As-Built Baseline Monitoring Report

FINAL

BAREFOOT SITE

NCDMS Project # 100044 (Contract # 7418)
USACE Action ID: SAW-2018-00433
DWR Project #2018-0235

Sampson County, North Carolina
Neuse River Basin
HUC 03020201

Provided by:

Resource Environmental Solutions, LLC
For Environmental Banc & Exchange, LLC
302 Jefferson Street, Suite 110
Raleigh, NC 27605

April 2020

3600 Glenwood Avenue, Suite 100
Raleigh, NC 27612

Corporate Headquarters
6575 W Loop S #300
Bellaire, TX 77401
Main: 713.520.5400

April 15, 2020

Lindsay Crocker
NC DEQ Division of Mitigation Services
217 West Jones Street
Raleigh, NC 27604

RE: Barefoot Site: Baseline Report and As-Built Drawings (NCDMS ID 100044)

Listed below are comments provided by DMS on April 14, 2020 regarding the Barefoot Site: Baseline Report and As-Built Drawings and RES' responses.

Baseline Report:
1. Table 1. Update Assets to show area of wetland out to 3 significant digits (this will ensure that debit ledger matches project table and is not considered a change from Mitigation Plan).
Table 1 has been updated to show wetland area out to 3 significant figures.

2. Provide description of substitute species for planting (additional species, changes from Mitigation Plan).
A description of substitute tree species was added to Section 1.6.

3. Provide explanation when pre-condition gauge data on W2 will be available.
Pre-construction gauge data for W2 will be included with the hydrographs for GW 13 and 15 in the Year 1 Report. This has been added to Section 1.7

4. Describe the distance that the new northern ditch is located from credit and if this should affect any drainage along the asset boundary.
The as-built location of the constructed northern ditch is 45 feet closer to the easement than the proposed location. This makes the new ditch about 100 feet from the wetland area. If this change were to affect the asset boundary it would be evident in the hydroperiods of GW1, 2, and 3. This has been added to Section 1.6.

As-Built Drawings:
1. Clarify by crossing out any items (in red line) that were proposed in the Mitigation Plan and not conducted or installed.
Done.

2. Clarify if and why any pipes were removed and how the eastern ditch is connected to outlet.
Clarification on pipe removal was added to the redline drawings. Also the culvert which connects the eastern ditch to the ditch to the north was added to the redline drawings.

3. Clarify if flow attenuation structures were designed to specifications or any deviation (written response is fine).
All flow attenuation structures were built as designed.

Table of Contents

1.0 Project Summary

1.1 Project Location and Description

The Barefoot Project ("Project") is located within a rural watershed in Sampson County, North Carolina approximately two miles west of Newton Grove and six miles southeast of Peacocks Crossroads. The Project lies within the Neuse River Basin, North Carolina Division of Water Resources (NCDWR) sub-basin 03-04-04 and United States Geological Survey (USGS) 8-digit hydrologic unit code (HUC) 03020201. The Project proposes to re-establish 23.23 acres of non-riparian wetlands within a 123-acre drainage area. The Project is located in the Rolling Coastal Plain level IV ecoregion within the Southeastern Plains level III ecoregion.

The Project area is comprised of a 33.29-acre easement involving a drained mineral flat wetland area, which eventually drains into Mill Creek and later the Neuse River. The wetland mitigation components are summarized in **Table 1**. The Project is located west of Warren Mill Road (SR 1647) and north of Harnett Dunn Highway (Hwy 55) and is accessible from Warren Mill Road. Coordinates for the Project areas are as follows: 35.253742, -78.392667.

The Project area is comprised of one contiguous non-riparian wetland area, that drains to Mill Creek and ultimately to the Neuse River. The total drainage area for the Project is 123 acres (0.19 mi^2). Primary land use within the drainage area consists of approximately 73 percent forest and 27 percent agricultural land. Impervious area is not present in the drainage area of the Project. Within the agricultural land use, row crops make up 100 percent of the area. Although the project watershed is primarily forested, the majority of the agricultural areas within the watershed are in close proximity to the Project and are drained via ditches and drain tiles, which plays a significant role in the past degradation of the Project wetlands. Historic land use within the immediate project area was primarily crop production and silviculture. These activities negatively impacted both water quality and habitat within the project area.

The primary wetland re-establishment activities included:

- The plugging and backfilling of ditches in and around the cultivated field,
- Removing/plugging all of the drain tiles within the agricultural field,
- Plugging and backfilling the ditches on two sides of the cut-over,
- Removal of spoil berms to reconnect the Project to its historical watershed,
- Creation of shallow depressional features typical of the community type, and
- Regraded areas of cut and fill along interior ditches to create a continuous wetland flat system.

The Site is to be monitored on a regular basis throughout the seven-year post-construction monitoring period, or until performance standards are met. Upon approval for closeout by the Interagency Review Team (IRT), the Site will be transferred to the NCDEQ Stewardship Program. The NCDEQ Stewardship Program will be responsible for periodic inspection of the Site to ensure that restrictions required in the Conservation Easement or the deed restriction document(s) are upheld.

1.2 Project Goals and Objectives

The Barefoot Wetland Restoration Project was identified as a wetland restoration opportunity to improve water quality, habitat, and hydrology within the Neuse 01 River Basin. Specific, attainable goals and objectives were realized by the Project. These goals clearly address the degraded water quality and nutrient input from farming that were identified as major watershed stressors in the 2010 Neuse River RBRP (amended in 2018). The Project addresses outlined RBRP Goal 2.

The project goals are:

- Reduce sediment and nutrient input into downslope receiving streams by limited runoff and sediment into connecting ditches,
- Improve filtration of runoff in project drainage area,
- Re-establish a historical aquatic resource into a functioning non-riparian wetland, and
- Improve aquatic and terrestrial habitat.

The project goals were addressed through the following project objectives:

- Convert active row crop land to a nonriverine hardwood forest,
- Plug, fill, and stabilize existing ditches and drainage tiles,
- Treat exotic invasive species,
- Provide habitat and hydrologic connectivity to a larger wetland community, and
- Establish a permanent conservation easement on the Project.

The Project brings functional uplift, benefits, and improvements to the project area and adjacent forests. Restoration of wetland hydrology and reconnection with the supplying watershed has re-established wetlands lost to past agricultural practices, and conversion of agricultural lands has reduced sediment and nutrients contributed to downstream systems. Planting of native species and control of invasives has restored terrestrial habitat, and reconnection of the project area with the adjacent forested wetlands has provided a source of native flora and fauna for the project area.

1.3 Project Success Criteria

The success criteria for the Project follows the 2016 USACE Wilmington District Stream and Wetland Compensatory Mitigation Update and subsequent agency guidance. Vegetation plot data will be reported in Monitoring Years 0, 1, 2, 3, 5, and 7. Wetland hydrology and visual monitoring will be reported annually. Specific success criteria components are presented below.

Wetland Restoration Success Criteria

Wetland Hydrology

The NRCS provides a current WETS table for Sampson County upon which to base a normal rainfall amount and average growing season. The closest comparable data station was determined to be WETS station Clinton 2 NE in Clinton NC (NRCS, n.d.). This station is located off Faison Highway near the Timberlake Golf Club approximately 17 miles south-southeast of the proposed mitigation project. The growing season for Sampson County is 254 days long, extending from March 13 to November 22, and is based on a daily minimum temperature greater than 28 degrees Fahrenheit occurring in five of ten years.

Because of the surface roughing and shallow depressions, a range of hydroperiods with areas of seasonal inundation is expected. The target hydroperiod is ten percent (approximately 26 days) for the duration of the monitoring period.

Digital Image Stations

The visual assessments include vegetation density, vigor, invasive species, and easement encroachments. Visual assessments of wetland success include an area walkthrough and structure and gauge inspection. Digital images will be taken at fixed representative locations to record each monitoring event, as well as any noted problem areas or areas of concern. Results of visual monitoring will be presented in a plan view exhibit with a brief description of problem areas and digital images. A series of images over time should

indicate successional maturation of wetland vegetation.

Vegetation Success Criteria

Specific and measurable success criteria for plant density within the wetland areas on the Project will follow IRT Guidance. The interim measures of vegetative success for the Project will be the survival of at least 320 planted three-year old trees per acre at the end of Year 3, five-year old trees at seven feet in height at the end of Year 5, and the final vegetative success criteria will be 210 trees per acre with an average height of ten feet at the end of Year 7. Volunteer trees will be counted, identified to species, and included in the yearly monitoring reports, and may be counted towards the success criteria of total planted stems if appropriate for the community type. Moreover, any single species can only account for up to 50 percent of the required number of stems within any vegetation plot. Any stems in excess of 50 percent will be shown in the monitoring table but will not be used to demonstrate success.

1.4 Project Components

The Project presents 23.238 acres of proposed non-riparian wetland re-establishment, generating 19.942 Wetland Mitigation Units (WMU) (**Table 1**). This is derived from the mitigation plan which was consistent with the February 22, 2018 Post Contract IRT Meeting Minutes and IRT response emails.

Wetland ID	Mitigation Approach	Acres	Ratio	Non-Riparian Wetland Mitigation Units
Wetland 1	Re-establishment	16.645	1:1	16.645
Wetland 2	Re-establishment	6.593	2:1	3.297
	Total	**23.238**		**19.942**

1.5 Wetland Design/Approach

The Barefoot Mitigation Project provides 19.94 wetland mitigation units through wetland re-establishment. The existing agricultural fields and clear-cut on the Project were re-established by restoring the hydrology, restoring vegetation in the agricultural field, and providing long-term protection. Wetland restoration design activities included: plugging the interior ditches and all ditches surrounding the agricultural fields, removing/plugging the drain tiles, removing spoil along the ditches, and limited grading of the area to reconstruct historical contours that include shallow depressions in the nearly level topography. Additionally, the ditch to the north of W1 was designed to be relocated approximately 95 feet north of the present location to allow continued use of the agricultural fields north of the Project, but to also limit drainage effect on the restored area. The field was planted with trees and a permanent seed mix. No additional plantings within the clear-cut were anticipated to be necessary. A ratio of 1:1 is used within re-established area of W1, which totals 16.64 acres. Within W2, wetland re-establishment at a ratio of 2:1 is used as hydrology is being re-established through the plugging of ditches, but existing vegetation is being left undisturbed. An additional buffer of 50 feet around the area of wetland re-establishment may achieve wetland hydrology at a lower hydroperiod. The remaining area between that and the easement edge is not expected to achieve wetland hydrology but will act as additional buffer between the wetland area and agricultural practices outside the easement. Plan views are provided in **Figure 2** and in **Appendix D**.

1.6 Construction and As-Built Conditions

Wetland construction and planting was completed in January 2020. Overall, the Barefoot Site was built to design plans and guidelines. A few minor adjustments, however, were made to the plans during

construction. The ditch directly north of the easement was constructed about 45 feet closer to the easement than proposed, to ensure appropriate farm access. This makes the new ditch about 100 feet from the wetland area. A berm was added in the upland area inside the northwest corner of the easement to limit surface draining from the wetland into the new ditch. Also, the ditch directly to the east (outside of the easement) was not filled as proposed due to the discovery of drain tiles draining from the east into it and due to landowner negotiations. If there any hydrologic effects to the wetland area it will be evident in the hydroperiods of the groundwater wells on the northern and eastern edges. Lastly, a path of forest was cleared in the southwestern portion of the easement. This was done to allow access for plugging the ditch on the southern edge of W2. This area was planted the same as W1. RES does not anticipate any changes to wetland crediting despite these minor field adjustments. As for the planting plan, a few minor adjustments were made due to tree availability. Laurel oak, sweetbay, and Atlantic white cedar were not planted, and water oak, green ash, silky dogwood, buttonbush, yellow poplar, southern crabapple, and sugarberry were planted instead. The rest of the planting plan was carried out as proposed. A redline version of the as-built survey is included in **Appendix E**. Additionally, there are as-built condition drone photos in **Appendix B**.

1.7 Baseline Monitoring Performance (MY0)

The Barefoot Baseline Monitoring activities were performed in January 2020. All Baseline Monitoring data is present below and in the appendices. The Site is on track to meeting vegetation and wetland interim success criteria.

Vegetation

Monitoring of the 10 permanent vegetation plots and six random vegetation plots was completed during January 2020. Vegetation data are in **Appendix C**, associated photos are in **Appendix B,** and plot locations are in **Appendix B**. MY0 monitoring data indicates that all plots are exceeding the interim success criteria of 320 planted stems per acre. Planted stem densities ranged from 809 to 1,983 planted stems per acre with a mean of 1,210 planted stems per acre across the permanent plots. A total of 11 species were documented within the plots. Volunteer species were not noted at baseline monitoring but are expected to establish in upcoming years. The average stem height in the permanent vegetation plots was 1.6 feet. Five of the six random plots were located in planted stem areas and one was located in the wooded section of W2 (as requested by the IRT). The stem densities in the random plots located in planted areas ranged from 809 to 1,416 with an average height of 1.5 feet. The stem density of the random plot in the wooded section of W2 was 4,856 with an average height of 12.9 feet.

Visual assessment of vegetation outside of the monitoring plots indicates that the herbaceous vegetation is becoming well established throughout the project where standing water is not present.

Wetland Hydrology

There are 17 groundwater wells at the Barefoot Site to monitor wetland hydrology. Four of the groundwater wells were installed pre-construction and the rest were installed in January 2020. Eleven of the wells are located in W1, four are in W2, and two are outside of the wetland crediting area. Pre-construction data from W2 will be included with the hydrographs in the Year 1 Report as requested by DWR. Exact well locations can be found on **Figure 2**, well elevations are in the as-built survey, and wetland hydrology data will be included subsequent monitoring reports.

2.0 Methods

Vegetation success is being monitored at 10 permanent monitoring plots and six random monitoring plots. Vegetation plot monitoring follows the CVS-EEP Level 2 Protocol for Recording Vegetation, version 4.2 (Lee et al. 2008) and includes analysis of species composition and density of planted species. Data are processed using the CVS data entry tool. In the field, the four corners of each plot were permanently marked with PVC at the origin and metal conduit at the other corners. Photos of each plot are to be taken from the origin during vegetation monitoring. Additionally, the six random monitoring plots are to be surveyed, in different locations, during each vegetation monitoring event. One of the six random plots is to be in the wooded section of W2 to document the change in community after the hydrologic uplift. The random plots will be 100 square meters with varying dimensions. The species and height of the trees as well as the location of the plot will be recorded during each monitoring event.

Wetland hydrology is monitored to document groundwater levels in the wetland restoration areas (Groundwater Wells 16 and 17 are located outside of the crediting areas). This is accomplished with 17 automatic pressure transducer gauges (located in groundwater wells) that record daily groundwater levels. One automatic pressure transducer is installed above ground for use as a barometric reference. Gauges are downloaded quarterly and wetland hydroperiods are calculated during the growing season. Gauge installation followed current regulatory guidance. Visual observations of primary and secondary wetland hydrology indicators are also recorded during quarterly site visits.

3.0 References

Griffith, G.E., J.M.Omernik, J.A. Comstock, M.P. Schafale, W.H.McNab, D.R.Lenat, T.F.MacPherson, J.B. Glover, and V.B. Shelburne. (2002). Ecoregions of North Carolina and South Carolina, (color Poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Lee Michael T., Peet Robert K., Roberts Steven D., and Wentworth Thomas R., 2008. *CVS-EEP Protocol for Recording Vegetation Level*. Version 4.2

Peet, R.K., Wentworth, T.S., and White, P.S. (1998), *A flexible, multipurpose method for recording vegetation composition and structure*. Castanea 63:262-274

Resource Environmental Solutions (2019). Barefoot Site Final Mitigation Plan.

Schafale, M.P. 2012. Classification of the Natural Communities of North Carolina, Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, NCDENR, Raleigh, NC.

USACE. (2016). Wilmington District Stream and Wetland Compensatory Mitigation Update. NC: Interagency Review Team (IRT).

Appendix A

Background Tables

Table 1. Barefoot (ID-100044) - Mitigation Assets and Components

Project Segment	Existing Footage or Acreage	Mitigation Plan Footage or Acreage	Mitigation Category	Restoration Level	Priority Level	Mitigation Ratio (X:1)	Mitigation Plan Credits		As-Built Footage or Acreage	Comments
No Stream Mitigation										
Wetland W1	0	16.645	NR	Re-establishment		1.000	16.645		16.645	Hydrologic restoration via plugging ditches and drainage tiles, planting
Wetland W2	0	6.593	NR	Re-establishment		2.000	3.297		3.297	Hydrologic restoration via plugging ditches

Project Credits

Restoration Level	Stream			Riparian Wetland		Non-Rip Wetland	Coastal Marsh
	Warm	Cool	Cold	Riverine	Non-Riv		
Restoration							
Re-establishment						19.942	
Rehabilitation							
Enhancement							
Enhancement I							
Enhancement II							
Creation							
Preservation							
TOTAL						**19.942**	

Table 2. Project Activity and Reporting History
Barefoot Site (ID-100044)

Elapsed Time Since grading complete:	**3 months**
Elapsed Time Since planting complete:	**3 months**
Number of reporting Years[1]:	**0**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Restoration Plan	NA	Jul-19
Final Design – Construction Plans	NA	Nov-19
Wetland Construction	NA	Jan-20
Bare root planting	NA	Jan-20
As-built (Year 0 Monitoring – baseline)	Jan-20	Apr-20
Year 1 Monitoring		
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		
Year 6 Monitoring		
Year 7 Monitoring		

1 = The number of reports or data points produced excluding the baseline

Table 3. Project Contacts Table Barefoot (ID-100044)	
Designer Primary project design POC	RES / 302 Jefferson Street, Suite 110, Raleigh, NC 27605 Sam Fasking
Construction Contractor Construction contractor POC	RES / 302 Jefferson Street, Suite 110, Raleigh, NC 27605 Paul Dunn
Survey Contractor Survey contractor POC	Matrix East, PLLC / 906 N. Queen St., Suite A, Kinston, NC 28501 Chris Paderick, PLS
Planting Contractor Planting contractor POC	H&J Forestry Matt Hitch
Seeding Contractor Contractor point of contact	RES / 302 Jefferson Street, Suite 110, Raleigh, NC 27605
Seed Mix Sources	Green Resource
Nursery Stock Suppliers	Arborgen
Monitoring Performers	RES / 302 Jefferson Street, Suite 110, Raleigh, NC 27605
Wetland Monitoring POC	Ryan Medric (919) 741-6268
Vegetation Monitoring POC	

Table 4. Project Background Information				
Project Name		Barefoot		
County		Sampson		
Project Area (acres)		32.29		
Project Coordinates (latitude and longitude)		Latitude: 35.4754 N Longitude: -78.3117 W		
Planted Acreage (Acres of Woody Stems Planted)		22.94		
Project Watershed Summary Information				
Physiographic Province		Coastal Plain		
River Basin		Neuse		
USGS Hydrologic Unit 8-digit	03020201	USGS Hydrologic Unit 14-digit	03020201150040	
DWR Sub-basin		03-04-04		
Project Drainage Area (Acres and Square Miles)		123 ac (0.19 sqmi)		
Project Drainage Area Percentage of Impervious Area		0%		
CGIA Land Use Classification		Forest (73%) Agriculture (27%)		
Wetland Summary Information				
Parameters		**Wetland 1**	**Wetland 2**	
Size of Wetland (acres)		16.64	6.59	
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)		non-riparian	non-riparian	
Mapped Soil Series		Rains/Foreston	Rains	
Drainage class		Poor	Poor	
Soil Hydric Status		Hydric/Nonhydric	Hydric	
Source of Hydrology		Groundwater	Groundwater	
Restoration or enhancement method (hydrologic, vegetative etc.)		Hydrologic & vegetative restoration	Hydrologic restoration	
Regulatory Considerations				
Parameters		**Applicable?**	**Resolved?**	**Supporting Docs?**
Water of the United States - Section 404		Yes	Yes	SAW-2018-00433
Water of the United States - Section 401		No	N/A	N/A
Endangered Species Act		Yes	Yes	USFWS (Corr. Letter)
Historic Preservation Act		Yes	Yes	SHPO (Corr. Letter)
Coastal Zone Management Act (CZMA or CAMA)		No	N/A	N/A
FEMA Floodplain Compliance		No	N/A	N/A
Essential Fisheries Habitat		No	N/A	N/A

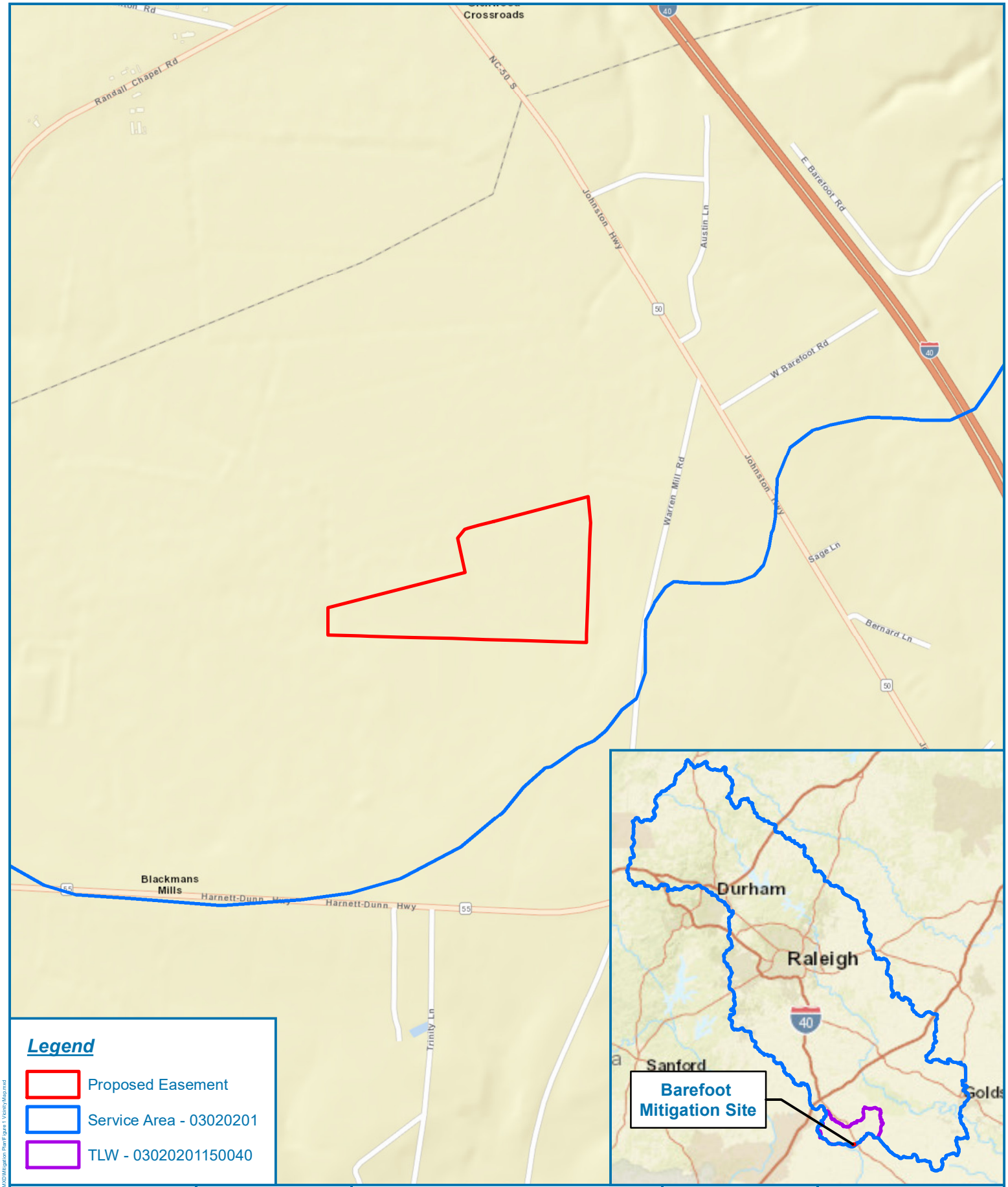


Figure 1 - Vicinity Map

Barefoot Mitigation Site

Sampson County, North Carolina

Date: 2/27/2019

Drawn by: SCF

Checked by: JRM

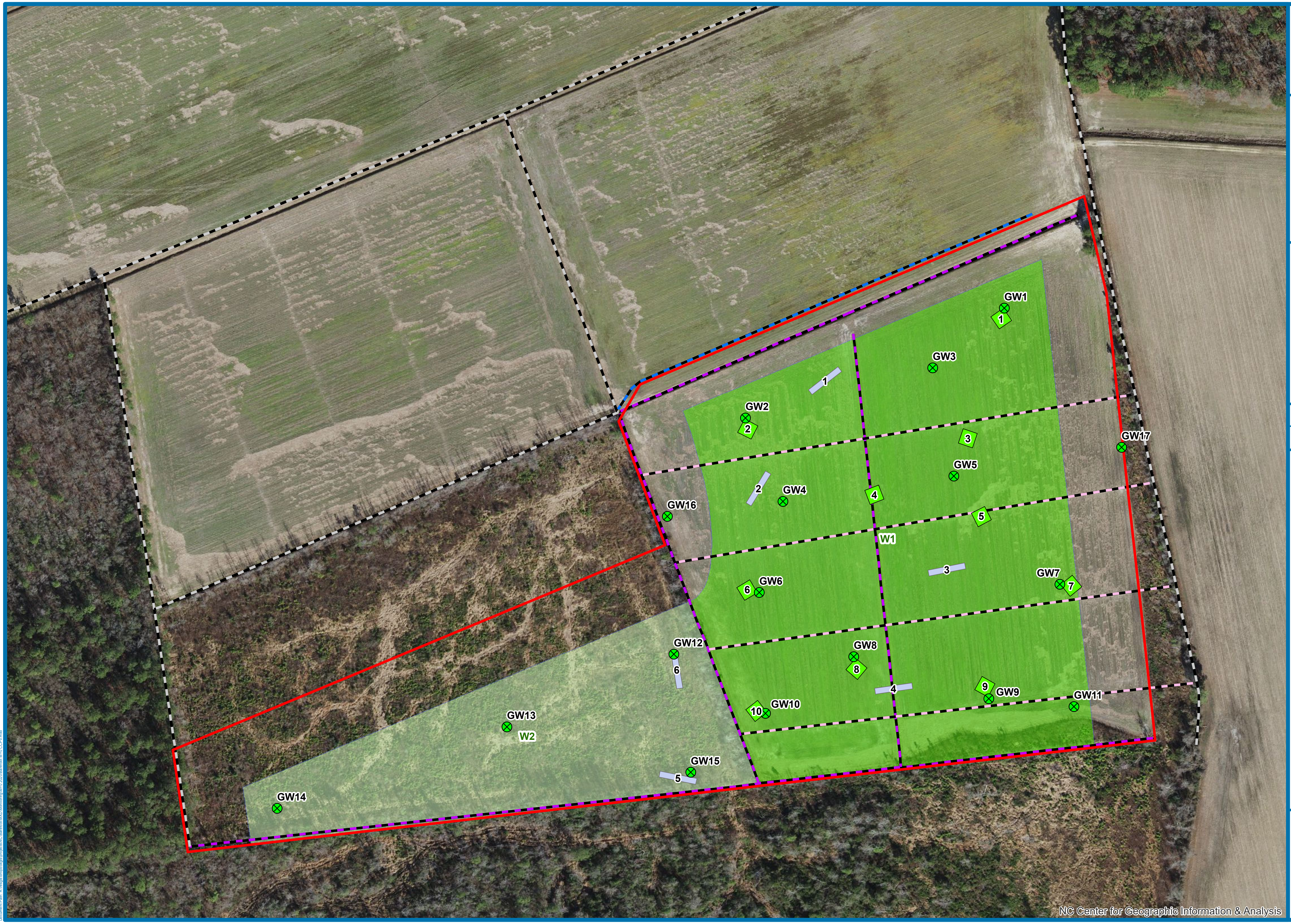
1 inch = 1,000 feet

res

Document Path: S:\@RES GIS\Projects\NC\Barefoot\MXD\Mitigation Plan\Figure 1 VicinityMap.mxd

Appendix B

Visual Assessment Data



N
W E
S
0 100 200
Feet

Figure 2

Current Conditions
Plan View

MY0 2020

Barefoot
Mitigation Site

Sampson County, NC

Date: 3/31/2020	Drawn by: RTM
Lat: 35.255825	Long: -78.390648

LEGEND

Conservation Easement

Wetland Treatment

Re-establishment (1:1)
Re-establishment (2:1)
Fixed Vegetation Plot
Random Vegetation Plot
Constructed Ditch
Filled Ditch
Plugged Drain Tile
No Treatment
Groundwater Well

Vegetation Condition Assessment

Invasive Species	Target Community: Present	Marginal	Absent
Absent	No Fill		
Present			

Table 5 Vegetation Condition Assessment

Planted Acreage[1] **22.94**

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

Easement Acreage[2] **14**

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

1 = Enter the planted acreage within the easement. This number is calculated as the easement acreage minus any existing mature tree stands that were not subject to supplemental planting of the understory, the channel acreage, crossings or any other elements not directly planted as part of the project effort.

2 = The acreage within the easement boundaries.

3 = Encroachment may occur within or outside of planted areas and will therefore be calculated against the overall easement acreage. In the event a polygon is cataloged into items 1, 2 or 3 in the table and is the result of encroachment, the associated acreage should be tallied in the relevant item (i.e., item 1,2 or 3) as well as a parallel tally in item 5.

4 = Invasives may occur in or out of planted areas, but still within the easement and will therefore be calculated against the overall easement acreage. Invasives of concern/interest are listed below. The list of high concern spcies are those with the potential to directly outcompete native, young, woody stems in the short-term (e.g. monitoring period or shortly thereafter) or affect the community structure for existing, more established tree/shrub stands over timeframes that are slightly longer (e.g. 1-2 decades). The low/moderate concern group are those species that generally do not have this capacity over the timeframes discussed and therefore are not expected to be mapped with regularity, but can be mapped, if in the judgement of the observer their coverage, density or distribution is suppressing the viability, density, or growth of planted woody stems. Decisions as to whether remediation will be needed are based on the integration of risk factors by EEP such as species present, their coverage, distribution relative to native biomass, and the practicality of treatment. For example, even modest amounts of Kudzu or Japanese Knotweed early in the projects history will warrant control, but potentially large coverages of Microstegium in the herb layer will not likley trigger control because of the limited capacities to impact tree/shrub layers within the timeframes discussed and the potential impacts of treating extensive amounts of ground cover. Those species with the "watch list" designator in gray shade are of interest as well, but have yet to be observed across the state with any frequency. Those in *red italics* are of particular interest given their extreme risk/threat level for mapping as points where isolated specimens are found, particularly ealry in a projects monitoring history. However, areas of discreet, dense patches will of course be mapped as polygons. The symbology scheme below was one that was found to be helpful for symbolzing invasives polygons, particulalry for situations where the conditon for an area is somewhere between isolated specimens and dense, discreet patches. In any case, the point or polygon/area feature can be symbolized to describe things like high or low concern and species can be listed as a map inset, in legend items if the number of species are limited or in the narrative section of the executive summary.

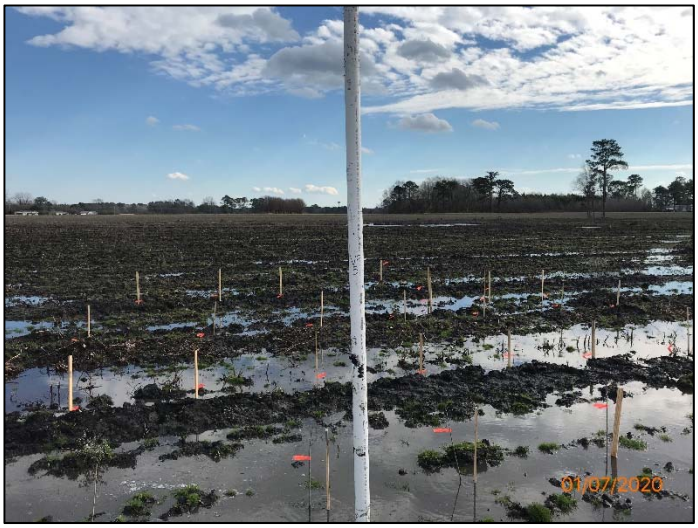
Barefoot MY0 Permanent Vegetation Monitoring Plot Photos

Vegetation Plot 1

Vegetation Plot 2

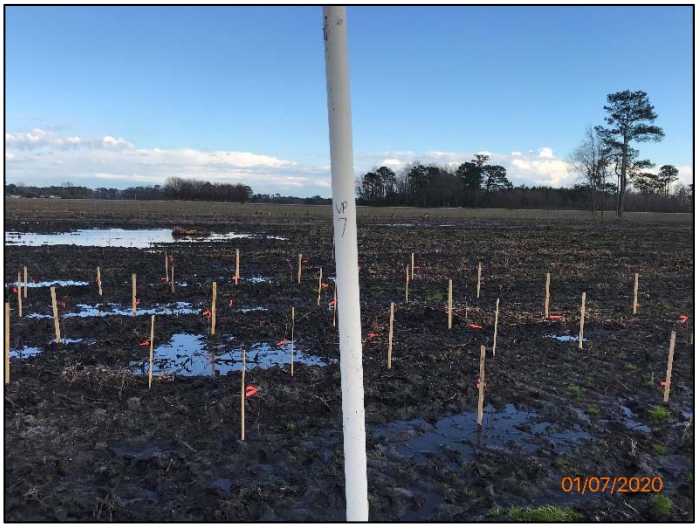
Vegetation Plot 3

Vegetation Plot 4



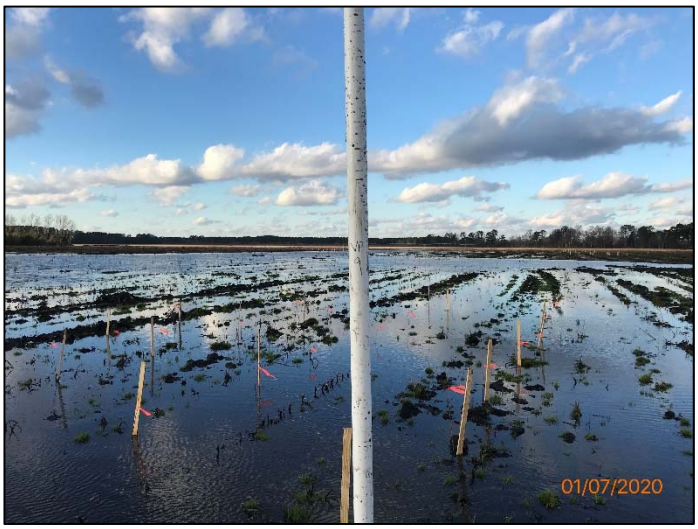
Vegetation Plot 5

Vegetation Plot 6



Vegetation Plot 7

Vegetation Plot 8



Vegetation Plot 9

Vegetation Plot 10

Barefoot MY0 Random Vegetation Monitoring Plot Photos

Random Vegetation Plot 1

Random Vegetation Plot 2

Random Vegetation Plot 3

Random Vegetation Plot 4


Random Vegetation Plot 5


Random Vegetation Plot 6

Barefoot As-Built Drone Photos

Looking south at W1 (1/31/2020)

Looking west at W2 (1/31/2020)

Looking northeast at W1 (1/31/2020)

Looking west at W1 (1/31/2020)

Appendix C

Vegetation Plot Data

Table 6. Planted Species Summary

Common Name	Scientific Name	Total Stems Planted
Swamp Chestnut Oak	*Quercus michauxii*	6,000
Baldcypress	*Taxodium distichum*	5,000
Wax Myrtle	*Morella cerifera*	4,320
Willow Oak	*Quercus phellos*	4,000
Cherrybark Oak	*Quercus pagoda*	3,000
Water Oak	*Quercus nigra*	2,500
Green Ash	*Fraxinus pennsylvanica*	2,400
Silky Dogwood	*Cornus amomum*	2,000
Buttonbush	*Cephalanthus occidentalis*	2,000
Yellow Poplar	*Liriodendron tulipifera*	1,000
Southern Crab Apple	*Malus angustifolia*	800
Sugarberry	*Celtis laevigata*	350
Blackgum	*Nyssa sylvatica*	40
	Total	33,410
	Planted Area	22.94
	As-built Planted Stems/Acre	1,456

Table 7. Vegetation Plot Mitigation Success Summary

Plot #	Planted Stems/Acre	Volunteer Stems/Acre	Total Stems/Acre	Success Criteria Met?	Average Planted Stem Height (ft)
1	1497	0	1497	Yes	1.7
2	809	0	809	Yes	1.6
3	1133	0	1133	Yes	1.6
4	1093	0	1093	Yes	1.5
5	1133	0	1133	Yes	1.4
6	1983	0	1983	Yes	1.8
7	1497	0	1497	Yes	1.6
8	931	0	931	Yes	1.3
9	1052	0	1052	Yes	1.6
10	971	0	971	Yes	1.6
Project Avg	**1210**	**0**	**1210**	**Yes**	**1.6**

Table 8. Stem Count Total and Planted by Plot Species

Barefoot			Current Plot Data (MY0 2020)																													Annual Means		
			100044-01-0001			100044-01-0002			100044-01-0003			100044-01-0004			100044-01-0005			100044-01-0006			100044-01-0007			100044-01-0008			100044-01-0009			100044-01-0010			MY0 (2020)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Cephalanthus occidentalis	common buttonbush	Shrub																3	3	3	1	1	1	3	3	3	1	1	1				8	8	8
Cornus amomum	silky dogwood	Shrub				5	5	5	3	3	3	2	2	2	1	1	1	1	1	1				3	3	3	7	7	7	2	2	2	24	24	24
Fraxinus pennsylvanica	green ash	Tree	3	3	3	2	2	2	5	5	5	11	11	11	7	7	7	1	1	1	3	3	3	1	1	1							33	33	33
Liriodendron tulipifera	tuliptree	Tree	1	1	1							1	1	1							13	13	13										15	15	15
Malus angustifolia	southern crabapple	Tree	7	7	7				1	1	1																2	2	2				10	10	10
Morella cerifera	wax myrtle	shrub	2	2	2				6	6	6	2	2	2	11	11	11	3	3	3				7	7	7	1	1	1	4	4	4	36	36	36
Quercus	oak	Tree	7	7	7	1	1	1				1	1	1	3	3	3	8	8	8													20	20	20
Quercus michauxii	swamp chestnut oak	Tree	3	3	3													17	17	17	9	9	9										29	29	29
Quercus nigra	water oak	Tree										1	1	1	2	2	2																3	3	3
Quercus pagoda	cherrybark oak	Tree	2	2	2	1	1	1				1	1	1																			4	4	4
Quercus phellos	willow oak	Tree	12	12	12										2	2	2	16	16	16	11	11	11										41	41	41
Taxodium distichum	bald cypress	Tree				11	11	11	13	13	13	8	8	8	2	2	2							9	9	9	15	15	15	18	18	18	76	76	76
		Stem count	37	37	37	20	20	20	28	28	28	27	27	27	28	28	28	49	49	49	37	37	37	23	23	23	26	26	26	24	24	24	299	299	299
		size (ares)	1			1			1			1			1			1			1			1			1			1			10		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.25		
		Species count	8	8	8	5	5	5	5	5	5	8	8	8	7	7	7	7	7	7	5	5	5	5	5	5	5	5	5	3	3	3	12	12	12
		Stems per ACRE	1497	1497	1497	809	809	809	1133	1133	1133	1093	1093	1093	1133	1133	1133	1983	1983	1983	1497	1497	1497	931	931	931	1052	1052	1052	971	971	971	1210	1210	1210

Table 9. Random Vegetation Monitoring Plot Data (W1)

Random Plot 1		
#	Species	Height (cm)
1	*Cornus amomum*	50
2	*Quercus michauxii*	55
3	*Quercus michauxii*	13
4	*Quercus phellos*	63
5	*Quercus phellos*	76
6	*Taxodium distichum*	35
7	*Quercus michauxii*	55
8	*Fraxinus pennsylvanica*	89
9	*Quercus phellos*	38
10	*Quercus phellos*	71
11	*Quercus phellos*	68
12	*Taxodium distichum*	35
13	*Fraxinus pennsylvanica*	58
14	*Quercus spp.*	25
15	*Quercus michauxii*	63
16	*Quercus michauxii*	66
17	*Quercus michauxii*	46
18	*Quercus phellos*	69
19	*Quercus michauxii*	36
20	*Cornus amomum*	50
Stems/Acre	809	
Average Height (cm)	53	
Average Height (ft)	1.7	
Plot Size (m)	25 x 4	

Random Plot 2		
#	Species	Height (cm)
1	*Quercus michauxii*	56
2	*Quercus michauxii*	51
3	*Quercus michauxii*	25
4	*Quercus lyrata*	58
5	*Quercus lyrata*	61
6	*Quercus lyrata*	53
7	*Taxodium distichum*	50
8	*Quercus michauxii*	50
9	*Quercus michauxii*	43
10	*Quercus spp.*	48
11	*Taxodium distichum*	41
12	*Taxodium distichum*	35
13	*Taxodium distichum*	66
14	*Quercus spp.*	64
15	*Quercus phellos*	33
16	*Quercus lyrata*	38
17	*Quercus lyrata*	41
18	*Quercus phellos*	51
19	*Quercus spp.*	46
20	*Quercus spp.*	66
21	*Taxodium distichum*	56
22	*Taxodium distichum*	45
23	*Quercus michauxii*	56
24	*Quercus spp.*	51
25	*Taxodium distichum*	43
26	*Quercus lyrata*	35
27	*Quercus lyrata*	41
28	*Quercus lyrata*	61
29	*Quercus lyrata*	50
30	*Quercus phellos*	58
31	*Quercus michauxii*	61
32	*Quercus michauxii*	58
33	*Cornus amomum*	69
34	*Quercus michauxii*	51
35	*Quercus michauxii*	13
Stems/Acre	1416	
Average Height (cm)	49	
Average Height (ft)	1.6	
Plot Size (m)	25 x 4	

Random Plot 3		
#	Species	Height (cm)
1	*Fraxinus pennsylvanica*	76
2	*Morella cerifera*	25
3	*Quercus spp.*	20
4	*Quercus spp.*	20
5	*Taxodium distichum*	33
6	*Cephalanthus occidentalis*	45
7	*Taxodium distichum*	25
8	*Cornus amomum*	46
9	*Fraxinus pennsylvanica*	40
10	*Taxodium distichum*	68
11	*Cornus amomum*	43
12	*Quercus phellos*	38
13	*Fraxinus pennsylvanica*	58
14	*Cephalanthus occidentalis*	36
15	*Quercus spp.*	41
16	*Cephalanthus occidentalis*	51
17	*Quercus spp.*	43
18	*Cornus amomum*	38
19	*Quercus phellos*	40
20	*Morella cerifera*	50
21	*Morella cerifera*	76
22	*Fraxinus pennsylvanica*	51
23	*Cornus amomum*	38
24	*Fraxinus pennsylvanica*	43
25	*Taxodium distichum*	38
26	*Cornus amomum*	50
27	*Taxodium distichum*	30
28	*Morella cerifera*	30
29	*Cephalanthus occidentalis*	50
Stems/Acre	1174	
Average Height (cm)	43	
Average Height (ft)	1.4	
Plot Size (m)	25 x 4	

Random Plot 4		
#	Species	Height (cm)
1	*Morella cerifera*	55
2	*Morella cerifera*	25
3	*Cephalanthus occidentalis*	41
4	*Taxodium distichum*	38
5	*Cephalanthus occidentalis*	51
6	*Morella cerifera*	38
7	*Cornus amomum*	40
8	*Morella cerifera*	25
9	*Taxodium distichum*	56
10	*Morella cerifera*	41
11	*Morella cerifera*	30
12	*Fraxinus pennsylvanica*	38
13	*Morella cerifera*	30
14	*Cephalanthus occidentalis*	38
15	*Quercus spp.*	43
16	*Fraxinus pennsylvanica*	41
17	*Taxodium distichum*	30
18	*Cornus amomum*	51
19	*Morella cerifera*	38
20	*Cephalanthus occidentalis*	43
Stems/Acre	809	
Average Height (cm)	40	
Average Height (ft)	1.3	
Plot Size (m)	25 x 4	

Table 9. Random Vegetation Monitoring Plot Data (W2)

Random Plot 5		
#	Species	Height (cm)
1	*Morella cerifera*	36
2	*Taxodium distichum*	42
3	*Taxodium distichum*	45
4	*Taxodium distichum*	41
5	*Taxodium distichum*	75
6	*Taxodium distichum*	50
7	*Taxodium distichum*	32
8	*Morella cerifera*	20
9	*Taxodium distichum*	65
10	*Taxodium distichum*	47
11	*Taxodium distichum*	80
12	*Taxodium distichum*	49
13	*Taxodium distichum*	39
14	*Taxodium distichum*	42
15	*Morella cerifera*	52
16	*Taxodium distichum*	47
17	*Taxodium distichum*	76
18	*Taxodium distichum*	56
19	*Taxodium distichum*	54
20	*Taxodium distichum*	51
21	*Taxodium distichum*	51
22	*Morella cerifera*	40
23	*Morella cerifera*	32
Stems/Acre	931	
Average Height (cm)	49	
Average Height (ft)	1.6	
Plot Size (m)	25 x 4	

Random Plot 6		
#	Species	Height (cm)
1	*Persea borbonia*	220
2	*Rhus coppallinum*	530
3	*Liquidambar styraciflua*	500
4	*Ilex opaca*	60
5	*Rhus coppallinum*	500
6	*Cyrilla racemiflora*	800
7	*Rhus coppallinum*	450
8	*Persea borbonia*	60
9	*Persea borbonia*	40
10	*Ilex opaca*	45
11	*Cyrilla racemiflora*	400
12	*Persea borbonia*	55
13	*Liquidambar styraciflua*	600
14	*Liquidambar styraciflua*	230
15	*Cyrilla racemiflora*	500
16	*Cyrilla racemiflora*	600
17	*Persea borbonia*	60
18	*Persea borbonia*	125
19	*Persea borbonia*	120
20	*Persea borbonia*	85
21	*Clethra alnifolia*	210
22	*Acer rubrum*	210
23	*Cyrilla racemiflora*	650
24	*Cyrilla racemiflora*	440
25	*Persea borbonia*	100
26	*Cyrilla racemiflora*	400
27	*Acer rubrum*	168
28	*Cyrilla racemiflora*	390
29	*Pinus taeda*	260
30	*Acer rubrum*	250

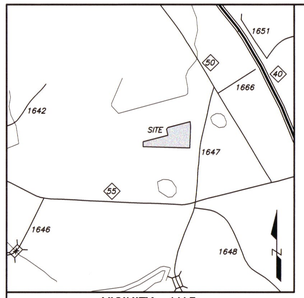
Random Plot 6		
#	Species	Height (cm)
31	*Cyrilla racemiflora*	165
32	*Cyrilla racemiflora*	400
33	*Pinus taeda*	450
34	*Ilex opaca*	85
35	*Quercus nigra*	95
36	*Pinus taeda*	600
37	*Pinus taeda*	450
38	*Pinus taeda*	380
39	*Pinus taeda*	300
40	*Pinus taeda*	450
41	*Persea borbonia*	130
42	*Pinus taeda*	330
43	*Liquidambar styraciflua*	330
44	*Quercus nigra*	600
45	*Quercus nigra*	150
46	*Quercus nigra*	80
47	*Pinus taeda*	900
48	*Pinus taeda*	600
49	*Pinus taeda*	700
50	*Pinus taeda*	700
51	*Pinus taeda*	700
52	*Persea borbonia*	110
53	*Liquidambar styraciflua*	450
54	*Cyrilla racemiflora*	350
55	*Cyrilla racemiflora*	400
56	*Cyrilla racemiflora*	400
57	*Pinus taeda*	800
58	*Persea borbonia*	270
59	*Clethra alnifolia*	115
60	*Clethra alnifolia*	110

Random Plot 6		
#	Species	Height (cm)
61	*Clethra alnifolia*	115
62	*Clethra alnifolia*	110
63	*Clethra alnifolia*	105
64	*Persea borbonia*	190
65	*Quercus nigra*	380
66	*Persea borbonia*	150
67	*Cyrilla racemiflora*	370
68	*Liquidambar styraciflua*	230
69	*Liquidambar styraciflua*	400
70	*Liquidambar styraciflua*	430
71	*Quercus nigra*	260
72	*Ilex opaca*	30
73	*Rhus coppallinum*	450
74	*Pinus taeda*	650
75	*Persea borbonia*	250
76	*Pinus taeda*	600
77	*Pinus taeda*	900
78	*Pinus taeda*	900
79	*Pinus taeda*	1000
80	*Quercus nigra*	80
81	*Quercus nigra*	175
82	*Quercus nigra*	120
83	*Pinus taeda*	1000
84	*Pinus taeda*	1000
85	*Pinus taeda*	1000
86	*Pinus taeda*	650
87	*Pinus taeda*	700
88	*Persea borbonia*	133
89	*Cyrilla racemiflora*	230
90	*Cyrilla racemiflora*	400

Random Plot 6		
#	Species	Height (cm)
91	*Pinus taeda*	600
92	*Pinus taeda*	600
93	*Pinus taeda*	500
94	*Pinus taeda*	500
95	*Pinus taeda*	500
96	*Rhus coppallinum*	380
97	*Pinus taeda*	600
98	*Cyrilla racemiflora*	170
99	*Pinus taeda*	500
100	*Pinus taeda*	600
101	*Pinus taeda*	550
102	*Pinus taeda*	550
103	*Quercus nigra*	200
104	*Pinus taeda*	500
105	*Cyrilla racemiflora*	650
106	*Liquidambar styraciflua*	600
107	*Pinus taeda*	300
108	*Persea borbonia*	145
109	*Persea borbonia*	110
110	*Pinus taeda*	800
111	*Pinus taeda*	400
112	*Persea borbonia*	80
113	*Liquidambar styraciflua*	400
114	*Pinus taeda*	300
115	*Cyrilla racemiflora*	980
116	*Cyrilla racemiflora*	230
117	*Cyrilla racemiflora*	230
118	*Cyrilla racemiflora*	500
119	*Cyrilla racemiflora*	550
120	*Cyrilla racemiflora*	550
Stems/Acre	4856	
Average Height (cm)	394	
Average Height (ft)	12.9	
Plot Size (m)	25 x 4	

Appendix D

As-Built Plan Sheets



VICINITY MAP
(NOT TO SCALE)

NAD 83(2011)

BAREFOOT WETLAND MITIGATION SITE
SAMPSON COUNTY, NORTH CAROLINA

NEUSE RIVER BASIN: HUC 03020101
NC DMS PROJECT #100044

AS-BUILT SURVEY

NOTES:
1. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
2. THE HORIZONTAL DATUM IS NAD 83(2011) AND THE VERTICAL DATUM IS NAVD 88.
3. THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES.
4. THE PURPOSE OF THIS MAP IS TO SHOW POST CONSTRUCTION AS-BUILT CONDITIONS OF THE WETLAND RESTORATION AND MAY NOT SHOW ALL UTILITIES, STRUCTURES, AND BOUNDARIES.
5. NO PROPERTY LINES WERE SURVEYED DURING THIS SURVEY. ALL CONSERVATION EASEMENTS, PROPERTY LINES, AND ADJOINING PROPERTY OWNERS ARE SHOWN BY PREVIOUS SURVEY BY MATRIX EAST, PLLC AS RECORDED IN PB 102, PG 30 IN THE SAMPSON COUNTY REGISTRY.
6. WETLAND AREAS AND WETLAND INFORMATION SHOWN HEREON WERE PROVIDED BY RESOURCE ENVIRONMENTAL SOLUTIONS, INC.
7. LOCATIONS & ELEVATIONS OF GROUNDWATER WELLS 3, 4, & 5 WERE PROVIDED BY RESOURCE ENVIRONMENTAL SOLUTIONS, INC.

PROJECT COORDINATES:

LATITUDE: 35.25347° N
LONGITUDE: 78.39303° W

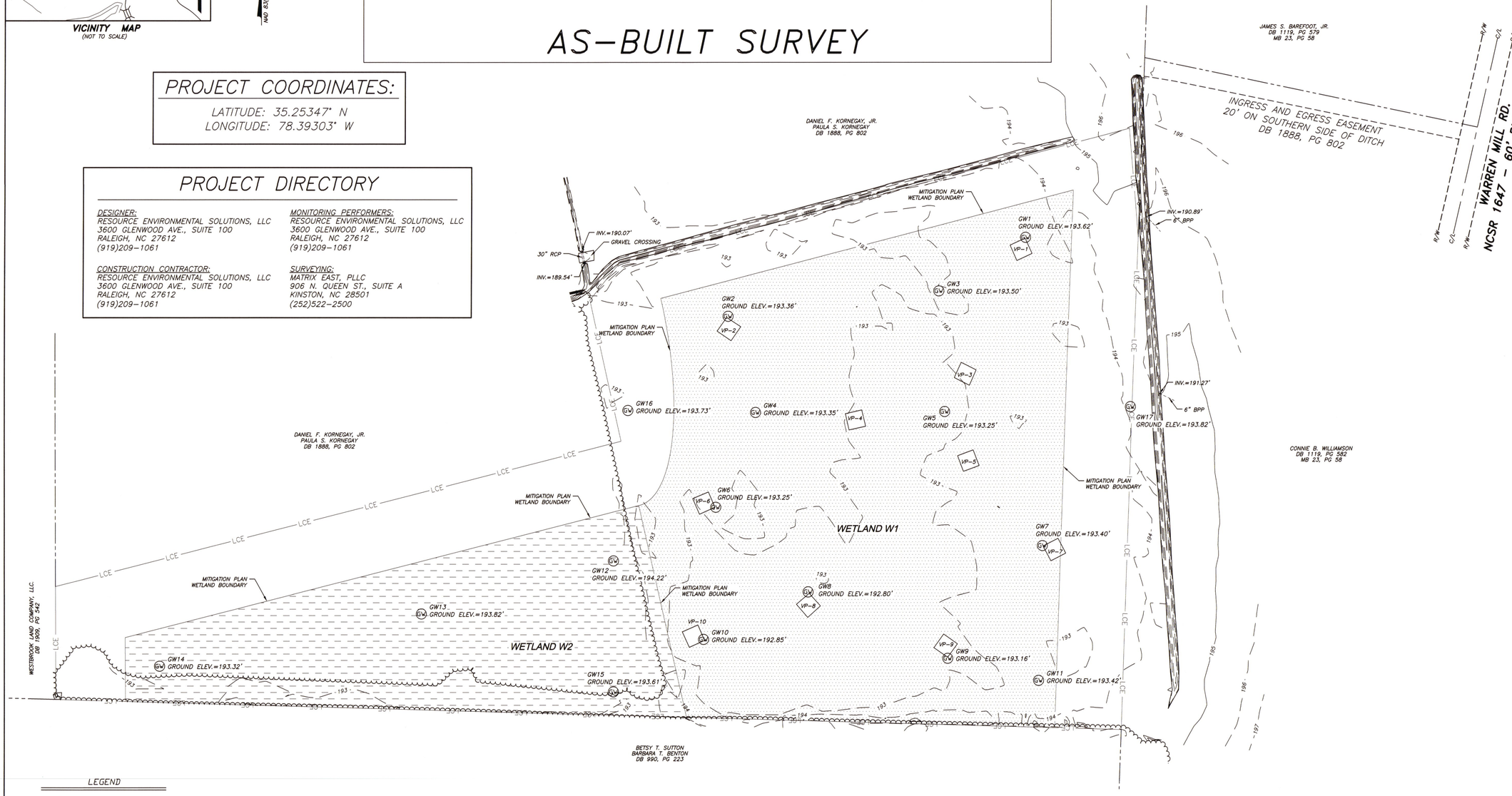
PROJECT DIRECTORY

DESIGNER:
RESOURCE ENVIRONMENTAL SOLUTIONS, LLC
3600 GLENWOOD AVE., SUITE 100
RALEIGH, NC 27612
(919)209-1061

MONITORING PERFORMERS:
RESOURCE ENVIRONMENTAL SOLUTIONS, LLC
3600 GLENWOOD AVE., SUITE 100
RALEIGH, NC 27612
(919)209-1061

CONSTRUCTION CONTRACTOR:
RESOURCE ENVIRONMENTAL SOLUTIONS, LLC
3600 GLENWOOD AVE., SUITE 100
RALEIGH, NC 27612
(919)209-1061

SURVEYING:
MATRIX EAST, PLLC
906 N. QUEEN ST., SUITE A
KINSTON, NC 28501
(252)522-2500



LEGEND

- C/L = CENTERLINE
- R/W = RIGHT OF WAY
- BPP = BLACK PLASTIC PIPE
- RCP = REINFORCED CONCRETE PIPE
- VP = VEGETATION PLOT
- GW = GROUNDWATER WELL
- = WETLANDS (RE-ESTABLISHMENT)
- = WETLANDS (RE-ESTABLISHMENT - LOW)
- LCE = CONSERVATION EASEMENT LINE
- = ADJOINER BOUNDARY LINE
- = WOODLINE

Wetland ID	Mitigation Type	Acres
W1	RE-ESTABLISHMENT	16.64
W2	RE-ESTABLISHMENT - LOW	6.59
	TOTAL ACREAGE	23.23

100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

SEAL
NORTH CAROLINA PROFESSIONAL SEAL L-4712 LAND SURVEYOR JAMES R. WATSON
3/12/2020

DRAWING NO. S1

SHEET No. 1 OF 1

WETLAND AS BUILT SURVEY

RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

BAREFOOT WETLAND MITIGATION SITE

SAMPSON COUNTY, N.C.

MATRIX EAST, PLLC
906 N. QUEEN ST., SUITE A
KINSTON, NC 28501
TEL: 252-522-2500
FAX: 252-522-4747
FIRM LIC. # P-0221
EMAIL: surveyor@matrixeast.net

DRAWN BY	DATE	SCALE
JRW	3/12/2020	1" = 100'

PROJECT NO. 20180030

DRAWING NAME BAREFOOT AS BUILT.DWG

BAREFOOT AS-BUILT REDLINES

SAMPSON COUNTY, NC

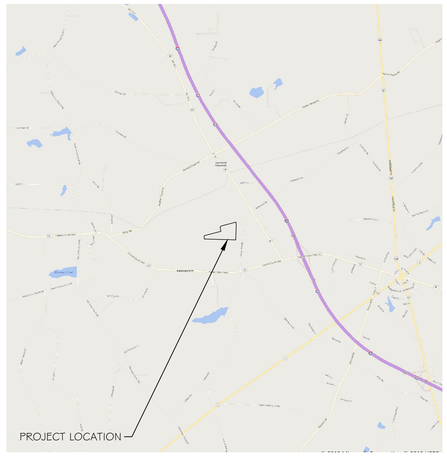
NEUSE RIVER BASIN: HUC 03020101

APRIL 2020

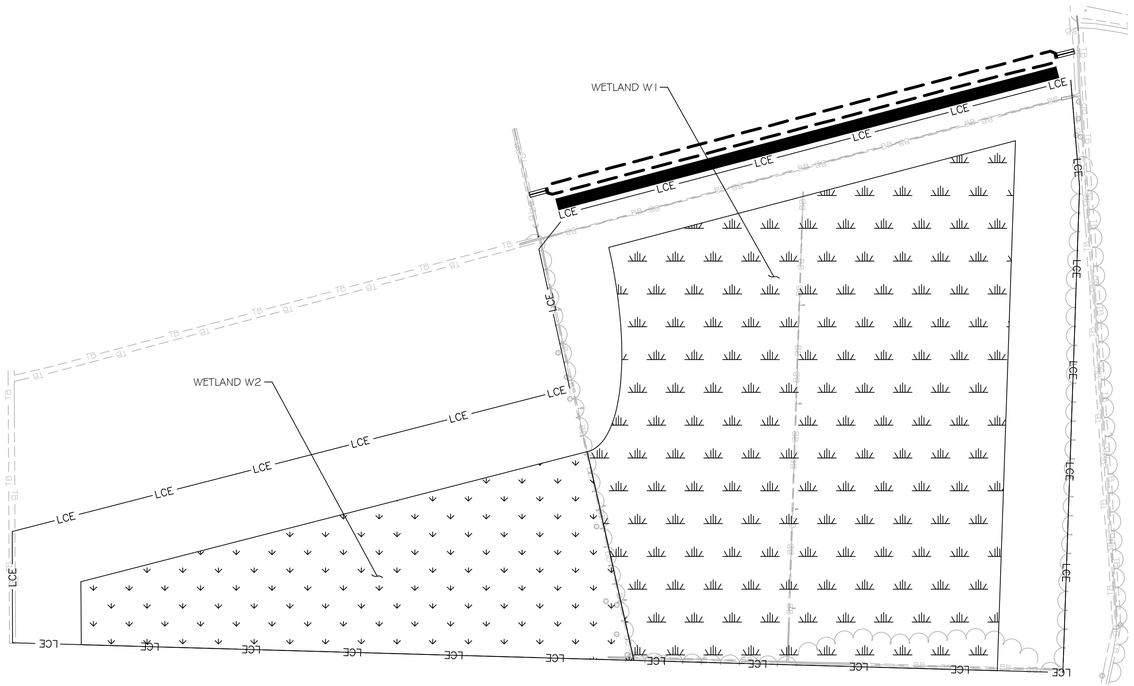
RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

3600 GLENWOOD AVE, SUITE 100

RALEIGH, NC 27612



VICINITY MAP
NTS



SITE MAP
NTS

PROJECT DIRECTORY

DESIGNED BY:
RESOURCE ENVIRONMENTAL SOLUTIONS, LLC
3600 GLENWOOD AVE., SUITE 100
RALEIGH, NC 27612

SURVEYED BY:
MATRIX EAST, PLLC.
906 N. QUEEN ST.
SUITE A
KINSTON, NC 28501

DMS PROJECT #: 100044
CONTRACT #: 7418
USACE ACTION ID #: SAW-2018-00433
RFP #: 16-007279

PROJECT TOPOGRAPHY AND EXISTING CONDITIONS PLANIMETRICS SURVEY WAS PROVIDED BY MATRIX EAST, PLLC (NC FIRM LICENSE NUMBER P-0221, JAMES R. WATSON, NC PLS L-4712), DATED MARCH 12, 2020

Sheet List Table	
Sheet Number	Sheet Title
-	COVER
W1	AS BUILT

res
3600 Glenwood Ave, Suite 100
Raleigh, NC 27612
Main: 919.829.9909
www.res.us

Engineering Services Provided By:
Angler Environmental LLC
License: F-1428

SEAL

PLOT DATE:
4/2/2020

REVISIONS:

RELEASED FOR:
FOR REVIEW PURPOSES ONLY

PROJECT NUMBER:	0517
PROJECT MANAGER:	BPB
DESIGNED:	GKL
DRAWN:	SCF
CHECKED:	TRS

SHEET NUMBER:

-

LEGEND

- AS-BUILT FEATURES
- AS-BUILT MONITORING WELL (GW)
- AS-BUILT VEGETATION PLOT (VP-#)
- AS-BUILT TREELINE
- AS-BUILT CULVERT
- AS-BUILT CONTOUR MAJOR (50)
- EXISTING DITCH
- EXISTING TOP OF BANK (TB)
- EXISTING DRAINAGE TILE
- PROPERTY LINE
- EXISTING TREELINE
- LIMITS OF PROPOSED CONSERVATION EASEMENT (LCE)
- PROPOSED TOP OF BANK
- PROPOSED WETLAND W1
- PROPOSED WETLAND W2
- PROPOSED DITCH PLUG
- PROPOSED DITCH TO BE FILLED
- PROPOSED DRAIN TILE PLUG
- PROPOSED CULVERT
- PROJECTED DITCH FLOW DIRECTIOIN

EXCAVATED FARM DITCH TERMINATED HERE PROPOSED CULVERT NOT INSTALLED DUE TO LAND SLOPE

PROPOSED FARM PATH NOT WANTED BY LANDOWNER

REMOVE 25 LF OF EXISTING 48"/54" CMP

PROPOSED EXCAVATED DITCH

PARTIAL FILL TO BE GRADED TO EXISTING CULVERT INVERT ELEVATION

EXCAVATED FARM DITCH MOVED TO EDGE OF EASEMENT PER LANDOWNER REQUEST

DITCH SPOIL PLACEMENT FOR FARM ACCESS ROAD

DANIEL F. KORNEGAY, JR.
PAULA S. KORNEGAY
DB 1888, PG 802

JAMES S. BAREFOOT, JR.
DB 1119, PG 579
MB 23, PG 58

INGRESS AND EGRESS EASEMENT 20' ON SOUTHERN SIDE OF DITCH DB 1888, PG 802

WARREN MILL RD. NCSR 1647 - 60' R/W

DITCH TO BE FILLED

PROPOSED 20 LF OF DBL 36" HDPE

PROPOSED 20 LF OF DBL 36" HDPE WITH CULVERT OUTFALL PROTECTION

CULVERT MOVED FOR DITCH RELOCATION
SNGL 30" RCP TO FIT DITCH

INV.=190.07'
INV.=189.54'

6" DRAIN TILES DISCOVERED UPON CONSTRUCTION START

INV.=190.89'

FLOW ATTENUATION STRUCTURES

GW1 GROUND ELEV.=193.62'
GW2 GROUND ELEV.=193.36'
GW3 GROUND ELEV.=193.50'

DITCH TO BE PARTIALLY FILLED

BERM INSTALLED FOR ADDED FLOW ATTENUATION

INV.=191.27'

FIELD DITCH LEFT OPEN PER LANDOWNER REQUEST

DITCH TO BE FILLED

GW16 GROUND ELEV.=193.73'
GW4 GROUND ELEV.=193.35'
GW5 GROUND ELEV.=193.25'
GW17 GROUND ELEV.=193.82'

DANIEL F. KORNEGAY, JR.
PAULA S. KORNEGAY
DB 1888, PG 802

CONNIE B. WILLIAMSON
DB 1119, PG 582
MB 23, PG 58

DITCH TO BE FILLED

GW6 GROUND ELEV.=193.25'

GW7 GROUND ELEV.=193.40'

GW12 GROUND ELEV.=194.22'

GW8 GROUND ELEV.=192.80'

GW13 GROUND ELEV.=193.82'

GW10 GROUND ELEV.=192.85'

GW9 GROUND ELEV.=193.16'

GW11 GROUND ELEV.=193.42'

GW14 GROUND ELEV.=193.32'

GW15 GROUND ELEV.=193.61'

WESTBROOK LAND COMPANY, LLC.
DB 1909, PG 542

MITIGATION PLAN LAND BOUNDARY

BETSY T. SUTTON
BARBARA T. BENTON
DB 990, PG 223

FLOW ATTENUATION STRUCTURE

DITCH TO BE FILLED

WETLAND W2
RE-ESTABLISHMENT (2:1)
6.59 ACRES

PATH CLEARED FOR CONSTRUCTION ACCESS TO FILL DITCH

WETLAND W1
RE-ESTABLISHMENT (1:1)
16.64 ACRES

DITCH TO BE FILLED

NOTE:
OPTIONAL SHALLOW DEPRESSIONS MAY BE EXCAVATED THROUGHOUT W1 PER DIRECTION OF ENGINEER

FILE NAME:R:\Resgis\dropboxgis\projects\NC\Barefoot\CAD\DWG\0517_C3D_DESIGN_SCF.dwg SAVED BY: Stasking

res
3600 Glenwood Ave, Suite 100
Raleigh, NC 27612
Main: 919.829.9909
www.res.us

Engineering Services Provided By:
Angler Environmental, LLC
License: F-1428

SEAL

FULL SCALE: 1"=100

0 100 200

2" = FULL SCALE
1" = HALF SCALE

PLOT DATE:
4/15/2020

REVISIONS:

RELEASED FOR:
FOR REVIEW PURPOSES ONLY

PROJECT NAME:
BAREFOOT AS-BUILT REDLINES
SAMPSON COUNTY, NC

DRAWING TITLE:
AS BUILT

PROJECT NUMBER:	0517
PROJECT MANAGER:	BPB
DESIGNED:	GKL
DRAWN:	SCF
CHECKED:	TRS

SHEET NUMBER:

W1