				
Remarks: (Include photo numbers here or on a separate sheet.)				
The majority of the feature is devoid of vegetation, with noted vegetation species occurring on the edges. Feature has hydric soils and strong hydrology indicators.				

SOIL

Sampling Point: Wetland B - DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	2.5Y 3/3	100%					sand	
2-9	10YR 4/2	98%	7.5YR 4/6	2%	C	PL	silty sand	
9-12	10YR 4/6	100%					sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 2/16/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland A/B - DP3
 Investigator(s): IE/JM Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.407315 Long: -81.60744 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland A/B - DP3

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Liriodendron tulipifera</u>	75	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	75 = Total Cover			
	50% of total cover: <u>37.5</u>		20% of total cover: <u>15</u>	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. <u>Ligustrum sinense</u>	60	Yes	FACU	
2. <u>Ilex opaca</u>	15	Yes	FACU	
3. _____				
4. _____				
5. _____				
6. _____				
	75 = Total Cover			
	50% of total cover: <u>37.5</u>		20% of total cover: <u>15</u>	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>5'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC:				<u>0</u> (A)
Total Number of Dominant Species Across All Strata:				<u>3</u> (B)
Percent of Dominant Species That Are OBL, FACW, or FAC:				<u>0</u> (A/B)
Prevalence Index worksheet:				
Total % Cover of:		Multiply by:		
OBL species	_____	x 1 =	_____	
FACW species	_____	x 2 =	_____	
FAC species	_____	x 3 =	_____	
FACU species	<u>150</u>	x 4 =	<u>600</u>	
UPL species	_____	x 5 =	_____	
Column Totals:	<u>150</u>	(A)	<u>600</u>	(B)
Prevalence Index = B/A = <u>4</u>				
Hydrophytic Vegetation Indicators:				
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation				
<input type="checkbox"/> 2 - Dominance Test is >50%				
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹				
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Upland A/B - DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	7.5Y 3/3	100					loam	
2-12	5YR 4/6	100					loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 2/16/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland D- DP4
 Investigator(s): Ian Eckardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.408339 Long: -81.609532 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Trampled seep/concave.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) <input checked="" type="checkbox"/> Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0</u> (at surface) (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland D- DP4

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Liriodendron tulipifera</u>	<u>30</u>	<u>YES</u>	<u>FACU</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
<u>30</u> = Total Cover				
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>				
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. <u>Acer rubrum</u>	<u>10</u>	<u>YES</u>	<u>FAC</u>	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = <u>3.4</u>
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
<u>10</u> = Total Cover				
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Microstegium vimineum</u>	<u>40</u>	<u>YES</u>	<u>FAC</u>	Definitions of Five Vegetation Strata: Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH). Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH. Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height. Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height. Woody vine – All woody vines, regardless of height.
2. <u>unknown moss</u>	<u>5</u>	<u>NO</u>	<u>NI</u>	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
<u>45</u> = Total Cover				
50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>				
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Wetland D- DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/1	100					silty sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input checked="" type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 2/16/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland C/D - DP5
 Investigator(s): Ian Eckhardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.408536 Long: 81.609729 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland C/D - DP5

<u>Tree Stratum</u> (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liriodendron tulipifera</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>40</u> = Total Cover			
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>			
<u>Sapling Stratum</u> (Plot size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ilex opaca</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>20</u> = Total Cover			
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>			
<u>Shrub Stratum</u> (Plot size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Herb Stratum</u> (Plot size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Microstegium vimineum</u>	<u>10</u>	<u>YES</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
<u>10</u> = Total Cover			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			
<u>Woody Vine Stratum</u> (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>5</u>	<u>YES</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>5</u> = Total Cover			
50% of total cover: <u>2.5</u> 20% of total cover: <u>1</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species 15 x 3 = 45

FACU species 60 x 4 = 240

UPL species _____ x 5 = _____

Column Totals: 75 (A) 285 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 2/16/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland E- DP6
 Investigator(s): Ian Eckardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.408614 Long: 81.609788 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Hillside seep; linear; trampled.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland E- DP6

<u>Tree Stratum</u> (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liriodendron tulipifera</u>	<u>45</u>	<u>YES</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>45</u> = Total Cover			
50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>			
<u>Sapling Stratum</u> (Plot size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ilex opaca</u>	<u>10</u>	<u>YES</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>10</u> = Total Cover			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			
<u>Shrub Stratum</u> (Plot size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Herb Stratum</u> (Plot size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Microstegium vimineum</u>	<u>60</u>	<u>YES</u>	<u>FAC</u>
2. <u>Verbena hastate</u>	<u>5</u>	<u>NO</u>	<u>NI</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
<u>65</u> = Total Cover			
50% of total cover: <u>32.50</u> 20% of total cover: <u>13</u>			
<u>Woody Vine Stratum</u> (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species 60 x 3 = 180

FACU species 55 x 4 = 220

UPL species _____ x 5 = _____

Column Totals: 115 (A) 400 (B)

Prevalence Index = B/A = 3.47

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

Majority of vegetation with FACU ratings are found along the edge of the feature. The majority of feature has dormant microstegium (FAC) or is devoid of vegetation at this time of year.

SOIL

Sampling Point: Wetland E- DP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	2.5Y 3/1	100					Silty sand	
4-12	10YR 4/1	95	2.5Y 5/6	5	C	PL	Silty sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 2/16/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland E- DP7
 Investigator(s): Ian Eckhardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.408957 Long: 81.609454 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland E- DP7

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30' radius</u>)				
1. <u>Liriodendron tulipifera</u>	<u>65</u>	<u>Yes</u>	<u>FACU</u>	
2. <u>Quercus nigra</u>	<u>15</u>	<u>No</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
	<u>80</u>	= Total Cover		
	50% of total cover: <u>40</u>	20% of total cover: <u>16</u>		
Sapling Stratum (Plot size: <u>15' radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
	_____	= Total Cover		
	50% of total cover: _____	20% of total cover: _____		
Shrub Stratum (Plot size: <u>15' radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
	_____	= Total Cover		
	50% of total cover: _____	20% of total cover: _____		
Herb Stratum (Plot size: <u>5' radius</u>)				
1. <u>Microstegium vimineum</u>	<u>60</u>	<u>Yes</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
	<u>60</u>	= Total Cover		
	50% of total cover: <u>30</u>	20% of total cover: <u>12</u>		
Woody Vine Stratum (Plot size: <u>30' radius</u>)				
1. <u>Lonicera japonica</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
	<u>5</u>	= Total Cover		
	50% of total cover: <u>2.5</u>	20% of total cover: <u>1</u>		
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)				
Total Number of Dominant Species Across All Strata: <u>3</u> (B)				
Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)				
Prevalence Index worksheet:				
Total % Cover of: _____ Multiply by:				
OBL species _____ x 1 = _____				
FACW species _____ x 2 = _____				
FAC species _____ x 3 = _____				
FACU species _____ x 4 = _____				
UPL species _____ x 5 = _____				
Column Totals: _____ (A) _____ (B)				
Prevalence Index = B/A = _____				
Hydrophytic Vegetation Indicators:				
___ 1 - Rapid Test for Hydrophytic Vegetation				
<input checked="" type="checkbox"/> 2 - Dominance Test is >50%				
___ 3 - Prevalence Index is ≤3.0 ¹				
___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
___ Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Upland E- DP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	5YR 4/6	100					loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- Thin Dark Surface (S9) **(MLRA 147, 148)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- Umbric Surface (F13) **(MLRA 136, 122)**
- Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Coast Prairie Redox (A16) **(MLRA 147, 148)**
- Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 2/25/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland F- DP8
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.414514 Long: 81.613391 Datum: _____
 Soil Map Unit Name: Pacolet sandy clay loam (PaD2) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No
 Are Vegetation , Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Small inundated pool near confluence of Cornwell Creek and UT1 to Cornwell Creek. Inundation is several inches creating a feature devoid of vegetation.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>6</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland F- DP8

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>5'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1.				
2.				
3.				
4.				
5.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

Inundated concave depression devoid of vegetation.

SOIL

Sampling Point: Wetland F- DP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	7.5YR 4/2	95	7.5YR 3/4	5	C	PL	silty sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 2/25/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland F- DP9
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.414386 Long: 81.613340 Datum: _____
 Soil Map Unit Name: Pacolet sandy clay loam (PaD2) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland F- DP9

<u>Tree Stratum</u> (Plot size: <u>30'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liriodendron tulipifera</u>	<u>50</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>50</u> = Total Cover			
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>			
<u>Sapling Stratum</u> (Plot size: <u>15'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liriodendron tulipifera</u>	<u>25</u>	<u>Yes</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>25</u> = Total Cover			
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>			
<u>Shrub Stratum</u> (Plot size: <u>15'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Herb Stratum</u> (Plot size: <u>5'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Microstegium vimineum</u>	<u>60</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Ligustrum sinense</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
3. <u>Allium ascalonicum</u>	<u>5</u>	<u>No</u>	<u>NI</u>
4. <u>Rubus argutus</u>	<u>2</u>	<u>No</u>	<u>FACU</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
<u>77</u> = Total Cover			
50% of total cover: <u>38.5</u> 20% of total cover: <u>15.4</u>			
<u>Woody Vine Stratum</u> (Plot size: <u>30'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>10</u> = Total Cover			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species 70 x 3 = 210

FACU species 87 x 4 = 348

UPL species _____ x 5 = _____

Column Totals: 157 (A) 558 (B)

Prevalence Index = B/A = 3.55

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 3/9/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland G- DP10
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.410213 Long: 81.614387 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Small depression pocket (11 flags) immediately above UT4 (S4)	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
--	--

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland G- DP10

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Acer rubrum</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>80</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>30</u> = Total Cover				
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>				
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. <u>Liquidambar styraciflua</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
2. <u>Carpinus caroliniana</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>40</u> = Total Cover				
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>				
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. <u>Ligustrum sinense</u>	<u>30</u>	<u>Yes</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>30</u> = Total Cover				
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>				
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Arundinaria gigantea</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>	Definitions of Five Vegetation Strata: Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH). Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH. Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height. Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height. Woody vine – All woody vines, regardless of height.
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>10</u> = Total Cover				
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. <u>Dioscorea bulbifera</u>	<u>25</u>	<u>Yes</u>	<u>NI</u>	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>25</u> = Total Cover				
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Wetland G- DP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5	10YR 3/2	100					silt loam	
5-12	10YR 4/1	98	7.5YR 4/3		C	PL	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 3/9/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland G- DP11
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.410154 Long: 81.614259 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland G- DP11

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Liriodendron tulipifera</u>	50	Yes	FACU	
2. <u>Juglans nigra</u>	10	Yes	FACU	
3. _____				
4. _____				
5. _____				
6. _____				
	<u>60</u> = Total Cover			
	50% of total cover: <u>30</u>		20% of total cover: <u>12</u>	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. <u>Liquidambar styraciflua</u>	25	Yes	FAC	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	<u>25</u> = Total Cover			
	50% of total cover: <u>12.5</u>		20% of total cover: <u>5</u>	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Smilax rotundifolia</u>	5	Yes	FAC	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	<u>5</u> = Total Cover			
	50% of total cover: <u>2.5</u>		20% of total cover: <u>1</u>	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. <u>Lonicera japonica</u>	5	Yes	FAC	
2. _____				
3. _____				
4. _____				
5. _____				
	<u>5</u> = Total Cover			
	50% of total cover: <u>2.5</u>		20% of total cover: <u>1</u>	
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC:				<u>3</u> (A)
Total Number of Dominant Species Across All Strata:				<u>5</u> (B)
Percent of Dominant Species That Are OBL, FACW, or FAC:				<u>60</u> (A/B)
Prevalence Index worksheet:				
Total % Cover of:		Multiply by:		
OBL species	_____	x 1 =	_____	
FACW species	_____	x 2 =	_____	
FAC species	_____	x 3 =	_____	
FACU species	_____	x 4 =	_____	
UPL species	_____	x 5 =	_____	
Column Totals:	_____ (A)	_____ (B)		
Prevalence Index = B/A = _____				
Hydrophytic Vegetation Indicators:				
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation				
<input checked="" type="checkbox"/> 2 - Dominance Test is >50%				
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹				
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Upland G- DP11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	7.5YR 3/4	100					loam	
4-12	7.5YR 4/4	100					loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- Thin Dark Surface (S9) **(MLRA 147, 148)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- Umbric Surface (F13) **(MLRA 136, 122)**
- Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Coast Prairie Redox (A16) **(MLRA 147, 148)**
- Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 3/9/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland H- DP12
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.403293 Long: 81.622127 Datum: _____
 Soil Map Unit Name: Helena-Worsham complex (HeB) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: At upstream fence line on Upper Fletcher Creek. 6 flags. Toe of hillslope pool	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) _____ Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) _____ Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) _____ <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) _____	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
--	--

Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>2</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
--	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland H- DP12

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>5'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1.				
2.				
3.				
4.				
5.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

Concave depression devoid of vegetation with hydrology and hydric soil.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Project City/County: Cleveland Sampling Date: 3/9/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland H- DP13
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.403293 Long: 81.622127 Datum: _____
 Soil Map Unit Name: Helena-Worsham complex (HeB) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland H- DP13

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Liriodendron tulipifera</u>	70	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	<u>70</u> = Total Cover			
	50% of total cover: <u>35</u>		20% of total cover: <u>14</u>	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Stellaria media</u>	10	Yes	UPL	
2. <u>Verbena hastate</u>	5	Yes	NI	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	<u>15</u> = Total Cover			
	50% of total cover: <u>7.5</u>		20% of total cover: <u>3</u>	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC:				<u>0</u> (A)
Total Number of Dominant Species Across All Strata:				<u>3</u> (B)
Percent of Dominant Species That Are OBL, FACW, or FAC:				<u>0</u> (A/B)
Prevalence Index worksheet:				
Total % Cover of:		Multiply by:		
OBL species	_____	x 1 =	_____	
FACW species	_____	x 2 =	_____	
FAC species	_____	x 3 =	_____	
FACU species	<u>70</u>	x 4 =	<u>280</u>	
UPL species	<u>10</u>	x 5 =	<u>50</u>	
Column Totals:	<u>80</u> (A)		<u>330</u> (B)	
Prevalence Index = B/A = <u>4.13</u>				
Hydrophytic Vegetation Indicators:				
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation				
<input type="checkbox"/> 2 - Dominance Test is >50%				
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹				
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Upland H- DP13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8	10YR 3/3	100					loam	
8-12	5YR 4/6	100					loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) (**LRR N**)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) (**MLRA 147, 148**)
- Thin Dark Surface (S9) (**MLRA 147, 148**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
- Umbric Surface (F13) (**MLRA 136, 122**)
- Piedmont Floodplain Soils (F19) (**MLRA 148**)
- Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (**MLRA 147**)
- Coast Prairie Redox (A16) (**MLRA 147, 148**)
- Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Project City/County: Cleveland Sampling Date: 3/9/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland I- DP14
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.402939 Long: 81.618749 Datum: _____
 Soil Map Unit Name: Helena-Worsham complex (HeB) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Saturated downstream end of field gully.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) _____ Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) _____ Thin Muck Surface (C7) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) _____ <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) _____	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>1</u> Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland I- DP14

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>5'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1.				
2.				
3.				
4.				
5.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC: _____				(A)
Total Number of Dominant Species Across All Strata: _____				(B)
Percent of Dominant Species That Are OBL, FACW, or FAC: _____				(A/B)
Prevalence Index worksheet:				
Total % Cover of:		Multiply by:		
OBL species	_____	x 1 =	_____	
FACW species	_____	x 2 =	_____	
FAC species	_____	x 3 =	_____	
FACU species	_____	x 4 =	_____	
UPL species	_____	x 5 =	_____	
Column Totals:	_____	(A)	_____	(B)
Prevalence Index = B/A = _____				
Hydrophytic Vegetation Indicators:				
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation				
<input type="checkbox"/> 2 - Dominance Test is >50%				
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹				
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				

Remarks: (Include photo numbers here or on a separate sheet.)

Concave depression devoid of vegetation with hydrology and hydric soils.

SOIL

Sampling Point: Wetland I- DP14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 4/2	100					sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- Thin Dark Surface (S9) **(MLRA 147, 148)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- Umbric Surface (F13) **(MLRA 136, 122)**
- Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Coast Prairie Redox (A16) **(MLRA 147, 148)**
- Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 3/16/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland J- DP15
 Investigator(s): Ian Eckardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.398350 Long: 81.607508 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Scour pool devoid of vegetation on a point bar.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) <input checked="" type="checkbox"/> Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>6</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 Tons of amphibian eggs within feature.

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland J- DP15

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Herb Stratum (Plot size: <u>5'</u> radius)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1.				
2.				
3.				
4.				
5.				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC: _____				(A)
Total Number of Dominant Species Across All Strata: _____				(B)
Percent of Dominant Species That Are OBL, FACW, or FAC: _____				(A/B)
Prevalence Index worksheet:				
Total % Cover of:		Multiply by:		
OBL species	_____	x 1 =	_____	
FACW species	_____	x 2 =	_____	
FAC species	_____	x 3 =	_____	
FACU species	_____	x 4 =	_____	
UPL species	_____	x 5 =	_____	
Column Totals:	_____	(A)	_____	(B)
Prevalence Index = B/A = _____				
Hydrophytic Vegetation Indicators:				
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation				
<input type="checkbox"/> 2 - Dominance Test is >50%				
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹				
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				

Remarks: (Include photo numbers here or on a separate sheet.)

Concave depression devoid of vegetation with wetland hydrology and hydric soil indicators.

SOIL

Sampling Point: Wetland J- DP15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 4/1	100					silty sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> (MLRA 147, 148)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> (MLRA 136, 147)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Other (Explain in Remarks)
<input checked="" type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	
<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)	
<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)	
<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)	
<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Stream Mitigation Site City/County: Cleveland Sampling Date: 3/16/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland J- DP16
 Investigator(s): Ian Eckardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.398070 Long: 81.607493 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
--	--

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
---	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland J- DP16

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Liriodendron tulipifera</u>	35	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	35 = Total Cover			
	50% of total cover: <u>17.50</u> 20% of total cover: <u>7</u>			
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____ 20% of total cover: _____			
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____ 20% of total cover: _____			
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Festuca brevipila</u>	25	Yes	UPL	
2. <u>Plantago major</u>	5	No	FACU	
3. <u>Galium aparine</u>	5	No	FACU	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	35 = Total Cover			
	50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>			
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
	_____ = Total Cover			
	50% of total cover: _____ 20% of total cover: _____			
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)				
Total Number of Dominant Species Across All Strata: <u>2</u> (B)				
Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)				
Prevalence Index worksheet:				
Total % Cover of: _____ Multiply by:				
OBL species _____ x 1 = _____				
FACW species _____ x 2 = _____				
FAC species _____ x 3 = _____				
FACU species <u>45</u> x 4 = <u>180</u>				
UPL species <u>25</u> x 5 = <u>125</u>				
Column Totals: <u>65</u> (A) <u>305</u> (B)				
Prevalence Index = B/A = <u>4.7</u>				
Hydrophytic Vegetation Indicators:				
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation				
<input type="checkbox"/> 2 - Dominance Test is >50%				
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹				
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Upland J- DP16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9	2.5Y 5/4	100					sand	
9-10	2.5Y 4/2	98	5YR 3/4	2	C	PL	sand	
10-14	2.5Y 5/4	100					sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/16/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland K- DP17
 Investigator(s): Ian Eckardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.397636 Long: 81.607900 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Large toe of slope linear feature.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland K- DP17

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Acer rubrum</u>	45	Yes	FAC	
2. <u>Liriodendron tulipifera</u>	10	No	FACU	
3. _____				
4. _____				
5. _____				
6. _____				
	55 = Total Cover			
	50% of total cover: <u>27.50</u>		20% of total cover: <u>11</u>	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. <u>Ligustrum sinense</u>	5	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	5 = Total Cover			
	50% of total cover: <u>2.5</u>		20% of total cover: <u>1</u>	
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Microstegium vimineum</u>	45	Yes	FAC	
2. <u>Ranunculus sp.</u>	15	Yes	FAC	
3. <u>Festuca sp.</u>	5	No	FACU	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	65 = Total Cover			
	50% of total cover: <u>32.5</u>		20% of total cover: <u>13</u>	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Remarks: (Include photo numbers here or on a separate sheet.)				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

SOIL

Sampling Point: Wetland K- DP17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5	10YR 4/1	95	5YR 3/4	5	C	PL	silt loam	
5-14	10YR 5/3	80	7.5YR 4/6	20	C	PL	silt sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/16/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland K- DP18
 Investigator(s): Ian Eckhardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.397615 Long: 81.607703 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: _____ _____ _____	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland K- DP18

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Liriodendron tulipifera</u>	80	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	<u>80</u> = Total Cover			
	50% of total cover: <u>40</u> 20% of total cover: <u>16</u>			
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____ 20% of total cover: _____			
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. <u>Cornus florida</u>	20	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	<u>20</u> = Total Cover			
	50% of total cover: <u>10</u> 20% of total cover: <u>4</u>			
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Ranunculus sp.</u>	80	Yes	FAC	
2. <u>Allium ascalonicum</u>	5	No	NI	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	<u>85</u> = Total Cover			
	50% of total cover: <u>42.5</u> 20% of total cover: <u>17</u>			
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
	_____ = Total Cover			
	50% of total cover: _____ 20% of total cover: _____			
Remarks: (Include photo numbers here or on a separate sheet.)				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species 80 x 3 = 240

FACU species 100 x 4 = 400

UPL species _____ x 5 = _____

Column Totals: 180 (A) 640 (B)

Prevalence Index = B/A = 3.56

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/18/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland M- DP21
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.396840 Long: 81.608455 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Crescent shaped side seep with vegetated bar between feature and channel.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) <input checked="" type="checkbox"/> Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>2"</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland M- DP21

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. <u>Sambucus racemosa</u>	10	Yes	FACU	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				10 = Total Cover
				50% of total cover: <u>5</u> 20% of total cover: <u>2</u>
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Microstegium vimineum</u>	20	Yes	FAC	
2. <u>Unknown Aster</u>	5	No	NI	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
				25 = Total Cover
				50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
Remarks: (Include photo numbers here or on a separate sheet.)				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species 20 x 3 = 60

FACU species 10 x 4 = 40

UPL species _____ x 5 = _____

Column Totals: 30 (A) 100 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

SOIL

Sampling Point: Wetland M- DP21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR 4/1	98	10YR 5/8	2	C	PL	silt sand	
7-14	10YR 5/2	95	10YR 5/8	5	C	PL	silt sand	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> (MLRA 147, 148)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> (MLRA 136, 147)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	
<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)	
<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)	
<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)	
<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/18/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland N - DP22
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.395065 Long: 81.611997 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Larger linear polygon immediately up stream of gravel driveway	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>0 (at surface)</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland N - DP22

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Liriodendron tulipifera</u>	20	Yes	FACU	
2. <u>Acer rubrum</u>	20	Yes	FAC	
3. <u>Salix nigra</u>	10	Yes	OBL	
4. _____				
5. _____				
6. _____				
	<u>50</u> = Total Cover			
	50% of total cover: <u>25</u> 20% of total cover: <u>10</u>			
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____ 20% of total cover: _____			
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____ 20% of total cover: _____			
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Rubus argutus</u>	15	Yes	FACU	
2. <u>Arundinaria gigantea</u>	30	Yes	FACW	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	<u>45</u> = Total Cover			
	50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>			
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. <u>Lonicera japonica</u>	25	Yes	FAC	
2. _____				
3. _____				
4. _____				
5. _____				
	<u>25</u> = Total Cover			
	50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>			
Remarks: (Include photo numbers here or on a separate sheet.)				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No _____

SOIL

Sampling Point: Wetland N - DP22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR 4/2	90	10YR 5/8	10	C	PL	silt loam	
7-14	10YR 5/2	85	10YR 5/8	15	C	PL	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> (MLRA 147, 148)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> (MLRA 136, 147)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	
<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)	
<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)	
<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)	
<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/18/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland N- DP23
 Investigator(s): Ian Eckhardt/Jon Meek Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.395296 Long: 81.611934 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland N- DP23

	Absolute % Cover	Dominant Species?	Indicator Status	
<u>Tree Stratum</u> (Plot size: <u>30'</u> radius)				
1. <u>Liriodendron tulipifera</u>	30	Yes	FACU	
2. <u>Acer negundo</u>	5	No	FAC	
3. _____				
4. _____				
5. _____				
6. _____				
	35 = Total Cover			
	50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>			
<u>Sapling Stratum</u> (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____ 20% of total cover: _____			
<u>Shrub Stratum</u> (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____ 20% of total cover: _____			
<u>Herb Stratum</u> (Plot size: <u>5'</u> radius)				
1. <u>Microstegium vimineum</u>	55	Yes	FAC	
2. <u>Rubus argutus</u>	35	Yes	FACU	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	90 = Total Cover			
	50% of total cover: <u>45</u> 20% of total cover: <u>18</u>			
<u>Woody Vine Stratum</u> (Plot size: <u>30'</u> radius)				
1. <u>Lonicera japonica</u>	20	Yes	FAC	
2. _____				
3. _____				
4. _____				
5. _____				
	20 = Total Cover			
	50% of total cover: <u>10</u> 20% of total cover: <u>4</u>			
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)				
Total Number of Dominant Species Across All Strata: <u>4</u> (B)				
Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)				
Prevalence Index worksheet:				
Total % Cover of: _____ Multiply by:				
OBL species _____ x 1 = _____				
FACW species _____ x 2 = _____				
FAC species <u>80</u> x 3 = <u>240</u>				
FACU species <u>65</u> x 4 = <u>260</u>				
UPL species _____ x 5 = _____				
Column Totals: <u>145</u> (A) <u>500</u> (B)				
Prevalence Index = B/A = <u>3.45</u>				
Hydrophytic Vegetation Indicators:				
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation				
<input type="checkbox"/> 2 - Dominance Test is >50%				
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹				
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Upland N- DP23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR 4/4	100					silt loam	
7-14	7.5YR 4/4	100					loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- Thin Dark Surface (S9) **(MLRA 147, 148)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- Umbric Surface (F13) **(MLRA 136, 122)**
- Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Coast Prairie Redox (A16) **(MLRA 147, 148)**
- Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/18/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland O - DP24
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.395065 Long: 81.611997 Datum: _____
 Soil Map Unit Name: Chewacla loam (ChA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Larger linear polygon immediately up stream of gravel driveway.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland O - DP24

<u>Tree Stratum</u> (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Liriodendron tulipifera</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>
3. <u>Salix nigra</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>50</u> = Total Cover			
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>			
<u>Sapling Stratum</u> (Plot size: <u>15' radius</u>)	_____	_____	_____
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Shrub Stratum</u> (Plot size: <u>15' radius</u>)	_____	_____	_____
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Herb Stratum</u> (Plot size: <u>5' radius</u>)	_____	_____	_____
1. <u>Arundinaria gigantea</u>	<u>30</u>	<u>Yes</u>	<u>FACW</u>
2. <u>Rubus argutus</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
<u>45</u> = Total Cover			
50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>			
<u>Woody Vine Stratum</u> (Plot size: <u>30' radius</u>)	_____	_____	_____
1. <u>Lonicera japonica</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>15</u> = Total Cover			
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Wetland O - DP24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR 4/2	90	10YR 5/8	10	C	PL	silt loam	
7-14	10YR 5/2	85	10YR 4.5/8	15	C	PL	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/24/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland P - DP25
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.395245 Long: 81.616502 Datum: _____
 Soil Map Unit Name: Pacolet sandy clay loam (PaC2) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Started at upper end of Bridges Creek. Approximately 1 acre size polygon with several drainage channels flowing throughout.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland P - DP25

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Acer rubrum</u>	90	Yes	FAC	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	<u>90</u> = Total Cover			
	50% of total cover: <u>45</u>		20% of total cover: <u>18</u>	
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. <u>Ligustrum sinense</u>	5	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
	<u>5</u> = Total Cover			
	50% of total cover: <u>2.5</u>		20% of total cover: <u>1</u>	
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Arundinaria gigantea</u>	60	Yes	FACW	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	<u>60</u> = Total Cover			
	50% of total cover: <u>30</u>		20% of total cover: <u>12</u>	
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
	_____ = Total Cover			
	50% of total cover: _____		20% of total cover: _____	
Dominance Test worksheet:				
Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)				
Total Number of Dominant Species Across All Strata: <u>3</u> (B)				
Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)				
Prevalence Index worksheet:				
Total % Cover of:		Multiply by:		
OBL species	_____	x 1 =	_____	
FACW species	_____	x 2 =	_____	
FAC species	_____	x 3 =	_____	
FACU species	_____	x 4 =	_____	
UPL species	_____	x 5 =	_____	
Column Totals:	_____ (A)	_____ (B)		
Prevalence Index = B/A = _____				
Hydrophytic Vegetation Indicators:				
<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation				
<input checked="" type="checkbox"/> 2 - Dominance Test is >50%				
<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹				
<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				
<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Definitions of Five Vegetation Strata:				
Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).				
Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.				
Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.				
Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.				
Woody vine – All woody vines, regardless of height.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Wetland P - DP25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-11	10YR 4/2	95	10YR 4/6	5	C	PL	silt loam	
11-14	10YR 3/1	95	10YR 4/6	5	C	PL	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/24/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland P- DP26
 Investigator(s): Ian Eckhardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.395019 Long: 81.616323 Datum: _____
 Soil Map Unit Name: Pacolet sandy clay loam (PaC2) NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland P- DP26

<u>Tree Stratum</u> (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>65</u>	<u>Yes</u>	<u>FAC</u>
2. <u>Liriodendron tulipifera</u>	<u>35</u>	<u>Yes</u>	<u>FACU</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
	<u>100</u> = Total Cover		
	50% of total cover: <u>50</u>	20% of total cover: <u>20</u>	

<u>Sapling Stratum</u> (Plot size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
	_____ = Total Cover		
	50% of total cover: _____	20% of total cover: _____	

<u>Shrub Stratum</u> (Plot size: <u>15' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ligustrum sinense</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>
2. <u>Arundinaria gigantea</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
	<u>30</u> = Total Cover		
	50% of total cover: <u>15</u>	20% of total cover: <u>6</u>	

<u>Herb Stratum</u> (Plot size: <u>5' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
	_____ = Total Cover		
	50% of total cover: _____	20% of total cover: _____	

<u>Woody Vine Stratum</u> (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	<u>30</u> = Total Cover		
	50% of total cover: <u>15</u>	20% of total cover: <u>6</u>	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Upland P- DP26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14	10YR 5/6	100					loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/24/2015
 Applicant/Owner: Wildlands Engineering, Inc. State: NC Sampling Point: Wetland Q - DP27
 Investigator(s): Ian Eckardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.400823 Long: 81.591846 Datum: _____
 Soil Map Unit Name: Toccoa loam (ToA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Along Lower Big Harris Creek. Linear side depression within active Big Harris Creek top of banks but separated by a vegetated bar.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) <input checked="" type="checkbox"/> Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input checked="" type="checkbox"/> Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0 (at surface)</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Wetland Q - DP27

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
Sapling Stratum (Plot size: <u>15'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
Shrub Stratum (Plot size: <u>15'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Cyperus strigosus</u>	15	Yes	FACW	
2. <u>Juncus effusus</u>	10	Yes	FACW	
3. <u>Ludwigia alternifolia</u>	5	No	FACW	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
				30 = Total Cover
				50% of total cover: 15 20% of total cover: 6
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
				_____ = Total Cover
				50% of total cover: _____ 20% of total cover: _____
Remarks: (Include photo numbers here or on a separate sheet.)				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

SOIL

Sampling Point: Wetland Q - DP27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1		100					gravel	
1-8	10YR 4/1	98	10YR 4/6	2	C	PL	silt loam	
8-9	10YR 4/1	100					silty sand	
9-12	10.5YR 5/3	80	7.5YR 5/6	20	C	PL	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> (MLRA 147, 148)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> (MLRA 136, 147)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	
<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)	
<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)	
<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)	
<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Big Harris Full Delivery Project City/County: Cleveland Sampling Date: 3/24/15
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland Q- DP28
 Investigator(s): Ian Eckhardt/Ruby Davis Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): _____
 Subregion (LRR or MLRA): MLRA 136 Lat: 35.400747 Long: 81.591825 Datum: _____
 Soil Map Unit Name: Toccoa loam (ToA) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Adjacent sandbar between Big Harris Creek and Wet Q.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) ___ Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) <input checked="" type="checkbox"/> Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) ___ Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) ___ Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: Upland Q- DP28

<u>Tree Stratum</u> (Plot size: <u>30'</u> radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____	_____	_____	_____	Prevalence Index worksheet:
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	OBL species _____ x 1 = _____
_____ = Total Cover				FACW species _____ x 2 = _____
50% of total cover: _____ 20% of total cover: _____				FAC species _____ x 3 = _____
<u>Sapling Stratum</u> (Plot size: <u>15'</u> radius)				FACU species _____ x 4 = _____
1. _____	_____	_____	_____	UPL species _____ x 5 = _____
2. _____	_____	_____	_____	Column Totals: _____ (A) _____ (B)
3. _____	_____	_____	_____	Prevalence Index = B/A = _____
4. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	___ 2 - Dominance Test is >50%
_____ = Total Cover				___ 3 - Prevalence Index is $\leq 3.0^1$
50% of total cover: _____ 20% of total cover: _____				___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
<u>Shrub Stratum</u> (Plot size: <u>15'</u> radius)				___ Problematic Hydrophytic Vegetation ¹ (Explain)
1. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. _____	_____	_____	_____	Definitions of Five Vegetation Strata:
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.
5. _____	_____	_____	_____	Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.
6. _____	_____	_____	_____	Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.
_____ = Total Cover				Woody vine – All woody vines, regardless of height.
50% of total cover: _____ 20% of total cover: _____				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
<u>Herb Stratum</u> (Plot size: <u>5'</u> radius)				
1. <u>Verbena hastata</u>	60	Yes	FACW	
2. <u>Stellaria media</u>	5	No	UPL	
3. <u>Veronica persica</u>	1	No	NI	
4. <u>Fragaria virginiana</u>	1	No	FACU	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: <u>33.5</u> 20% of total cover: <u>13.4</u>				
<u>Woody Vine Stratum</u> (Plot size: <u>30'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Upland Q- DP28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Table with 8 columns: Depth (inches), Matrix (Color (moist), %), Redox Features (Color (moist), %, Type¹, Loc²), Texture, Remarks. Row 1: 0-14, 7.5YR 4/4, 100, sand.

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) (LRR N)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)

- ___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (MLRA 147, 148)
___ Thin Dark Surface (S9) (MLRA 147, 148)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
___ Umbric Surface (F13) (MLRA 136, 122)
___ Piedmont Floodplain Soils (F19) (MLRA 148)
___ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ___ 2 cm Muck (A10) (MLRA 147)
___ Coast Prairie Redox (A16) (MLRA 147, 148)
___ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:



Cornwell Creek



Cornwell Creek – UT1



Eaker Creek



Scism Creek



Royster Creek – Reach 1



Royster Creek – Reach 2



Lower Stick Elliott Creek



Scott Creek



Carroll Creek



Upper Big Harris Creek – Reach 1



Upper Big Harris Creek – Reach 2



Upper Big Harris Creek – Reach 3



Upper Big Harris Creek – Reach 4



Upper Big Harris Creek – Reach 5



Upper Big Harris Creek – Reach 6



Upper Big Harris Creek – UT1



Upper Big Harris Creek – UT2



Upper Big Harris Creek – UT3



Upper Big Harris Creek – UT4



Elliott Creek



Elliott Creek – UT1



Bridges Creek – Reach 1



Bridges Creek – Reach 2



Bridges Creek – UT1



Upper Stick Elliott Creek – Reach 2



Upper Stick Elliott Creek – Reach 5



Upper Stick Elliott Creek – Reach 6



Upper Stick Elliott Creek – UT1



Upper Stick Elliott Creek – UT2



Upper Stick Elliott Creek – UT3



Upper Fletcher Creek – Reach 1



Lower Fletcher Creek – Reach 1



Lower Fletcher Creek – Reach 2



Lower Big Harris Creek – Reach 1a



Lower Big Harris Creek – Reach 1b



Lower Big Harris Creek – Reach 2



Lower Big Harris Creek – UT1



Lower Big Harris Creek – UT2



Lower Big Harris Creek – UT3



Lower Big Harris Creek – UT4

Big Harris Creek Mitigation Site Existing Conditions

Area B

	Notation	Units	Bridges Creek		Bridges Creek UT1		Elliott Creek		UT1 to Elliott Creek		Lower Fletcher Creek Reach 1		Lower Fletcher Creek Reach 2		Upper Stick Elliott Creek Reach 1		Upper Stick Elliott Creek Reach 2		Upper Stick Elliott Creek Reach 3		Upper Stick Elliott Creek Reach 4a		Upper Stick Elliott Creek Reach 4b		Upper Stick Elliott Creek Reach 5		Upper Stick Elliott Creek Reach 6		Upper Stick Elliott Creek UT1		Upper Stick Elliott Creek UT2		Upper Stick Elliott Creek UT3		Upper Fletcher Creek Reach 2			
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
stream type			Incised E4		F5b		Incised C5		F4		F4		F4		F4		B4c		E4		Incised E4		Incised E4		B4c		Incised C4 / F4		G4		G4		G4		G4			
drainage area	DA	sq mi	0.07		0.01		0.13		0.02		0.41		0.42		0.05		0.16		0.42		0.52		0.53		0.72		0.76		0.08		0.07		0.10		0.29			
bankfull discharge	Q	cfs	12		3		17		6		35		37		9		21		38		47		47		54		13		12		15		30					
bankfull cross-sectional area	A _{bkf}	SF	3.15		0.61		4.03		1.15		12.4		9.13		1.87		4.15		6.23		11.1		9.39		18.4		18.4		1.5		2.85		3.56		10.3			
average velocity during bankfull event	V _{bkf}	fps	3.8		3.9		4.2		5.2		2.8		4.1		4.8		5.1		6.1		4.2		5.0		2.8		2.9		8.7		4.2		4.2		3.6			
Cross-Section																																						
width at bankfull	W _{bkf}	feet	2.9	5.3	3.4		7.7		5.5		16.4		9.2		4.9		5.5		7.3		9.9		5.7		15.2		15.7		24.7		3.0		4.4		4.2		9.2	
maximum depth at bankfull	d _{max}	feet	0.7	1.2	0.3		0.9		0.4		1.1		1.3		0.6		1.1		1.4		1.7		2.0		1.7		1.5		1.7		0.7		0.9		1.1		1.7	
mean depth at bankfull	d _{mf}	feet	0.4	1.0	0.2		0.5		0.2		0.8		1.0		0.4		0.8		0.9		1.1		1.6		1.2		0.7		1.2		0.5		0.7		0.8		1.1	
bankfull width to depth ratio	W _{bkf} /d _{bkf}		3.0	9.8	18.6		14.9		26.3		21.6		9.2		12.8		7.2		8.4		8.9		3.5		12.6		13.5		34.4		6.7		6.8		5.0		8.3	
low bank height		feet	1.9	2.1	1.8		1.8		6.9		5.7		3.1		12.0		2.3		2.6		4.0		3.6		2.9		2.2		5.7		5.0		3.5		4.3		5.6	
bank height ratio	BHR		1.9	2.3	6.2		1.9		17.3		5.1		2.3		20.7		2.1		1.9		2.3		1.8		1.7		1.4		3.5		7.7		4.0		4.1		3.2	
floodprone area width	W _{fp}	feet	6	17	4		18		6		21		11		6		10		19		20		14		23		19		58		4		7		5		19	
entrenchment ratio	ER		2.2	4.7	1.2		2.3		1.1		1.3		1.2		1.3		1.3		1.9		2.6		2.0		2.4		1.5		1.2		2.3		1.3		1.6		2.0	
Slope																																						
valley slope	S _{valley}	feet/foot	0.0208		0.0812		0.0179		0.0132		0.0125		0.0198		0.0638		0.0181		0.0100		0.0079		0.0171		0.0143		0.0087		0.0854		0.0208		0.0353		0.016			
channel slope	S _{channel}	feet/foot	0.0196		0.07		0.0138		0.0113		0.0113		0.0192		0.0613		0.0159		0.0078		0.0068		0.0168		0.0093		0.0080		0.07		0.0200		0.0289		0.013			
Profile																																						
riffle slope	S _{rifle}	feet/foot	0.0293		-		0.0190		0.0250		0.0204		0.0220		0.0320		0.0308		0.0231		0.0058		0.0058		0.0150		0.0175		-		0.0200		-		0.0270		0.0458	
riffle slope ratio	S _{rifle} /S _{channel}		1.49		-		1.38		2.22		1.80		1.14		0.52		1.93		2.95		0.85		0.85		1.61		2.19		-		1.00		-		2.08		3.52	
pool slope	S _{pool}	feet/foot	0.0000	0.0001	-	-	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	-	-	0	0.0001	-	-	0.000	0.0069
pool slope ratio	S _{pool} /S _{channel}		0.0000	0.0051	-	-	0.0000	0.0073	0.0000	0.0089	0.0000	0.0088	0.0000	0.0052	0.0000	0.0016	0.0000	0.0063	0.0000	0.0128	0.0000	0.0147	0.0000	0.0060	0.0000	0.0107	0.0000	0.0125	-	-	0	0.005	-	-	0.00	0.53		
pool-to-pool spacing	L _{pp}	feet	22.1	51.2	3.8	4.1	15.0	100.0	22.5	27.9	65.0	80.0	6.0	80.0	14.1	68.1	15.0	110.0	25.0	95.0	25.0	80.0	25.0	80.0	15.0	90.0	15.0	90.0	3.5	3.5	29.5	49.3	21.5	21.5	77	259		
pool spacing ratio	L _{pp} /W _{bkf}		5.4	7.9	1.1	1.2	1.9	12.9	4.1	5.1	4.0	4.9	0.7	8.7	2.9	14.0	2.7	20.1	3.4	13.1	2.5	8.0	4.4	14.0	1.0	5.9	1.0	3.6	1.2	1.2	6.7	11.2	5.1	5.1	8.37	28.15		
pool cross-sectional area	A _{pool}	SF	3.5	4.5	1.0		5.0		1.5		13.6		12.5		4.0		6.0		8.0		13.6		12.9		23.0		24.0		2.0		3.0		4.5		11.2			
pool area ratio	A _{pool} /A _{bkf}		1.1	1.4	1.6		1.2		1.3		1.1		1.4		2.1		1.4		1.3		1.2		1.4		1.3		1.3		1.3		1.1		1.3		1.09			
maximum pool depth	d _{pool}	feet	1.2	1.5	0.5	0.5	1.0	1.4	0.5	0.5	1.1	1.4	1.3	1.7	1.3	2.0	1.4	1.7	1.4	2.1	1.9	2.4	1.9	2.4	1.7	2.1	1.7	2.1	0.8	1.0	1.0	1.2	1.3	1.4	2.2			
pool depth ratio	d _{pool} /d _{bkf}		1.3	1.6	1.7	1.7	1.9	2.6	1.3	1.3	1.4	1.8	1.3	1.7	2.2	3.4	1.8	2.2	1.6	2.5	1.7	2.1	1.2	2.1	1.4	1.4	1.7	2.4	1.8	1.2	1.5	1.1	1.4	1.2	1.3	2.0		
pool width at bankfull	W _{pool}	feet	4.0	5.0	4.0		8.0		6.0		17.4		11.4		7.0		6.5		9.0		10.0		7.0		16.0		19.0		4.0		5.0		4.0		8.3			
pool width ratio	W _{pool} /W _{bkf}		1.0	1.2	1.2		1.0		1.1		1.1		1.2		1.4		1.2		1.2		1.0		1.2		1.1		1.2		1.3		1.1		0.9		0.90			
Pattern																																						
sinuosity	K		1.06		1.16		1.30		1.17		1.10		1.03		1.04		1.14		1.28		1.16		1.02		1.53		1.09		1.22		1.04		1.22		1.23			
belt width	W _{belt}	feet	11.1	26.0	8.5	13.0	2.6	39.8	3.6	19.7	20.9	43.2	38.7	43.2	3.6	37.2	8.5	58.4	15.5	67.6	13.5	41.9	11.1	15.0	20.8	96.6	19.5	48.9	17.0	17.0	6.7	38.4	17.0	17.0	48	143		
meander width ratio	W _{belt} /W _{bkf}		3.8	8.9	2.5	3.9	0.3	5.1	0.7	3.6	1.3	2.6	4.2	4.7	0.7	7.7	1.6	10.7	2.1	9.3	1.4	4.2	1.9	2.6	1.4	6.4	0.8	2.0	5.7	5.7	1.5	8.7	4.0	4.0	5.2	15.5		
meander length	L _m	feet	44.3	102.4	7.5	8.2	53.6	165.9	44.9	55.8	248.6	339.0	318.4	336.1	28.2	136.1	65.3	207.2	68.8	288.1	64.9	185.6	155.4	235.6	72.2	134.2	142.3	304.4	7.0	7.0	59.0	98.7	43.0	43.0	200	295		
meander length ratio	L _m /W _{bkf}		15.1	34.9	2.2	2.4	6.9	21.5	8.1	10.1	15.2	20.7	34.7	36.6	5.8	28.0	11.9	37.9	9.5	39.7	6.5	18.7	27.2	41.3	4.7	8.8	5.8	12.3	2.3	2.3	13.4	22.5	10.2	10.2	21.7	32.1		
radius of curvature	R _c	feet	5.9	25.4	2.3	3.6	6.9	73.8	4.7	23.3	53.0	97.6	100.0	129.9	2.4	22.5	6.6	88.0	9.6	108.8	6.9	31.3	41.7	53.0	11.4	75.8	14.9	68.9	5.0	10.0	12.3	26.2	21.0	33.0	10	90		
radius of curvature ratio	R _c /W _{bkf}		2.0	8.7	0.7	1.1	0.9	9.5	0.9	4.2	3.2	5.9	10.9	14.2	0.5	4.6	1.2	16.1	1.3	15.0	0.7	3.1	7.3	9.3	0.7	5.0	0.6	2.8	1.7	3.3	2.8	6.0	5.0	7.8	1.1	9.8		

Big Harris Creek Mitigation Site Existing Conditions			Area C			
	Notation	Units	Lower Big Harris Creek R1a/R1b		Lower Big Harris Creek R2	
			Min	Max	Min	Max
stream type			E4/G4c		E4/G4c	
drainage area	DA	sq mi	3.19	3.36	3.5	3.88
bankfull discharge	Q	cfs	176		194	
bankfull cross-sectional area	A_{bkf}	SF	60.5		60.5	
average velocity during bankfull event	V_{bkf}	fps	2.9		3.2	
Cross-Section						
width at bankfull	w_{bkf}	feet	25.2		25.2	
maximum depth at bankfull	d_{max}	feet	3.6		3.6	
mean depth at bankfull	d_{bkf}	feet	2.4		2.4	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		10.5		10.5	
low bank height		feet	7.1		7.1	
bank height ratio	BHR		2.0		2.0	
floodprone area width	w_{fpa}	feet	120		120	
entrenchment ratio	ER		4.8		4.8	
Slope						
valley slope	S_{valley}	feet/ foot	0.0053		0.0053	
channel slope	$S_{channel}$	feet/ foot	0.005		0.005	
Profile						
riffle slope	S_{riffle}	feet/ foot	0.0133	0.0512	0.0063	0.0177
riffle slope ratio	$S_{riffle}/$		2.7	10.2	1.3	3.5
pool slope	S_{pool}	feet/ foot	0.0029	0.0073	0.0022	0.0054
pool slope ratio	$S_{pool}/S_{channel}$		0.6	1.5	0.4	1.1
pool-to-pool spacing	L_{p-p}	feet	200	250	410	480
pool spacing ratio	L_{p-p}/w_{bkf}		7.9	9.9	16.3	19.0
pool cross-sectional area	A_{pool}	SF	39.0		35.7	
pool area ratio	A_{pool}/A_{bkf}		0.6		0.6	
maximum pool depth	d_{pool}	feet	4.1		3.2	
pool depth ratio	d_{pool}/d_{bkf}		1.7		1.3	
pool width at bankfull	w_{pool}	feet	23.4		20.2	
pool width ratio	w_{pool}/w_{bkf}		0.9		0.8	
Pattern						
belt width	w_{bit}	feet	75	120	85	125
meander width ratio	w_{bit}/w_{bkf}		3.0	4.8	3.4	5.0
meander length	L_m	feet	350	450	250	300
meander length ratio	L_m/w_{bkf}		13.9	17.9	9.9	11.9
radius of curvature	R_c	feet	70	165	120	190
radius of curvature ratio	R_c/w_{bkf}		2.8	6.5	4.8	7.5

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Appendices](#)