MITIGATION PLAN

Buffalo Flats Restoration Site
Cabarrus County, North Carolina
EEP Contract 003273

Yadkin-Pee Dee River Basin
Cataloging Unit 03040105

Prepared for:

NC Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

December 2010

Page 22 revised August 11, 2011
based on Agency Comments

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Prepared by:

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December 2010

EXECUTIVE SUMMARY

This mitigation plan has been written in conformance with the requirements of the following:

- *Federal rule for compensatory mitigation project sites as described in the Federal Register Title 33 Navigation and Navigable Waters Volume 3 Chapter 2 Section § 332.8 paragraphs (c)(2) through (c)(14).*
- *NCDENR Ecosystem Enhancement Program In-Lieu Fee Instrument signed and dated July 28, 2010*

These documents govern NCEEP operations and procedures for the delivery of compensatory mitigation.

The Buffalo Flats Restoration Site (BFRS) is a full-delivery mitigation project being developed for the North Carolina Ecosystem Enhancement Program (EEP). The site offers the opportunity to restore a heavily impacted wetland system in order to buffer Dutch Buffalo Creek from water quality degradation and to expand aquatic and terrestrial habitat in the Rocky River Watershed (03040105). The project is located in the Upper Dutch Buffalo Creek Drainage (03040105020050), which the EEP has identified as a Targeted Local Watershed.

The project goals address stressors identified in the TLW and include the following:

- Create diverse bottomland hardwood and low elevation seep communities that are integrated into the Dutch Buffalo Creek Corridor.
- Buffer nutrient and sediment impacts to Dutch Buffalo Creek from adjacent grazing practices.

The project goals will be addressed through the following objectives:

- Fill field ditches and ponds to slow the removal of hydrology from the site.
- Redevelop wetland microtopography to capture surface hydrology and slow subsurface drainage.
- Plant the mitigation area with species native to bottomland riparian forest and lowland elevation seep.
- Install livestock exclusion fencing.

The site is currently used for pasture. Past anthropogenic modifications have involved installing lateral field ditches to drain hillside seepage and surface overflow from the site. Existing seeps have also been developed into ponds, which in turn drain to Dutch Buffalo Creek. Three separate wetland areas are proposed to provide riparian wetland restoration and creation and nonriparian wetland restoration. The ditches and ponds across the site will be filled and redeveloped to retain and distribute surface flow across the site. Once site grading is complete, the riparian communities will be planted as Bottomland Hardwood Forest and the non-riparian wetland will be planted as a Low Elevation Seep (Schafale and Weakley 1990). The site will be monitored for five years or until the success criteria are met.

Buffalo Flats Restoration Site, Cabarrus County									
Mitigation Credits									
	Stream		**Riparian Wetland**		**Non-riparian Wetland**		**Buffer**	**Nitrogen Nutrient Offset**	**Phosphorous Nutrient Offset**
Type	R	RE	R	RE	R	RE			
Acres	-	-	11.2	1.2	3.4	-			
Credits	-	-	11.2	0.4	3.4	-	-	-	-
TOTAL CREDITS			11.6		3.4				

R= Restoration RE= Restoration Equivalent of Creation or Enhancement

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1.0 RESTORATION PROJECT GOALS AND OBJECTIVES

EEP develops River Basin Restoration Priorities (RBRPs) to guide its restoration activities within each of the state's 54 cataloging units. RBRPs delineate 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 EEP planning and restoration project funds.

The 2009 Lower Yadkin Pee-Dee RBRP identified HUC 03040105020050 (Upper Dutch Buffalo Creek) as a Targeted Local Watershed (NCDENR, EEP 2009). Forests and wetlands are the predominant land use in the watershed at 53.46%.

The 2009 Lower Yadkin Pee-Dee RBRP identified animal operations and population growth as the major stressors within this TLW. The Buffalo Flats Restoration Site was identified as a wetland opportunity to buffer a high-quality stream and expand habitat within the TLW.

The project goals address stressors identified in the TLW and include the following:

- Create diverse bottomland hardwood and low elevation seep communities that are integrated into the Dutch Buffalo Creek Corridor.
- Buffer nutrient and sediment impacts to Dutch Buffalo Creek from adjacent grazing practices.

The project goals will be addressed through the following objectives:

- Fill field ditches and ponds to slow the removal of hydrology from the site.
- Redevelop wetland microtopography to capture surface hydrology and slow subsurface drainage.
- Plant the mitigation area with species native to bottomland riparian forest and lowland elevation seep.
- Install livestock exclusion fencing.

2.0 SITE SELECTION

2.1 Directions

The BFRS is located on a single parcel located off of Gold Hill Road approximately six miles northeast of Concord, North Carolina. To reach the site from Raleigh: proceed west on I-40 for approximately 80 miles. Then travel on I-85 south toward High Point. Take Exit 64 toward Kannapolis. Turn left at Lane Street and then another left onto Old Salisbury-Concord Road. Next take a slight right onto Irish Potato Road. Travel for 5 miles and then turn left onto Gold Hill Road. The site will be approximately 1.3 miles ahead on the left (shortly after crossing the bridge over Dutch Buffalo Creek).

2.2 Site Selection

The site is part of the 03040105 Watershed Cataloging Unit (Rocky River). The Rocky River Watershed as a whole is experiencing a large amount of habitat alteration due to population growth from Charlotte and its surrounding metropolitan area. As a result, the focus in this watershed is on mitigating impacts from stormwater and protecting existing habitat (NCDENR, EEP 2009).

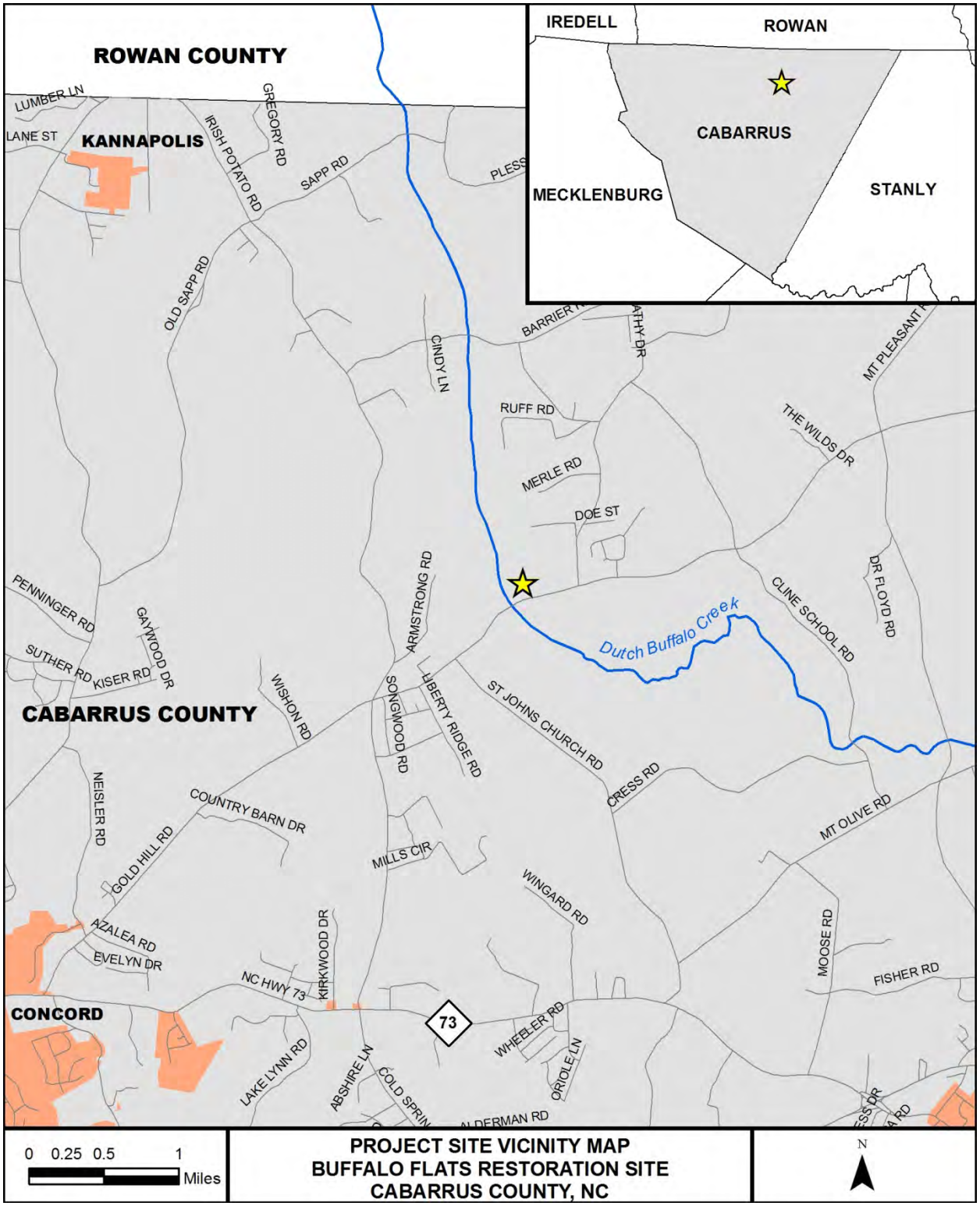
Within the Rocky River Watershed, the Upper Dutch Buffalo Creek drainage (03040105020050) remains relatively unaffected by urban development. The drainage is expected to gain an estimated 1,400 new residents over the period from 2000 to 2015 (NCDENR, EEP 2009). The drainage also contains several Natural Heritage Elements of Occurrences. The project site was selected due to its location along a section of Dutch Buffalo Creek (DWQ 13-17-11-(1)) that is classified as Class C, Water Supply II (WS-II) and High Quality Waters (HQW) (NCDENR, DWQ 2010a). According to the most recent listing under Section 303(d) of the Clean Water Act, no reach of Dutch Buffalo Creek is listed as an impaired water body (NCDENR, DWQ 2010b). The current land use of pasture and evidence of hydrologic modification in this important geographic setting indicated that the site had a high potential for wetland mitigation.

Once the site was located, historic aerials from Cabarrus County were examined for land use trends over the recent history of the site. The reviewed aerials are found in Section 2.7 and include images from 1938, 1956, 1964, 1975, 1987, 1995, 2001, and 2005. This photographic chronology shows that the area surrounding the project site has been used for agriculture for many years. As early as 1938, drainage ditches are evident across the project site. The 1938 aerial shows the unnamed tributary to Dutch Buffalo Creek that runs through the site is already a straightened channel. Drainage ditches that run east to west were already in place at that time as well. The pond located in the southwest corner was likely already constructed in 1956. A farm pond to the east of the project property was constructed by the current landowner and is seen by 1995. These land use trends indicated that restoring this property back to a wetland corridor along Dutch Buffalo Creek would provide an important buffer to grazing and agricultural practices further up in the watershed.

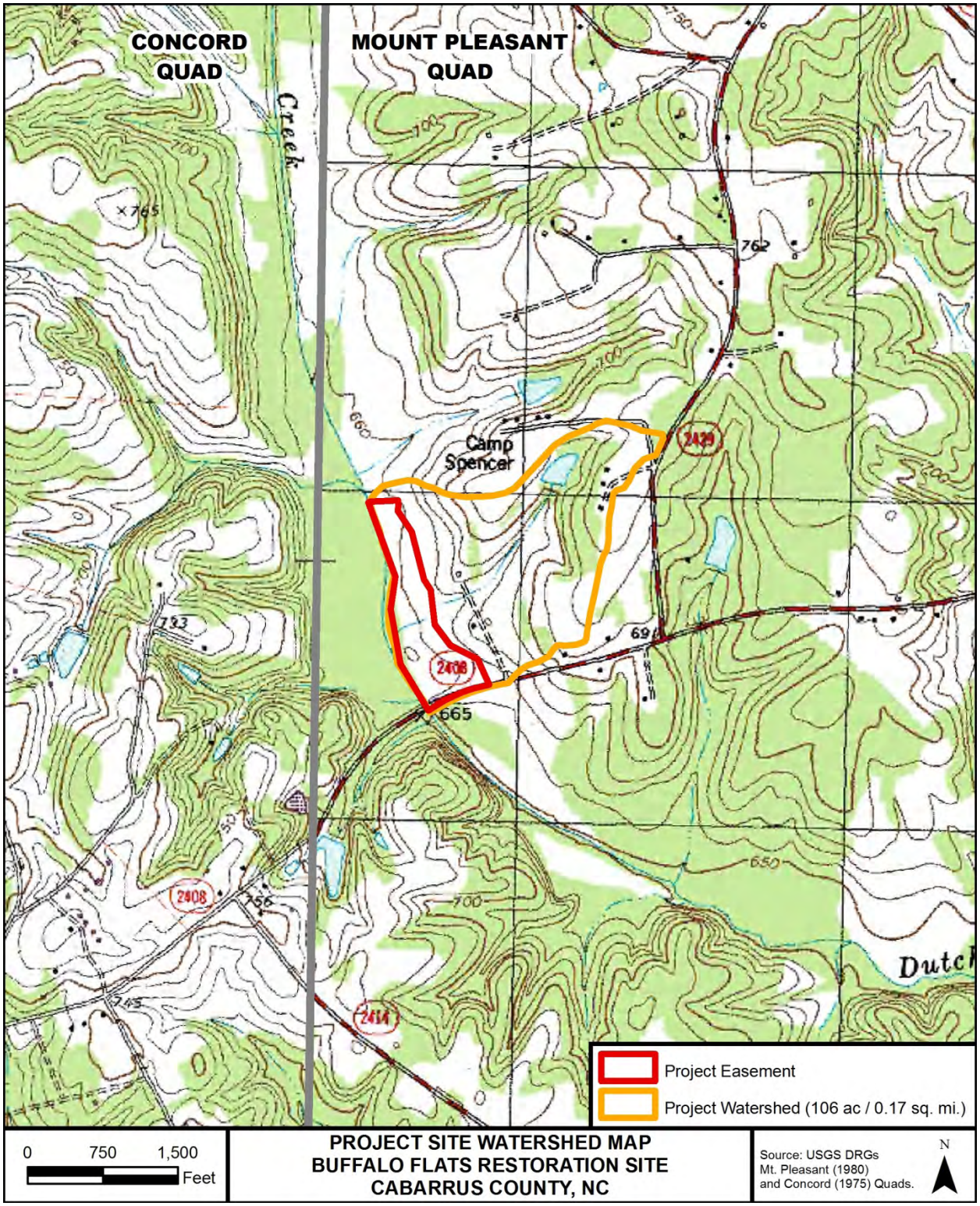
The soils at the site were also examined for their wetland potential. The Soil Survey of Cabarrus County has the BFRS mapped as having Chewacla soils, but a detailed investigation determined that the soils at the site are primarily Wehadkee and Armenia, which are classified as hydric soils (see Appendix C for a detailed description).

Based on these watershed and site-specific attributes, the BFRS was selected as an ideal candidate for wetland mitigation that has the potential to provide an important buffer to approximately 2,200 linear feet of Dutch Buffalo Creek. The restored site will also expand forested wetland habitat in an area that has been actively used for agriculture since at least 1938.

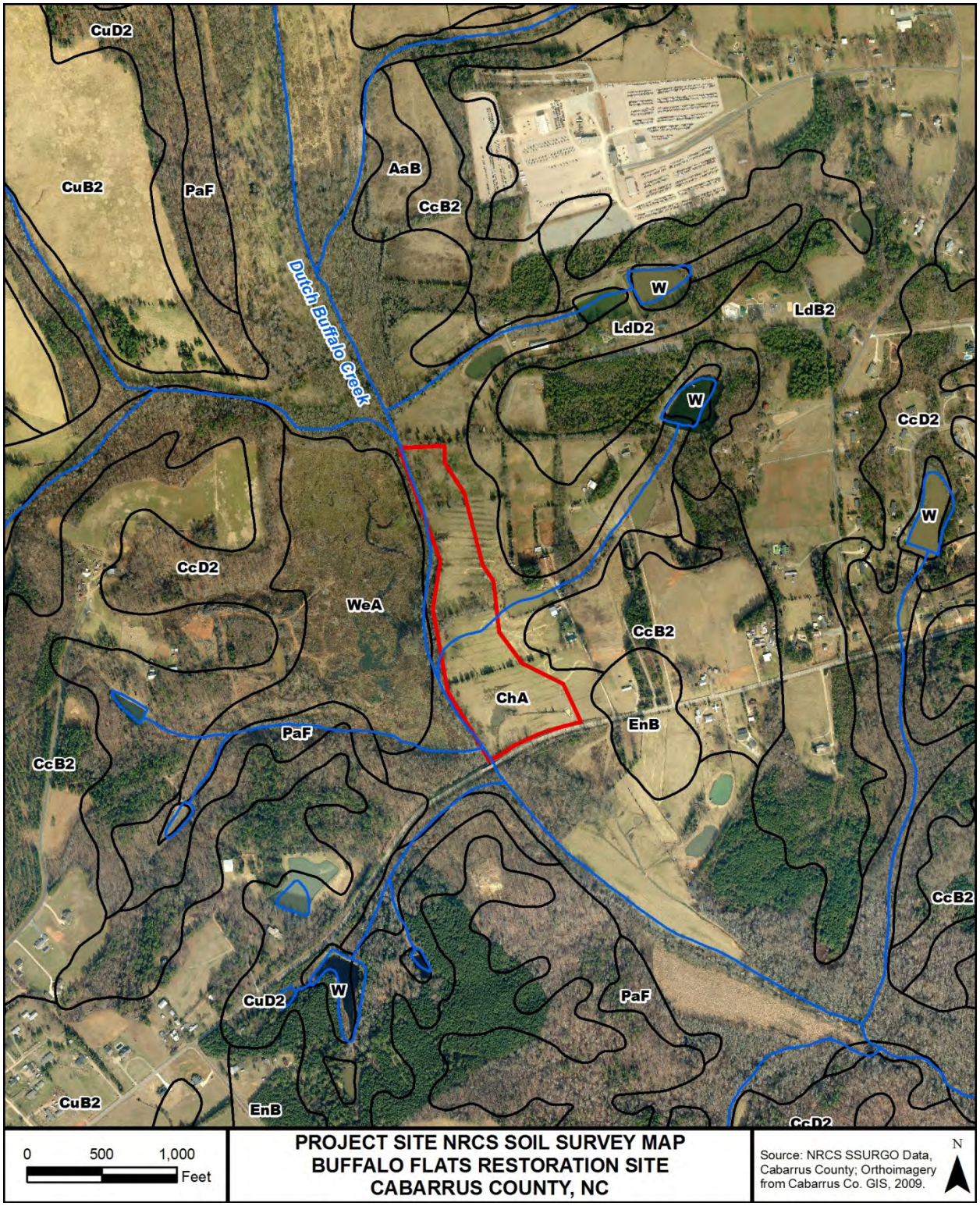
2.3 Vicinity Map



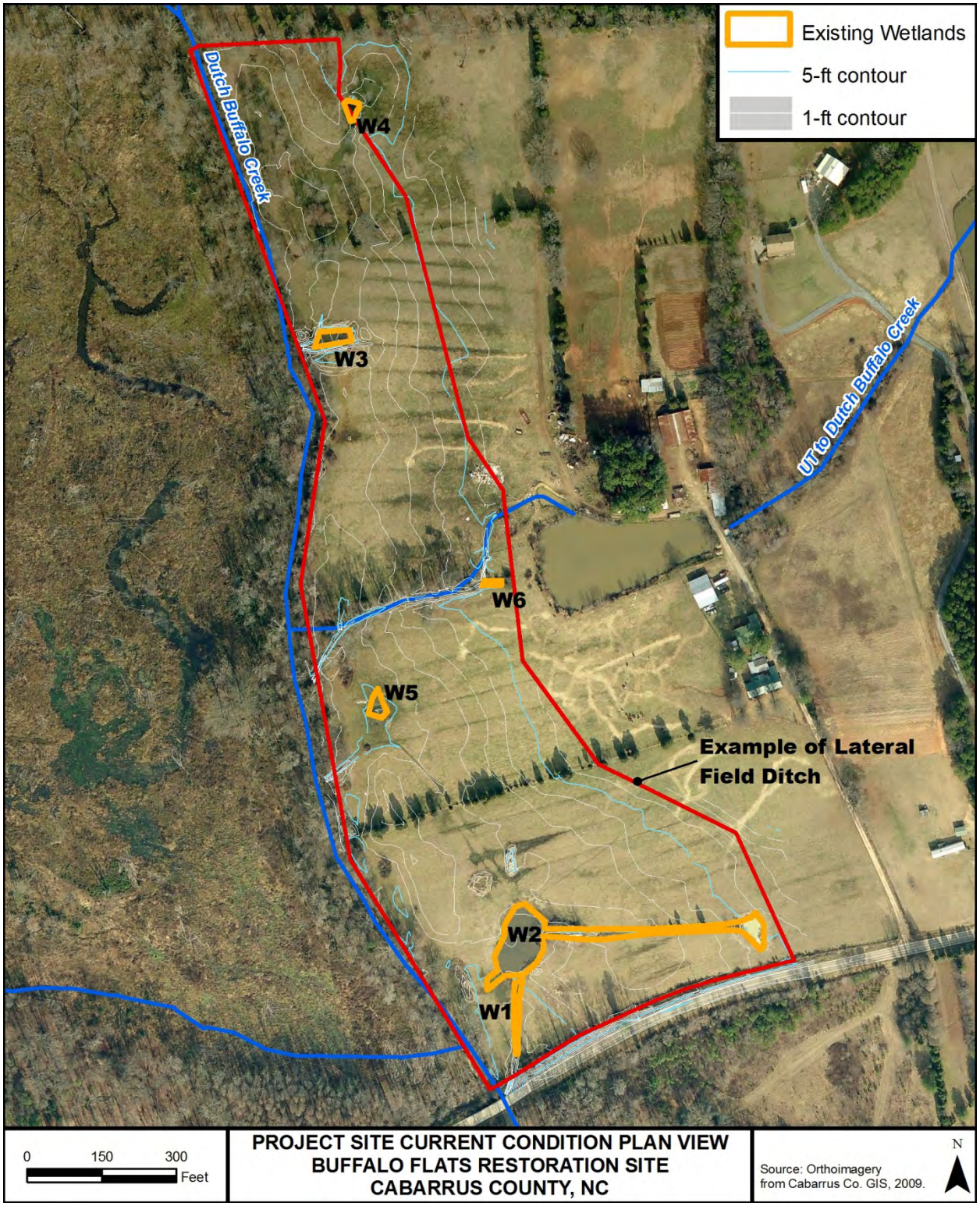
2.4 Watershed Map



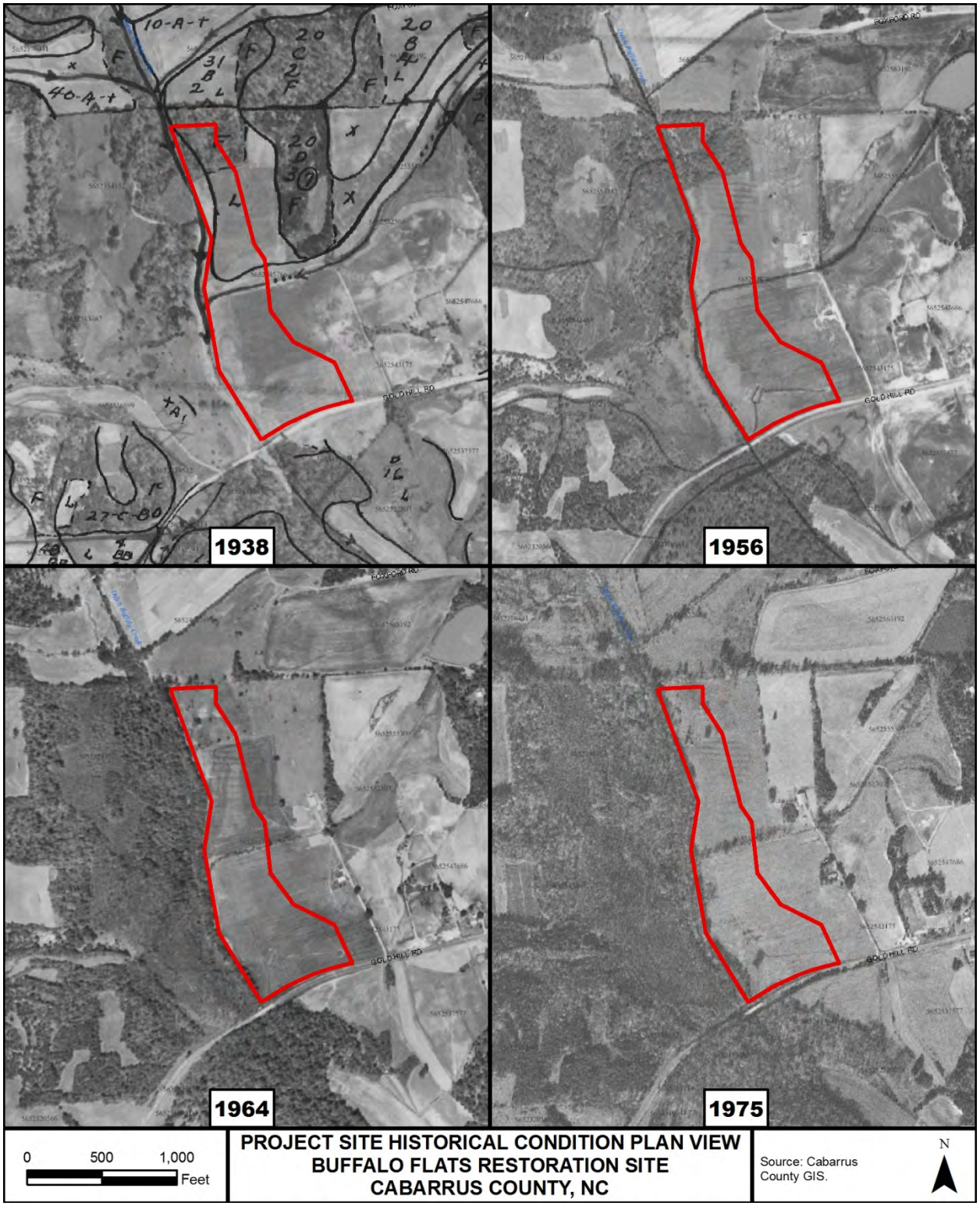
2.5 Soil Survey

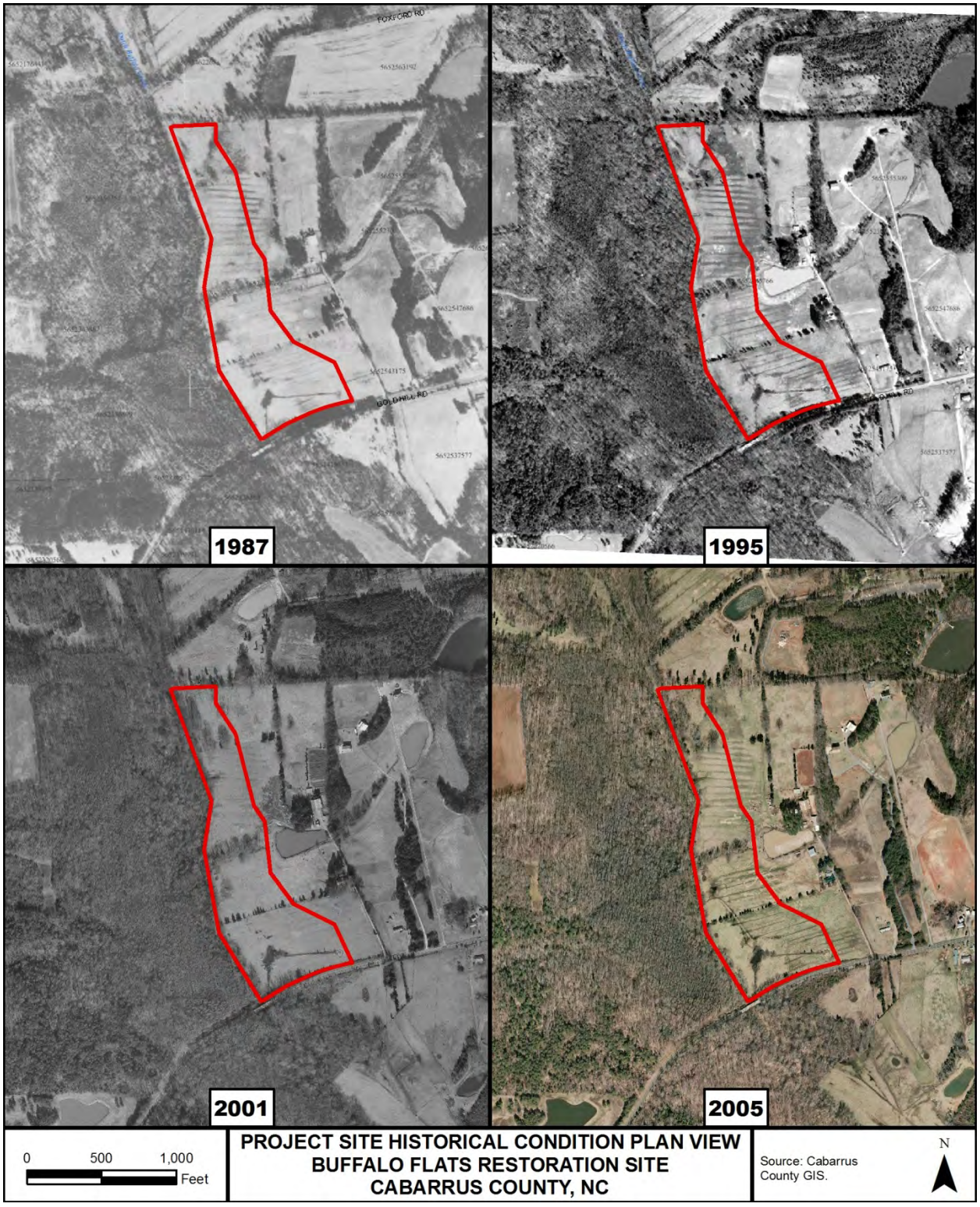


2.6 Current Condition Plan View



2.7 Historical Condition Plan View




1987
1995
2001
2005
0 500 1,000 Feet
PROJECT SITE HISTORICAL CONDITION PLAN VIEW
BUFFALO FLATS RESTORATION SITE
CABARRUS COUNTY, NC
Source: Cabarrus County GIS.
N

2.8 Site Photographs

Looking south from top of the site; Dutch Buffalo Creek is to the right and riparian wetland restoration to the left. 11/5/2010

Looking north toward the top of the site at a riparian wetland restoration area. 11/5/2010

Looking east along an existing upper fenceline toward the riparian wetland restoration area. 11/5/2010

A view toward the south from the upper fenceline that shows a riparian wetland restoration area. 11/5/2010

Existing pond in the northwestern section of the site that is draining to Dutch Buffalo Creek in the background. 11/5/2010

Looking east toward the riparian wetland creation area. 11/5/2010

Looking downstream along an unnamed tributary to Dutch Buffalo Creek that runs through the center of the site. 11/5/2010

A view to the southwest across the riparian wetland restoration area in the middle of the site. 11/5/2010

Looking southwest over the lower third of the project (nonriparian and riparian wetland restoration areas). 11/5/2010

Example of field ditches draining hillside seepage from the site (looking toward lower eastern boundary). 3/2/2010

Hillside seep in the southeastern corner of the project that has been formed into a pond to facilitate drainage. 11/5/2010

Looking west along ditch carrying drainage from upper pond (hillside seep) to lower pond. 11/5/2010

	
View toward the south of the lower pond in the southwestern corner of the project. 11/5/2010	Spoil remaining from the pond construction. 3/2/2010
	
Looking upstream (northeast) at ditch draining lower pond into Dutch Buffalo Creek. 3/2/2010	The southwestern corner of the site; the bridge taking Gold Hill Road over Dutch Buffalo Creek is in the background. 11/5/2010
	
View toward the east along the southern project boundary. 11/5/2010	Looking west along southern project boundary. 11/5/2010

3.0 SITE PROTECTION INSTRUMENT

3.1 Site Protection Instrument Summary Information

The project site will be placed in a conservation easement held by the State of North Carolina and will consist of 20.20 acres.

	Landowners	PIN	County	Site Protection Instrument	Deed Book and Page Number	Acreage protected
Parcel A	James and Janet Jordan	5652-4457-660000	Cabarrus	Conservation Easement	DB 436 PG 659	20.20 acres

3.2 Site Protection Instrument Figure

The conservation easement documents were finalized in December 2010. See Appendix A for the Site Protection Instrument and Figure.

4.0 BASELINE INFORMATION

Project Information			
Project Name	Buffalo Flats Restoration Site		
County	Cabarrus County		
Project Area (acres)	20.20 acres		
Project Coordinates (lat. and long.)	35.456988 N , -80.496325 W		
Project Watershed Summary Information			
Physiographic Province	Piedmont		
River Basin	Yadkin-Pee Dee		
USGS Hydrologic Unit 8-digit	03040105	**USGS Hydrologic Unit 14-digit**	03040105020050
DWQ Sub-basin	03-07-12		
Project Drainage Area (acres)	106 acres		
Project Drainage Area Percentage of Impervious Area	1%		
CGIA Land Use Classification	3.6% Cultivated, 54.1% Managed Herbaceous Cover, 32.5% Mixed Upland Hardwoods, 5.2% Southern Yellow Pine, and 4.6% Water Bodies		
Wetland Summary Information			
Parameters	**Wetland Area 1**	**Wetland Area 2**	**Wetland Area 3**
Size of Wetland (acres)	3.4 acres	11.2 acres	1.2 acres
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	Non-riparian	Riparian non-riverine	Riparian non-riverine
Mapped Soil Series	Chewacla (Wehadkee and Armenia by detailed soil investigation)	Chewacla (Wehadkee and Armenia by detailed soil investigation)	Chewacla
Drainage class	Poorly drained	Poorly drained	Somewhat poorly drained
Soil Hydric Status	Drained Hydric	Drained Hydric	Non hydric
Source of Hydrology	Hillside seepage	Surface/Overbank Flow	Surface/Overbank Flow
Hydrologic Impairment	Ditching and Pasture	Ditching and Pasture	Ditching and Pasture
Native vegetation community	Pasture	Pasture	Pasture
Percent composition of exotic invasive vegetation	0%	0%	2%
Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Applying for NWP 27	Jurisdictional Determination
Waters of the United States – Section 401	Yes	Applying for NWP 27	Jurisdictional Determination
Endangered Species Act*	No	N/A	N/A
Historic Preservation Act*	No	N/A	N/A
Coastal Zone Management Act * (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	Yes	Coordinating No-Rise Certification with county	FEMA Model
Essential Fisheries Habitat*	No	N/A	N/A

* Items addressed in the Categorical Exclusion in Appendix B.

4.1 Watershed Summary Information

The site is part of the 03040105 Watershed Cataloging Unit (Rocky River). The Rocky River Watershed as a whole is experiencing extensive habitat alteration due to population growth from Charlotte and its surrounding metropolitan area. Currently, only 16% of the watershed is developed, but the area is expected to continue to grow. The other predominant land uses are 43% forest and 40% agriculture (NCDENR, EEP 2009).

The project drainage is comprised of 0.17 square mile (106 acres) that flow through the project floodplain before reaching Dutch Buffalo Creek. The total impervious cover of the project drainage is approximated at 1% (CWP 2003). Dutch Buffalo Creek ultimately drains into the Rocky River downstream of the project site. The project area is located in the United States Geological Survey (USGS) Mt. Pleasant Quadrangle (1980).

4.2 Reach Summary Information

Not applicable for this project.

4.3 Wetland Summary Information

Currently, there is 0.55 acre of existing wetland on the BFRS. The wetland data forms are included in Appendix B. Existing wetlands were delineated in August 2010 using the methods outlined by the US Army Corps of Engineers (Environmental Laboratory 1987). All six existing wetland communities on the site show signs of anthropogenic modification. Wetland W1 is a naturalized manmade ditch located on the southern portion of the project site, draining to Dutch Buffalo Creek, and includes 0.03 acre (1,410 sq ft) dominated by herbaceous and shrub-scrub vegetation. Wetland W2 is formed by two springs that have been enlarged by excavation into ponds and are connected by an excavated linear ditch 18" deep and 12-18' wide. The 0.42 acre (18,380 sq ft) wetland is dominated by herbaceous and shrub-scrub vegetation in the shallow areas. The two springs (approximately 0.046 acres and 0.277 acre, respectively) currently exist as open water. W2 drains into W1. Wetland W3 is a constructed cattle watering hole located in the northwestern corner of the project site and includes 0.04 acre (1,755 sq ft). The wetland has sporadic herbaceous vegetation but it has not naturalized due to the number of cows using the watering hole. Wetland W4 is similar to W3, but it is located in the extreme northeastern corner of the project site. W4 consists of 0.02 acre (780 sq ft) and is dominated by herbaceous vegetation around the perimeter of the watering hole. Wetland W5 is a naturalized cattle watering hole located in the southwestern portion of the site below the unnamed tributary to Dutch Buffalo Creek. W5 consists of 0.03 acre (1,160 sq ft) dominated by herbaceous vegetation around its perimeter. Wetland W6 is a shallow manmade ditch located adjacent to the unnamed tributary in the central portion of the site and includes 0.007 acre (315 Sq ft) dominated by herbaceous and shrub-scrub vegetation. These wetlands are shown on the Current Condition Plan View (Section 2.6).

The project site has experienced significant hydrologic and vegetative modifications to allow for cattle grazing across the property. The historic aerials indicate that the existing streams were channelized and the site has been ditched since at least 1938. Currently, the site is still being used for cattle grazing. The landowner has installed a series of drainage ditches and ponds to optimize livestock grazing, which has created a system with drained hydric soils without hydrophytic vegetation.

4.4 Regulatory Considerations

A jurisdictional determination was approved by the US Army Corps of Engineers on October 1, 2010 (see Appendix B). Following the completion of the mitigation plan, a pre-construction notification (PCN) will be completed to apply for a Nationwide 27 Permit (NWP) to comply with Sections 401 and 404 of the Clean Water Act with the Wilmington District of the US Army Corps of Engineers and the NCDENR Division of Water Quality.

The BFRS is also located within the 100-year floodplain (Zone AE). It is the intent of the restoration design to maintain the existing 100-year flood elevations. KCI has acquired the existing HEC-RAS model from FEMA as shown on DFIRM Panel 5652 for Cabarrus County. KCI has developed a conditional floodplain model by updating the published hydraulic data with the detailed topographic survey used to prepare the construction drawings. The proposed model represents the conditions following changes to the channel and floodplain as a result of the restoration. Following completion of the final design, the proposed model will be updated and submitted to Cabarrus County for approval. Preliminary indications are that the proposed project will not produce hydrologic trespass conditions outside of the conservation easement (see EEP Floodplain Requirements Checklist in Appendix B).

5.0 DETERMINATION OF CREDITS

Buffalo Flats Restoration Site, Cabarrus County									
Mitigation Credits									
	Stream		**Riparian Wetland**		**Non-riparian Wetland**		**Buffer**	**Nitrogen Nutrient Offset**	**Phosphorous Nutrient Offset**
Type	R	RE	R	RE	R	RE			
Acres	-	-	11.2	1.2	3.4	-			
Credits	-	-	11.2	0.4	3.4	-	-	-	-
TOTAL CREDITS			11.6		3.4				

Project Components						
Project Component -or- Reach ID	**Stationing/ Location**	**Existing Footage/ Acreage**	**Approach (PI, PII etc.)**	**Restoration -or- Restoration Equivalent**	**Restoration Footage or Acreage**	**Mitigation Ratio**
Wetland Area 1	Southeastern corner of project	3.4 acres	-	Restoration	3.4 acres	1:1
Wetland Area 2	North to south throughout the center of project	11.2 acres	-	Restoration	11.2 acres	1:1
Wetland Area 3	West-central portion of the project	1.2 acres	-	Creation	1.2 acres	3:1

Component Summation						
Restoration Level	**Stream (linear feet)**	**Riparian Wetland (acres)**		**Non-riparian Wetland (acres)**	**Buffer (square feet)**	**Upland (acres)**
		Riverine	Non-Riverine			
Restoration	-	-	11.2 acres	3.4 acres	-	-
Enhancement		-	-		-	-
Enhancement I	-					
Enhancement II	-					
Creation		-	1.2 acres	-		-
Preservation	-	-	-	-		4.4 acres
High Quality Preservation	-	-	-	-		-
TOTAL			12.4 acres	3.4 acres		4.4 acres

R= Restoration RE= Restoration Equivalent of Creation or Enhancement

6.0 MITIGATION WORK PLAN

6.1 Target Wetland Types and Plant Communities

Plantings shall consist of native species commonly found in the Piedmont Bottomland Forest Community and Low Elevation Seep Community as described by Schafale and Weakley (1990). Trees and shrubs will be planted at a density of 436 trees per acre (10 feet by 10 feet spacing). Plant placement and groupings will be randomized during installation in order to develop a more naturalized appearance. Woody vegetation planting will be conducted during dormancy. Tree species to be planted within the wetland site will consist of the following species:

Piedmont Bottomland Hardwood Forest

Common Name	**Scientific Name**	**Indicator Status (Region 2)**
Sugarberry	*Celtis laevigata*	FACW
Buttonbush	*Cephalanthus occidentalis*	OBL
Green ash*	*Fraxinus pennsylvanica*	FACW
Tulip poplar*	*Liriodendron tulipifera*	FAC
Water tupelo	*Nyssa aquatica*	OBL
Overcup oak	*Quercus lyrata*	OBL
Swamp chestnut oak	*Quercus michauxii*	FACW-
Cherrybark oak	*Quercus pagoda*	FAC+
Willow oak*	*Quercus phellos*	FACW-
American Elm*	*Ulmus americana*	FACW

Low Elevation Seep

Common Name	**Scientific Name**	**Indicator Status (Region 2)**
Tulip poplar*	*Liriodendron tulipifera*	FAC
Laurel oak	*Quercus laurifolia*	FACW
Swamp chestnut oak	*Quercus michauxii*	FACW-
Cherrybark oak	*Quercus pagoda*	FAC+
Willow oak*	*Quercus phellos*	FACW-
American sycamore*	*Platanus occidentalis*	FACW-
American Elm*	*Ulmus americana*	FACW

***Trees observed on-site or in adjacent floodplain

6.2 Design Parameters

Modifications at the BFRS will focus on restoring hydrology to the proposed wetland mitigation areas. This will be achieved by undoing the anthropogenic modifications that have been implemented across the site and will result in improved surface storage of hillside seepage for the nonriparian wetland and a lengthened or impeded flowpath of surface water throughout the riparian wetland. Please see the mitigation overview in Section 6.4 and the wetland plans included in Appendix D.

Wetland Area 1 – 3.4 acres of nonriparian wetland restoration

In this area, wetland restoration will be implemented along hydric soils that have developed below hillside seeps as the landscape slopes down to the Dutch Buffalo Creek floodplain. Lateral field ditches (seen in Section 2.6) currently drain seepage entering the site. An existing seep in the southeastern

corner of the site has been developed into a pond, which has a ditch extending out to drain directly to Dutch Buffalo Creek (the upper portion of Existing Wetland W1). In order to restore hydrology, the field ditches draining the site will be filled. Minor variations in ground elevations will be maintained in order to increase surface retention of hillside seepage. The existing pond in the southeastern corner will be filled with the adjacent spoil and the seep redeveloped into a hydrologic source for the upper slopes. Following the completion of site grading, the nonriparian wetland will be planted as a Low Elevation Seep Community as described in Section 6.1

Wetland Area 2 – 11.2 acres of riparian wetland restoration

This section of wetland restoration comprises the largest component of mitigation on the BFRS. Wetland Area 2 is located on the floodplain of Dutch Buffalo Creek and the restored wetland community will merge into the narrow riparian buffer along a levee at the creek. Overbank flooding from Dutch Buffalo Creek will provide occasional hydrologic inputs to the wetland, but the predominant source of hydrology will come from surface inputs that are currently being routed off the site. The field ditches that begin in the slopes coming down to the Dutch Buffalo Creek floodplain continue through the pastures that make up Wetland Area 2. Existing Wetlands W1, W2, W3, W4, and W5 all consist of anthropogenic features that are reducing the hydroperiod in proposed Wetland Area 2. In the northern section of Wetland Area 2, W4 is a ponded area that is preventing surface water from moving to the southwest. The ponded area will be filled in and developed to elongate the flowpath of surface hydrology throughout this upper section. At W3, a large pond has been cut through an existing levee along Dutch Buffalo Creek. This pond will be filled and its outlet will be graded up to the existing top of bank elevation along Dutch Buffalo Creek. Existing spoil material left from the original pond construction will be used to fill the pond. The spoil areas are generally located in proximity to the pond. Some of the larger spoil areas are readily apparent on the 1-foot topographic maps. Other areas of spoil are located along the levee position of Dutch Buffalo Creek, generally at elevation 657 (see grading plan Sheet 6 of 14). The ditch draining W5 will also be filled and the outlet brought up to the existing top of bank elevation. In the southwestern corner of the site, the lower end of Existing Wetland W1 as well as W2 will be filled using the adjacent spoil piles remaining from the original pond excavation. Ditch plugs will be installed along the linear section of W2 and at the outlets of W1, W3, and W5.

In addition to the major grading of the existing ponds, the lateral field ditches will also be filled. As in Wetland Area 1, minor variations in elevation will be maintained in order to reproduce natural wetland microtopography. Once the grading is completed, Wetland Area 2 will be planted as a Bottomland Hardwood Forest as described in Section 6.1.

Wetland Area 3 – 1.2 acres of wetland creation

In the central portion of the site, a small section of creation will be developed that will tie into Wetland Area 2. A natural high spot in the soils has developed in this location. These soils will be reshaped to develop microtopography that will match the elevations of Wetland Area 2. Spoil adjacent to the unnamed tributary to Dutch Buffalo Creek will also be removed from this area. Wetland Area 3 will also be planted as a Bottomland Hardwood Forest.

Reference Wetland

A suitable reference wetland was found west of the BFRS and on the opposite side of Dutch Buffalo Creek. The site is consistent with the Bottomland Hardwood Community that will be the primary wetland type at the project site. A groundwater monitoring well has also been installed to document the reference wetland hydrology during the course of monitoring.

6.3 Data Analysis

The numerous modifications to the hydrology of the BFRS have effectively drained the historic wetlands on-site. The development of a network of field ditches has significantly altered the retention of surface hydrology in these areas. The pre and post-restoration effects of ditching on wetland hydrology was evaluated using a hydrologic budget for the site (see Appendix C).

Existing Conditions
Existing site hydrology was modeled by developing an annual water budget that calculates hydrologic inputs and outputs in order to calculate the change in storage on a monthly time step. In order to set up the water budget, historic climatic data were obtained from the North Carolina State Climatic Office. The weather station in Concord, North Carolina was used, which is approximately 13 miles to the southwest of BFRS. Monthly precipitation totals from the entire period of record (1934-2009) were reviewed and three years were selected to represent a range of precipitation conditions: dry year (1986), average year (1996), and wet year (1975).

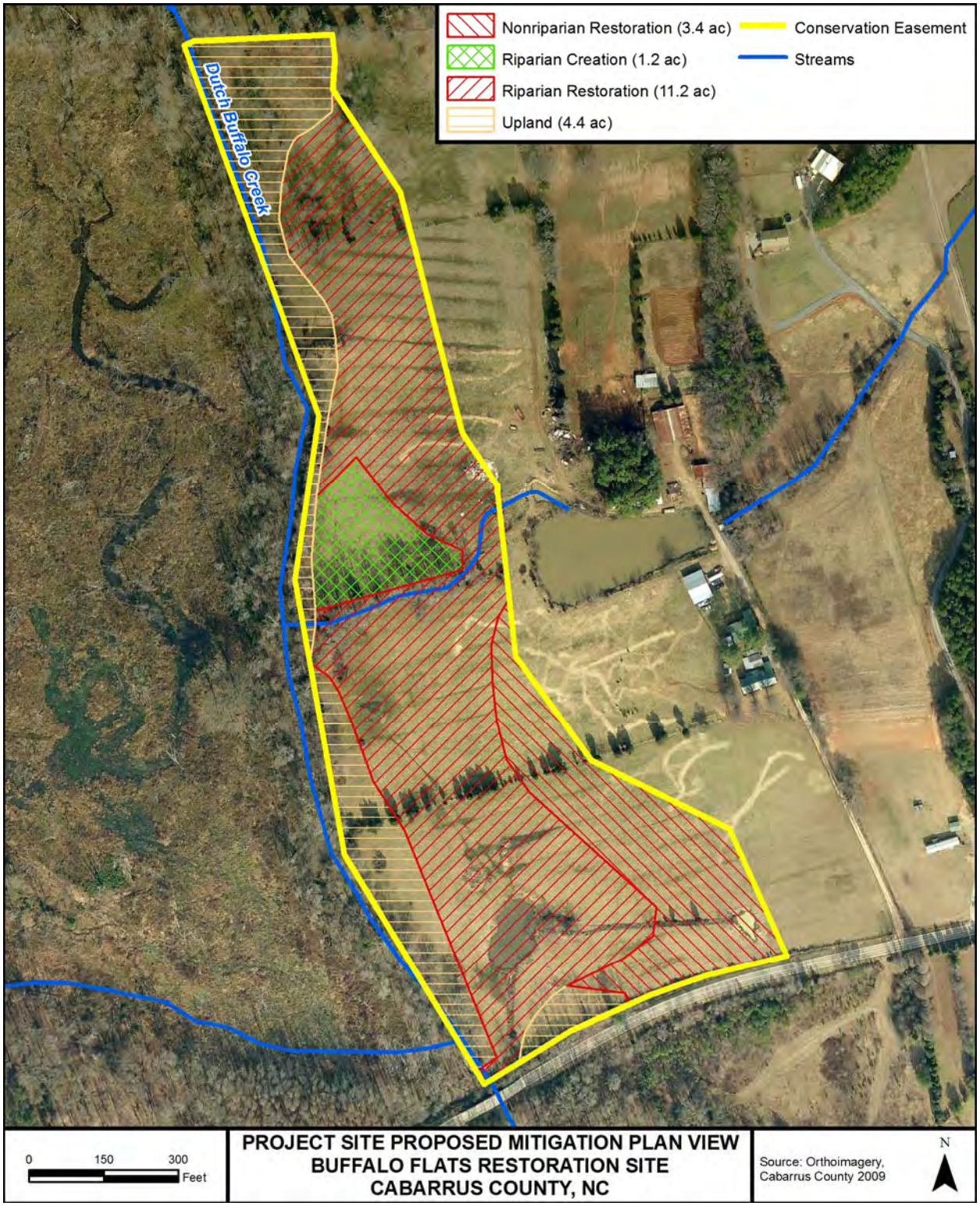
Potential inputs to the water budget include precipitation, groundwater, and surface inputs. For precipitation, the data from the three selected years were used in the budget. Groundwater inputs likely exist, particularly in the upper portions of the site, but they were considered to be negligible to be conservative for the purposes of this study. Surface water input was calculated using the USDA Soil Conservation Service (SCS) runoff curve number equation (USDA, SCS 1986).

Outputs from the site include potential evapotranspiration (PET), groundwater, and surface water diversion. PET was calculated by the Thornthwaite method using mean monthly temperatures determined from the chosen years of record: 1986, 1996, and 1975. Surface water was assumed entirely lost during the existing condition.

Once the inputs and outputs were determined, a net monthly total was calculated in inches and used to estimate a yearly water budget. The model assumes unsaturated conditions at the beginning of the year. A maximum wetland water volume of 5.4 inches was calculated based on the specific yield of 0.15 for 36 inches of Wehadkee soil. The resulting hydrographs for the average, dry, and wet years show a seasonal pattern. The model shows that the majority of hydrologic inputs to the site come during the rainy spring months. The site begins to lose saturation in the upper twelve inches in the late spring and early summer months. The late fall sees a small increase in hydrologic inputs again. The dry year shows very little hydrology overall. It is clear from the existing model output that the ditches within the site are exerting a larger influence on the site than the water budget is accurately able to predict. The site is currently not achieving the wetland hydrology that the model predicts.

Proposed Conditions
A modified water budget was developed to analyze the effect of mitigation actions on the site hydrology. All surface flow is assumed to be retained in the proposed condition, because it will no longer be immediately routed off the site. To estimate the impact from re-creating wetland microtopography, an additional two inches of hydrologic capacity was added to the calculations. Based on these changes, the budget shows an increase in jurisdictional wetland hydrology in the spring for the average and wet years when compared to the existing conditions. The dry year remains relatively unchanged from the pre-construction condition.

6.4 Proposed Mitigation Plan View



7.0 MAINTENANCE PLAN

KCI shall monitor the site on a regular basis and shall conduct a physical inspection of the site a minimum of once 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 should be expected most often in the first two years following site construction and may include the following:

Component/Feature	Maintenance Through Project Close-Out
Wetland	Routine wetland maintenance and repair activities may include securing of loose coir matting and supplemental installations of live stakes and other target vegetation within the wetland. Areas where stormwater and floodplain flows intercept the wetland may also require maintenance to prevent scour.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. 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.
Utility Right-of-Way	Utility rights-of-way within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restrictions, rights of way, or corridor agreements.

This page was revised from the original version, based on agency comments

9.0 PERFORMANCE STANDARDS

The BFRS will be monitored to determine if the development of the wetland indicators on site meet the standards for mitigation credit production as presented in Section 5.0. The credits will be validated upon confirmation that the success criteria described below are met. The site will be monitored for performance standards for seven-years after completion of construction.

Hydrologic Performance

The site will present continuous saturated or inundated hydrologic conditions for at least 10% of the growing season for riparian mitigation areas (11.6 acres) and 5% for non-riparian mitigation areas (3.4 acres) (50% probability of reoccurrence) during normal weather conditions. A "normal" year is based on NRCS climatological data for Cabarrus County, and using the 30th to 70th percentile thresholds as the range of normal, as documented in the USACE Technical Report "Accessing and Using Meteorological Data to Evaluate Wetland Hydrology, April 2000." According to the Cabarrus County Soil Survey, the growing season is considered to extend from March 23rd to November 11th, comprising 233 days.

Due to the inherent variability in the sites features and its geomorphic position, it is unlikely that the project will homogeneously exhibit common hydrologic conditions across the site, making a single hydrologic performance criterion unrepresentative of the sites performance. As such, the gauge data will be evaluated as a spatial average with each gauge representing the area half the distance to adjacent gauges or wetland type boundaries. The spatial average by wetland type will be the calculated value for comparison with the performance standard for credit validation. Gauges not achieving a minimum of 5% saturation will be considered non-attaining even if the spatial average exceeds the credit validation performance standard (5% for non-riparian and 10% for riparian).

Hydrologic performance will be determined through evaluation of automatic recording gauge data supplemented by documentation of wetland hydrology indicators as defined in the 1987 US ACOE Wetland Delineation Manual (Manual). Seven automatic recording gauges will be established within the restoration areas of the site and two gauges will be established within the wetland creation area and will record data daily.

Vegetation Success

The site will demonstrate the re-establishment of targeted vegetative communities based on survival and growth of planted species and volunteer colonization, with an average planted stem density of 320 stems/acre after three years, 288 stems/acre after four years, 260 stems/acre after five years, and 210 seven year old stems/acre after 7 years.

Permanent monitoring plots (10 by 10 meters) will be established in the wetland restoration and creation areas at a density that will statistically represent the total mitigation acreage. The average density of these plots will determine whether the site meets the success criterion of a planted stem density. Non-target species must not constitute more than 20% of the woody vegetation based on permanent monitoring plots.

Soil Development

The 1.2 acre wetland creation area will be monitored to document the development of redoximorphic features in the soil by evidence of two or more indicators i.e. changes in chroma, organic matter content, oxidized root channels, concretions, mottles and other indications that the soil is subject to low oxygen conditions etc. within the seven-year monitoring period. Two permanent monitoring plots will be established and soil profiles will be monitored yearly for development of redoximorphic conditions by a licensed soil scientist. Profiles will be compared from year to year and changes will be documented in the yearly monitoring reports.

9.0 MONITORING REQUIREMENTS

The first scheduled monitoring will be conducted during the first full growing season following project completion. Monitoring shall subsequently be conducted annually for a total period of five years or until the project meets its success criteria.

Groundwater elevations will be monitored to evaluate the attainment of jurisdictional wetland hydrology. Verification of wetland hydrology will be determined by automatic recording well data collected within the project area and reference wetland. Five to six automatic recording gauges will be established within the mitigation areas. Daily data will be collected from the automatic gauges over the 5-year monitoring period following wetland construction. A nearby reference wetland will also be monitored using the same procedures for comparative analysis (see Appendix B for reference wetland data sheet and location map).

Beginning at the end of the first growing season, KCI will monitor the planted vegetation for five years or until the success criterion is met. The survivability of the vegetation plantings will be evaluated using a sufficient number of 100 m^2 vegetative sampling plots randomly placed throughout the created and restored wetlands. Permanent monuments will be established at the corners of each monitoring plot and documented by either conventional survey or GPS. These plots will be monitored according to the current CVS/EEP monitoring protocol. Additionally, a photograph will be taken of each monitoring plot, allowing yearly qualitative comparison of vegetation conditions.

Photograph reference points (PRPs) will be established to assist in characterizing the site and to allow qualitative evaluation of the site conditions. The location of each photo point will be marked in the monitoring plan and the bearing/orientation of the photograph will be documented.

Annual monitoring reports will be prepared and submitted after all monitoring tasks for each year are completed. The report will document the monitored components and include all collected data, analyses, and photographs. Each report will provide the new monitoring data and compare the most recent results against previous findings. The monitoring report format will be similar to that set out in the most recent EEP monitoring protocol.

Required	Parameter	Quantity	Frequency	Notes
Yes	Groundwater Hydrology	5-6 gauges	annual	Groundwater monitoring gauges with data recording devices will be installed on site; the data will be downloaded on a monthly basis during the growing season
Yes	Vegetation	Will be distributed to ensure sufficient coverage of planted vegetation	annual	Vegetation will be monitored using the Carolina Vegetation Survey (CVS) protocols
Yes	Exotic and nuisance vegetation		annual	Locations of exotic and nuisance vegetation will be mapped
Yes	Project boundary		semi-annual	Locations of fence damage, vegetation damage, boundary encroachments, etc. will be mapped

10.0 LONG-TERM MANAGEMENT PLAN

Upon approval for close-out by the Interagency Review Team (IRT), the site will be transferred to the NCDENR 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 are upheld. Endowment funds required to uphold easement and deed restrictions shall be negotiated prior to site transfer to the responsible party.

The NCDENR Division of Natural Resource Planning and Conservation's Stewardship Program currently houses EEP 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 NCDENR 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.

11.0 ADAPTIVE MANAGEMENT PLAN

Upon completion of site construction, KCI 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, KCI will notify the EEP and the USACE of the need to develop a Plan of Corrective Action. Once the Corrective Action Plan is prepared and finalized KCI will:

1. Notify the EEP and 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.

12.0 FINANCIAL ASSURANCES

Pursuant to Section IV H and Appendix III of the Ecosystem Enhancement Program's In-Lieu Fee Instrument dated July 28, 2010, the North Carolina Department of Environment and Natural Resources has provided the U.S. Army Corps of Engineers Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by EEP. This commitment provides financial assurance for all mitigation projects implemented by the program.

13.0 OTHER INFORMATION

13.1 Definitions

Native vegetation community – a distinct and reoccurring assemblage of populations of plants, animals, bacteria and fungi naturally associated with each other and their population; as described in Schafale, M.P. and Weakley, A. S. (1990), Classification of the Natural Communities of North Carolina, Third Approximation.

Project Area - includes all protected lands associated with the mitigation project.

13.2 References

Center for Watershed Protection. 2003. Impacts of Impervious Cover on Aquatic Systems. Watershed Protection Research Monograph No. 1. Ellicott City, MD.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

NCDENR, Division of Water Quality. 2010a. Surface Water Classification. Last accessed 11/2010 at: http://portal.ncdenr.org/web/wq/ps/csu

NCDENR, Division of Water Quality. 2010b. 2010 Final 303(d) list. Raleigh, NC. Last accessed 11/2010 at: http://portal.ncdenr.org/web/wq/ps/mtu/assessment

NCDENR, Ecosystem Enhancement Program. 2009. Lower Yadkin Pee-Dee River Basin Priorities 2009. Raleigh, NC. Last accessed 11/2010 at: http://www.nceep.net/services/restplans/Yadkin_Pee_Dee_RBRP_2009_Final.pdf

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina, 3rd Approximation. North Carolina Natural Heritage Program, NCDEHNR, Division of Parks and Recreation. Raleigh, NC.

Sprecher, S.W. 2000. Accessing and Using Meteorological Data to Evaluate Wetland Hydrology. Headquarters, U.S. Army Corps of Engineers, Operations Division, Regulatory Branch.

USDA, Natural Resources Conservation Service. 2010. Field Indicators of Hydric Soils in the United States: a Guide for Identifying and Delineating Hydric Soils, Version 7.0.

USDA, Natural Resources Conservation Service, Water and Climate Center. 1995. WETS Table for Concord, North Carolina. Portland, OR. Last accessed 11/2010 at: http://www.wcc.nrcs.usda.gov/ftpref/support/climate/wetlands/nc/37025.txt

USDA, Soil Conservation Service. 1986. Urban Hydrology for Small Watersheds. Technical Release 55. Washington, DC: Soil Conservation Service.

USDA, Soil Conservation Service. 1988. Soil Survey of Cabarrus County. Raleigh, NC.

13.3 Appendix A. Site Protection Instrument

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INSTRUMENT # 26061
EXCISE TAX $148.00
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FILED
CABARRUS
COUNTY NC
LINDA F. McABEE
REGISTER
OF DEEDS

Excise Tax: $148.00

STATE OF NORTH CAROLINA

CONSERVATION EASEMENT AND RIGHT OF ACCESS

CABARRUS COUNTY

Prepared by / return to: Paul Arena, Poyner Spruill LLP, 301 S. College St., Suite 2300, Charlotte, NC 28202-6021

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 10 day of December, 2010, by James B. Jordan and wife Janet O. Jordan, "**Grantor**"), whose mailing address is 4939 Gold Hill Road, Concord NC, 28025, to KCI Environmental Technologies and Construction, Inc., a Delaware corporation ("**Grantee**"), whose mailing address is 4601 Six Forks Road, Suite 220, Landmark Center II, Raleigh, NC 27609. 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, Grantee is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in No. 6 Township, Cabarrus County, North Carolina (the "Property"), and being more particularly described as that certain parcel of land containing approximately 43.51 acres and being conveyed to the Grantor by deed as recorded in Deed Book/Page 436 / 659 of the Cabarrus 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 Dutch Buffalo Creek.

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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:

Tract Number 2 containing a total of **2.6 acres** as shown on the plats of survey entitled "Conservation Easement for Buffalo Flats Restoration, State of North Carolina Ecosystem Enhancement Program," dated August 18, 2010 by James M. Gellenthin, PLS Number L-3860 and recorded in the Cabarrus County, North Carolina Register of Deeds at **Plat Book** 59 **Page** 92.

See attached "**Exhibit A**", Legal Description of area of the Property hereinafter referred to as the "Easement Area"

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 ACTIVITES

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.

B. Usage of motorized vehicles in the Easement Area is prohibited.

C. 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.

D. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, or vegetation that 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.

E. Industrial, Residential and Commercial Uses. All industrial, residential and commercial uses are prohibited in the Easement Area.

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

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

H. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area.

I. 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.

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

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

L. 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 in the Easement Area. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns is allowed. All removal

of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides in the Easement Area 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 on the Property.

M. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying Property owned by the Grantor in fee simple ("fee") that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee and the rights 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.

N. Development Rights. All development rights are permanently removed from the Easement Area and are non-transferrable.

O. 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 not inconsistent with the purposes of this Conservation Easement, and the Grantor obtains advance 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 by motor vehicles, pedestrians and machinery 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 in 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, its employees and agents, successors or assigns, shall be permitted to place signs and witness posts on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the project boundaries and 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 in the Easement Area that may have been damaged by such unauthorized activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, the Grantee shall, except as provided below, notify the Grantor in writing of such breach and the Grantor shall have ninety (90) days after receipt of such notice to correct the damage caused by such breach. If the breach and damage remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by bringing appropriate legal proceedings including an action to recover damages, as well as 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 is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement, and the Grantor and Grantee acknowledge that the damage would be irreparable and remedies at law 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 is 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 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, or damage to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring expenses, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, 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. Grantor is responsible for any real estate taxes, assessments, fees, or charges levied upon the Property. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Upkeep of any constructed bridges, fences, or other amenities on the Property are the sole responsibility of the Grantor. Nothing herein shall relieve the Grantor of the obligation to comply with federal, state or local laws, regulations and permits that may apply to the exercise of the Reserved Rights.

C. 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.

D. 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 that any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

E. 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.

F. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, or their successors or assigns, if 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 owner of the Property shall notify the U.S. Army Corps of Engineers in writing sixty (60) days prior to the initiation of any transfer of all or any part

of the Property. Such notification shall be addressed to: Justin McCorkle, General Counsel, US Army Corps of Engineers, 69 Darlington Avenue, Wilmington, NC 28403

G. 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 Grantee 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 is free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

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

James B. Jordan (SEAL)
James B. Jordan

Janet O. Jordan (SEAL)
Janet O. Jordan

NORTH CAROLINA

COUNTY OF Mecklenburg

I, the undersigned, a Notary Public in and for the County and State aforesaid, do hereby certify that James B. Jordan and wife Janet O. Jordan, 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 10th day of December, 2010.

Teresa S. Herron
Print name: Teresa S. Herron, Notary Public

My commission expires: 5/2/14

Exhibit A

TRACT 2
2.60 ACRE ADDITIONAL NONRIPARIAN WMU AREA

A Tract of land designated as a Nonriparian WMU Area located on lands now or formerly owned by James & Janet Jordan (Deed Book 436 Page 659) in No. 6 Township, Cabarrus County, North Carolina and being more particularly described as follows:

Commencing at a found iron pin on the North line of Gold Hill Road (60' public right-of-way) at the intersection with the East line of said lands now or formerly owned by James & Janet Jordan, said pin having North Carolina State Plane Coordinates of N:623981.58 and E:1555367.83 (NAD '83).

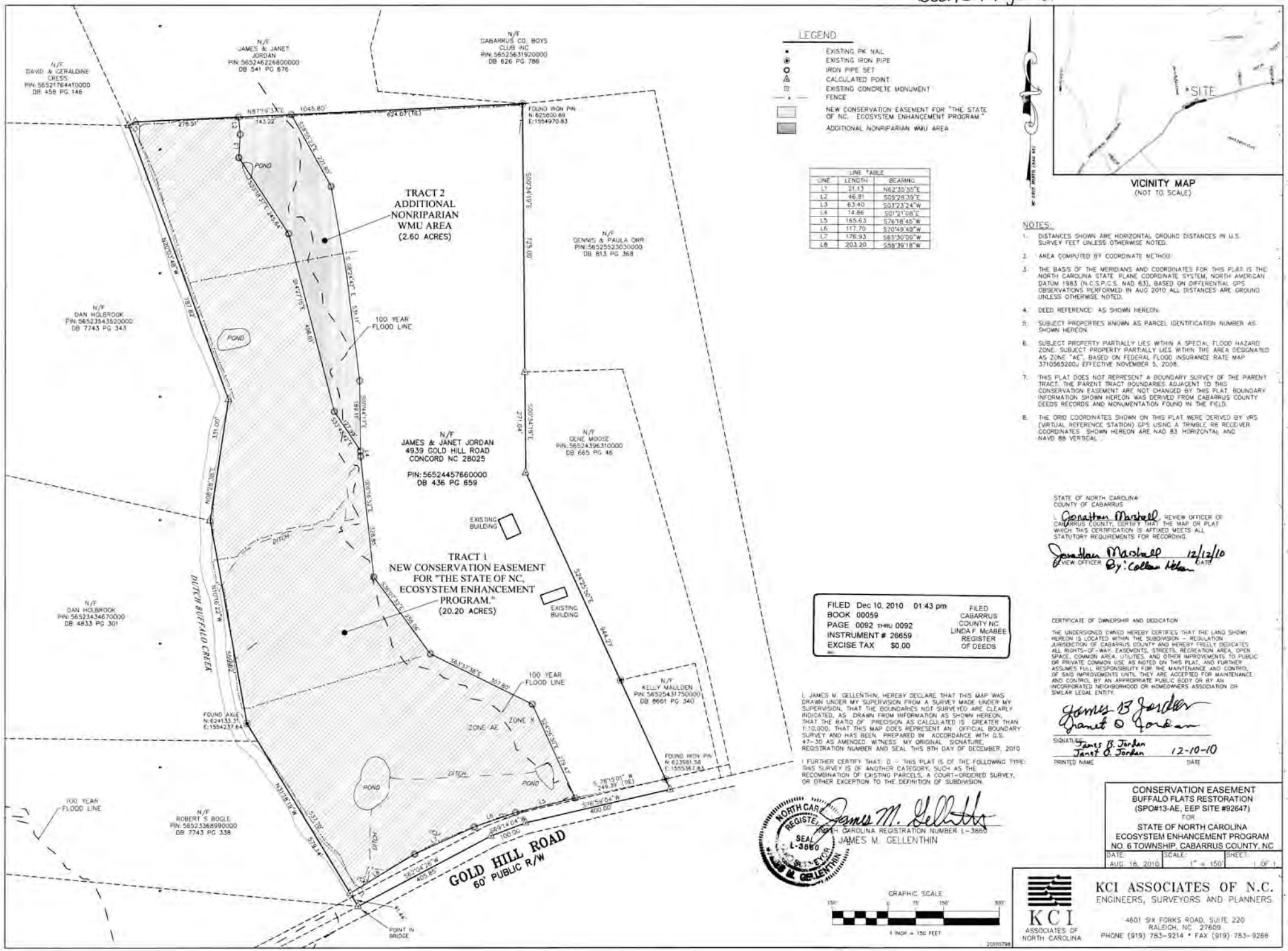
Thence on a grid bearing South 78°15'01" West a distance of 249.39 feet to a point;
Thence North 24°26'30" West a distance of 279.47 feet to a point;
Thence North 63°37'38" West a distance of 307.80 feet to a point;
Thence North 36°07'32" West a distance of 258.06 feet to a point;
Thence North 06°16'52" West a distance of 328.85 feet to a point;
Thence North 01°21'08" West a distance of 14.86 feet to the Point of Beginning;
Thence North 33°42'42" West a distance of 127.99 feet to a point;
Thence North 14°27'15" West a distance of 496.01 feet to a point;
Thence North 33°18'37" West a distance of 245.64 feet to a point;
Thence North 03°23'24" East a distance of 63.40 feet to a point;

Thence North 05°28'39" West a distance of 46.81 feet to a point on the South line of lands now or formerly owned by James and Janet Jordan (Deed Book 541 Page 676);

Thence North 87°19'37" East on the said South line of lands owned by James and Janet Jordan (Deed Book 541 Page 676) a distance of 143.22 feet to a point;

Thence South 28°55'23" East a distance of 221.80 feet to a point;
Thence South 08°24'42" East a distance of 531.11 feet to a point;
Thence South 00°44'17" East a distance of 189.11 feet to the Point of Beginning.
Containing 2.60 acres, more or less.

Book 59 Page 92



LEGEND

- EXISTING PK NAIL
- EXISTING IRON PIPE
- IRON PIPE SET
- CALCULATED POINT
- EXISTING CONCRETE MONUMENT
- FENCE
- NEW CONSERVATION EASEMENT FOR "THE STATE OF NC, ECOSYSTEM ENHANCEMENT PROGRAM."
- ADDITIONAL NONRIPARIAN WMU AREA

LINE TABLE		
LINE	LENGTH	BEARING
L1	21.13	N62°35'55"E
L2	46.81	S05°29'39"E
L3	63.40	S01°23'24"W
L4	14.86	S01°21'08"E
L5	165.63	S76°18'45"W
L6	117.70	S70°49'40"W
L7	176.93	S65°30'09"W
L8	203.20	S58°39'18"W

VICINITY MAP
(NOT TO SCALE)

NOTES:

1. DISTANCES SHOWN ARE HORIZONTAL GROUND DISTANCES IN U.S. SURVEY FEET UNLESS OTHERWISE NOTED.
2. AREA COMPUTED BY COORDINATE METHOD.
3. THE BASIS OF THE MERIDIANS AND COORDINATES FOR THIS PLAT IS THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983 (N.C.S.P.C.S. NAD 83), BASED ON DIFFERENTIAL GPS OBSERVATIONS PERFORMED IN AUG 2010. ALL DISTANCES ARE GROUND UNLESS OTHERWISE NOTED.
4. DEED REFERENCE: AS SHOWN HEREON.
5. SUBJECT PROPERTIES KNOWN AS PARCEL IDENTIFICATION NUMBER AS SHOWN HEREON.
6. SUBJECT PROPERTY PARTIALLY LIES WITHIN A SPECIAL FLOOD HAZARD ZONE. SUBJECT PROPERTY PARTIALLY LIES WITHIN THE AREA DESIGNATED AS ZONE "AE", BASED ON FEDERAL FLOOD INSURANCE RATE MAP 3710565200J EFFECTIVE NOVEMBER 5, 2008.
7. THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARENT TRACT. THE PARENT TRACT BOUNDARIES ADJACENT TO THIS CONSERVATION EASEMENT ARE NOT CHANGED BY THIS PLAT. BOUNDARY INFORMATION SHOWN HEREON WAS DERIVED FROM CABARRUS COUNTY DEEDS RECORDS AND MONUMENTATION FOUND IN THE FIELD.
8. THE GRID COORDINATES SHOWN ON THIS PLAT WERE DERIVED BY VRS (VIRTUAL REFERENCE STATION) GPS USING A TRIMBLE R8 RECEIVER. COORDINATES SHOWN HEREON ARE NAD 83 HORIZONTAL AND NAVD 88 VERTICAL.

STATE OF NORTH CAROLINA
COUNTY OF CABARRUS

I, Jonathan Marshall, REVIEW OFFICER OF CABARRUS COUNTY, CERTIFY THAT THE MAP OR PLAT WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

Jonathan Marshall 12/12/10
REVIEW OFFICER By: Colleen Nolan DATE

FILED Dec 10, 2010 01:43 pm
BOOK 00059
PAGE 0092 THRU 0092
INSTRUMENT # 26659
EXCISE TAX $0.00

FILED
CABARRUS
COUNTY NC
LINDA F. McABEE
REGISTER
OF DEEDS

CERTIFICATE OF OWNERSHIP AND DEDICATION

THE UNDERSIGNED OWNER HEREBY CERTIFIES THAT THE LAND SHOWN HEREON IS LOCATED WITHIN THE SUBDIVISION – REGULATION JURISDICTION OF CABARRUS COUNTY AND HEREBY FREELY DEDICATES ALL RIGHTS-OF-WAY, EASEMENTS, STREETS, RECREATION AREA, OPEN SPACE, COMMON AREA, UTILITIES, AND OTHER IMPROVEMENTS TO PUBLIC OR PRIVATE COMMON USE AS NOTED ON THIS PLAT, AND FURTHER ASSUMES FULL RESPONSIBILITY FOR THE MAINTENANCE AND CONTROL OF SAID IMPROVEMENTS UNTIL THEY ARE ACCEPTED FOR MAINTENANCE AND CONTROL BY AN APPROPRIATE PUBLIC BODY OR BY AN INCORPORATED NEIGHBORHOOD OR HOMEOWNERS ASSOCIATION OR SIMILAR LEGAL ENTITY.

James B Jordan
Janet O Jordan
SIGNATURE

James B. Jordan 12-10-10
Janet O. Jordan
PRINTED NAME DATE

I, JAMES M. GELLENTHIN, HEREBY DECLARE THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM A SURVEY MADE UNDER MY SUPERVISION, THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED, AS DRAWN FROM INFORMATION AS SHOWN HEREON, THAT THE RATIO OF PRECISION AS CALCULATED IS GREATER THAN 1:10,000; THAT THIS MAP DOES REPRESENT AN OFFICIAL BOUNDARY SURVEY AND HAS BEEN PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 8TH DAY OF DECEMBER, 2010.

I FURTHER CERTIFY THAT: D – THIS PLAT IS OF THE FOLLOWING TYPE: THIS SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT-ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION.

NORTH CAROLINA REGISTERED SEAL L-3860 LAND SURVEYOR JAMES M. GELLENTHIN

James M. Gellenthin
NORTH CAROLINA REGISTRATION NUMBER L-3860
JAMES M. GELLENTHIN

GRAPHIC SCALE
150' 0 75' 150' 300'
1 INCH = 150 FEET

20100798

CONSERVATION EASEMENT
BUFFALO FLATS RESTORATION
(SPO#13-AE, EEP SITE #92647)
FOR
STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM
NO. 6 TOWNSHIP, CABARRUS COUNTY, NC

DATE:	SCALE:	SHEET:
AUG. 18, 2010	1" = 150'	1 OF 1

KCI ASSOCIATES OF N.C.
ENGINEERS, SURVEYORS AND PLANNERS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NC 27609
PHONE (919) 783-9214 • FAX (919) 783-9266
KCI ASSOCIATES OF NORTH CAROLINA

13.4 Appendix B. Baseline Information Data

USACE WETLAND DETERMINATION FORMS

DP#1

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: Buffalo Flats Restoration Site **Applicant / Owner:** KCI **Investigator:** Steven F. Stokes, LSS	**Date:** 8-18-2010 **County:** Cabarrus **State:** NC
Do normal circumstances exist on the site? Yes ____ No ✓ **Is the site significantly disturbed (Atypical situation)?** Yes ____ No ✓ **Is the area a potential problem area?** Yes ____ No ✓ **(explain on reverse if needed)**	**Community ID:** ____ **Transect ID:** ____ **Plot ID:** DP# 1 WETLAND

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Juncus effusus	3	FACW+	9.		
2. Eleocharis obtusa	3	OBL	10.		
3. Polygonium pensylvanicum	3	FACW	11.		
4. Diodia virginiana	3	FACW	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). 100%

Remarks:
PASTURE

HYDROLOGY

____ **Recorded Data (Describe In Remarks):**
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

✓ **No Recorded Data Available**

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: > 18 (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12"
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators:
- ✓ Oxidized Roots Channels in Upper 12"
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ✓ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Depressional Wetlands

DP#1

SOILS

Map Unit Name (Series and Phase): Wehadkee **Drainage Class:** Poorly Drained

Taxonomy (Subgroup): Fluvaquentic Endoaquepts **Confirm Mapped Type? Yes** ___ **No** ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3	Ap	10yr 5/1	5yr 4/6	c2p	sl, 1 m sbk
3-8	Bg1	10yr 4/1	5yr 4/6	m3p	cl, 1 m sbk
8-18	Bg2	3/10G	5yr 3/3	m3p	cl, massive

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ✓ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed On Local Hydric Soils List
- ✓ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ✓ No ___
Wetland Hydrology Present? Yes ✓ No ___
Hydric Soils Present? Yes ✓ No ___

Is the Sampling Point Within a Wetland? Yes ✓ No ___

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: Buffalo Flats Restoration Site **Applicant / Owner:** KCI **Investigator:** Steven F. Stokes, LSS	**Date:** 8-18-2010 **County:** Cabarrus **State:** NC
Do normal circumstances exist on the site? Yes ✓ No ___ **Is the site significantly disturbed (Atypical situation)?** Yes ___ No ✓ **Is the area a potential problem area?** Yes ___ No ✓ **(explain on reverse if needed)**	**Community ID:** ___ **Transect ID:** ___ **Plot ID:** DP# 2 WWET

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Juncus effusus	3	FACW+	9.		
2. Festuca arundinacea	3	FAC-	10.		
3. Paspalum dilatatum	3	FAC+	11.		
4. Diodia virginiana	3	FACW	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). 75%

Remarks:

PASTURE

HYDROLOGY

___ **Recorded Data (Describe In Remarks):**
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ **No Recorded Data Available**

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ___ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

DRAINED

DP# 2 NW

SOILS

Map Unit Name (Series and Phase): Wehadkee **Drainage Class:** Poorly Drained

Taxonomy (Subgroup): Fluvaquentic Endoaquepts **Confirm Mapped Type? Yes** ___ **No** ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3	A1	10yr 5/3	5yr 4/6	f1p	cl, 1fgr
3-9	A2	10yr 5/3	10yr 6/1	c2d	cl, 1mgr
			5yr 4/6	f1d	
9-13	Bg1	10yr 6/2	10yr 3/3	f1d	cl, 1msbk
13-18	Bg2	10yr 5/1	7.5yr 3/3	c2d	cl 1msbk

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed On Local Hydric Soils List
- ✓ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

DRAINED

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ✓ No ___
Wetland Hydrology Present? Yes ___ No ✓
Hydric Soils Present? Yes ✓ No ___

Is the Sampling Point Within a Wetland? Yes ___ No ✓

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: Buffalo Flats Restoration Site **Applicant / Owner:** **Investigator:** Steven F. Stokes, LSS	**Date:** 8-18-2010 **County:** Cabarrus **State:** NC
Do normal circumstances exist on the site? Yes ___ No ✓ **Is the site significantly disturbed (Atypical situation)?** Yes ___ No ✓ **Is the area a potential problem area?** Yes ___ No ✓ **(explain on reverse if needed)**	**Community ID:** **Transect ID:** **Plot ID:** DP#3 Wet

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Sagittaria latifolia	3	OBL	9.		
2. Impatiens capensis	3	FACW	10.		
3. Juncus effusus	3	FACW+	11.		
4. Ludwigia sp.	3	OBL	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). 100%

Remarks:

Pasture

HYDROLOGY

___ **Recorded Data (Describe In Remarks):**
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

✓ **No Recorded Data Available**

Field Observations:

Depth of Surface Water: 6 (in.)

Depth to Free Water in Pit: ___ (in.)

Depth to Saturated Soil: ___ (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ✓ Inundated
- ✓ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ___ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ✓ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

DP#3 wet

SOILS

Map Unit Name
(Series and Phase): Wehadkee Variant Drainage Class: Poorly Drained

Taxonomy (Subgroup): Fluvaquentic Endoaquepts Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3	Cg1	10yr 5/2			cl massive
3-18	Cg2	5/5GY	10yr 5/6 c2d		c massive

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
✓ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
✓ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
✓ Listed On Local Hydric Soils List
✓ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ✓ No ___
Wetland Hydrology Present? Yes ✓ No ___
Hydric Soils Present? Yes ✓ No ___

Is the Sampling Point Within a Wetland? Yes ✓ No ___

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: Buffalo Flats Restoration Site **Applicant / Owner:** **Investigator:** Steven F. Stokes, LSS	**Date:** 8-18-2010 **County:** Cabarrus **State:** NC
Do normal circumstances exist on the site? Yes____ No ✓ **Is the site significantly disturbed (Atypical situation)?** Yes____ No ✓ **Is the area a potential problem area?** Yes____ No ✓ **(explain on reverse if needed)**	**Community ID:**____ **Transect ID:**____ **Plot ID:** DP#4 NW

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Solanum carolinense	3	FACU	9.		
2. Cynodon dactylon	3	FACU	10.		
3. Setaria glauca	3	FAC	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). 33 %

Remarks:
PASTURE

HYDROLOGY

___ **Recorded Data (Describe In Remarks):**
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ **No Recorded Data Available**

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ___ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
DRAINED

DP#4 NW

SOILS

Map Unit Name
(Series and Phase): Wehadkee Drainage Class: Poorly Drained

Taxonomy (Subgroup): Fluvaquentic Endoaquepts Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-7	A	10yr 4/2			pl, 1fgr
7-11	Bg1	10yr 5/2	10yr 4/4	f1f	sl, 1fgr
11-16	Bg2	10yr 5/2	10yr 5/1	c2f	scl, 2m sbk
			10yr 5/6	c2d	
15-18	Bg3	10yr 4/2	10yr 5/6	c2d	scl, 2c sbk

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed On Local Hydric Soils List
- ✓ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

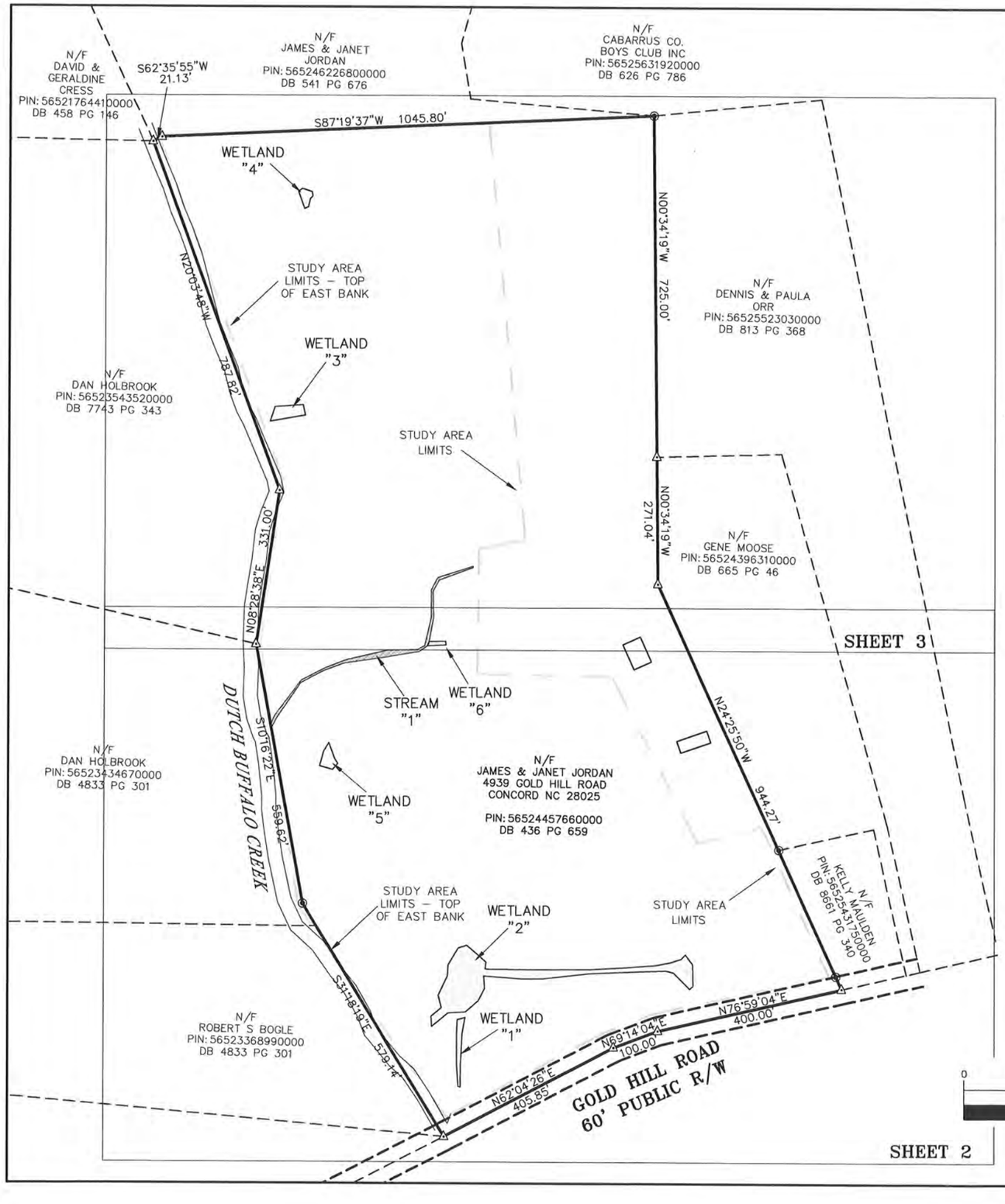
Remarks:
DRAINED

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓
Hydric Soils Present? Yes ✓ No ___

Is the Sampling Point Within a Wetland? Yes ___ No ✓

Remarks:



GENERAL NOTES:

THIS PLAN DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARENT TRACT. BOUNDARY INFORMATION SHOWN HEREON WAS DERIVED FROM CABARRUS COUNTY DEEDS RECORDS AND MONUMENTATION FOUND IN THE FIELD.

THE BASIS OF THE COORDINATES SHOWN HEREON IS THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983.

ALL WETLAND FLAGS AND DATA POINTS WERE LOCATED IN THE FIELD BY CONVENTIONAL SURVEY METHODS AUGUST 18–20, 2010.

FLOOD INFORMATION SHOWN HEREON WAS TAKEN FROM FIRM 3710565200J EFFECTIVE NOVEMBER 5, 2008.

VICINITY MAP
(NOT TO SCALE)

WETLAND AREA TABLE

WETLAND/STREAM	ACREAGE	SQUARE FEET
W1	0.03 AC	1,410 SF
W2	0.42 AC	18,380 SF
W3	0.04 AC	1,755 SF
W4	0.02 AC	780 SF
W5	0.03 AC	1160 SF
W6	0.007 AC	315 SF
S1	0.09 AC	3,740 SF
STUDY AREA	31.10 AC	1,354,707 SF

LEGEND:

WETLANDS

STREAMS

STUDY AREA LIMITS

"THIS CERTIFIES THAT THIS COPY OF THIS PLAT ACCURATELY DEPICTS THE BOUNDARY OF THE JURISDICTION OF SECTION 404 OF THE CLEAN WATER ACT AS DETERMINED BY THE UNDERSIGNED ON THIS DATE. UNLESS THERE IS A CHANGE IN THE LAW OR OR OUR PUBLISHED REGULATIONS, THIS DETERMINATION OF SECTION 404 JURISDICTION MAY BE RELIED UPON FOR A PERIOD NOT TO EXCEED FIVE YEARS FROM THIS DATE. THIS DETERMINATION WAS MADE UTILIZING THE 1987 CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL."

NAME: Steve Chapin

TITLE: Reg. Specialist

DATE: 10/1/10

AID: 2010-01570

I, JAMES M. GELLENTHIN, HEREBY DECLARE THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM A SURVEY MADE UNDER MY SUPERVISION, THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED THAT THE RATIO OF PRECISION AS CALCULATED IS GREATER THAN 1:10,000; THAT THIS MAP DOES NOT REPRESENT AN OFFICIAL BOUNDARY SURVEY AND HAS NOT BEEN PREPARED IN ACCORDANCE WITH G.S. 47–30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 9TH DAY OF SEPTEMBER, 2010.

NORTH CAROLINA REGISTRATION NUMBER L-3860

JAMES M. GELLENTHIN

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR SEAL JAMES M. GELLENTHIN

GRAPHIC SCALE

0 125 250 500

1 INCH = 250 FEET

20100798

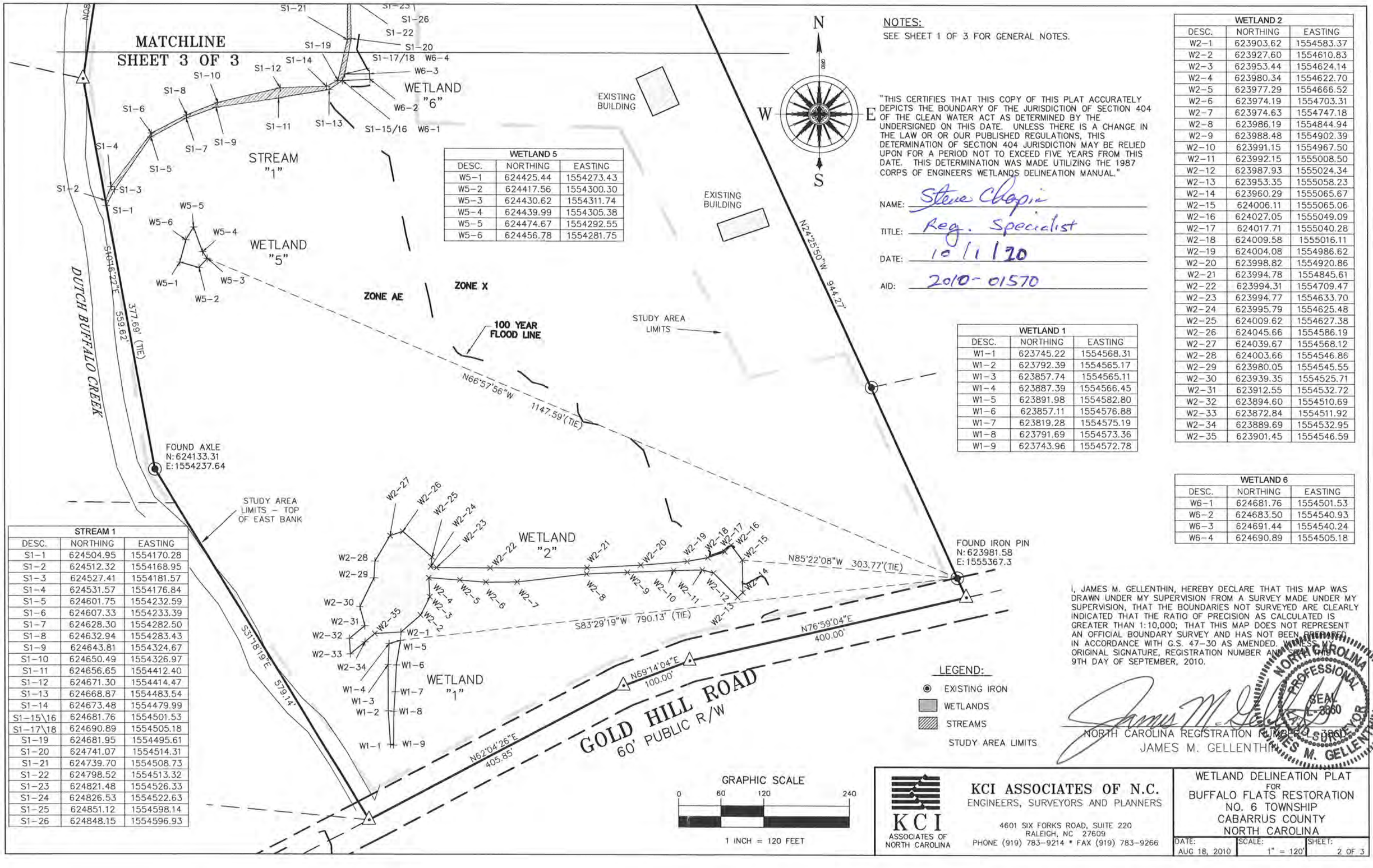
KCI ASSOCIATES OF NORTH CAROLINA

KCI ASSOCIATES OF N.C.
ENGINEERS, SURVEYORS AND PLANNERS

4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NC 27609
PHONE (919) 783–9214 * FAX (919) 783–9266

WETLAND DELINEATION PLAT
FOR
BUFFALO FLATS RESTORATION
NO. 6 TOWNSHIP
CABARRUS COUNTY
NORTH CAROLINA

DATE:	SCALE:	SHEET:
AUG 18, 2010	1"–250'	1 OF 3



NOTES:

SEE SHEET 1 OF 3 FOR GENERAL NOTES.

"THIS CERTIFIES THAT THIS COPY OF THIS PLAT ACCURATELY DEPICTS THE BOUNDARY OF THE JURISDICTION OF SECTION 404 OF THE CLEAN WATER ACT AS DETERMINED BY THE UNDERSIGNED ON THIS DATE. UNLESS THERE IS A CHANGE IN THE LAW OR OR OUR PUBLISHED REGULATIONS, THIS DETERMINATION OF SECTION 404 JURISDICTION MAY BE RELIED UPON FOR A PERIOD NOT TO EXCEED FIVE YEARS FROM THIS DATE. THIS DETERMINATION WAS MADE UTILIZING THE 1987 CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL."

NAME: Steve Chapin

TITLE: Reg. Specialist

DATE: 10/1/20

AID: 2010-01570

WETLAND 5		
DESC.	NORTHING	EASTING
W5-1	624425.44	1554273.43
W5-2	624417.56	1554300.30
W5-3	624430.62	1554311.74
W5-4	624439.99	1554305.38
W5-5	624474.67	1554292.55
W5-6	624456.78	1554281.75

WETLAND 1		
DESC.	NORTHING	EASTING
W1-1	623745.22	1554568.31
W1-2	623792.39	1554565.17
W1-3	623857.74	1554565.11
W1-4	623887.39	1554566.45
W1-5	623891.98	1554582.80
W1-6	623857.11	1554576.88
W1-7	623819.28	1554575.19
W1-8	623791.69	1554573.36
W1-9	623743.96	1554572.78

WETLAND 2		
DESC.	NORTHING	EASTING
W2-1	623903.62	1554583.37
W2-2	623927.60	1554610.83
W2-3	623953.44	1554624.14
W2-4	623980.34	1554622.70
W2-5	623977.29	1554666.52
W2-6	623974.19	1554703.31
W2-7	623974.63	1554747.18
W2-8	623986.19	1554844.94
W2-9	623988.48	1554902.39
W2-10	623991.15	1554967.50
W2-11	623992.15	1555008.50
W2-12	623987.93	1555024.34
W2-13	623953.35	1555058.23
W2-14	623960.29	1555065.67
W2-15	624006.11	1555065.06
W2-16	624027.05	1555049.09
W2-17	624017.71	1555040.28
W2-18	624009.58	1555016.11
W2-19	624004.08	1554986.62
W2-20	623998.82	1554920.86
W2-21	623994.78	1554845.61
W2-22	623994.31	1554709.47
W2-23	623994.77	1554633.70
W2-24	623995.79	1554625.48
W2-25	624009.62	1554627.38
W2-26	624045.66	1554586.19
W2-27	624039.67	1554568.12
W2-28	624003.66	1554546.86
W2-29	623980.05	1554545.55
W2-30	623939.35	1554525.71
W2-31	623912.55	1554532.72
W2-32	623894.60	1554510.69
W2-33	623872.84	1554511.92
W2-34	623889.69	1554532.95
W2-35	623901.45	1554546.59

WETLAND 6		
DESC.	NORTHING	EASTING
W6-1	624681.76	1554501.53
W6-2	624683.50	1554540.93
W6-3	624691.44	1554540.24
W6-4	624690.89	1554505.18

STREAM 1		
DESC.	NORTHING	EASTING
S1-1	624504.95	1554170.28
S1-2	624512.32	1554168.95
S1-3	624527.41	1554181.57
S1-4	624531.57	1554176.84
S1-5	624601.75	1554232.59
S1-6	624607.33	1554233.39
S1-7	624628.30	1554282.50
S1-8	624632.94	1554283.43
S1-9	624643.81	1554324.67
S1-10	624650.49	1554326.97
S1-11	624656.65	1554412.40
S1-12	624671.30	1554414.47
S1-13	624668.87	1554483.54
S1-14	624673.48	1554479.99
S1-15\16	624681.76	1554501.53
S1-17\18	624690.89	1554505.18
S1-19	624681.95	1554495.61
S1-20	624741.07	1554514.31
S1-21	624739.70	1554508.73
S1-22	624798.52	1554513.32
S1-23	624821.48	1554526.33
S1-24	624826.53	1554522.63
S1-25	624851.12	1554598.14
S1-26	624848.15	1554596.93

LEGEND:

- EXISTING IRON
- WETLANDS
- STREAMS
- STUDY AREA LIMITS

GRAPHIC SCALE

0 60 120 240

1 INCH = 120 FEET

I, JAMES M. GELLENTHIN, HEREBY DECLARE THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM A SURVEY MADE UNDER MY SUPERVISION, THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED THAT THE RATIO OF PRECISION AS CALCULATED IS GREATER THAN 1:10,000; THAT THIS MAP DOES NOT REPRESENT AN OFFICIAL BOUNDARY SURVEY AND HAS NOT BEEN PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 9TH DAY OF SEPTEMBER, 2010.

NORTH CAROLINA REGISTRATION NUMBER L-3860 SURVEYOR
JAMES M. GELLENTHIN

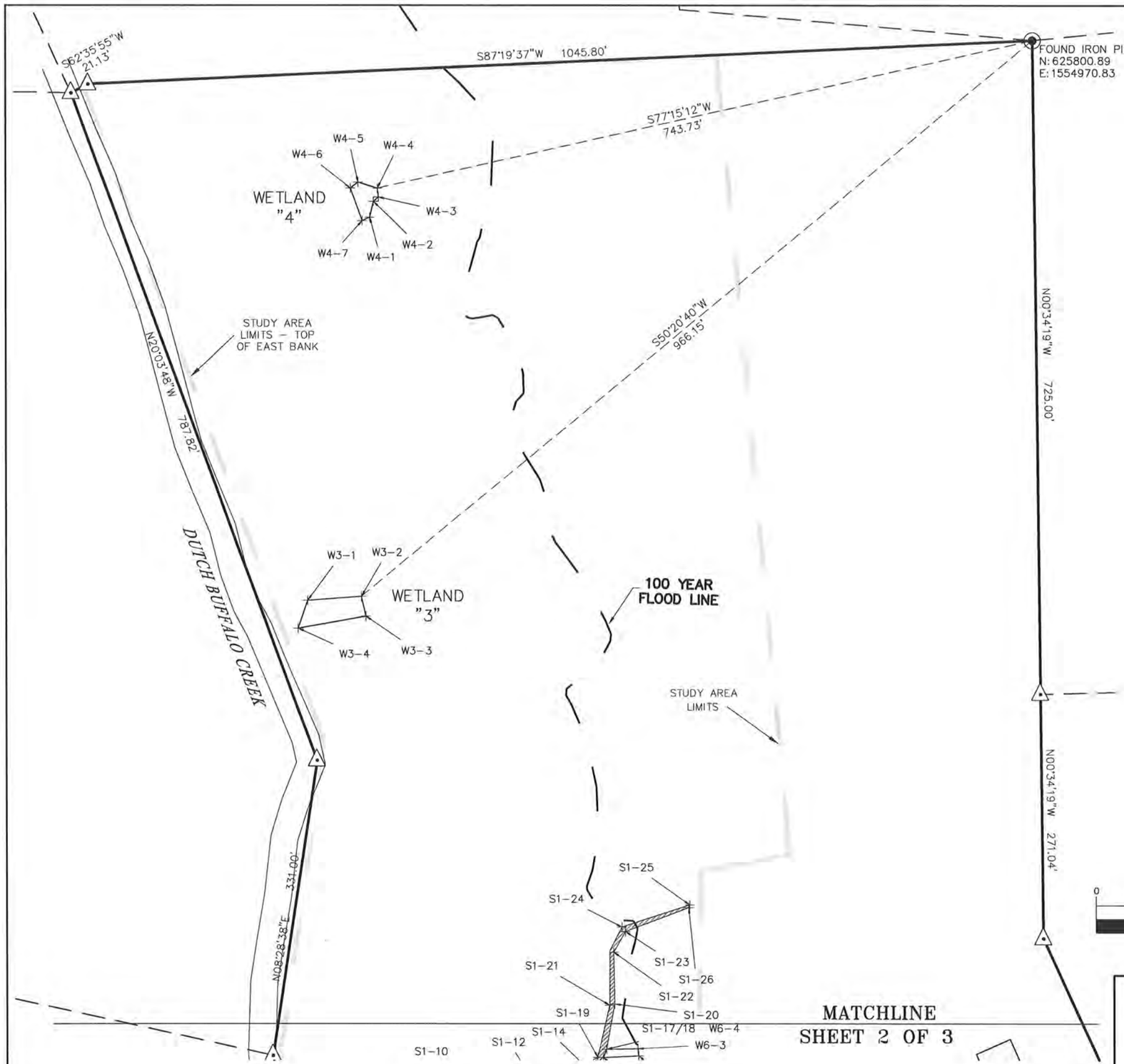
NORTH CAROLINA PROFESSIONAL SEAL L-3860 SURVEYOR JAMES M. GELLENTHIN

KCI ASSOCIATES OF NORTH CAROLINA

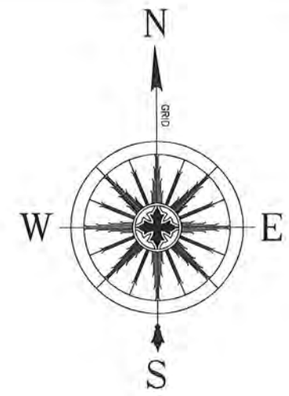
KCI ASSOCIATES OF N.C.
ENGINEERS, SURVEYORS AND PLANNERS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NC 27609
PHONE (919) 783-9214 * FAX (919) 783-9266

WETLAND DELINEATION PLAT
FOR
BUFFALO FLATS RESTORATION
NO. 6 TOWNSHIP
CABARRUS COUNTY
NORTH CAROLINA

DATE:	SCALE:	SHEET:
AUG 18, 2010	1" = 120'	2 OF 3



NOTES:
SEE SHEET 1 OF 3 FOR GENERAL NOTES.



LEGEND:

- EXISTING IRON PIN
- WETLANDS
- STREAMS
- STUDY AREA LIMITS

"THIS CERTIFIES THAT THIS COPY OF THIS PLAT ACCURATELY DEPICTS THE BOUNDARY OF THE JURISDICTION OF SECTION 404 OF THE CLEAN WATER ACT AS DETERMINED BY THE UNDERSIGNED ON THIS DATE. UNLESS THERE IS A CHANGE IN THE LAW OR OR OUR PUBLISHED REGULATIONS, THIS DETERMINATION OF SECTION 404 JURISDICTION MAY BE RELIED UPON FOR A PERIOD NOT TO EXCEED FIVE YEARS FROM THIS DATE. THIS DETERMINATION WAS MADE UTILIZING THE 1987 CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL."

NAME: Steve Chapin

TITLE: Reg. Specialist

DATE: 10/1/10

AID: 2010-01570

I, JAMES M. GELLENTHIN, HEREBY DECLARE THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM A SURVEY MADE UNDER MY SUPERVISION, THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED THAT THE RATIO OF PRECISION AS CALCULATED IS GREATER THAN 1:10,000; THAT THIS MAP DOES NOT REPRESENT AN OFFICIAL BOUNDARY SURVEY AND HAS NOT BEEN PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 9TH DAY OF SEPTEMBER, 2010.

GRAPHIC SCALE
0 60 120 240
1 INCH = 120 FEET

NORTH CAROLINA REGISTRATION NUMBER L-3860
JAMES M. GELLENTHIN

NORTH CAROLINA PROFESSIONAL SEAL L-3860 SURVEYOR JAMES M. GELLENTHIN

KCI ASSOCIATES OF NORTH CAROLINA

KCI ASSOCIATES OF N.C.
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WETLAND DELINEATION PLAT
FOR
BUFFALO FLATS RESTORATION
NO. 6 TOWNSHIP
CABARRUS COUNTY
NORTH CAROLINA

DATE:	SCALE:	SHEET:
AUG 18, 2010	1" = 120'	3 OF 3

REFERENCE WETLAND

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Buffalo Flats Wetland Restoration Project (Jordan Property)	Date:	11-5-10
Applicant/Owner:	KCI Associates of NC	County:	Cabarrus
Investigator:	T. Morris	State:	North Carolina

			Community ID:	PFO
Do Normal Circumstances exist on the site?	☒ Yes	☐ No	Transect ID:	NA
Is the site significantly disturbed (Atypical Situation)?	☐ Yes	☒ No	Plot ID:	1
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐ Yes	☐ No		

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	speckled alder (Alnus serrulata)	S	FACW+	8	red maple (acer rubrum)	T	FAC
2	soft rush (Juncus effusus)	H	FACW+	9	river birch (betula nigra)	T	FACW
3	Canada rush (Juncus Canadensis)	H	OBL	10	Virginia pine (Pinus virginiana)	T	FAC
4	woolgrass (Scirpus cyperinus)	H	OBL	11	Quercus phellos (willow oak)	T	FACW-
5	American sycamore (Platanus occidentalis)	T	FACW-	12			
6	black raspberry (Rubus occidentalis)	H	FACU	13			
7	sweet gum (*Liquidambar styraciflua)*	T	FAC+	14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-):

Remarks: Sparse canopy, dense herbaceous cover.

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

X No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 18 (In.)
- Depth to Saturated Soil: 6 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 inches
- ☒ Water Marks
- ☒ Drift Lines
- ☒ Sediment Deposits
- ☒ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels in Upper 12"
- ☒ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks: Evidence of inundation.

SOILS

Map Unit Name (Series and Phase): Wedhadkee Loam
Taxonomy (Subgroup): Typic Fluvaquents

Drainage Class: Poorly Drained
Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6	A	10 YR 6/3	10 YR 4/4	Few/Faint	Silt Loam
6-15	B	10 YR 5/2	10YR 4/4	Common/Distinct	Silt Loam
15-22	C	10 YR 6/1	None	None	Silty Clay Loam

Hydric Soil Indicators:
- ☐ Histosol
- ☐ Histic Epipedon
- ☒ Sulfidic Odor
- ☒ Aquatic Moisture Regime
- ☒ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☒ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

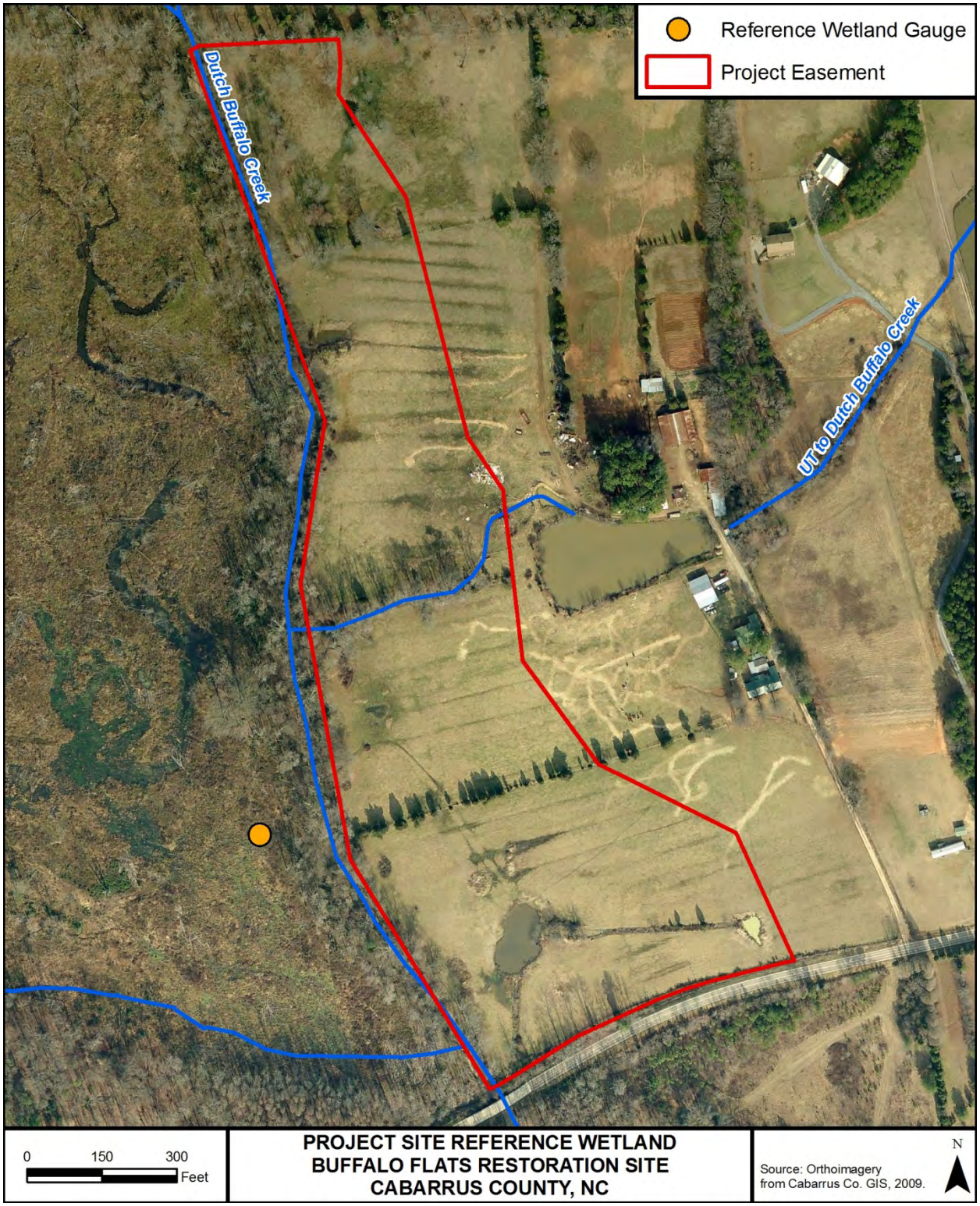
Remarks: Hydric Soil criteria met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒ Yes	☐ No	Is this Sampling Point Within a Wetland?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No			
Hydric Soils Present?	☒ Yes	☐ No			

Remarks: Hydrology, vegetation and soils criteria indicate that the plot is within a wetland.

Form Content Approved by HQUSACE 3/92


Reference Wetland Gauge
Project Easement
Dutch Buffalo Creek
UT to Dutch Buffalo Creek
0
150
300
Feet
PROJECT SITE REFERENCE WETLAND
BUFFALO FLATS RESTORATION SITE
CABARRUS COUNTY, NC
Source: Orthoimagery
from Cabarrus Co. GIS, 2009.
N

FHWA Categorical Exclusion Form

Ecosystem Enhancement PROGRAM

November 8, 2010

Mr. Tim Morris – Project Manager
KCI Technologies, Inc.
4601 Six Forks Road, Suite 220
Raleigh, North Carolina 27609

Subject: Categorical Exclusion Form for the
Buffalo Flats Wetland Mitigation Site – Full Delivery Project
Yadkin River Basin – CU# 03040105 – Cabarrus County
Contract No. 003273

Dear Mr. Morris:

Attached please find the approved Categorical Exclusion Form for the subject full delivery project. I have approved your invoice, in the amount of $62,175.00 (5% of contract) for completion of the Task 1 deliverable. Please include a copy of the form in your Mitigation Plan.

If you have any questions, or wish to discuss this matter further, please contact me at any time. I can be reached at (919) 715-1656, or email me at guy.pearce@ncdenr.gov

Sincerely,

Guy C. Pearce
EEP Full Delivery Program Supervisor

cc: file

Categorical Exclusion Form for Ecosystem Enhancement Program Projects
Version 1.4

Note: Only Appendix A should to be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	Buffalo Flats Wetland Restoration Project
County Name:	Cabarrus County, NC
EEP Number:	003273
Project Sponsor:	KCI Technologies, Inc.
Project Contact Name:	Tim Morris
Project Contact Address:	4601 Six Forks Rd, Suite 220, Raleigh, NC 27609
Project Contact E-mail:	Tim.morris@kci.com
EEP Project Manager:	Guy Pearce

Project Description

This project proposes to improve water quality and protect aquatic habitat in an agricultural area that has undergone degradation from unrestricted activities and human induced disturbances. This wetland restoration site is located along the floodplain of Dutch Buffalo Creek, north and east of the Town of Concord, NC.

For Official Use Only

Reviewed By: Guy C. Pearce

11/8/2010
Date

Guy C. Pearce
EEP Project Manager

Conditional Approved By:

Date

For Division Administrator
FHWA

☐ Check this box if there are outstanding issues

Final Approval By:

11-5-10
Date

For Division Administrator
FHWA

RECEIVED
OCT 14 2010
NC ECOSYSTEM ENHANCEMENT PROGRAM

Part 2: All Projects Regulation/Question	Response
Coastal Zone Management Act (CZMA)	
1. Is the project located in a CAMA county?	☐ Yes ☒ No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?	☐ Yes ☐ No ☒ N/A
3. Has a CAMA permit been secured?	☐ Yes ☐ No ☒ N/A
4. Has NCDCM agreed that the project is consistent with the NC Coastal Management Program?	☐ Yes ☐ No ☒ N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	
1. Is this a "full-delivery" project?	☒ Yes ☐ No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?	☐ Yes ☒ No ☐ N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☒ No ☐ N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☐ No ☒ N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?	☐ Yes ☐ No ☒ N/A
6. Is there an approved hazardous mitigation plan?	☐ Yes ☐ No ☒ N/A
National Historic Preservation Act (Section 106)	
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?	☐ Yes ☒ No
2. Does the project affect such properties and does the SHPO/THPO concur?	☐ Yes ☐ No ☒ N/A
3. If the effects are adverse, have they been resolved?	☐ Yes ☐ No ☒ N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)	
1. Is this a "full-delivery" project?	☒ Yes ☐ No
2. Does the project require the acquisition of real estate?	☒ Yes ☐ No ☐ N/A
3. Was the property acquisition completed prior to the intent to use federal funds?	☐ Yes ☒ No ☐ N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?	☒ Yes ☐ No ☐ N/A

Part 3: Ground-Disturbing Activities Regulation/Question	Response
American Indian Religious Freedom Act (AIRFA)	
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?	☐ Yes ☒ No
2. Is the site of religious importance to American Indians?	☐ Yes ☐ No ☒ N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?	☐ Yes ☒ No ☐ N/A
4. Have the effects of the project on this site been considered?	☐ Yes ☐ No ☒ N/A
Antiquities Act (AA)	
1. Is the project located on Federal lands?	☐ Yes ☒ No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?	☐ Yes ☒ No ☐ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☒ No ☐ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☒ N/A
Archaeological Resources Protection Act (ARPA)	
1. Is the project located on federal or Indian lands (reservation)?	☐ Yes ☒ No
2. Will there be a loss or destruction of archaeological resources?	☐ Yes ☒ No ☐ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☒ No ☐ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☒ N/A
Endangered Species Act (ESA)	
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?	☒ Yes ☐ No
2. Is Designated Critical Habitat or suitable habitat present for listed species?	☐ Yes ☒ No ☐ N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?	☐ Yes ☒ No ☐ N/A
4. Is the project "likely to adversely affect" the specie and/or "likely to adversely modify" Designated Critical Habitat?	☐ Yes ☐ No ☒ N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination? (By virtue of no-response)	☒ Yes ☐ No ☐ N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?	☐ Yes ☒ No ☐ N/A

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	☐ Yes ☒ No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	☐ Yes ☐ No ☒ N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	☐ Yes ☐ No ☒ N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	☒ Yes ☐ No
2. Has NRCS determined that the project contains prime, unique, statewide or local important farmland?	☒ Yes ☐ No ☐ N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	☒ Yes ☐ No ☐ N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	☐ Yes ☒ No
2. Have the USFWS and the NCWRC been consulted?	☒ Yes ☐ No ☐ N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	☐ Yes ☒ No
2. Has the NPS approved of the conversion?	☐ Yes ☐ No ☒ N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	☐ Yes ☒ No
2. Is suitable habitat present for EFH-protected species?	☐ Yes ☐ No ☒ N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	☐ Yes ☐ No ☒ N/A
4. Will the project adversely affect EFH?	☐ Yes ☐ No ☒ N/A
5. Has consultation with NOAA-Fisheries occurred?	☐ Yes ☐ No ☒ N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	☐ Yes ☒ No
2. Have the USFWS recommendations been incorporated?	☐ Yes ☐ No ☒ N/A
Wilderness Act	
1. Is the project in a Wilderness area?	☐ Yes ☒ No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	☐ Yes ☐ No ☒ N/A

FEMA Compliance – EEP Floodplain Requirements Checklist

EEP Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program, NC Floodplain Mapping program and Ecosystem Enhancement Program to be filled for all EEP projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. Edward Curtis), NC Floodplain Mapping Unit (attn. John Gerber) and NC Ecosystem Enhancement Program.

Project Location

Name of project:	Buffalo Flats Wetland Restoration
Name if stream or feature:	Dutch Buffalo Creek
County:	Cabarrus
Name of river basin:	Yadkin
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Unincorporated/Cabarrus County
DFIRM panel number for entire site:	5652
Consultant name:	Kristin Knight-Meng
Phone number:	(919) 923-2854
Address:	4601 Six Forks Rd, Suite 220 Raleigh, NC 27609

Design Information

Provide a general description of project (one paragraph). Include project limits on a reference orthophotograph at a scale of 1" = 500".

Summarize stream reaches or wetland areas according to their restoration priority.

Wetland Area	Length	Priority
Wetland Area 1	*3.4 acres*	*Restoration*
Wetland Area 2	*11.2 acres*	*Restoration*
Wetland Area 3	*1.2 acres*	*Creation*

Floodplain Information

Is project located in a Special Flood Hazard Area (SFHA)?

☑ Yes ☐ No

If project is located in a SFHA, check how it was determined:

☐ Redelineation

☐ Detailed Study

☑ Limited Detail Study

☐ Approximate Study

☐ Don't know

List flood zone designation: Zone AE

Check if applies:

☑ AE Zone

- ☐ Floodway
- ☐ Non-Encroachment
- ☑ None

☐ A Zone

- ☐ Local Setbacks Required
- ☐ No Local Setbacks Required

If local setbacks are required, list how many feet:

Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?

☐ Yes ☒ No

Land Acquisition (Check)

☐ State owned (fee simple)

☐ Conservation easment (Design Bid Build)

☑ Conservation Easement (Full Delivery Project)

Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)

Is community/county participating in the NFIP program?

☒ Yes ☐ No

Note: if community is not participating, then all requirements should be addressed to NFIP (attn: Edward Curtis, (919) 715-8000 x369)

Name of Local Floodplain Administrator: Robbie Foxx
Phone Number: (704) 920-2138

Floodplain Requirements

This section to be filled by designer/applicant following verification with the LFPA

☐ No Action

☑ No Rise

☐ Letter of Map Revision

☐ Conditional Letter of Map Revision

☐ Other Requirements

List other requirements:

Comments:

Name: _Kristin Knight_____ Signature: _____

Title: _Environmental Scientist_____ Date: _____

13.5 Appendix C. Mitigation Work Plan Data and Analyses

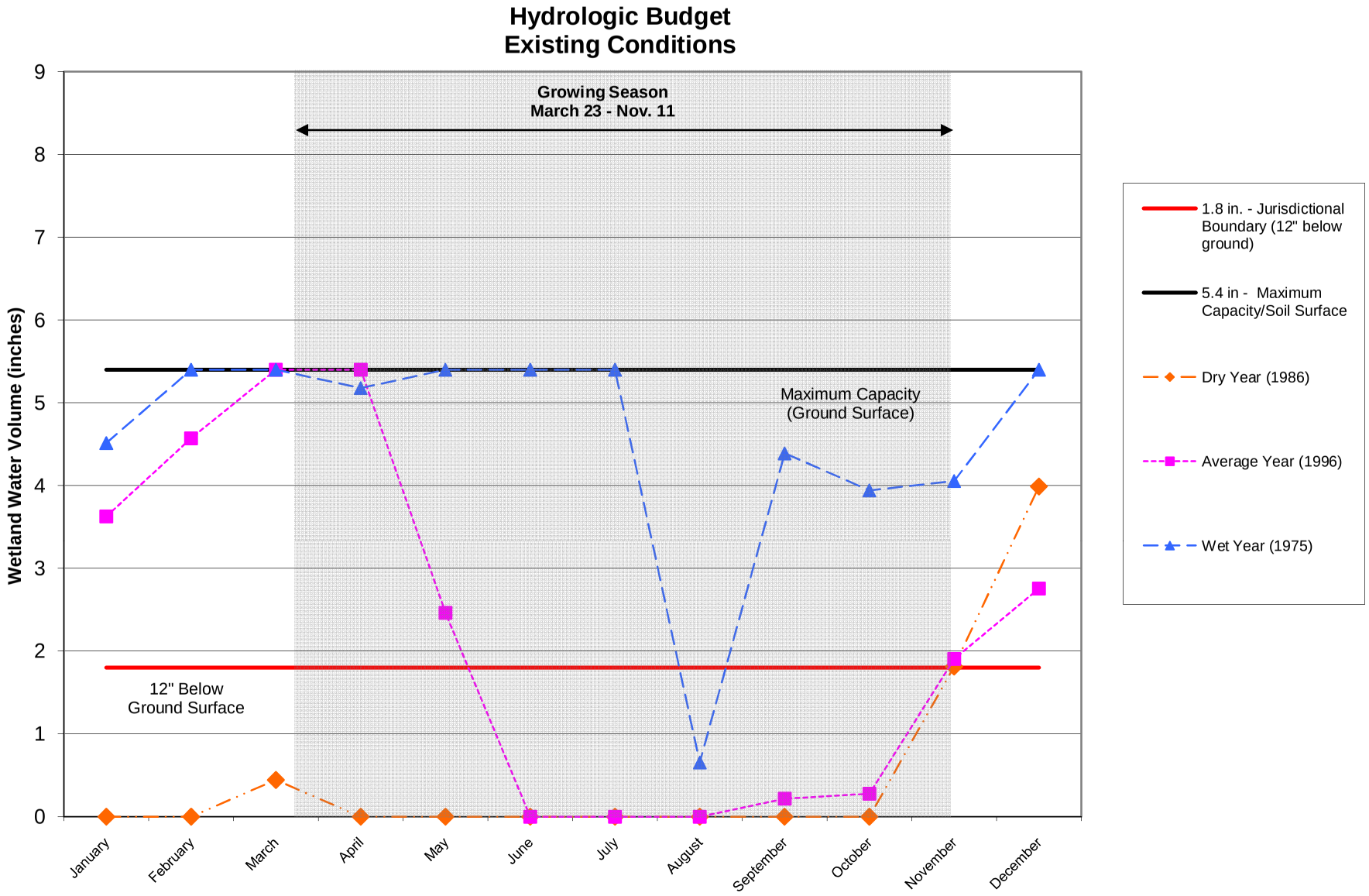
Groundwater Modeling/Hydrologic Budget

Buffal Flats Restoration Site - Existing Conditions

Dry Year	*Water Inputs*			*Water Outputs*			Change in Storage	Excess Water	Wetland Volume
1986	**P**	**Si ***	**Gi**	**PET**	**So**	**Go**			
January	1.16	0.02	0.00	0.13	0.02	1.04	-0.01	0.00	0.00
February	1.23	0.00	0.00	0.57	0.00	1.04	-0.38	0.00	0.00
March	2.55	0.07	0.00	1.07	0.07	1.04	0.44	0.00	0.44
April	1.12	0.04	0.00	2.75	0.04	1.04	-2.67	0.00	0.00
May	1.64	0.01	0.00	3.82	0.01	1.04	-3.22	0.00	0.00
June	0.32	0.00	0.00	6.45	0.00	1.04	-7.17	0.00	0.00
July	4.39	0.05	0.00	6.98	0.05	1.04	-3.63	0.00	0.00
August	5.03	0.22	0.00	5.16	0.22	1.04	-1.17	0.00	0.00
September	1.13	0.00	0.00	4.13	0.00	1.04	-4.04	0.00	0.00
October	3.33	0.33	0.00	2.36	0.33	1.04	-0.07	0.00	0.00
November	3.84	0.03	0.00	0.99	0.03	1.04	1.81	0.00	1.81
December	3.46	0.00	0.00	0.25	0.00	1.04	2.17	0.00	3.99
Annual Totals	**29.20**	**0.78**	**0.00**	**34.64**	**0.78**	**12.48**			

Avg. Year	*Water Inputs*			*Water Outputs*			Change in Storage	Excess Water	Wetland Volume
1996	**P**	**Si ***	**Gi**	**PET**	**So**	**Go**			
January	4.81	0.32	0.00	0.14	0.32	1.04	3.63	0.00	3.63
February	2.40	0.29	0.00	0.42	0.29	1.04	0.94	0.00	4.57
March	3.44	0.10	0.00	0.72	0.10	1.04	1.68	0.85	5.40
April	3.94	0.06	0.00	2.22	0.06	1.04	0.68	0.68	5.40
May	2.40	0.00	0.00	4.30	0.00	1.04	-2.94	0.00	2.46
June	3.77	0.12	0.00	5.79	0.12	1.04	-3.06	0.00	0.00
July	5.69	0.28	0.00	6.23	0.28	1.04	-1.58	0.00	0.00
August	4.40	0.05	0.00	5.38	0.05	1.04	-2.02	0.00	0.00
September	5.26	0.64	0.00	4.00	0.64	1.04	0.22	0.00	0.22
October	3.18	0.27	0.00	2.08	0.27	1.04	0.06	0.00	0.28
November	3.30	0.02	0.00	0.63	0.02	1.04	1.63	0.00	1.91
December	2.34	0.01	0.00	0.45	0.01	1.04	0.85	0.00	2.76
Annual Totals	**44.93**	**2.15**	**0.00**	**32.35**	**2.15**	**12.48**			

Wet Year	*Water Inputs*			*Water Outputs*			Change in Storage	Excess Water	Wetland Volume
1975	**P**	**Si ***	**Gi**	**PET**	**So**	**Go**			
January	6.01	0.41	0.00	0.46	0.41	1.04	4.51	0.00	4.51
February	3.09	0.09	0.00	0.61	0.09	1.04	1.44	0.55	5.40
March	6.99	0.47	0.00	0.79	0.47	1.04	5.16	5.16	5.40
April	2.93	0.06	0.00	2.11	0.06	1.04	-0.22	0.00	5.18
May	10.29	1.69	0.00	4.19	1.69	1.04	5.06	4.84	5.40
June	6.7	0.61	0.00	5.35	0.61	1.04	0.31	0.31	5.40
July	9.2	2.30	0.00	5.61	2.30	1.04	2.55	2.55	5.40
August	2.34	0.10	0.00	6.04	0.10	1.04	-4.74	0.00	0.66
September	8.75	1.11	0.00	3.98	1.11	1.04	3.73	0.00	4.39
October	3.19	0.36	0.00	2.60	0.36	1.04	-0.45	0.00	3.94
November	2.34	0.13	0.00	1.19	0.13	1.04	0.11	0.00	4.06
December	2.95	0.04	0.00	0.31	0.04	1.04	1.60	0.26	5.40
Annual Totals	**64.78**	**7.37**	**0.00**	**33.23**	**7.37**	**12.48**			


Hydrologic Budget
Existing Conditions
Growing Season
March 23 - Nov. 11
Maximum Capacity
(Ground Surface)
12" Below
Ground Surface
Wetland Water Volume (inches)
0
1
2
3
4
5
6
7
8
9
January
February
March
April
May
June
July
August
September
October
November
December
1.8 in. - Jurisdictional Boundary (12" below ground)
5.4 in - Maximum Capacity/Soil Surface
Dry Year (1986)
Average Year (1996)
Wet Year (1975)

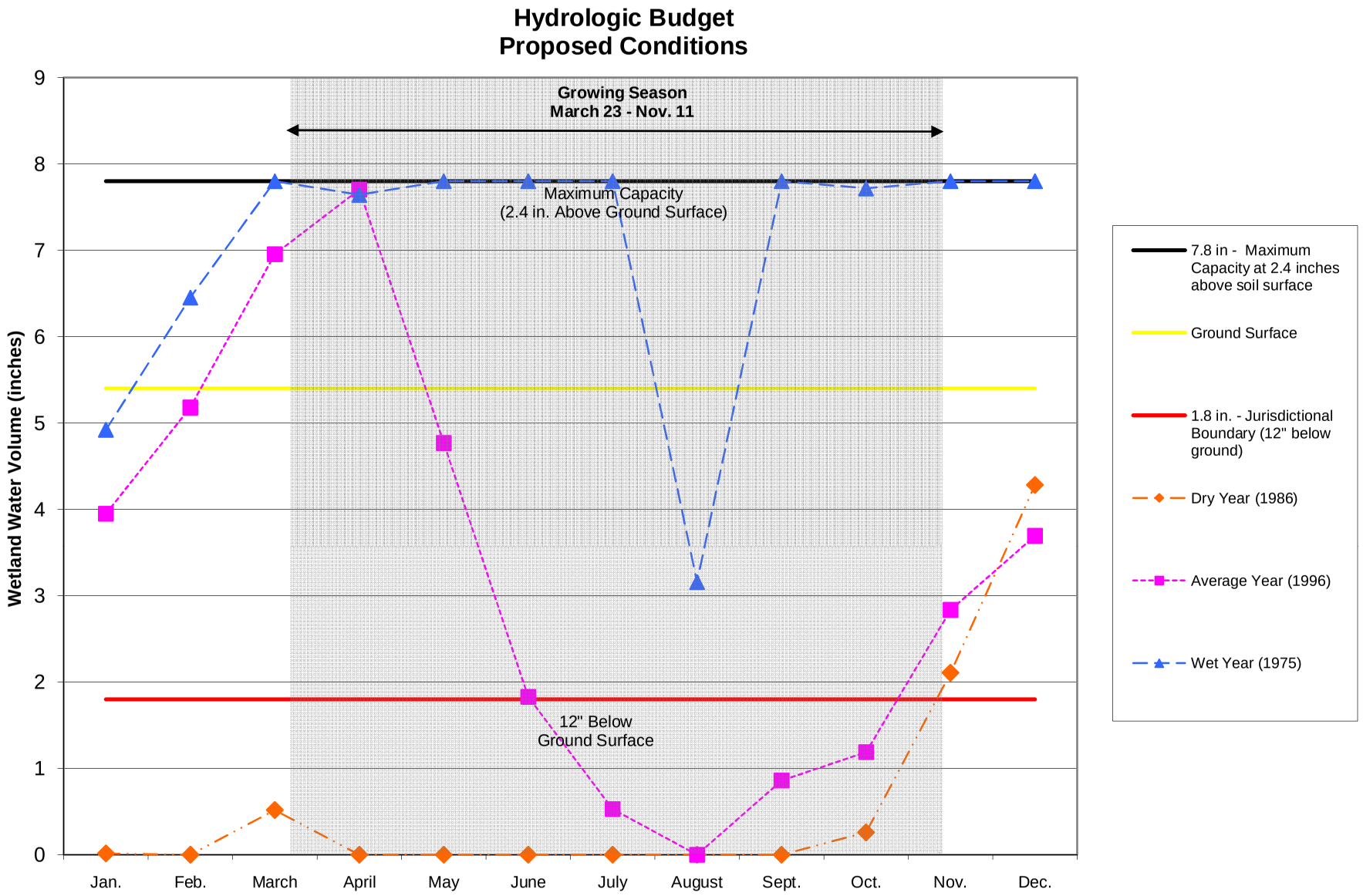
Buffalo Flats Restoration Site - Proposed Conditions

Dry Year	*Water Inputs*			*Water Outputs*			Change in	Excess	
1986	**P**	**Si ***	**Gi**	**PET**	**So**	**Go**	**Storage**	**Water**	**Wetland Volume**
January	1.16	0.02	0.00	0.13	0.00	1.04	0.01	0.00	0.01
February	1.23	0.00	0.00	0.57	0.00	1.04	-0.38	0.00	0.00
March	2.55	0.07	0.00	1.07	0.00	1.04	0.52	0.00	0.52
April	1.12	0.04	0.00	2.75	0.00	1.04	-2.62	0.00	0.00
May	1.64	0.01	0.00	3.82	0.00	1.04	-3.21	0.00	0.00
June	0.32	0.00	0.00	6.45	0.00	1.04	-7.17	0.00	0.00
July	4.39	0.05	0.00	6.98	0.00	1.04	-3.58	0.00	0.00
August	5.03	0.22	0.00	5.16	0.00	1.04	-0.95	0.00	0.00
September	1.13	0.00	0.00	4.13	0.00	1.04	-4.04	0.00	0.00
October	3.33	0.33	0.00	2.36	0.00	1.04	0.26	0.00	0.26
November	3.84	0.03	0.00	0.99	0.00	1.04	1.85	0.00	2.11
December	3.46	0.00	0.00	0.25	0.00	1.04	2.17	0.00	4.28
Annual Totals	**29.20**	**0.78**	**0.00**	**34.64**	**0.00**	**12.48**			

Avg. Year	*Water Inputs*			*Water Outputs*			Change in	Excess	
1996	**P**	**Si ***	**Gi**	**PET**	**So**	**Go**	**Storage**	**Water**	**Wetland Volume**
January	4.81	0.32	0.00	0.14	0.00	1.04	3.95	0.00	3.95
February	2.40	0.29	0.00	0.42	0.00	1.04	1.23	0.00	5.18
March	3.44	0.10	0.00	0.72	0.00	1.04	1.78	0.00	6.95
April	3.94	0.06	0.00	2.22	0.00	1.04	0.75	0.00	7.70
May	2.40	0.00	0.00	4.30	0.00	1.04	-2.94	0.00	4.77
June	3.77	0.12	0.00	5.79	0.00	1.04	-2.94	0.00	1.83
July	5.69	0.28	0.00	6.23	0.00	1.04	-1.30	0.00	0.53
August	4.40	0.05	0.00	5.38	0.00	1.04	-1.97	0.00	0.00
September	5.26	0.64	0.00	4.00	0.00	1.04	0.86	0.00	0.86
October	3.18	0.27	0.00	2.08	0.00	1.04	0.33	0.00	1.19
November	3.30	0.02	0.00	0.63	0.00	1.04	1.65	0.00	2.84
December	2.34	0.01	0.00	0.45	0.00	1.04	0.86	0.00	3.69
Annual Totals	**44.93**	**2.15**	**0.00**	**32.35**	**0.00**	**12.48**			

Wet Year	*Water Inputs*			*Water Outputs*			Change in	Excess	
1975	**P**	**Si ***	**Gi**	**PET**	**So**	**Go**	**Storage**	**Water**	**Wetland Volume**
January	6.01	0.41	0.00	0.46	0.00	1.04	4.92	0.00	4.92
February	3.09	0.09	0.00	0.61	0.00	1.04	1.53	0.00	6.45
March	6.99	0.47	0.00	0.79	0.00	1.04	5.62	4.28	7.80
April	2.93	0.06	0.00	2.11	0.00	1.04	-0.16	0.00	7.64
May	10.29	1.69	0.00	4.19	0.00	1.04	6.75	6.60	7.80
June	6.7	0.61	0.00	5.35	0.00	1.04	0.92	0.92	7.80
July	9.2	2.30	0.00	5.61	0.00	1.04	4.85	4.85	7.80
August	2.34	0.10	0.00	6.04	0.00	1.04	-4.64	0.00	3.16
September	8.75	1.11	0.00	3.98	0.00	1.04	4.84	0.20	7.80
October	3.19	0.36	0.00	2.60	0.00	1.04	-0.08	0.00	7.72
November	2.34	0.13	0.00	1.19	0.00	1.04	0.25	0.16	7.80
December	2.95	0.04	0.00	0.31	0.00	1.04	1.64	1.64	7.80
Annual Totals	**64.78**	**7.37**	**0.00**	**33.23**	**0.00**	**12.48**			

Note: An increase in capacity of 0.2 feet (2.4 inches) of surface water is assumed based on the creation of microtopography during wetland restoration.


Hydrologic Budget
Proposed Conditions
Growing Season
March 23 - Nov. 11
Maximum Capacity
(2.4 in. Above Ground Surface)
12" Below
Ground Surface
Wetland Water Volume (inches)
0
1
2
3
4
5
6
7
8
9
Jan.
Feb.
March
April
May
June
July
August
Sept.
Oct.
Nov.
Dec.
7.8 in - Maximum Capacity at 2.4 inches above soil surface
Ground Surface
1.8 in. - Jurisdictional Boundary (12" below ground)
Dry Year (1986)
Average Year (1996)
Wet Year (1975)

Soil Delineation and Characterization

A detailed soils investigation at the BFRS was conducted by a licensed soil scientist (# 187) to determine the extent and distribution of the hydric soils and to classify the predominate soils to the soil series level. The investigation consisted of delineating the hydric soil boundaries with pink flagging and wooden survey stakes in accordance with the US Army Corps of Engineers, Wetland Delineation Manual (1987) and the USDA Field Indicators Of Hydric Soils In The United States: A Guide for Identifying and Delineating Hydric Soils, Version 7.0 (2010). Areas that were identified as possible hydric soil mapping units were surveyed at a higher intensity until the edge of the mapping unit was identified. The boundary of the hydric and non-hydric soil mapping units were then followed by continual sampling and observations as the boundary line was identified and delineated. In those areas where the boundary was found to be a broad gradient rather than a distinct break, microtopography, landscape position, soil textural changes, redoximorphic features, and depleted matrices were additionally considered to identify the extent of the hydric soils.

In developing a detailed soils map, several soil borings were advanced on the site in the general hydric soil areas identified by landscape position, vegetation and slope. Once the hydric soil borings were identified, the soil scientist marked the points and established a visual line to the next auger boring where again hydric soil conditions were confirmed by additional borings. The soil scientist moved along the edges of the mapping unit and marked each point along the line. To confirm the hydric soil mapping unit and taxonomic classification, soil borings were advanced to a depth of 50 inches. The soil profile descriptions identified the individual horizons in the topsoil and upper subsoil as well as the depth, color, texture, structure, boundary, and evidence of restrictive horizons and redoximorphic features. Delineated hydric soils boundaries were in contrast to those mapped in the Soil Survey of Cabarrus County, North Carolina. The delineated hydric soil boundaries are shown in the following figure, Detailed Soils Map.

Taxonomic Classification

The predominant soils identified on the site were of the Wehadkee (Fine-Loamy, mixed, active, nonacid, thermic Fluvaquentic Endoaquepts) soil series. Inclusions of other soil series include Armenia (Fine, smectitic, thermic Typic Argiaquolls), Altavista (Fine-loamy, mixed, semiactive, thermic Aquic Hapludults), Hiwassee (Fine, Kaolinitic, thermic Rhodic Kanhapludults), Sedgefield (Fine, mixed, active, thermic Aquultic Hapludalfs). The Wehadkee and Armenia series are listed as hydric soils in Cabarrus County, North Carolina. They are defined as hydric due to saturation for a significant period during the growing season. Armenia is also defined as hydric due to ponding for long to very long duration during the growing season. These two soils are listed as hydric on the federal, state and local lists. The Wehadkee and Armenia series are also listed by the Natural Resources Conservation Service (NRCS) as hydric soils.

Profile Description

The Wehadkee series is described as very deep, poorly drained and very poorly drained soils typically found on floodplains along streams that drain from the mountains and piedmont. They are formed in loamy sediments with slopes ranging from 0 to 2 percent. The Armenia series is described as very deep, poorly drained slowly permeable soils that formed in clayey material mostly weathered from dark colored, basic rocks. It is commonly overlain by a thin, 10 to 20 inch, layer of loamy alluvium. These soils are on small to medium floodplains or nearly level upland flats and depressions of the Piedmont Plateau. Slopes commonly are less than 1 percent but range to as much as 2 percent.

Typical Pedon Description of the Wehadkee mapping unit:

WEHADKEE SERIES

TAXONOMIC CLASS: Fine-loamy, mixed, active, nonacid, thermic Fluvaquentic Endoaquepts

TAXONOMIC CLASS: Fine-loamy, mixed, active, nonacid, thermic Fluvaquentic Endoaquepts

TYPICAL PEDON: Wehadkee fine sandy loam -- cultivated (Colors are for moist soil unless otherwise stated.)

Ap--0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium granular structure; very friable; few flakes of mica; moderately acid; abrupt smooth boundary. (6 to 14 inches thick)

Bg1--8 to 17 inches; dark gray (10YR 4/1) loam; common medium prominent strong brown (7.5YR 5/6) soft masses of iron accumulation; weak fine and medium subangular blocky structure; friable; few flakes of mica; moderately acid; clear smooth boundary. (8 to 20 inches thick)

Bg2--17 to 40 inches; gray (10YR 6/1) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) soft masses of iron accumulation; weak medium subangular blocky structure; friable; common flakes of mica; moderately acid; clear smooth boundary. (0 to 30 inches thick)

Cg--40 to 50 inches; gray (10YR 6/1) sandy loam; common medium faint grayish brown (10YR 5/2) iron depletions and prominent strong brown (7.5YR 5/6) soft masses of iron accumulation; massive; friable; common flakes of mica; moderately acid.

TYPE LOCATION: Catawba County, North Carolina; 1/2 mile south of Witherspoon Crossroads on SR 1801, 3/4 mile east on SR 1807, and 650 feet north of bridge on Hogan Creek.

RANGE IN CHARACTERISTICS: Solum thickness ranges from about 20 to more than 60 inches. The content of mica flakes ranges from few too many. The soil ranges from very strongly acid through neutral, but some part of the 10 to 40 inch control section is moderately acid through neutral. Content of rock fragments ranges from 0 to 5 percent by volume in the A and B horizons and from 0 to 20 percent by volume in the C horizons. Fragments are dominantly pebble size.

The Ap or A horizon has hue of 10YR or 2.5Y or is neutral, value of 3 to 6, and chroma of 0 to 4. Some pedons have soft masses of iron accumulation in shades of brown or red. Texture is fine sandy loam, very fine sandy loam, loam, silty clay loam, sandy loam, or silt loam. Some pedons have recent layers of overwash as much as 20 inches thick that are loamy and variable in color. Many pedons have an Ab horizon that has the same color and texture range as the A horizon.

The Bg horizon has hue of 10YR to 5Y or is neutral, value of 4 to 6, and chroma of 0 to 2. Soft masses of iron accumulation are in shades of red, yellow, and brown. Texture is sandy clay loam, silt loam, loam, clay loam, or silty clay loam.

The Cg horizon has hue of 10YR to 5Y or is neutral, value of 4 to 7, and chroma of 0 to 2. Soft masses of iron accumulation are in shades of brown, red, and yellow. Texture is commonly sandy loam, loam, or

silt loam, but in some pedons the Cg horizon contains stratified layers of sandy clay loam, clay loam, silty clay loam, loamy sand, sand, and gravel. Sandy textures are restricted to depths below 40 inches.

Typical Pedon Description of the Armenia mapping unit:

ARMENIA SERIES

The Armenia series consists of very deep, poorly drained, slowly permeable soils that formed in clayey material mostly weathered from dark colored, basic rocks. It is commonly overlain by a thin, 10 to 20 inch, layer of loamy alluvium. These soils are on small to medium flood plains or nearly level upland flats and depressions of the Piedmont Plateau. Slopes commonly are less than 1 percent but range to as much as 2 percent. Near the type location the average annual precipitation is about 46 inches and the average annual temperature is about 61 degrees F.

TAXONOMIC CLASS: Fine, smectitic, thermic Typic Argiaquolls

TYPICAL PEDON: Armenia loam on a 0.5 percent slope, in a pasture on a narrow flood plain. (Colors are for moist soil unless otherwise stated.)

Ap1--0 to 2 inches; dark brown (10YR 3/3) loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to moderate medium granular; friable; many fine and medium roots; many fine pores; few black concretions; neutral; abrupt smooth boundary. (2 to 11 inches thick)

Ap2--2 to 7 inches; dark grayish brown (2.5Y 4/2) loam, grayish brown (10YR 5/2) dry; few fine faint dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure parting to moderate medium granular; friable; common fine and medium roots; many fine pores; few black concretions; neutral; clear wavy boundary. (0 to 5 inches thick)

BA1--7 to 16 inches; very dark gray (10YR 3/1) sandy clay loam, dark gray (10YR 4/1) dry; weak coarse subangular blocky structure; slightly sticky, slightly plastic; common fine roots; common fine and few medium pores; few fine and medium black concretions; neutral; clear wavy boundary. (0 to 14 inches thick)

BA2--16 to 20 inches; very dark grayish brown (2.5Y 3/2) sandy loam, grayish brown (10YR 5/2) dry; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate coarse subangular blocky structure; sticky, plastic; common distinct clay films in pores; few fine roots; common very fine pores; few fine and medium black concretions; neutral; clear wavy boundary. (0 to 8 inches thick)

Btg--20 to 29 inches; very dark gray (N 3/0) clay, gray (10YR 5/1) dry; common fine distinct olive brown (2.5Y 4/4) mottles; moderate coarse subangular blocky structure; sticky, very plastic; common distinct clay films in pores; few fine roots; few fine pores; few fine and medium black concretions; few fine pebbles of feldspar; mildly alkaline; gradual wavy boundary. (8 to 41 inches thick)

Btgc--29 to 48 inches; dark gray (N 4/0) clay loam; few fine faint olive brown (2.5Y 4/4) mottles; weak coarse subangular blocky structure; sticky, very plastic; common faint clay films in pores; few fine roots;

few very fine and fine pores; common fine and medium black concretions; few fine pebbles of feldspar; mildly alkaline; gradual wavy boundary. (0 to 19 inches thick)

BC--48 to 67 inches; mottled gray (5Y 5/1), light olive brown (2.5Y 5/6), light gray (10YR 7/2), and strong brown (7.5YR 5/8) sandy clay loam; massive; sticky, plastic; pockets of clay and coarse sandy clay loam; common faint clay films in some pores; few very fine pores; common fine and medium black concretions; few fine pebbles of quartz and feldspar; neutral; clear wavy boundary. (0 to 20 inches thick)

C--67 to 80 inches; mottled gray (5Y 5/1), strong brown (7.5YR 5/8); light gray (10YR 7/2), and reddish brown (5YR 4/3) sandy clay loam; massive; friable; common fine pebbles of feldspar; few fine and medium pebbles of quartz; slightly acid.

TYPE LOCATION: Chester County, South Carolina; 8.2 miles northeast of Chester on State Highway 191; 1,050 feet west of junction of State Highway 191 and 323; 100 feet north of Highway 191; 25 feet east of drainageway.

RANGE IN CHARACTERISTICS: Solum thickness is 30 to more than 60 inches. Depth to bedrock is more than 5 feet. Content of dark concretions range from few to common. Content of pebbles range from 0 to 6 percent by volume. The A horizon is moderately acid to neutral and the B and C horizons are slightly acid to mildly alkaline.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3. Some pedons have recent deposition with a value of 4. It is loam, sandy loam, silt loam, or clay loam.

The Btg horizon has hue of 10YR to 5Y or it is neutral, value of 3 to 6, and chroma of 2 or less. The Btg horizon commonly is mottled in shades of brown, yellow or olive. It is clay, sandy clay, clay loam, or silty clay.

The Btgc horizon, where present, has hue of 10YR to 5Y or it is neutral, value of 4 to 6, and chroma of 2 or less. It commonly is mottled in shades of brown, yellow or olive. It is clay, sandy clay, clay loam, or silty clay.

The BC horizon, where present, is commonly mottled in hue of 7.5YR to 5Y or it is neutral, value of 3 to 8, and chroma of 1 to 8. Some pedons have a BCg horizon that has matrix color with chroma of 2 or less and mottles in shades of yellow, olive, and black. The BC horizon is sandy clay loam or clay loam.

The C or Cg horizon is mottled in hue of 7.5YR to 5Y or it is neutral, value of 3 to 8, and chroma of 1 to 8, or it has matrix chroma of 2 or less and mottles in shades of yellow, olive, brown and black. It is sandy loam, loam, clay loam, or sandy clay loam.

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: **Date:** March 2, 2010

Project: Buffalo Flats **Project #:**

County: Cabarrus **State:** NC

Location: Jordan Farm-Gold Hill Road, Concord, NC **Site/Lot:** **1** (SD # 1)

Soil Series: Wehadkee Variant

Soil Classification: Fine-loamy, mixed,active, nonacid, thermic Fluvaquentic Endoaquepts

AWT: 14" **SHWT:** **Slope:** **Aspect:**

Elevation: **Drainage:** Poorly Drained **Permeability:** Moderately slow

Vegetation: Pasture grasses

Borings terminated at 38 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	PERM. in/hr	NOTES
Ap1	0-4	10YR 4/2		sl	1fgr	mfr		Collivium
Ap2	4-11	10YR 5/3	10YR 5/2c2d	l	1mgr	mfr		Colluvium
			7.5YR 4/4c1d					
Ab	11-13	10YR 6/2		sl	1fsbk	mfr		
Bg1	13-18	10YR 5/2	10YR 5/4c2d	l	1fsbk	mfr		
Bg2	18-30	10YR 6/2	10YR 5/3m2d	sl-ls	1fsbk	mfr		
Bg3	30-36		10YR 5/2	scl	1msbk	mfr		
			10YR 5/3					
			10YR 5/6					
Bg4	36-43		10YR 6/1	sc	1msbk	mfi		
			10YR 5/4					
Cg	43+	10YR 6/1		sl	massive	mfr		

COMMENTS:

DESCRIBED BY: Steven F. Stokes 3/2/2010

KCI
ASSOCIATES OF
NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: _____ **Date:** March 2, 2010

Project: Buffalo Flats **Project #:** _____

County: Cabarrus **State:** NC

Location: Jordan Farm-Gold Hill Road, Concord, NC **Site/Lot:** 2 (SD # 2)

Soil Series: Wehadkee Variant

Soil Classification: Fine-loamy, mixed,active, nonacid, thermic Fluvaquentic Endoaquepts

AWT: 12" **SHWT:** _____ **Slope:** _____ **Aspect:** _____

Elevation: _____ **Drainage:** Poorly Drained **Permeability:** slow

Vegetation: Pasture Grasses

Borings terminated at 50 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	PERM. in/hr	NOTES
Ap1	0-4	10YR 4/2	10YR 4/4	sl	1fgr	mfr		
Ap2	4-10	10YR 4/1	10YR 4/4c2d	sl	1fgr	mfr		
E	10-13	10YR 6/1		ls	1fgr	mfr		
Bg1	13-18	10YR 5/1	10YR 5/6c2d	sc	1msbk	mfi		
Cg1	18-24		4/5GY	sc	massive	mfi		
			10YR 5/1					
			10YR 5/4					
Cg2	24-50	10YR 5/1	4/5GY	sc	massive	mfi		

COMMENTS:

DESCRIBED BY: Steven F. Stokes 3/2/2010

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** August 18, 2010
Project: Buffalo Flats Wetland Restoration Site **Project #:** 20100798
County: Cabarrus **State:** NC
Location: 4939 Gold Hill Road **Site/Lot:** **3** (BF#1 Pasture # 2)
Soil Series: Armenia
Soil Classification: Fine, smectitic, thermic Typic Argiaquolls
AWT: > 58" **SHWT:** 3"-8" **Slope:** 0-1% **Aspect:**
Elevation: ~657' **Drainage:** Poorly Drained **Permeability:** slow
Vegetation: Pasture Grasses
Borings terminated at 58 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
Ap1	0-3	10YR 3/2		sl	1fgr	mfr	as	
Ap2	3-8	10YR 5/2		sl	1fsbk	mfr	cw	
BA1	8-14	10YR 5/1	10YR 4/4f1f	sl	1fsbk	mfr	cw	
BA2	14-19	10YR 5/2	10YR5/4c2d	scl	1fsbk	mfr	cw	
Btg1	19-36	2.5Y6/2	10YR5/6c2d	sc	2msbk	mfi	gw	
Cg1	36-46	5/10Y	10YR5/6c2p	c	massive	mfi	cw	
Cg2	46-58	2.5Y6/2	10YR5/6c2d	c	massive	mfi		

COMMENTS:
Pedon did not exhibit the concretions commonly associated with this soil.

DESCRIBED BY: SFS DATE: 8/18/2010

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** August 18, 2010
Project: Buffalo Flats Wetland Restoration Site **Project #:** 20100798
County: Cabarrus **State:** NC
Location: 4939 Gold Hill Road **Site/Lot:** **4** (BF3 - Pasture # 3)
Soil Series: Wehadkee Variant
Soil Classification: Fine-Loamy, mixed, active, nonacid, thermic Fluvaquentic Endoaquepts
AWT: 48" **SHWT:** 3-5" **Slope:** 0-2% **Aspect:**
Elevation: ~660' **Drainage:** Poorly Drained **Permeability:** moderately slow
Vegetation: Pasture Grasses
Borings terminated at 48 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
Ap1	0-3	10YR4/1	2.5YR3/6f1p	sl	1fgr	mfr		
Ap2	3-5	10YR 5/1	10YR5/4f1f	sl	1fgr	mfr		
Ab1	5-8	10YR4/2	10YR6/4f1f	sl	1fgr	mfr		
Bg1	8-12	10YR5/2	2.5Y6/2f1f	scl	1fsbk	mfr		
Bg2	12-18	10YR5/1	2.5Y5/2c2d	scl	1fsbk	mfr		
Bg3	18-36	10YR5/1	10YR5/6c2d	sc	2msbk	mfi		
Bg4	36-40	2.5Y6/2	5/5GYc2p	sc	2msbk	mfi		
			10YR5/6c2d					
Cg	40-48	2.5Y6/2	5/5GYc2p	scl	massive	mfi		
			10YR5/6c2d					
R	48							Auger refusal on weathered granite, gneiss,
								or sandstone

COMMENTS:
Apparent water table is at 48 inches.
Wehadkee Variant due to sandy clay B horizon.

DESCRIBED BY: SFS DATE: 8/18/2010

KCI ASSOCIATES OF NORTH CAROLINA, PA

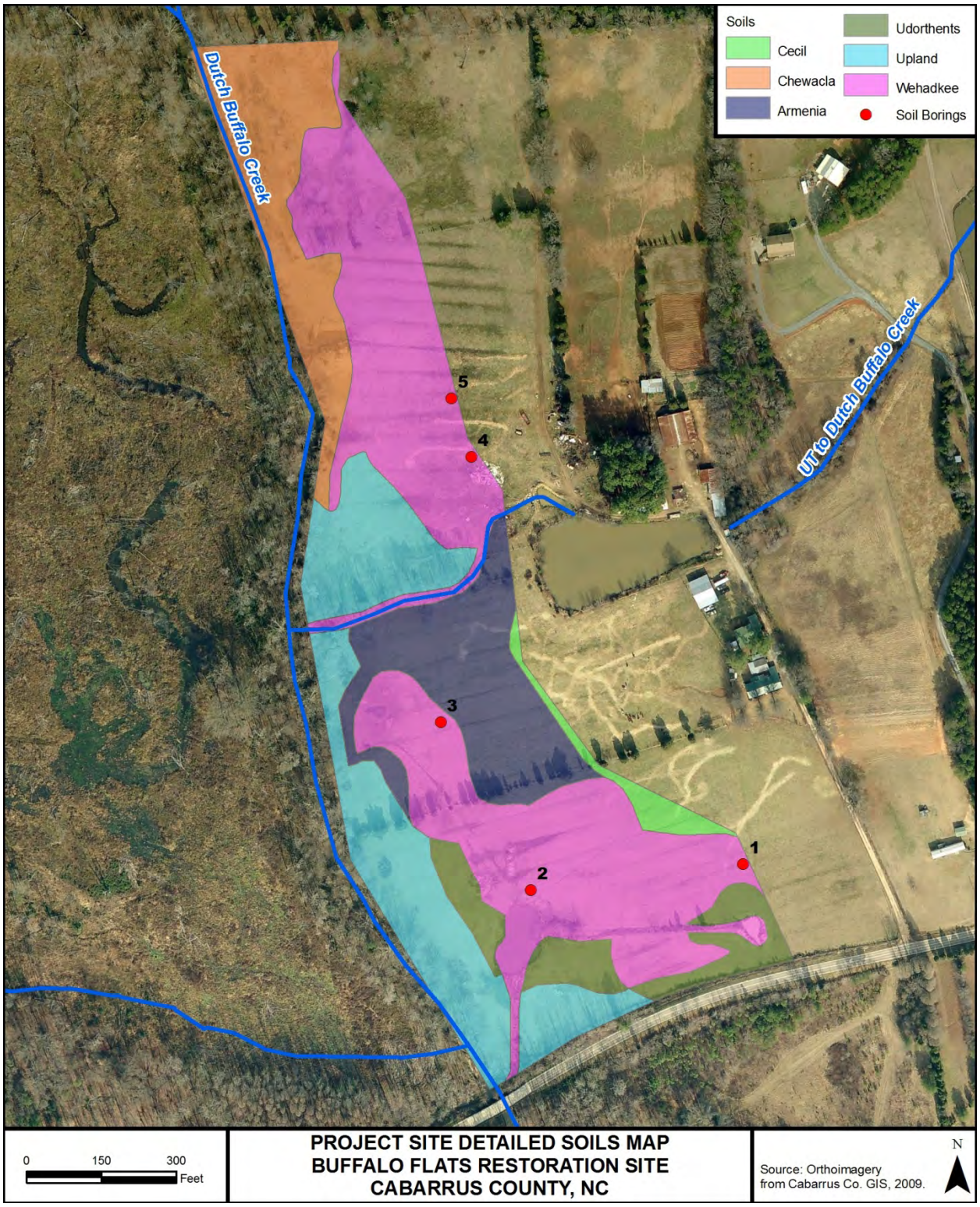
SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** August 18, 2010
Project: Buffalo Flats Wetland Restoration Site **Project #:** 20100798
County: Cabarrus **State:** NC
Location: 4939 Gold Hill Road **Site/Lot:** **5** (BF#2 Pasture # 3)
Soil Series: Wehadkee Variant
Soil Classification: Fine-Loamy, mixed, active, nonacid, thermic Fluvaquentic Endoaquepts
AWT: > 51" **SHWT:** 4"-8" **Slope:** 0-2% **Aspect:**
Elevation: ~660' **Drainage:** Poorly Drained **Permeability:** moderate
Vegetation: Pasture Grasses
Borings terminated at 51 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
Ap1	0-4	10YR5/2	5YR4/6c1d	sl	1fgr	mfr	as	
			10YR5/3c2f					
Ap2	4-8	2.5Y6/2	2.5Y5/6c2d	fsl	1fgr	mfr	cs	
			10YR5/3c2d					
Ab1	8-15	2.5Y6/2	2.5Y5/4f2f	ls	1fgr	ml	cs	
Ab2	15-18	2.5Y5/2		sl	1fsbk	mfr	cs	
Bg1	18-24	2.5Y5/2	10YR5/8c2p	scl	1msbk	mfr	cs	
Bg2	24-38	10YR6/2	10YR5/8c2p	sc	2msbk	mfi	gw	
Bg3	38-46	6/10Y	2.5Y6/2f2p	cl	1msbk	mfr	gw	
			2.5Y5/6f1d					
Cg1	46-51	2.5Y6/4		ls	massive	mfr	cs	
R	51							auger refusal on weathered granite, gneiss,
								or sandstone

COMMENTS:
Wehadkee Variant due to sandy clay B horizon.

DESCRIBED BY: SFS DATE: 8/18/2010


Soils
Cecil
Chewacla
Armenia
Udorthents
Upland
Wehadkee
Soil Borings
Dutch Buffalo Creek
UT to Dutch Buffalo Creek
1
2
3
4
5
0
150
300
Feet
PROJECT SITE DETAILED SOILS MAP
BUFFALO FLATS RESTORATION SITE
CABARRUS COUNTY, NC
Source: Orthoimagery
from Cabarrus Co. GIS, 2009.
N

Appendix D. Project Plan Sheets

KCI JOB# : 20100798

CONTRACT #: 003273

STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM

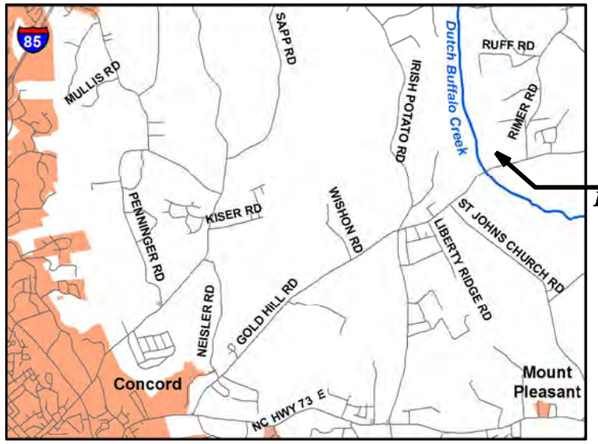
STATE	CONTRACT NUMBER	SHEET NO.	TOTAL SHEETS
N.C.	003273	1	15

A	SUBMITTED WITH MITIGATION PLAN	DEC 2010	
SYM	DESCRIPTION	DATE	APPROVED

REVISIONS

BUFFALO FLATS RESTORATION SITE

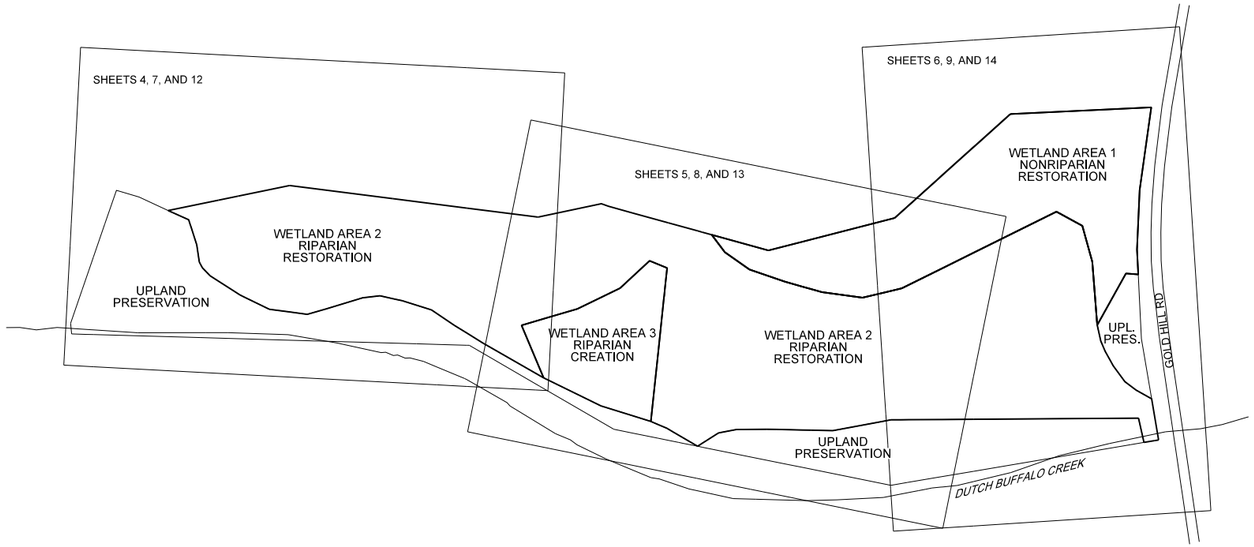
CABARRUS COUNTY, NORTH CAROLINA



PROJECT LOCATION

VICINITY MAP
NOT TO SCALE

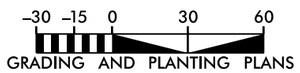
DIRECTIONS FROM RALEIGH:
PROCEED WEST ON I-40 FOR APPROXIMATELY 80 MILES. THEN TRAVEL ON I-85 SOUTH TOWARD HIGH POINT. TAKE EXIT 63 TOWARD KANNAPOLIS. TURN LEFT AT LANE STREET AND ANOTHER LEFT ONTO OLD SALISBURY-CONCORD RD. THEN TAKE A SLIGHT RIGHT ONTO IRISH POTATO RD. TRAVEL FOR 5 MILES AND THEN TURN LEFT AT GOLD HILL RD. THE SITE WILL BE APPROXIMATELY 1.3 MILES AHEAD ON THE LEFT (SHORTLY AFTER CROSSING THE BRIDGE OVER DUTCH BUFFALO CREEK).



INDEX OF SHEETS

**SUBMITTED WITH MITIGATION PLAN*

GRAPHIC SCALES



PROJECT DATA

WETLAND AREA 1
NONRIPARIAN WETLAND RESTORATION = 3.4 ACRES

WETLAND AREA 2
RIPARIAN WETLAND RESTORATION = 11.2 ACRES

WETLAND AREA 3
RIPARIAN WETLAND CREATION = 1.2 ACRES

PROJECT TOTAL AREA OF DISTURBANCE = 20.2 ACRES

Prepared in the Office of:

KCI Associates of North Carolina, P.A.
SUITE 220 LANDMARK CENTER II, 4601 SIX FORKS RD., RALEIGH, NC
ENGINEERS • PLANNERS • ECOLOGISTS

GARY M. MRYNCZA, P.E.
PROJECT ENGINEER

TIM MORRIS & KRISTIN KNIGHT-MENG
WETLAND DESIGN

PROJECT ENGINEER

SIGNATURE: *P.E.*

Prepared for:

Ecosystem Enhancement PROGRAM

GUY PEARCE
CONTRACT ADMINISTRATOR

GENERAL NOTES

BEARING AND DISTANCES:
ALL BEARINGS ARE NAD 1983 GRID BEARINGS.
ALL DISTANCES AND COORDINATES SHOWN ARE HORIZONTAL (GROUND) VALUES.
ALL INFORMATION IS BASED ON THE FOLLOWING KCI CONTROL POINTS.

	NORTHING	EASTING	ELEVATION
KCI#1	624294.47	1555119.40	673.51
KCI#2	624480.81	1554912.23	671.51
KCI#3	624821.38	1554612.95	668.01
KCI#4	625290.70	1554571.63	665.10
KCI#5	623837.52	1554881.96	664.70
KCI#6	625737.58	1554793.95	700.04
KCI#7	623805.73	1554637.20	654.11
KCI#8	624167.99	1554370.86	657.18
KCI#9	623746.57	1554530.92	654.58
KCI#10	623959.39	1554391.07	654.81
KCI#11	624153.55	1554237.65	654.46
KCI#12	624346.88	1554216.71	655.79
KCI#13	624554.67	1554182.40	656.14
KCI#14	624707.53	1554359.64	657.78
KCI#15	625247.79	1554184.79	655.75
KCI#16	625715.89	1553955.01	657.90
KCI#17	625617.33	1554268.00	658.14

GRADING:
-ALL EXCAVATED MATERIALS, INCLUDING NATURAL STONE MEETING SIZE LIMITATIONS, ARE TO BE SALVAGED FOR REUSE WITHIN THE PROJECT AT THE DISCRETION OF THE DESIGNER.
-ALL INFLECTION POINTS BETWEEN SLOPE ANGLES SHALL BE ROUNDED SLIGHTLY IN ORDER TO PROVIDE FOR SMOOTH TRANSITIONS AND A MORE NATURAL APPEARANCE.

UTILITY/SUBSURFACE PLANS:
-NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. EXISTING UNDERGROUND UTILITIES HAVE NOT BEEN VERIFIED. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING A UTILITY LOCATOR AND ESTABLISHING THE EXACT LOCATION OF ANY AND ALL EXISTING UTILITIES IN THE PROJECT REACH.

PROJECT LEGEND

WETLAND MITIGATION

Proposed Filled Ditches

Proposed Ditch Plug

Proposed Rock Stabilized Outlet

TOPOGRAPHY

Minor Contour Line

Major Contour Line — 720

Proposed Contour — 720

Proposed Spot Elevation 490.0

MISCELLANEOUS

Existing Barbed Wire Fencing

Existing Overhead Wire — OH —

Existing Woods Line

Single Tree

SEDIMENT & EROSION CONTROL

Stabilized Construction Entrance SCE

Silt Fence — SF —

Limits of Disturbance — LOD —

Rock Silt Screen (Std. Drawing 1636.01)

Temporary Rock Ford Crossing

Silt Fence Rock Outlet

A	SUBMITTED WITH MITIGATION PLAN	SWL	DEC 2010	APPROVED
	REVISIONS	DESCRIPTION	DATE	

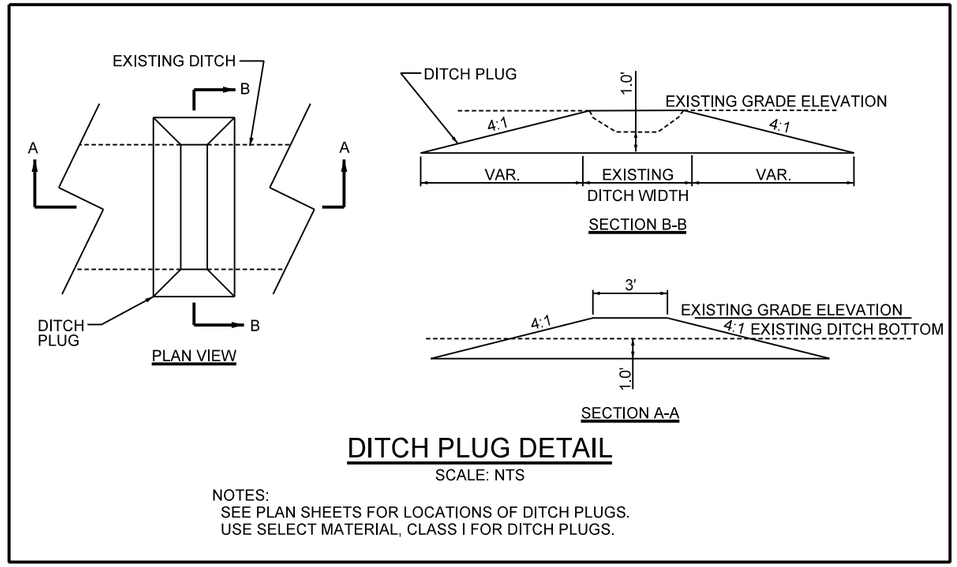
Ecosystem Enhancement Program

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

BUFFALO FLATS
RESTORATION SITE
CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010
SCALE: NOT TO SCALE

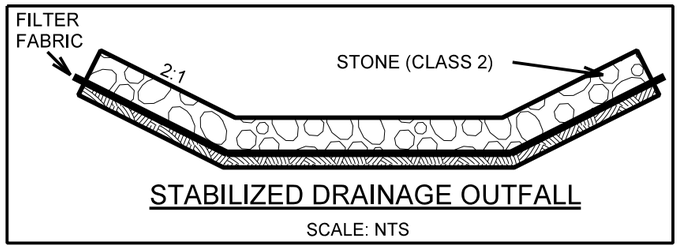
GENERAL NOTES & PROJECT LEGEND



DITCH PLUG DETAIL

SCALE: NTS

NOTES:
SEE PLAN SHEETS FOR LOCATIONS OF DITCH PLUGS.
USE SELECT MATERIAL, CLASS I FOR DITCH PLUGS.



STABILIZED DRAINAGE OUTFALL

SCALE: NTS

REVISIONS			
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	DESCRIPTION		DATE
			APPROVED

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BUFFALO FLATS
RESTORATION SITE
CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010
SCALE: NOT TO SCALE

DETAILS

NC GRID
NAD 83

–30 –15 0 30 60
GRAPHIC SCALE

ADDITIONAL CONSERVATION EASEMENT
HELD BY OTHERS

CONSERVATION EASEMENT

CONSERVATION EASEMENT

DUTCH BUFFALO CREEK

MATCHLINE - SEE SHEET 5

INSTALL ROCK
STABILIZED OUTLET

FILL EXPANDED DITCH
WITH ADJACENT SPOIL

REVISIONS			
DESCRIPTION	DATE	APPROVED	
A SUBMITTED WITH MITIGATION PLAN	DEC 2010	SVM	

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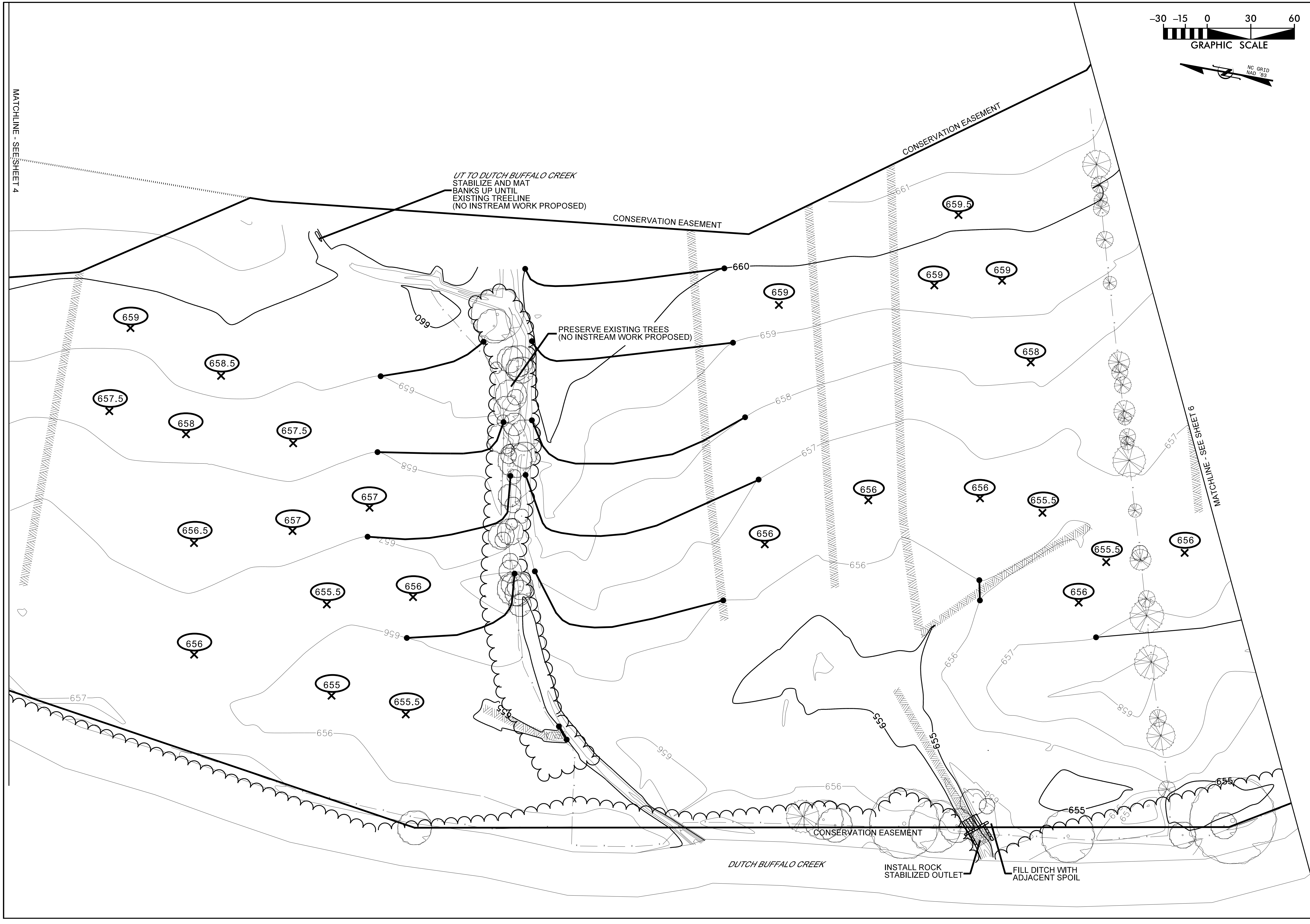
BUFFALO FLATS RESTORATION SITE

CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010
SCALE: 1"=30'

GRADING PLAN


MATCHLINE - SEE SHEET 4
MATCHLINE - SEE SHEET 6
-30 -15 0 30 60
GRAPHIC SCALE
NC GRID NAD '83
CONSERVATION EASEMENT
CONSERVATION EASEMENT
CONSERVATION EASEMENT
UT TO DUTCH BUFFALO CREEK
STABILIZE AND MAT
BANKS UP UNTIL
EXISTING TREELINE
(NO INSTREAM WORK PROPOSED)
PRESERVE EXISTING TREES
(NO INSTREAM WORK PROPOSED)
DUTCH BUFFALO CREEK
INSTALL ROCK
STABILIZED OUTLET
FILL DITCH WITH
ADJACENT SPOIL
659.5
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A	SUBMITTED WITH MITIGATION PLAN	DEC 2010		
SYM.	DESCRIPTION	DATE	APPROVED	

REVISIONS

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BUFFALO FLATS RESTORATION SITE
CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010
SCALE: 1"=30'

GRADING PLAN

SHEET 5 OF 15

MATCHLINE - SEE SHEET 5

CONSERVATION EASEMENT

DUTCH BUFFALO CREEK

REMOVE SPOIL PILES AND USE TO FILL POND

POND

INSTALL ROCK STABILIZED OUTLET

HO

CONSERVATION EASEMENT

GOLD HILL RD

REMOVE SPOIL PILES AND USE TO FILL POND

POND

CONSERVATION EASEMENT

GRAPHIC SCALE

–30 –15 0 30 60

REVISIONS			
A	SVM	SUBMITTED WITH MITIGATION PLAN	DEC 2010
		DESCRIPTION	DATE

APPROVED

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BUFFALO FLATS RESTORATION SITE

CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010

SCALE: 1"=30'

GRADING PLAN

SHEET 6 OF 15

ZONE A

ZONE B

NC GRID NAD '83

–30 –15 0 30 60

GRAPHIC SCALE

CONSERVATION EASEMENT

CONSERVATION EASEMENT

CONSERVATION EASEMENT

MATCHLINE - SEE SHEET 8

DUTCH BUFFALO CREEK

A	SVM	SUBMITTED WITH MITIGATION PLAN	DEC 2010	APPROVED
		DESCRIPTION	DATE	
		REVISIONS		

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BUFFALO FLATS RESTORATION SITE

CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010

SCALE: 1"=30'

PLANTING PLAN

SHEET 7 OF 15

MATCHLINE - SEE SHEET 7

CONSERVATION EASEMENT

CONSERVATION EASEMENT

660

661

659

658

657

656

655

MATCHLINE - SEE SHEET 9

CONSERVATION EASEMENT

DUTCH BUFFALO CREEK

–30 –15 0 30 60

GRAPHIC SCALE

NC GRID NAD 83

ZONE A

ZONE B

REVISIONS			
DESCRIPTION	DATE	APPROVED	
A SUBMITTED WITH MITIGATION PLAN	DEC 2010	SVM	

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BUFFALO FLATS RESTORATION SITE

CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010

SCALE: 1"=30'

PLANTING PLAN

ZONE A

ZONE B

MATCHLINE - SEE SHEET 8

CONSERVATION EASEMENT

DUTCH BUFFALO CREEK

GOLD HILL RD

–30 –15 0 30 60

GRAPHIC SCALE

REVISIONS			
DESCRIPTION	DATE	APPROVED	
A SUBMITTED WITH MITIGATION PLAN	DEC 2010	SVM	

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BUFFALO FLATS RESTORATION SITE

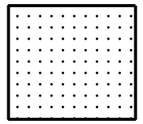
CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010

SCALE: 1"=30'

PLANTING PLAN

ZONE A



LOW ELEVATION SEEP ZONE

WETLAND AREA 1
NONRIPARIAN WETLAND RESTORATION
3.4 AC

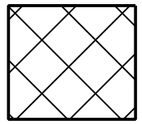
18" - 24" BARE ROOT MATERIAL
436 STEMS/ACRE (10' X 10' SPACING), RANDOM SPECIES PLACEMENT

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR	% OF TOTAL	# OF PLANTS
TULIP POPLAR	LIRIODENDRON TULIPIFERA	FAC	16	237
AMERICAN SYCAMORE	PLATANUS OCCIDENTALIS	FACW-	16	237
LAUREL OAK	QUERCUS LAURIFOLIA	FACW	13	193
SWAMP CHESTNUT OAK	QUERCUS MICHAUXII	FACW-	13	193
CHERRYBARK OAK	QUERCUS PAGODA	FAC+	13	193
WILLOW OAK	QUERCUS PHELLOS	FACW-	13	193
AMERICAN ELM	ULMUS AMERICANA	FACW	16	237
			100	1,483

NOTE: THE DISTRIBUTION OF THE STEMS MAY BE CHANGED AT THE ENGINEER'S DIRECTION. HOWEVER, ONE SPECIES MAY OCCUPY NO MORE THAN 20% OF THE TOTAL STEMS AND AT LEAST FIVE SPECIES MUST BE USED.

* UNDISTURBED FORESTED AREAS WITHIN PLANTING ZONE WILL NOT BE PLANTED

ZONE B



BOTTOMLAND HARDWOOD FOREST ZONE

WETLAND AREAS 2 AND 3
RIPARIAN WETLAND RESTORATION AND CREATION
12.4 AC

18" - 24" BARE ROOT MATERIAL
436 STEMS/ACRE (10' X 10' SPACING), RANDOM SPECIES PLACEMENT

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR	% OF TOTAL	# OF PLANTS
SUGARBERRY	CELTIS LAEVIGATA	FACW	10	541
BUTTONBUSH	CEPHALANTHUS OCCIDENTALIS	OBL	10	541
GREEN ASH	FRAXINUS PENNSYLVANICA	FACW	10	541
TULIP POPLAR	LIRIODENDRON TULIPIFERA	FAC	10	541
WATER TUPELO	NYSSA AQUATICA	OBL	10	541
OVERCUP OAK	QUERCUS LYRATA	OBL	10	541
SWAMP CHESTNUT OAK	QUERCUS MICHAUXII	FACW-	10	541
CHERRYBARK OAK	QUERCUS PAGODA	FAC+	10	541
WILLOW OAK	QUERCUS PHELLOS	FACW-	10	541
AMERICAN ELM	ULMUS AMERICANA	FACW	10	541
			100	5,410

NOTE: THE DISTRIBUTION OF THE STEMS MAY BE CHANGED AT THE ENGINEER'S DISCRETION. HOWEVER, ONE SPECIES MAY OCCUPY NO MORE THAN 20% OF THE TOTAL STEMS AND AT LEAST FIVE SPECIES MUST BE USED.

* UNDISTURBED FORESTED AREAS WITHIN PLANTING ZONE WILL NOT BE PLANTED

REVISIONS			
	DESCRIPTION	DATE	APPROVED
A	SUBMITTED WITH MITIGATION PLAN	DEC 2010	
	SVM		

Ecosystem Enhancement Program

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RALEIGH, NORTH CAROLINA 27609

BUFFALO FLATS
RESTORATION SITE
CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010
SCALE: NOT TO SCALE

PLANTING PLAN

NC GRID
NAD 83

–80 –40 0 80 160
GRAPHIC SCALE

INSTALL LIVESTOCK EXCLUSION FENCING AND NCEEP CONSERVATION EASEMENT MARKERS AS SHOWN.

USE EXISTING FENCE AND ROADWAY (GOLD HILL ROAD) AS SOUTHERN EASEMENT BOUNDARY. PLACE NCEEP CONSERVATION EASEMENT MARKERS IN LOCATIONS INDICATED.

CONSERVATION EASEMENT HELD BY OTHERS. LIVESTOCK EXCLUSION FENCING TO BE INSTALLED.

NCEEP CONSERVATION EASEMENT MARKER

INSTALL NCEEP CONSERVATION EASEMENT MARKERS ALONG BOUNDARY BETWEEN NCEEP CONSERVATION EASEMENT AND CONSERVATION EASEMENT HELD BY OTHERS.

INSTALL LIVESTOCK EXCLUSION FENCING AND NCEEP CONSERVATION EASEMENT MARKERS AS SHOWN.

DUTCH BUFFALO CREEK

DUTCH BUFFALO CREEK

WESTERN EASEMENT BOUNDARY ALONG DUTCH BUFFALO CREEK. PLACE NCEEP CONSERVATION EASEMENT MARKERS ALONG TOP OF BANK IN LOCATIONS INDICATED.

REVISIONS			
A	SUBMITTED WITH MITIGATION PLAN	SWL	DEC 2010
	DESCRIPTION	DATE	APPROVED

Ecosystem Enhancement Program

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RALEIGH, NORTH CAROLINA 27609

BUFFALO FLATS RESTORATION SITE

CONCORD, CABARRUS COUNTY, NORTH CAROLINA

DATE: DECEMBER 2010
SCALE: 1"=80'

BOUNDARY MARKING PLAN