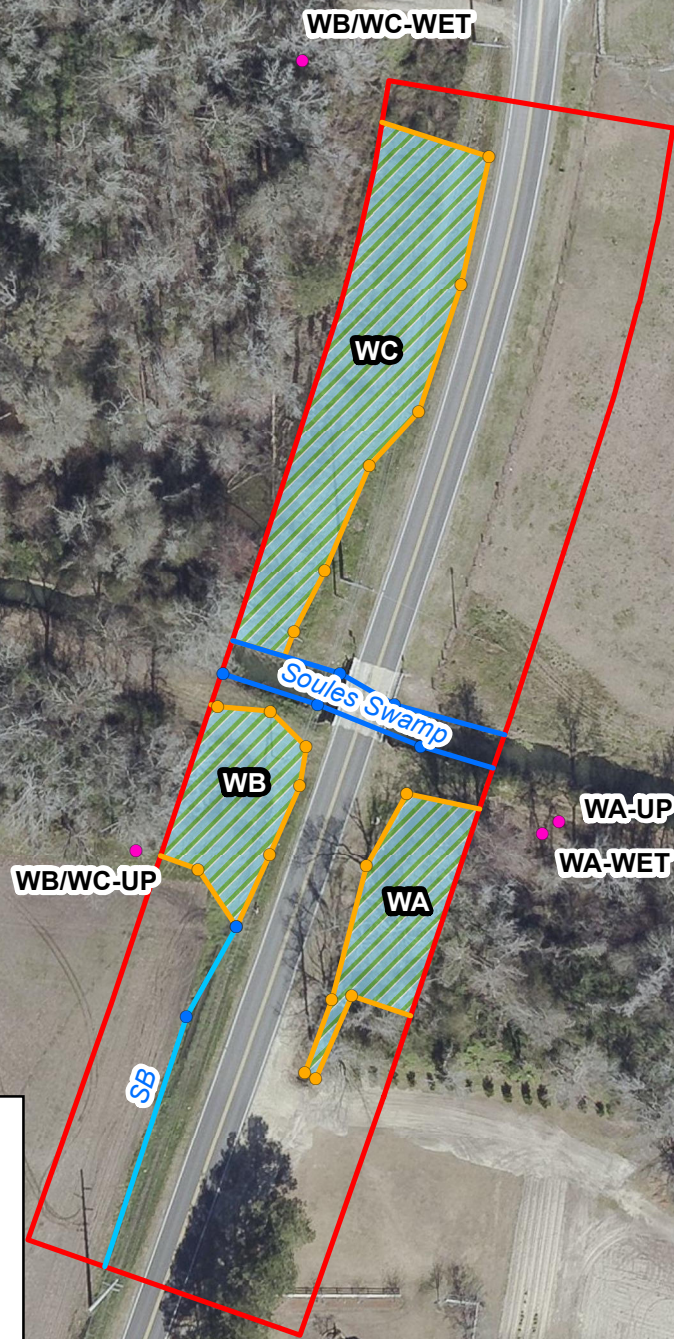


Low/Minimal Impact Bridge Project Data Sheet

	TIP NO	
	WBS	17BP.6.R.61
	County	Columbus
	Bridge Number	230308
	Description	SR1005 over Soules Swamp
Stream	Basin	Lumber
	Classification	C;Sw
	SIN	15-4-8
	Type (Perennial/Intermittent)	Soules Swamp - Perennial SB - Man-made Tributary to Jurisdictional Waters
	Size (bankfull width)	Soules Swamp - 20' SB - 6'
Existing Structure	Type	
	Size	
	Suff. Rating	
Proposed Structure	Type	
	Size (width-out to out)	
Stream	USACE Impacts (Y/N)	Yes
	Non 404 Impacts (Y/N)	No
Wetlands	USACE Impacts (Y/N)	Yes
	Non 404 Impacts (Y/N)	No
	CAMA Impacts (Y/N)	
NC DWQ Buffers	Impacts (Y/N)	
Buffer Application Required (>40 ft) (Y/N)		
NC DWQ StormWater Permit Required (Y/N)		
T&E	Habitat (Y/N)	American alligator - Yes Wood stork - Yes Cooley's meadowrue - Yes Rough-leaved loosestrife - Yes
	Species Present	American alligator - Surveys not required due to T(S/A) designation Wood stork - No Cooley's meadowrue - Undetermined Rough-leaved loosestrife - Undetermined
	Bio Conclusion	American alligator - N/A Wood stork - No Effect Cooley's meadowrue - Unresolved Rough-leaved loosestrife - Unresolved
Moratorium	Type	
	Dates	
Trout Waters	Native/Hatchery	
	Trout Species Present	
	Trout Conditions (Y/N)	
	WRC Reviewer	
CAMA AECs		
Essential Fish Habitat (Y/N)		
Nav. Opening		
USCG Permit		
Historic Properties		
Archaeological Resources		
Tribal Lands		
4(f) Resources		
6(f) [LWCF] Resources		
Wild and Scenic River		No
Forest Service Lands		
TVA Area		
FEMA Buyout		
FEMA Flood Study		
USTs Haz Mats		
Relocatees		
Location (decimal degrees)	LAT	34.325481
	LONG	-78.799343
Project Comments		Marginally suitable habitat for American alligator [T(S/A)] and wood stork (foraging) (T) exists within the study area within Soules Swamp, and wetlands WA, WB, and WC which are riverine swamp forests. No wading birds were observed during field observations, and the understory was dense in these wetlands. Suitable habitat for Cooley's meadowrue (E) and rough-leaved loosestrife (E) is present along the roadside ditches along SR1005. Field investigation was conducted outside of the USFWS survey windows for these plant species. Kimley-Horn staff will conduct surveys for these species during the appropriate survey window. According to NCNHP records (updated July 2014), there are no recorded element occurrences of any of the listed species within the project study area of within 1.0 mile of the study area.
Completed by:	Beth Reed, PWS	
	Consultant Biologist	
Reviewed by:	Kimley-Horn and Associates	
	Consulting Firm	



Legend

- Field Notes
- Stream Points
- Wetland Points
- Streams
- Tributary to Jurisdictional Water
- Wetland Boundary
- Project Study Area

0 100 200 Feet

NC OneMap, NC Center for Geographic Information and Analysis, NC 911 Board



Figure 3: Aerial Image
Division 6 Bridges - Structure #230308
Columbus County, NC
August 2014

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Structure # 230308 City/County: Columbus County Sampling Date: 8/6/2014
 Applicant/Owner: NCDOT State: NC Sampling Point: WA-UP
 Investigator(s): J. Hartshorn (KHA), R. Sullivan (KHA) Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Sewer easement Local relief (concave, convex, none): none Slope (%): <1%
 Subregion (LRR or MLRA): LRR P Lat: 34.325170 Long: -78.799016 Datum: NAD 1983
 Soil Map Unit Name: Muckalee sandy loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: The upland data point was taken in a sewer/stormwater easement and was ~10' north from and 2' higher in elevation than wetland data point WA-WET. WA is bounded on three sides by disturbed uplands (easement, road, ag. field).			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) ☐ Surface Water (A1) ☐ Aquatic Fauna (B13) ☐ High Water Table (A2) ☐ Marl Deposits (B15) (LRR U) ☐ Saturation (A3) ☐ Hydrogen Sulfide Odor (C1) ☐ Water Marks (B1) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Sediment Deposits (B2) ☐ Presence of Reduced Iron (C4) ☐ Drift Deposits (B3) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Algal Mat or Crust (B4) ☐ Thin Muck Surface (C7) ☐ Iron Deposits (B5) ☐ Other (Explain in Remarks) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) ☐ Surface Soil Cracks (B6) ☐ Sparsely Vegetated Concave Surface (B8) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ FAC-Neutral Test (D5) ☐ Sphagnum moss (D8) (LRR T, U)	
Field Observations: Surface Water Present? Yes ☐ No ☒ Depth (inches): _____ Water Table Present? Yes ☐ No ☒ Depth (inches): <u>>16"</u> Saturation Present? Yes ☐ No ☒ Depth (inches): <u>>16"</u> (includes capillary fringe)		Wetland Hydrology Present? Yes ☐ No ☒	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: No indicators of hydrology were observed at upland data point location during the site visit. The sewer easement appears to periodically experience flooding from either WA or Soules Swamp.			

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: WA-UP

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>None</u>				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
_____ = Total Cover				
50% of total cover: _____			20% of total cover: _____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Ligustrum sinense</u>	<u>10%</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Sambucus canadensis</u>	<u>5%</u>	<u>Y</u>	<u>NI</u>	
3. <u>Melia azedarach</u>	<u>5%</u>	<u>Y</u>	<u>FACU</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
_____ = Total Cover				
50% of total cover: <u>10%</u>			20% of total cover: <u>4%</u>	
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Microstegium vimineum</u>	<u>70%</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Ligustrum sinense</u>	<u>10%</u>	<u>N</u>	<u>FAC</u>	
3. <u>Eupatorium capillifolium</u>	<u>5%</u>	<u>N</u>	<u>FACU</u>	
4. <u>Elymus villosus</u>	<u>5%</u>	<u>N</u>	<u>FACU</u>	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
_____ = Total Cover				
50% of total cover: <u>45%</u>			20% of total cover: <u>18%</u>	
Woody Vine Stratum (Plot size: <u>30'</u>)				
1. <u>Toxicodendron radicans</u>	<u>5%</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Smilax bona-nox</u>	<u>5%</u>	<u>Y</u>	<u>FAC</u>	
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: <u>5%</u>			20% of total cover: <u>2%</u>	

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 6 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
 _____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
 _____ 3 - Prevalence Index is ≤3.0¹
 _____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:
Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?
 Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

No morphological adaptations were observed in the wetland area during the site visit.

SOIL

Sampling Point: WA-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8"	10YR 4/3	100%					Sandy loam	30% UCS
8-16"	10YR 4/1	90%	10YR 6/8	10%			Sandy loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Muck Presence (A8) (LRR U)
☐ 1 cm Muck (A9) (LRR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,B)
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
 (MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No indicators of hydric soils were observed during the site visit at the upland data point. Neither soil saturation nor the water table was observed within 16" of the soil profile.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Structure # 230308 City/County: Columbus County Sampling Date: 8/6/2014
 Applicant/Owner: NCDOT State: NC Sampling Point: WA-WET
 Investigator(s): J. Hartshorn (KHA), R. Sullivan (KHA) Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depressional wetland Local relief (concave, convex, none): Concave Slope (%): 2%
 Subregion (LRR or MLRA): LRR P Lat: 34.325153 Long: -78.799045 Datum: NAD 1983
 Soil Map Unit Name: Muckalee sandy loam NWI classification: PFO1Ad

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: WA is a depressional swamp separated from Soules Swamp by a sewer/stormwater easement. Based upon sediment deposits, wetland WA has experienced ~2' of standing water.			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☒ Surface Water (A1) ☒ High Water Table (A2) ☒ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☒ Water-Stained Leaves (B9)	☐ Aquatic Fauna (B13) ☐ Marl Deposits (B15) (LRR U) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Sparsely Vegetated Concave Surface (B8) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☒ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ FAC-Neutral Test (D5) ☐ Sphagnum moss (D8) (LRR T, U)	
Field Observations: Surface Water Present? Yes ☐ No ☒ Depth (inches): _____ Water Table Present? Yes ☒ No ☐ Depth (inches): <u>4"</u> Saturation Present? Yes ☒ No ☐ Depth (inches): <u>Surface</u> (includes capillary fringe)		Wetland Hydrology Present? Yes ☒ No ☐	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: The wetland data point was located in a dry patch of the wetland. However, much of wetland WA had standing water to a depth of ~ 1' or greater. The soil was saturated at the surface and the water table was observed at 4". WA receives hydrology from overland flow, flooding from Soules Swamp, and groundwater. It is likely that water entering WA gets impounded between the sewer easement, road, and the upland areas.			

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: WA-WET

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Persea palustris</u>	<u>15%</u>	<u>Y</u>	<u>FACW</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>8</u> (A) Total Number of Dominant Species Across All Strata: <u>8</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)																
2. <u>Liquidambar styraciflua</u>	<u>15%</u>	<u>Y</u>	<u>FAC</u>																	
3. <u>Acer rubrum</u>	<u>15%</u>	<u>Y</u>	<u>FAC</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
<u>45%</u> = Total Cover 50% of total cover: <u>22.5%</u> 20% of total cover: <u>9%</u>				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species _____</td> <td>x 1 = _____</td> </tr> <tr> <td>FACW species _____</td> <td>x 2 = _____</td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = _____</td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = _____</td> </tr> <tr> <td>Column Totals: _____</td> <td>(A) _____ (B) _____</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = _____</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species _____	x 1 = _____	FACW species _____	x 2 = _____	FAC species _____	x 3 = _____	FACU species _____	x 4 = _____	UPL species _____	x 5 = _____	Column Totals: _____	(A) _____ (B) _____	Prevalence Index = B/A = _____	
Total % Cover of:	Multiply by:																			
OBL species _____	x 1 = _____																			
FACW species _____	x 2 = _____																			
FAC species _____	x 3 = _____																			
FACU species _____	x 4 = _____																			
UPL species _____	x 5 = _____																			
Column Totals: _____	(A) _____ (B) _____																			
Prevalence Index = B/A = _____																				
<u>45%</u> = Total Cover 50% of total cover: <u>22.5%</u> 20% of total cover: <u>9%</u>																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Ligustrum sinense</u>	<u>60%</u>	<u>Y</u>	<u>FAC</u>																	
2. <u>Fraxinus caroliniana</u>	<u>5%</u>	<u>N</u>	<u>OBL</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
<u>65%</u> = Total Cover 50% of total cover: <u>32.5%</u> 20% of total cover: <u>13%</u>																				
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Microstegium vimineum</u>	<u>20%</u>	<u>Y</u>	<u>FAC</u>																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
12. _____	_____	_____	_____																	
<u>20%</u> = Total Cover 50% of total cover: <u>10%</u> 20% of total cover: <u>4%</u>																				
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. <u>Smilax rotundifolia</u>	<u>10%</u>	<u>Y</u>	<u>FAC</u>																	
2. <u>Smilax bona-nox</u>	<u>10%</u>	<u>Y</u>	<u>FAC</u>																	
3. <u>Vitis rotundifolia</u>	<u>10%</u>	<u>Y</u>	<u>FAC</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
<u>30%</u> = Total Cover 50% of total cover: <u>15%</u> 20% of total cover: <u>6%</u>																				
Hydrophytic Vegetation Present?																				
Yes ☒ No ☐																				

Hydrophytic Vegetation Indicators:
 _____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
 _____ 3 - Prevalence Index is ≤3.0¹
 _____ Problematic Hydrophytic Vegetation¹ (Explain)

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Remarks: (If observed, list morphological adaptations below).

Buttressing was observed on many of the trees within wetland WA.

SOIL

Sampling Point: WA-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8"	2.5Y 3/2	100%					Loam	
8-16"	2.5Y 3/2	80%	7.5YR 4/4	20%	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Muck Presence (A8) (LRR U)
☐ 1 cm Muck (A9) (LRR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☒ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,B)
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
 (MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Soils greater than 16" were too saturated for removal with an auger in the field. The water table was observed at 4" and soil saturation was observed at the surface.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Structure # 230308 City/County: Columbus County Sampling Date: 8/6/2014
 Applicant/Owner: NCDOT State: NC Sampling Point: WB/WC-UP
 Investigator(s): J. Hartshorn (KHA), R. Sullivan (KHA) Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Field edge Local relief (concave, convex, none): None Slope (%): <1%
 Subregion (LRR or MLRA): LRR P Lat: 34.325130 Long: -78.799746 Datum: NAD 1983
 Soil Map Unit Name: Muckalee sandy loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: WB and WC are wetlands on that surround Soules Swamp. They both appear to receive flooding from SA. WB is separated from SA by a sewer/stormwater easement while WC is directly adjacent/north of SA. The upland area surrounding both wetland areas have similar vegetation and soils and are both documented on this form.			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Water-Stained Leaves (B9)	☐ Aquatic Fauna (B13) ☐ Marl Deposits (B15) (LRR U) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Sparsely Vegetated Concave Surface (B8) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ FAC-Neutral Test (D5) ☐ Sphagnum moss (D8) (LRR T, U)	
Field Observations: Surface Water Present? Yes ☐ No ☒ Depth (inches): _____ Water Table Present? Yes ☐ No ☒ Depth (inches): <u>>24"</u> Saturation Present? Yes ☐ No ☒ Depth (inches): <u>>24"</u> (includes capillary fringe)		Wetland Hydrology Present? Yes ☐ No ☒	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No indicators of hydrology were observed at this data point location. WB/WC-UP is in an area of higher elevation than WB-WET situated next to an agricultural field. A slight topographic break distinguishes the upland area from the wetland area.			

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: WB/WC-UP

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>None</u>				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
_____ = Total Cover				
50% of total cover: _____			20% of total cover: _____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Sambucus canadensis</u>	<u>20%</u>	<u>Y</u>	<u>NI</u>	
2. <u>Carya illinoensis</u>	<u>5%</u>	<u>Y</u>	<u>FACU</u>	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
_____ = Total Cover				
50% of total cover: <u>12.5%</u>			20% of total cover: <u>5%</u>	
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Rubus argutus</u>	<u>20%</u>	<u>Y</u>	<u>FACU</u>	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
_____ = Total Cover				
50% of total cover: <u>20%</u>			20% of total cover: <u>8%</u>	
Woody Vine Stratum (Plot size: <u>30'</u>)				
1. <u>Parthenocissus quinquefolia</u>	<u>10%</u>	<u>Y</u>	<u>FACU</u>	
2. <u>Toxicodendron radicans</u>	<u>5%</u>	<u>Y</u>	<u>FAC</u>	
3. <u>Apios americana</u>	<u>5%</u>	<u>Y</u>	<u>FACW</u>	
4. _____				
5. _____				
_____ = Total Cover				
50% of total cover: <u>10%</u>			20% of total cover: <u>4%</u>	

Remarks: (If observed, list morphological adaptations below).

 The upland area is in a disturbed field edge between a corn field and wetland WB.

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

 Total Number of Dominant Species Across All Strata: 6 (B)

 Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species <u>5%</u>	x 2 = <u>10</u>
FAC species <u>5%</u>	x 3 = <u>15</u>
FACU species <u>35%</u>	x 4 = <u>140</u>
UPL species _____	x 5 = _____
Column Totals: <u>55</u> (A)	<u>165</u> (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:
 _____ 1 - Rapid Test for Hydrophytic Vegetation
 _____ 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0¹
 _____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?
 Yes ☒ No ☐

SOIL

Sampling Point: WB/WC-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	10YR 4/5	100%					Sandy Loam	35% UCS
4-12"	10YR 4/3	95%	7.5YR 5/6	5%	C	M	Sandy Clay Loam	
12-24"	10YR 3/2	90%	7.5YR 5/6	10%	C	M	Sandy Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Muck Presence (A8) (LRR U)
☐ 1 cm Muck (A9) (LRR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,B)
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
 (MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No soil saturation or water table was observed at the data point location. Concentrations were observed in soil below 4" that were likely due to occasional flooding from Soules Swamp, but due to geomorphology that area does not likely stay inundated.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Structure # 230308 City/County: Columbus County Sampling Date: 8/6/2014
 Applicant/Owner: NCDOT State: NC Sampling Point: WB-WET
 Investigator(s): J. Hartshorn (KHA), R. Sullivan (KHA) Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): <1%
 Subregion (LRR or MLRA): LRR P Lat: 34.325135 Long: -78.799744 Datum: NAD 1983
 Soil Map Unit Name: Muckalee sandy loam NWI classification: PFO1Ad

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: WB is a depressional wetland adjacent to a sewer easement. The sewer easement separates WB from Soules Swamp.			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) ☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☒ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☒ Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) ☐ Surface Soil Cracks (B6) ☐ Sparsely Vegetated Concave Surface (B8) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☒ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ FAC-Neutral Test (D5) ☐ Sphagnum moss (D8) (LRR T, U)	
Field Observations: Surface Water Present? Yes ☐ No ☒ Depth (inches): _____ Water Table Present? Yes ☐ No ☒ Depth (inches): <u>>16"</u> Saturation Present? Yes ☐ No ☒ Depth (inches): <u>>16"</u> (includes capillary fringe)		Wetland Hydrology Present? Yes ☒ No ☐	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: Sediment staining on vegetation indicates that areas surrounding the wetland data point experience flooding to depths of 2'. Neither the water table nor soil saturation were observed at WB-WET during the site visit.			

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: WB-WET

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Liquidambar styraciflua</u>	<u>40%</u>	<u>Y</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>83.3%</u> (A/B)																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
<u>40%</u> = Total Cover 50% of total cover: <u>20%</u> 20% of total cover: <u>8%</u>				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species _____</td> <td>x 1 = _____</td> </tr> <tr> <td>FACW species _____</td> <td>x 2 = _____</td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = _____</td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = _____</td> </tr> <tr> <td>Column Totals: _____</td> <td>(A) _____ (B) _____</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = _____</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species _____	x 1 = _____	FACW species _____	x 2 = _____	FAC species _____	x 3 = _____	FACU species _____	x 4 = _____	UPL species _____	x 5 = _____	Column Totals: _____	(A) _____ (B) _____	Prevalence Index = B/A = _____	
Total % Cover of:	Multiply by:																			
OBL species _____	x 1 = _____																			
FACW species _____	x 2 = _____																			
FAC species _____	x 3 = _____																			
FACU species _____	x 4 = _____																			
UPL species _____	x 5 = _____																			
Column Totals: _____	(A) _____ (B) _____																			
Prevalence Index = B/A = _____																				
<u>40%</u> = Total Cover 50% of total cover: <u>20%</u> 20% of total cover: <u>8%</u>																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Liguistrum sinense</u>	<u>15%</u>	<u>Y</u>	<u>FAC</u>																	
2. <u>Melia azedarach</u>	<u>10%</u>	<u>Y</u>	<u>UPL</u>																	
3. <u>Ulmus rubra</u>	<u>10%</u>	<u>Y</u>	<u>FAC</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
<u>35%</u> = Total Cover 50% of total cover: <u>17.5%</u> 20% of total cover: <u>7%</u>																				
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>None</u>	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
12. _____	_____	_____	_____																	
_____ = Total Cover 50% of total cover: _____ 20% of total cover: _____																				
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. <u>Smilax rotundifolia</u>	<u>10%</u>	<u>Y</u>	<u>FAC</u>																	
2. <u>Toxicodendron radicans</u>	<u>10%</u>	<u>Y</u>	<u>FAC</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
<u>20%</u> = Total Cover 50% of total cover: <u>10%</u> 20% of total cover: <u>4%</u>																				
Remarks: (If observed, list morphological adaptations below). <u>Many of the trees in the wetland displayed buttressed trunks.</u>				Hydrophytic Vegetation Present? Yes ☒ No ☐																

SOIL

Sampling Point: WB-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10"	10YR 3/2	100%					Clay loam	
10-16"	10YR 3/2	90%	7.5YR 5/6	10%	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Muck Presence (A8) (LRR U)
☐ 1 cm Muck (A9) (LRR P, T)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☒ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,B)
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
 (MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

The soils were dark with concentrations beginning at 10" in the soil profile and increasing with depth. No saturation and no water table was observed at the data point location during the site visit.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Structure # 230308 City/County: Columbus County Sampling Date: 8/6/2014
 Applicant/Owner: NCDOT State: NC Sampling Point: WC-WET
 Investigator(s): J. Hartshorn (KHA), R. Sullivan (KHA) Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 2%
 Subregion (LRR or MLRA): LRR P Lat: 34.326259 Long: -78.799456 Datum: NAD 1983
 Soil Map Unit Name: Norfolk loamy fine sand NWI classification: PFO1Ad

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: Wetland WC is a bottomland wetland north of Soules Swamp. The wetland data form was taken on a hillslope just inside the wetland area near the boundary of WC and adjacent uplands. The wetland slopes slightly towards Soules Swamp and has many large buttressed trees.			

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) ☐ Surface Water (A1) ☐ High Water Table (A2) ☒ Saturation (A3) ☐ Water Marks (B1) ☒ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Water-Stained Leaves (B9)		Secondary Indicators (minimum of two required) ☐ Surface Soil Cracks (B6) ☐ Sparsely Vegetated Concave Surface (B8) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☒ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☒ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ FAC-Neutral Test (D5) ☐ Sphagnum moss (D8) (LRR T, U)	
Field Observations: Surface Water Present? Yes ☐ No ☒ Depth (inches): _____ Water Table Present? Yes ☒ No ☐ Depth (inches): <u>16"</u> Saturation Present? Yes ☒ No ☐ Depth (inches): <u>Surface</u> (includes capillary fringe)		Wetland Hydrology Present? Yes ☒ No ☐	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: Wetland WC is likely inundated during flood events from Soules Swamp. Surface water to ~1' deep were observed in the lowest-lying areas of WC. The water table was observed at 16" and the soil was saturated at the surface.			

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: WC-WET

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Liquidambar styraciflua</u>	<u>40%</u>	<u>Y</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>8</u> (A) Total Number of Dominant Species Across All Strata: <u>8</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)																
2. <u>Quercus nigra</u>	<u>20%</u>	<u>Y</u>	<u>FAC</u>																	
3. <u>Magnolia grandiflora</u>	<u>10%</u>	<u>N</u>	<u>FAC</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
<u>70%</u> = Total Cover 50% of total cover: <u>35%</u> 20% of total cover: <u>14%</u>				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td>Total % Cover of:</td> <td>Multiply by:</td> </tr> <tr> <td>OBL species _____</td> <td>x 1 = _____</td> </tr> <tr> <td>FACW species _____</td> <td>x 2 = _____</td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = _____</td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = _____</td> </tr> <tr> <td>Column Totals: _____</td> <td>(A) _____ (B) _____</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = _____</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species _____	x 1 = _____	FACW species _____	x 2 = _____	FAC species _____	x 3 = _____	FACU species _____	x 4 = _____	UPL species _____	x 5 = _____	Column Totals: _____	(A) _____ (B) _____	Prevalence Index = B/A = _____	
Total % Cover of:	Multiply by:																			
OBL species _____	x 1 = _____																			
FACW species _____	x 2 = _____																			
FAC species _____	x 3 = _____																			
FACU species _____	x 4 = _____																			
UPL species _____	x 5 = _____																			
Column Totals: _____	(A) _____ (B) _____																			
Prevalence Index = B/A = _____																				
<u>70%</u> = Total Cover 50% of total cover: <u>35%</u> 20% of total cover: <u>14%</u>																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Ulmus rubra</u>	<u>20%</u>	<u>Y</u>	<u>FAC</u>																	
2. <u>Ligustrum sinense</u>	<u>15%</u>	<u>Y</u>	<u>FAC</u>																	
3. <u>Morus alba</u>	<u>10%</u>	<u>N</u>	<u>FACU</u>																	
4. <u>Magnolia grandiflora</u>	<u>10%</u>	<u>N</u>	<u>FAC</u>																	
5. <u>Acer rubrum</u>	<u>5%</u>	<u>N</u>	<u>FAC</u>																	
6. <u>Callicarpa americana</u>	<u>5%</u>	<u>N</u>	<u>FACU</u>																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
<u>65%</u> = Total Cover 50% of total cover: <u>32.5%</u> 20% of total cover: <u>13%</u>																				
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Woodwardia areolata</u>	<u>20%</u>	<u>Y</u>	<u>OBL</u>	Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ Problematic Hydrophytic Vegetation ¹ (Explain)																
2. <u>Leucothoe axillaris</u>	<u>10%</u>	<u>Y</u>	<u>FACW</u>																	
3. <u>Osmundastrum cinnamomeum</u>	<u>5%</u>	<u>N</u>	<u>FACW</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
<u>35%</u> = Total Cover 50% of total cover: <u>17.5%</u> 20% of total cover: <u>7%</u>																				
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. <u>Toxicodendron radicans</u>	<u>15%</u>	<u>Y</u>	<u>FAC</u>	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.																
2. <u>Vitis rotundifolia</u>	<u>10%</u>	<u>Y</u>	<u>FAC</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
<u>25%</u> = Total Cover 50% of total cover: <u>12.5%</u> 20% of total cover: <u>5%</u>																				
Hydrophytic Vegetation Present? Yes ☒ No ☐																				
Remarks: (If observed, list morphological adaptations below).																				

Buttressing was observed on the trees within wetland WC.

SOIL

Sampling Point: WC-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"	2.5Y 2.5/1	100%					Loam	
4-12"	2.5Y 4/1	90%	2.5Y 6/8	10%			Sandy loam	
12-20"	2.5Y 6/3	100%					Sandy loam	
20-30"	2.5Y 6/4	70%	2.5Y 6/6	30%			Sandy loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Organic Bodies (A6) (LRR P, T, U)
☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
☐ Muck Presence (A8) (LRR U)
☐ 1 cm Muck (A9) (LRR P, T)
☒ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Coast Prairie Redox (A16) (MLRA 150A)
☐ Sandy Mucky Mineral (S1) (LRR O, S)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
☐ Thin Dark Surface (S9) (LRR S, T, U)
☐ Loamy Mucky Mineral (F1) (LRR O)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Marl (F10) (LRR U)
☐ Depleted Ochric (F11) (MLRA 151)
☐ Iron-Manganese Masses (F12) (LRR O, P, T)
☐ Umbric Surface (F13) (LRR P, T, U)
☐ Delta Ochric (F17) (MLRA 151)
☐ Reduced Vertic (F18) (MLRA 150A, 150B)
☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- ☐ 1 cm Muck (A9) (LRR O)
☐ 2 cm Muck (A10) (LRR S)
☐ Reduced Vertic (F18) (outside MLRA 150A,B)
☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
☐ Anomalous Bright Loamy Soils (F20)
 (MLRA 153B)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

The soils were saturated throughout the soil profile. The water table was observed at 16" within the soil profile.

WETLAND RATING WORKSHEET Fourth version

STR #230308
WA

Project Name: Structure #230308 Nearest road: Peacock Rd
 County: Columbus Wetland area: 0.19 acres Wetland width: 200 feet
 Name of Evaluator: J. Hartshorn, R. Sullivan Date: 9/2/2014

Wetland Location

☐ on pond or lake
☒ on perennial stream
☐ on intermittent stream
☐ within interstream divide
☐ other: _____

Soil Series

☐ predominantly organic
 (humus, muck, or peat)
☒ predominantly mineral
 (non-sandy)
☐ predominantly sandy

Hydrolic factors

☐ steep topography
☐ ditched or channelized
☒ total riparian wetland width $\geq$ 100 ft

Adjacent land use (within ½ mile upstream, upslope, or radius)

☒ forested/natural vegetation 25 %
☒ agriculture, urban/suburban 70 %
☒ impervious service 5 %

Dominant vegetation

1) Liquidambar styraciflua
 2) Acer rubrum
 3) Persea palustris

Flooding and wetness

☐ semipermanently to permanently flooded
 or inundated
☒ seasonally flooded or inundated
☐ intermittently flooded or temporary
 surface water
☐ no evidence of flooding or surface water

Wetland type (select one)

☒ Bottomland hardwood forest	☐ Pine savanna
☐ Headwater forest	☐ Freshwater marsh
☐ Swamp forest	☐ Bog/fen
☐ Wet flat	☐ Ephemeral wetland
☐ Pocosin	☐ Carolina Bay
☐ Bog forest	☐ Other _____

*The rating system cannot be applied to salt or brackish marshes or stream channels

				weight		
R	Water Storage	<u>5</u>	x	<u>4.00</u>	=	<u>12</u>
A	Bank/Shoreline stabilization	<u>3</u>	x	<u>4.00</u>	=	<u>12</u>
T	Pollutant removal	<u>5</u>	x	<u>5.00</u>	=	<u>25</u>
I	Wildlife habitat	<u>4</u>	x	<u>2.00</u>	=	<u>8</u>
N	Aquatic life	<u>4</u>	x	<u>4.00</u>	=	<u>16</u>
G	Recreation/Education	<u>1</u>	x	<u>1.00</u>	=	<u>1</u>

Total Score¹ 74

¹Add 1 point if in sensitive watershed and >10% nonpoint disturbance within ½ mile radius.

WETLAND RATING WORKSHEET Fourth version

STR #230308
WB

Project Name: Structure #230308 Nearest road: Peacock Rd
County: Columbus Wetland area: 0.12 acres Wetland width: 100 feet
Name of Evaluator: J. Hartshorn, R. Sullivan Date: 9/2/2014

Wetland Location

☐ on pond or lake
☒ on perennial stream
☐ on intermittent stream
☐ within interstream divide
☐ other: _____

Soil Series

☐ predominantly organic
(humus, muck, or peat)
☒ predominantly mineral
(non-sandy)
☐ predominantly sandy

Hydrolic factors

☐ steep topography
☐ ditched or channelized
☒ total riparian wetland width $\geq$ 100 ft

Adjacent land use (within ½ mile upstream, upslope, or radius)

☒ forested/natural vegetation 20 %
☒ agriculture, urban/suburban 75 %
☒ impervious service 5 %

Dominant vegetation

1) Liquidambar styraciflua
2) Ligustrum sinense
3) Acer rubrum

Flooding and wetness

☐ semipermanently to permanently flooded
or inundated
☒ seasonally flooded or inundated
☐ intermittently flooded or temporary
surface water
☐ no evidence of flooding or surface water

Wetland type (select one)

☒ Bottomland hardwood forest	☐ Pine savanna
☐ Headwater forest	☐ Freshwater marsh
☐ Swamp forest	☐ Bog/fen
☐ Wet flat	☐ Ephemeral wetland
☐ Pocosin	☐ Carolina Bay
☐ Bog forest	☐ Other _____

*The rating system cannot be applied to salt or brackish marshes or stream channels

				weight		
R	Water Storage	<u>5</u>	x	<u>4.00</u>	=	<u>12</u>
A	Bank/Shoreline stabilization	<u>3</u>	x	<u>4.00</u>	=	<u>12</u>
T	Pollutant removal	<u>5</u>	x	<u>5.00</u>	=	<u>25</u>
I	Wildlife habitat	<u>4</u>	x	<u>2.00</u>	=	<u>8</u>
N	Aquatic life	<u>4</u>	x	<u>4.00</u>	=	<u>16</u>
G	Recreation/Education	<u>1</u>	x	<u>1.00</u>	=	<u>1</u>

Total Score¹ 74

¹Add 1 point if in sensitive watershed and >10% nonpoint disturbance within ½ mile radius.

WETLAND RATING WORKSHEET Fourth version

STR #230308
WC

Project Name: Structure #230308 Nearest road: Peacock Rd
 County: Columbus Wetland area: 0.12 acres Wetland width: 100 feet
 Name of Evaluator: J. Hartshorn, R. Sullivan Date: 9/2/2014

Wetland Location

☐ on pond or lake
☒ on perennial stream
☐ on intermittent stream
☐ within interstream divide
☐ other: _____

Soil Series

☐ predominantly organic
 (humus, muck, or peat)
☒ predominantly mineral
 (non-sandy)
☐ predominantly sandy

Hydrolic factors

☐ steep topography
☐ ditched or channelized
☒ total riparian wetland width $\geq$ 100 ft

Adjacent land use (within ½ mile upstream, upslope, or radius)

☒ forested/natural vegetation 40 %
☒ agriculture, urban/suburban 55 %
☒ impervious service 5 %

Dominant vegetation

1) Liquidambar styraciflua
 2) Quercus nigra
 3) Ulmus rubra

Flooding and wetness

☐ semipermanently to permanently flooded
 or inundated
☒ seasonally flooded or inundated
☐ intermittently flooded or temporary
 surface water
☐ no evidence of flooding or surface water

Wetland type (select one)

☒ Bottomland hardwood forest	☐ Pine savanna
☐ Headwater forest	☐ Freshwater marsh
☐ Swamp forest	☐ Bog/fen
☐ Wet flat	☐ Ephemeral wetland
☐ Pocosin	☐ Carolina Bay
☐ Bog forest	☐ Other _____

*The rating system cannot be applied to salt or brackish marshes or stream channels

				weight			
R	Water Storage	<u>5</u>	x	<u>4.00</u>	=	<u>12</u>	
A	Bank/Shoreline stabilization	<u>3</u>	x	<u>4.00</u>	=	<u>12</u>	
T	Pollutant removal	<u>5</u>	x	<u>5.00</u>	=	<u>25</u>	
I	Wildlife habitat	<u>5</u>	x	<u>2.00</u>	=	<u>10</u>	
N	Aquatic life	<u>5</u>	x	<u>4.00</u>	=	<u>20</u>	
G	Recreation/Education	<u>1</u>	x	<u>1.00</u>	=	<u>1</u>	

Total Score¹ 80

¹Add 1 point if in sensitive watershed and >10% nonpoint disturbance within ½ mile radius.

North Carolina Division of Water Quality - Stream Identification Form, Version 4.11

Date: 8/6/2014	Project/Site: Structure 230308 Feature SB	Latitude: 34.324961
Evaluator: J. Hartshorn (KHA) R. Sullivan (KHA)	County: Columbus	Longitude: -78.799607
Total Points: 16 Stream is at least intermittent if ≥ 19 or perennial if ≥ 30	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other e.g. Quad Name:

A. Geomorphology Subtotal = 8

	Absent	Weak	Moderate	Strong	Score
1 ^a . Continuity of channel bed and bank	0	1	2	3	3
2. Sinuosity of channel along thalweg	0	1	2	3	0
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	1
4. Particle size of stream substrate	0	1	2	3	1
5. Active/relic floodplain	0	1	2	3	1
6. Depositional bars or benches	0	1	2	3	2
7. Recent alluvial deposits	0	1	2	3	0
8. Headcuts	0	1	2	3	0
9. Grade control	0	0.5	1	1.5	0
10. Natural valley	0	0.5	1	1.5	0
11. Second or greater order channel	No = 0		Yes = 3		0

^a artificial ditches are not rated; see discussions in manual

B. Hydrology Subtotal = 6

12. Presence of Baseflow	0	1	2	3	1
13. Iron oxidizing bacteria	0	1	2	3	1
14. Leaf litter	1.5	1	0.5	0	1
15. Sediment on plants or debris	0	0.5	1	1.5	0
16. Organic debris lines or piles	0	0.5	1	1.5	0
17. Soil-based evidence of high water table?	No = 0		Yes = 3		3

C. Biology Subtotal = 2

18. Fibrous roots in streambed	3	2	1	0	1
19. Rooted upland plants in streambed	3	2	1	0	1
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3	0
21. Aquatic Mollusks	0	1	2	3	0
22. Fish	0	0.5	1	1.5	0
23. Crayfish	0	0.5	1	1.5	0
24. Amphibians	0	0.5	1	1.5	0
25. Algae	0	0.5	1	1.5	0
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5; Other = 0				0

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Feature SB is a linear roadside ditch that has been recently maintained but low flow was observed in the ditch. Iron oxidizing bacteria was present within the channel. Substrate was sandy and depositional bars were present along the ditch bottom.



STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: J. Hartshorn, R. Sullivan
3. Date of evaluation: 08/06/2014
4. Time of evaluation: 10:00 am
5. Name of stream: Structure 230308 - SB
6. River basin: Lumber
7. Approximate drainage area: <1 acre
8. Stream order: First Order
9. Length of reach evaluated: 100'
10. County: Columbus
11. Site coordinates (if known): prefer in decimal degrees.
12. Subdivision name (if any): n/a
- Latitude (ex. 34.872312): 34.324961 Longitude (ex. -77.556611): -78.799607
- Method location determined (circle): ☒ GPS ☐ Topo Sheet ☐ Ortho (Aerial) Photo/GIS ☐ Other GIS ☐ Other _____
13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location):
Feature SB is located west of Peacock Road, south of Soules Swamp, between the road and an agricultural field.
14. Proposed channel work (if any): n/a
15. Recent weather conditions: Hot and humid, with no rainfall recorded within 48 hours
16. Site conditions at time of visit: Hot, approximately 90 degrees and clear
17. Identify any special waterway classifications known: ☐ Section 10 ☐ Tidal Waters ☐ Essential Fisheries Habitat
☐ Trout Waters ☐ Outstanding Resource Waters ☐ Nutrient Sensitive Waters ☐ Water Supply Watershed (I-IV)
18. Is there a pond or lake located upstream of the evaluation point? NO If yes, estimate the water surface area: n/a
19. Does channel appear on USGS quad map? NO
20. Does channel appear on USDA Soil Survey? NO
21. Estimated watershed land use: _____% Residential _____% Commercial _____% Industrial _____% Agricultural
50 % Forested _____% Cleared / Logged 50 % Other (Roadway)
22. Bankfull width: 6'
23. Bank height (from bed to top of bank): 3'
24. Channel slope down center of stream: ☒ Flat (0 to 2%) ☐ Gentle (2 to 4%) ☐ Moderate (4 to 10%) ☐ Steep (>10%)
25. Channel sinuosity: ☒ Straight ☐ Occasional bends ☐ Frequent meander ☐ Very sinuous ☐ Braided channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 30 **Comments:** _____
Feature SB is a linear roadside ditch with a sandy substrate. Iron oxidizing bacteria was observed throughout SB and depositional bars were found along the channel.

Evaluator's Signature Jason Hartshorn **Date** 08/06/2014

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	3
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	1
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	2
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	2
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	0
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	1
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	4
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	0
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	N/A
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	4
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	2
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0 – 5	0 – 4	0 – 5	1
HABITAT	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	1
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	2
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	0
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	N/A
BIOLOGY	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	0
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	2
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						30

* These characteristics are not assessed in coastal streams.