

Appendix C: NRTM

Technical Memorandum

To: SC DOT, ESO
South Carolina Department of Transportation

From: Robert W. Hanley, Ph.D.
Senior Consultant

Subject: Woodruff Road Congestion Relief – Natural Resources Assessment

Date: August 1, 2019

CC: Petrina Butler, P.E.

Project No.: 258900.0000.0000

1.0 Introduction

1.1 Project Description

The Woodruff Road Congestion Relief Project (Project) is a South Carolina Department of Transportation (SC DOT) sponsored study of an approximately 2.4-mile portion of Woodruff Road (South Carolina Primary Highway 146) in Greenville County. The purpose of the Project is to identify a practical alternative to relieve traffic congestion on this portion of Woodruff Road. Several options are under consideration. Appendix A provides figures referenced in this document and Appendix B provides photographs of the Study Area.

The Project Study Area (Study Area) is located in central Greenville County. After a preliminary review the SC DOT refined the Study Area to encompass an area that is bounded on the northeast by Woodruff Road from its intersections with Smith-Hines Road on the east and Roper Mountain Road and Verdae Boulevard on the west; on the east by Smith-Hines Road; on the west by Verdae Boulevard; and on the south by the Woodruff Road Parallel project, Market Point Drive, South Oak Forest Drive, and Thousand Oaks Boulevard. Figure 1 is a map depicting the location of the Study Area showing the existing transportation network and the Study Area. Figure 2 is a map of the Study Area superimposed on a 7.5-minute United States Geological Survey (USGS) quadrangle topographic map.

1.2 Methodology

Prior to undertaking field activities TRC reviewed the following reference materials:

- United States Geological Survey (USGS) Mauldin, South Carolina 7.5-minute quadrangle topographic map
- USGS National Map of the National Hydrography Data set
- *Soil Survey of Greenville County, South Carolina*. United States Department of Agriculture (USDA) Soil Conservation Service, 1972
- USDA Web Soil Survey, on-line soil mapping application (<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>)
- United States Fish and Wildlife Service (USFWS) , National Wetland Inventory Wetland Mapper on-line mapping application (<https://www.fws.gov/wetlands/Data/Mapper.html>)

- USFWS Information for Planning and Conservation (IPac) on-line threatened and endangered species mapping application
- South Carolina Department of Natural Resources Rare, Threatened and Endangered Species Inventory for Greenville County (<http://www.dnr.sc.gov/species/greenville.html>)
- Aerial photographs from 1930 to the present

Field activities were conducted during late 2017 and again during June, July and August 2018. Field work included identifying and delineating potentially jurisdictional waters of the United States, habitat communities, and habitat suitable for federally or state protected species within the Study Area.

Wetlands were delineated using the procedures described in federal Wetlands Delineation Technical Manual (USACE, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2) (USACE, 2010) (“Regional Supplement”). This procedure requires an analysis of vegetation, hydrology, and soils to delineate wetland:upland boundaries. The general approach conformed to the procedures described for areas less than or equal to 5 acres, and involved selecting representative observation points for different plant communities.

At each observation point, the vegetation analysis followed the Standard Dominance test described in the Regional Supplement. This test involves identifying the predominant species in four or five vegetation strata. For the Project Area described in this report, four strata were analyzed: herbs, saplings/shrubs, trees and woody vines. If greater than 50 percent of the observed plant species identified as obligate wetland, facultative wetland or facultative on the National Wetland Plant List, 2016 NWPL v3.3 (USACE, 2016), then the sampling point was deemed to exhibit wetland vegetation. Hydrology was analyzed by looking for at least one primary or two secondary indicators listed on Table 10 of the Regional Supplement.

Soils were assessed by advancing a 1-inch diameter, stainless steel tube 12 to 18 inches into the ground to retrieve a soil core. Soil cores were examined for one or more hydric soil indicators listed in the Regional Supplement.

For areas exhibiting wetland characteristics, the presumed upland:wetland boundary was marked by placing sequentially numbered pin flags. Wetland delineation data collected during the field reconnaissance were entered onto standard Wetland Delineation Data forms for the Eastern Mountains and Piedmont Region for four vegetation strata (Appendix D of the Regional Supplement).

Tributaries were identified and delineated based on evidence of confined, channelized flow and an ordinary high-water mark (OHWM), as defined by USACE at 33 CFR 328.3(e). For waters, pin flags were at the presumed OHWM as determined by physical evidence, following procedures described in USACE Regulatory Guidance Letter RGL-05-05 (USACE, 2005).

Pin flags were located in the field using a Global Positioning System (GPS) receiver with submeter accuracy. At each data point, the receiver collected GPS data for at least 60 seconds.

2.0 Physical Resources

2.1 Land Use

Aerial photographs reviewed by TRC show that in the 1930s most of the land cover in the Study Area was either open, agricultural land or wooded. Development was rural in character. Uplands were either cultivated for row-crop production or pasture. Low-lying areas and stream margins were mostly wooded.

By the time the Study Area began to undergo urbanization in the 1960s, most of the open land had become wooded. Construction of Interstate Highway 85 (I-85) in the 1960s spurred commercial and industrial development along Woodruff Road proximate to its interchange with I-85. One of the larger industrial development activities was construction of the Celanese, Incorporated polyester fiber manufacturing plant on an approximately 40-acre tract of land west of Woodruff Road and south of I-85. This facility operated several surface water impoundments for wastewater treatment and an on-site landfill for disposal of off-spec product. South of the Celanese manufacturing plant, the first residential community in the Study Area was constructed north of Miller Road.

By 1970, three other commercial or industrial facilities were erected west of Woodruff Road, each of which had a surface impoundment, as can be seen in aerial photographs and the USGS, Mauldin, South Carolina, 7.5-minute topographic map published during this time period. Other than the development along Woodruff Road, most of the Study Area was wooded.

Beginning in 1980, the Woodruff Road corridor between I-385 on the east and Roper Mountain Road on the west began and continues to be developed for commercial use, such as shopping centers, hotels, motels, and restaurants. Verdae Boulevard, which extends from the Woodruff Road/Roper Mountain Road intersection west to Laurens Road, was constructed in the 1980s, further spurring development along the Woodruff Road traffic corridor.

Presently within the Study Area, the Woodruff Road corridor from Smith-Hines Road west to Roper Mountain Road and Verdae Boulevard is a densely developed commercial center (Photographs 1 through 4). Woodruff Road provides the only access to commercial properties situated adjacent to Woodruff Road between I-85 and Roper Mountain Road. However, the City of Greenville is constructing a two-lane road, the Woodruff Road Parallel Parkway, that will run parallel to Woodruff Road from Verdae Boulevard east to Woodruff Industrial Lane. In addition, two other side roads, Ketron Court and Green Heron Road will be extended to the south to connect to the Woodruff Road Parallel Parkway. This road is scheduled to open in August or September 2019. Construction on the Woodruff Road Parallel Parkway was initiated after the field work for this project was completed.

Southeast of I-85, portions of the former Celanese site have been developed for multifamily residential or retail use (Photograph 5). A railroad spur that serves a nearby manufacturing facility crosses this portion of the Study Area. The area between Carolina Point Parkway and Market Point Drive is rapidly developing, with construction on several new projects having been started after the field activities were conducted.

One high-voltage overhead electric power transmission line crosses the Study Area (Photograph 6). It originates at a substation east of Salters Road and extends east to a substation south of Market Point Drive.

2.2 Physiography and Topography

Most of Greenville County, including the Study Area, lies within the Southern Piedmont Major Land Resource Area (MLRA 136; USDA, 2006). In South Carolina, MLRA 136 lies within the Piedmont Province of the Appalachian Highlands. As described by the United States Department of Agriculture (USDA), this MLRA is characterized by:

- Terrain is dominated by rolling hills with well-defined drainages that have narrow, steeply sloping valleys. Terraces along stream corridors are typically lacking, and floodplains are typically narrow. Most of the land consists of sloping uplands.
- Underlying bedrock consists of Precambrian and Paleozoic metamorphic and igneous rock. The upper bedrock layer is often highly weathered.
- Climate is summarized as temperate and humid. Winters are short with the frost-free period typically exceeding 180 days. Rainfall is evenly distributed from winter through summer; however, the pattern varies from prolonged, low-precipitation rain events during the winter to scattered, heavy-precipitation rain events during the summer. Fall is typically dry.
- Soils are predominantly Ultisols, Alfisols, and Inceptisols that are derived from weathered bedrock. Topsoil over much of the area is shallow due to poor farming practices in the 19th and early 20th centuries. Hydric soils may occur along stream valleys and low-lying areas.
- The dominant climax forest is mixed hardwood and pine, with hardwood species being dominated by hickory and oak. Tulip poplar, red maple, and black gum are often found in riparian areas. Pine is often the dominant tree on weathered sites with poor soils.
- The dominant land use is forest, most of which is privately owned. Urban land and crop- and pastureland occupy almost equivalent amounts of this MLRA.

TRC's review of topographic maps and observations made during the Site Reconnaissance shows that the Study Area exhibits topographic features consistent with the USDA description.

2.3 Geology and Soils

The Study Area lies within Six Mile Thrust Sheet of the Piedmont Physiographic Unit (SC DOT, 2019). Geologists believe that the Piedmont is the remains of a severely eroded ancient mountain chain. Elevations range from 300 feet above mean sea level (ft. MSL) to 1,400 ft. MSL. Topography is characterized by gently rolling, deeply weathered bedrock with few rock outcrops. The highest elevations are due to widely scattered, isolated bedrock outcrops, also known as Monadnocks, such as Paris Mountain in Greenville County.

Geologically the Piedmont is complex. It contains numerous rock types that were formed during the Paleozoic Era (250 to 570 million year ago). The typical residual soil profile consists 5 to 70 feet of clayey soils near the surface, where soil weathering is more advanced, underlain by sandy silts and silty sands. Weathered residual subsoils, also known as saprolites, consist of physically and chemically weathered rocks. Saprolites can be soft/loose to very hard and dense, or friable. They typically retain the structure of the parent rock, which consists of metamorphic and igneous basement rocks (granite, schist, and gneiss).

TRC accessed the Natural Resources Conservation Service (NRCS) Web Soil Survey, an on-line soil mapping routine, to evaluate soils in the Study Area. Figure 3 is a soils map depicting the different soils mapped by the NRCS. Thirteen soils are mapped within the Study Area. Cecil sandy loam is the largest

soil mapping unit in the Study Area, covering approximately 50 percent of the land, and of this soil type, Cecil sandy loam with 2 to 6 percent slopes comprises most of the Cecil soils. Cecil soils are deep, well drained soils that are found on ridges and side slopes in Piedmont uplands. They are typically deep to saprolite and very deep to bedrock. The surface horizon is a dark, yellow-brown sandy loam, grading to a red clay. Depths to bedrock range from 6 to 10 feet below ground surface (bgs).

The second largest mapping unit is Cecil-Urban land complex, a soil type found in developed areas. At the time this area was mapped, Cecil-Urban land complex was mapped on a former industrial site southwest of the interchange of Woodruff Road and I-85 and at the interchange of Roper Mountain Road and I-385. This mapping unit consists of intermixed Cecil and Urban soils. Urban soils are found in areas that have been excavated, filled, graded or otherwise disturbed by human activities. Much of this mapping unit has been covered by pavement and/or buildings. Deeper profiles are similar to Cecil soils.

The only hydric soil mapped in the Study Area is Wehadkee, which covers approximately 3 percent of the Study Area. Wehadkee soils are very deep, poorly drained soils found in floodplains. The surface horizon is typically a gray-brown, fine sandy loam. Deeper horizons are dark gray to gray loam to sandy clay loam. Wehadkee soils are mapped along three drainage features in the Study Area.

2.4 Water Resources

The Study Area lies on the divide between three USGS identified subwatershed basins, as shown on Figure 4. That portion of the Study Area that lies northwest of Interstate Highway 85 and Carolina Point Parkway and roughly southwest of Woodruff Road and Interstate Highway 385 is in the Laurel Creek – Reedy River Subwatershed (USGS 12-digit hydrologic unit [12-digit HU] 030501090404). That portion of the Study Area that lies roughly northeast of Woodruff Road is in the Brushy Creek – Enoree River Subwatershed (12-digit HU 030501080102). Finally, the portion of the Study Area that lies southeast of Interstate Highway 85 and Carolina Point Parkway and roughly southwest of Woodruff Road is in the Gilder Creek subwatershed (12-digit HU 030501080103).

The Laurel Creek – Reedy River subwatershed is a component of the Saluda River Watershed (8-digit HU 03050904), while the Brushy Creek – Enoree River and Gilder Creek subwatersheds are both in the Enoree River Watershed (8-digit HU 03050108).

The USGS National Hydrography Data Set was accessed through the on-line version of the National Map (<https://viewer.nationalmap.gov/advanced-viewer/>) to identify USGS mapped water features within the Study Area. These features are depicted on Figure 4 and summarized in Table 1.

Table 1
Water Resources
Woodruff Road Congestion Relief Project, Greenville County, South Carolina

TRC Site Reconnaissance Feature	USGS National Hydrography Data Set Reach Code	USGS Descriptor	National Wetland Inventory (1994)	TRC 2017 Site Reconnaissance and Delineation	Site Reconnaissance Observations
Features in the Laurel Creek – Reedy River Sub-watershed (12-digit Hydrologic Unit 030501090404)					
Non-Wetland Water 1	Not mapped	Not mapped	Not mapped	Non-Wetland, Non-Relatively Permanent Water.	At the time of the initial Site reconnaissance (June 2017) this feature arose from a piped conveyance. West of Verdae Boulevard. It is conveyed under Verdae Boulevard by a piped conveyance and discharges to a storm water pond that is outside of the Study Area limits. Between 2017 and 2019 that portion of this feature upstream from Verdae Boulevard was filled and converted to a piped conveyance.
Non-Wetland Water 2	03050109001672	Perennial Stream	Mapped as Riverine, Lower Perennial, Unconsolidated Bottomed, Permanently Flooded wetland	Non-wetland, Relatively Permanent Water	The USGS mapped portion of this reach upstream from Woodruff Road has been filled and is a piped conveyance. The reach now arises from culvert that emerges from the south side of Woodruff Road. The banks are highly eroded and undercut. Several tributaries to this feature delineated by TRC are not mapped by the USGS.
Non-Wetland Water 2.3	03050109004259 and 03050109004264	Intermittent Stream	Mapped as Riverine, Intermittent, Streambed, Seasonally Flooded wetland	Non-wetland, Relatively Permanent Water	The USGS maps this feature as arising north of Woodruff Road. This feature drains the Magnolia Place Shopping Center. Most of upper reach has been filled and converted to a piped conveyance that discharges downstream from Woodruff Road. The upper reach is highly eroded with steep, often undercut banks. The downstream reach is a short stream segment, much of which lies outside of the Study Area.
Not present	03050109011741	Reservoir/Cooling Pond	Not mapped	Closed man-made surface impoundment	This feature is depicted on the USGS 7.5' Mauldin, South Carolina topographic map as a pond situated southwest of the Nutra nutritional supplement manufacturing facility. At the time of TRC's site reconnaissance, this feature had been drained and was vegetated with mostly Virginia pine (<i>Pinus virginiana</i>). No evidence of saturation or standing water was observed.
Not present	03050109004265	Artificial Path	Mapped as Riverine, Intermittent, Streambed, Seasonally Flooded wetland	This feature was not located.	The USGS maps this feature as arising from the reservoir/cooling water pond described in the previous row. TRC's site reconnaissance found no evidence of this feature.

**Table 1
 Water Resources
 Woodruff Road Congestion Relief Project, Greenville County, South Carolina**

TRC Site Reconnaissance Feature	USGS National Hydrography Data Set Reach Code	USGS Descriptor	National Wetland Inventory (1994)	TRC 2017 Site Reconnaissance and Delineation	Site Reconnaissance Observations
Wetland SW2	03050109011742	Reservoir/Cooling Pond	Not mapped	Possibly Wetland SW2	The USGS maps this feature as an oval-shaped cooling water pond that is located in the vicinity of TRC's site reconnaissance feature Wetland SW2. However, the size and position of the USGS mapped feature do not correspond well to the size and orientation of Wetland SW-2. Hence, TRC is not certain that the two features are the same.
Non-Wetland Water 2.4	03050109004279	Intermittent Stream	Mapped as Riverine, Intermittent, Streambed, Seasonally Flooded wetland	Non-wetland, Relatively Permanent Water	This feature arises near the southwest end of Green Heron Road and drains the southern side of Woodruff Road between Green Heron Road and Woodruff Industrial Lane. Wetland SW2 drains into this feature.
Wetland SW3	03050109004284	Reservoir/Cooling Pond	Mapped as a Riverine, Unknown Perennial, Unconsolidated Bottom, Permanently Flooded wetland	Wetland SW3	This is a man-made storm water management feature that drains properties along the southeastern side of Woodruff Industrial Lane. It is overgrown and discharges to Non-wetland Water 3.4 (USGS Reach 03050109004284).
Non-Wetland Water 3	03050109004283 and 03050109004301	Intermittent Stream	Palustrine, Forested, Broad-leaved Deciduous, Temporarily Flooded wetland	Non-wetland, Relatively Permanent Water	Much of the upstream portion of Reach 03050109004283 has been filled and converted into a piped conveyance that drains several large retail stores located southeast of Woodruff Industrial Lane. The feature arises at the discharge of a large pipe, and it exhibits a deeply incised channel and undercut bank. Reach 03050109004301 begins at the confluence of Reach 03050109004283 and Non-wetland Water 3.4 (USGS Reach 03050109004284).
Non-Wetland Water 3.4	03050109004284	Intermittent Stream	Mapped as Riverine, Intermittent, Streambed, Seasonally Flooded wetland	Non-wetland, Relatively Permanent Water	This feature conveys the discharge from Wetland SW3 and flows into Non-Wetland Water 3.

**Table 1
 Water Resources
 Woodruff Road Congestion Relief Project, Greenville County, South Carolina**

TRC Site Reconnaissance Feature	USGS National Hydrography Data Set Reach Code	USGS Descriptor	National Wetland Inventory (1994)	TRC 2017 Site Reconnaissance and Delineation	Site Reconnaissance Observations
Features in the Gilder Creek Sub-watershed (12-digit Hydrologic Unit 030501080103)					
Non-Wetland Water 4, Non-Wetland Water 4.1	03050108001189	Intermittent Stream	Mapped as Riverine, Intermittent, Streambed, Seasonally Flooded wetland	Non-wetland, Relatively Permanent Water 4 and Non-wetland Open Water 4.1	This feature drains the area south of Woodruff Road and along both sides of Market Point Drive. Upstream from where it crosses Market Point Drive, this feature has been filled and converted to a piped conveyance. An impoundment of Non-wetland Water 4 has created a permanent impoundment and open water habitat (Non-Wetland Water 4.1) that is not mapped by either the USGS or the NWI.
Non-Wetland Water 5	03050108001183 and 03050108003316	Intermittent Stream	Mapped as Riverine, Intermittent, Streambed, Seasonally Flooded wetland	Non-Wetland, Relatively Permanent Water	This feature drains the commercial development that is situated south of Woodruff Road and west of Interstate Highway 385. It arises from Wetland F and is the headwaters of Gilder Creek. Reach 03050108001183 is the headwaters, and the upstream limit of Reach 03050108003316 is at the confluence of Non-Wetland Water 5 and Non-Wetland Water 5.3.
Non-Wetland Water 5.3	03050108001182	Intermittent Stream	Mapped as Riverine, Intermittent, Streambed, Seasonally Flooded wetland	Non-wetland, Non-relatively Permanent Water	Most of the USGS mapped stream segment has been filled for construction of a retail shopping center. This feature is situated in a similar location as Non-wetland Water 5.3 that was delineated during TRC's Study Area reconnaissance.
Features in the Brushy Creek – Enoree River Sub-watershed (12-digit Hydrologic Unit 030501080102)					
Not mapped	03050108001162	Intermittent Stream	Mapped as Riverine, Intermittent, Streambed, Seasonally Flooded wetland	Not mapped	This feature is mapped as being located on the north side of Woodruff Boulevard between Interstate Highways 85 and 385. This feature is located in the Shops at Green Ridge shopping center and likely was filled and converted to a piped conveyance.

3.0 Biotic Resources

The determination of biotic community habitats within the Study Area was done through a review of published literature, aerial photographs and field reconnaissance activities. Documents reviewed included the United States Fish and Wildlife Service National Wetland Inventory, the USGS National Hydrography data set, the NRCS *Soil Survey for Greenville County*. Classification of natural communities followed to the extent practicable descriptions found in Nelson, 1986. The following narrative describes biotic community habitats in the Study Area.

3.1 Human Influence Terrestrial Communities

TRC's review of recent aerial photographs and field reconnaissance identified two human influenced terrestrial habitat communities within the Study Area, commercial development and residential development. A brief summary of the human-influenced, terrestrial habitat types is presented in the following narrative.

Commercial Development:

Approximately eighty percent of the land area within the Study Area consists of commercial development. Commercial development includes three large shopping complexes all on the north side of Woodruff Road. From east to west these are an unnamed shopping center whose primary tenant is Sam's Club, the shops and Green Ridge, and Magnolia Place. Along the south side of Woodruff Road, commercial development consists of a mixture of "big box" stores, such as Target and Home Depot, smaller retail outlets, restaurants, hotels, and some commercial office developments. One industrial facility, a nutritional supplement manufacturer, is also located on the south side of Woodruff Road at its intersection with Green Heron Lane.

A former industrial facility, the Celanese Fiber site, is located south of Woodruff Road between Market Point Drive on the east and Carolina Point Parkway on the west. This area is largely cleared, open land that is undergoing redevelopment for commercial and residential use.

Commercially developed land is mostly covered with impervious surfaces. The remaining land cover is a mixture of manicured grassed areas interspersed with ornamental trees and shrubs.

Residential Development:

Approximately ten percent of the land area within the Study Area consists of residential development, of which approximately one half has been developed as single-family homes and the other half as multiple-family apartments and/or condominiums. The single-family homes are located west of Miller Road and south of South Oak Forest Drive. Land cover in this area is mostly pervious surfaces that consist of manicured lawns, open canopy woods, and landscaped shrubs and/or gardens.

Multiple-family properties are located along the southern edge of the Study Area on both sides of Market Point Drive and along southeast of Carolina Point Parkway. At the time of the site reconnaissance, two such properties were under construction. Land cover in the multiple-family developments consists mostly of impervious surfaces with small landscaped areas that are grassed or planted with ornamental shrubs.

Except for the single-family residential human influenced community, wildlife in the commercial and residential area is limited to species that have adapted to urban settings, such as house sparrows,

pigeons, mice, and small rodents. Predators, such as hawks and coyotes, may occasionally hunt in this habitat, but would not be residents.

In the single-family habitat, a more diverse fauna would be expected, including a wider variety of songbirds, small mammals, and bats. In addition, reptiles and amphibians may reside in this habitat.

3.2 Natural Terrestrial Communities

Based on the field reconnaissance, three natural terrestrial habitat/community types, Mixed Mesic Hardwood Forest, Oak-Hickory Forest, and Piedmont Seepage Forest, were identified within the Study Area. The following narrative describes these communities and the plants and animals either observed or typically associated with each of them

Mixed Mesic Hardwood Forest:

In the Piedmont of South Carolina, this natural community is typically found on north-facing slopes and in ravines. The dominant canopy and understory trees are mostly hardwood species such as American beech (*Fagus grandifolia*), tulip poplar (*Liriodendron tulipifera*), white oak (*Quercus alba*), southern red oak (*Quercus rubra*), sweet gum (*Liquidambar styraciflua*), and pignut hickory (*Carya glabra*). American holly (*Ilex glabra*) is a common understory species.

In the Study Area, this community was found in a small area west of Interstate Highway 85 and east of Woodruff Industrial Lane, in a small area east of Green Heron Road, and along streams east of Verdae Boulevard.

Small mammals associated with this community include a number of rodents, such as voles, wood mice, and squirrels. Predatory mammals found include raccoon, skunk and fox. Deer may be plentiful, especially if grassed bedded areas are present. Reptiles often found in this habitat include small and large, upland snakes, such as ribbon snakes, ring-necked snake, rat snake, and copperhead. Box turtles may be found in semi-open areas. Amphibians include American toad, and upland salamander species, as long as suitable breeding habitat is nearby. Typical birds found in this habitat include neotropical, migrating woodland songbirds, larger, year-round resident song-birds, and avian predatory birds, such as sharp-shinned hawk and barred owl.

Oak Hickory Forest:

This community is more commonly found on drier, south-facing slopes. Typical hardwood species include a variety of oaks, such as white oak, southern red oak, and chestnut oak (*Quercus montana*), a variety of hickory species, such as pignut hickory, bitternut hickory (*Carya cordiformis*), and mockernut hickory (*Carya tomentosa*), sweetgum and tulip poplar. Understory vegetation includes American holly, flowering dogwood (*Cornus florida*), and redbud (*Cercis canadensis*). Loblolly pine (*Pinus taeda*) and Virginia pine are often dense in disturbed areas.

In the Study Area, this community was observed on the slope east of Verdae Boulevard, and on wooded hillsides south and southwest of Ketrone Court, Green Heron Road, and Woodruff Industrial Boulevard.

Animals found in this community are similar to those that inhabit the Mixed Mesic Hardwood Forest.

Piedmont Seepage Forest:

This community is found in nearly level or depressional features where cool groundwater discharges to the surface. Two canopy species that dominate this habitat are red maple (*Acer rubrum*), tupelo gum (*Nyssa sylvatica*). Understory species include small-leaf arrowwood (*Viburnum nudum*) and ironwood (*Carpinus caroliniana*). Typical ground cover plants include cinnamon fern (*Osmunda cinnamomea*), net-veined chain fern (*Woodwardia areolata*), New York fern (*Thelypteris noveboracensis*). These seeps are often bordered by dense stands of club moss (*Lycopodium*).

In addition to animals listed for the other two habitats, tree frogs and leopard frogs are often found in and around these habitats.

One small area of Piedmont Seepage Forest was identified within the Study Area. It was located on a southeast facing hillside adjacent to Verdae Boulevard.

3.3 Wetland Communities

Wetlands are areas that exhibit three characteristics, a predominance of vegetation adapted to growing in moist and/or saturated soils, saturation at or near the surface continuously for several weeks or more during the growing season, and soils that show evidence of prolonged saturation and deoxygenation. Wetland communities in the Study Area include palustrine emergent wetlands, palustrine wooded wetlands, riverine wetlands, and open water wetlands. With the exception of palustrine, wooded wetlands, and riverine wetlands, the other wetland habitats observed in the refined study are the result of human construction.

Wetland plants and animals are adapted to living in saturated soils that are often oxygen depleted. They are considered highly productive ecosystems, which means that they convert relatively more sunlight into biomass than other ecosystems. Wetlands also provide other valuable functions, such as trapping and holding sediment, nutrients and pollutants, and flood control and storage.

More information on wetland types identified within the Study Area is presented in Section 4.0 – Jurisdictional Waters.

3.4 Essential Fish Habitat

TRC accessed the National Oceanographic and Atmospheric Administration’s Essential Fish Habitat (EFH) mapping tool (<https://www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper>) to determine whether EFH exists in or around the Study Area. There is no EFH designated in Greenville County. This is due to its location in the Piedmont region of South Carolina.

4.0 Jurisdictional Waters

Two federal laws, the Rivers and Harbors Act of 1899 (RHA) and the Clean Water Act (CWA) regulate activities in “waters of the United States.” Section 10 of the RHA specifically regulates activities in navigable waters and makes it unlawful to “excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of, any port, roadstead, haven, harbor, canal, lake, harbor of refuge, or inclosure (*sic*) within the limits of any breakwater, or of the channel of any navigable water of the United States, unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of War prior to beginning the same.” (33 U.S.C. 403).

The term “navigable waters” is defined as “...those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.” (33 CFR §329.4). For tidal waters, RHA jurisdiction extends to the Mean High Water, which is a tidal datum that is the average of high tides over a tidal averaging period (33 CFR §329.12). For non-tidal lakes, rivers and streams, RHA jurisdiction extends to upstream to the head of navigation, and shoreward to the OHWM, which is determined by observations of vegetation, debris and streambank profile (33 CFR §329.11). Navigable waters regulated by the RHA are commonly referred to by the regulatory agencies as TNWs or Traditionally Navigable Waterways. The RHA specifically grants regulatory powers to the USACE to enforce provisions of the Act.

The CWA was enacted to “...restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” (33 U.S.C. 1251). The CWA defines navigable waters as “waters of the United States, including the territorial seas.” [33 U.S.C. 1362.(7)], which differs from the RHA definition. Congress delegated administration of the CWA to the Administrator of the United States Environmental Protection Agency (USEPA) [33 U.S.C. 1251.(d)]. Section 404 of the CWA specifically authorizes the Administrator to regulate discharges of dredge and fill materials into “navigable waters,” which includes all “waters of the United States.”

Since the USACE had an existing permit program in place to regulate activities in TNWs, the USACE and USEPA agreed through a joint memorandum of understanding that the USACE would have primary responsibility for developing and implementing the CWA Section 404 permit program. This program is codified at 33 CFR §328, *et seq.*

4.1 Waters of the United States

The CWA Section 404 program encompasses both TNWs and, as more broadly enumerated by the CWA, “waters of the United States.” Both the USACE and USEPA define waters of the United States as¹:

- (1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- (2) All interstate waters, including interstate wetlands;
- (3) The territorial seas;
- (4) All impoundments of waters otherwise identified as waters of the United States under this section;
- (5) All tributaries, as defined in paragraph (c)(3) of this section, of waters identified in paragraphs (a)(1) through (3) of this section;
- (6) All waters adjacent to a water identified in paragraphs (a)(1) through (5) of this section, including wetlands, ponds, lakes, oxbows, impoundments, and similar waters;

¹ This definition has been challenged in several federal courts. On July 27, 2017 the USACE and USEPA issued a joint proposed rule to repeal and rescind the current federal definition. Therefore, the definition published in the *Code of Federal Regulations* is not in effect. However, the agencies are still in the formal rulemaking process and are currently reviewing comments on a proposed revised definition of waters of the United States that was published in the *Federal Register* on December 11, 2018.

(7) All waters in paragraphs (a)(7)(i) through (v) of this section where they are determined, on a case-specific basis, to have a significant nexus to a water identified in paragraphs (a)(1) through (3) of this section. The waters identified in each of paragraphs (a)(7)(i) through (v) of this section are similarly situated and shall be combined, for purposes of a significant nexus analysis, in the watershed that drains to the nearest water identified in paragraphs (a)(1) through (3) of this section. Waters identified in this paragraph shall not be combined with waters identified in paragraph (a)(6) of this section when performing a significant nexus analysis. If waters identified in this paragraph are also an adjacent water under paragraph (a)(6), they are an adjacent water and no case-specific significant nexus analysis is required.

(i) *Prairie potholes*. Prairie potholes are a complex of glacially formed wetlands, usually occurring in depressions that lack permanent natural outlets, located in the upper Midwest.

(ii) *Carolina bays and Delmarva bays*. Carolina bays and Delmarva bays are ponded, depressional wetlands that occur along the Atlantic coastal plain.

(iii) *Pocosins*. Pocosins are evergreen shrub and tree dominated wetlands found predominantly along the Central Atlantic coastal plain.

(iv) *Western vernal pools*. Western vernal pools are seasonal wetlands located in parts of California and associated with topographic depression, soils with poor drainage, mild, wet winters and hot, dry summers.

(v) *Texas coastal prairie wetlands*. Texas coastal prairie wetlands are freshwater wetlands that occur as a mosaic of depressions, ridges, intermound flats, and mima mound wetlands located along the Texas Gulf Coast.

(8) All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1) through (3) of this section and all waters located within 4,000 feet of the high tide line or ordinary high water mark of a water identified in paragraphs (a)(1) through (5) of this section where they are determined on a case-specific basis to have a significant nexus to a water identified in paragraphs (a)(1) through (3) of this section. For waters determined to have a significant nexus, the entire water is a water of the United States if a portion is located within the 100-year floodplain of a water identified in paragraphs (a)(1) through (3) of this section or within 4,000 feet of the high tide line or ordinary high water mark. Waters identified in this paragraph shall not be combined with waters identified in paragraph (a)(6) of this section when performing a significant nexus analysis. If waters identified in this paragraph are also an adjacent water under paragraph (a)(6), they are an adjacent water and no case-specific significant nexus analysis is required.

The federal definition specifically excludes the following features from federal jurisdiction even where they otherwise meet the terms of paragraphs (a)(4) through (8) of federal definition.

- (1) Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act.
- (2) Prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

(3) The following ditches:

- (i) Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.
- (ii) Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.
- (iii) Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1) through (3) of this section.

(4) The following features:

- (i) Artificially irrigated areas that would revert to dry land should application of water to that area cease;
- (ii) Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds;
- (iii) Artificial reflecting pools or swimming pools created in dry land;
- (iv) Small ornamental waters created in dry land;
- (v) Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water;
- (vi) Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways; and
- (vii) Puddles.

(5) Groundwater, including groundwater drained through subsurface drainage systems.

(6) Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.

(7) Wastewater recycling structures constructed in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.

The USACE's definition is found at 33 CFR 329; and the USEPA's definition is found at 40 CFR 230.

Wetlands are described by the USACE as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are transitional areas between open water and dry land that are often found adjacent to bays, lakes, rivers and streams. Wetlands may also be found in depressional features and hillside seeps. Examples of wetland types include bottomland forests, seasonally flooded woods or grasslands, swamps, bogs, and marshes.

Cowardin proposed a classification system for wetlands and deep-water habitats based on vegetation and geomorphological features. Deep water habitats are those whose woods. The Charleston District USACE distinguishes wetlands from non-wetland waters based on evidence of channelized flow.

The field investigation identified features exhibiting the following wetland and non-wetland waters characteristics:

- Palustrine, emergent wetlands
- Palustrine, forested wetlands
- Palustrine, scrub/shrub and emergent wetlands
- Riverine, non-wetland waters
- Lacustrine, non-wetland waters.

Table 2 lists features identified and delineated during the field investigations exhibiting characteristics of wetland and non-wetland waters. Figure 5 locates each of the features described on Table 2.

Table 2
Woodruff Road Congestion Relief Study Area
Delineated Features Exhibiting Wetland and Non-wetland Waters Characteristics

Location Number	Cowardin Class	Estimated Extent of Aquatic Resource in Study Area	Aquatic Resource Class	Comments
Wetland SW 1	PEM1Jx	0.35 acres	Non-Section 10, Wetland Constructed in Upland	Excavated storm water management feature for Holiday Inn Express. Drains to Non-wetland Waters Tributary 2.3. Photograph 7.
Wetland SW 2	PFO1J/PEM1Jh	0.13 acres	Non-Section 10, Wetland Constructed in Upland	Diked storm water management feature for Piedmont Natural Gas. Drains to Non-wetland Waters Tributary 2.4 Photographs 8 and 9.
Wetland SW 3	PFO1Bh	0.13 acres	Non-Section 10, Wetland Constructed in Upland	Diked storm water management feature for businesses on southeast side of Woodruff Industrial Blvd. Drains to Non-wetland Waters Tributary 3.4 Photograph 11.
Wetland SW 5	PEM1Jx	0.26 acres	Non-Section 10, Isolated Wetland Constructed in Upland	Excavated storm water management feature for Hamricks and Garden Ridge shopping center. Drains through piped conveyance to Non-wetland Waters Tributary 5. Photograph 13.
Wetland SW 6	PEM1Ax	0.72 acres	Non-Section 10, Isolated Wetland Constructed in Upland	Excavated storm water management feature for Garden Ridge shopping center. Drains through piped conveyance to Non-wetland Waters Tributary 5. This feature was fenced and inaccessible. The extent of wetland was based on aerial image interpretation.
Wetland SW 7	PEM1Jx	0.1 acres	Non-Section 10, Isolated Wetland Constructed in Upland	Excavated storm water management feature for commercial properties at end of Woodruff Oaks Lane. Drains to a subsurface conveyance. This feature was fenced and inaccessible. The extent of wetland was based on aerial image interpretation.

Location Number	Cowardin Class	Estimated Extent of Aquatic Resource in Study Area	Aquatic Resource Class	Comments
Wetland SW 8	PFO1Bx	0.43 acres	Non-Section 10, Isolated Wetland Constructed in Upland	Partially excavated, partially diked storm water management feature for Home Depot. Drains to Non-wetland Waters Tributary 4. This feature was fenced and inaccessible. The extent of wetland was based on aerial image interpretation. Photograph 14.
Wetland SW 9	PEM1Jx	0.16 acres	Non-Section 10, Isolated Wetland Constructed in Upland	Excavated storm water management feature for Target store parking lot. Drains to a subsurface conveyance. This feature was fenced and inaccessible. The extent of wetland was based on aerial image interpretation.
Wetland A	PFO1B	0.31 acres	Adjacent and abutting	Wooded wetland adjacent to Tributaries 2.2, 2.2.1, and 2.2.2. Photographs 39 & 40.
Wetland B	PFO1B	0.07 acres	Adjacent and abutting	Wooded wetland adjacent to the right descending bank of Non-wetland Waters 2. Photograph 41.
Wetland C	PFO1B	0.01 acres	Adjacent and abutting	Wooded wetland on a bench adjacent to the left descending bank of Non-wetland Waters 2. Since the field work was completed, this wetland has been filled for construction of a culverted crossing of the PNG Connector Road project undertaken by the City of Greenville. Photographs 42 & 43.
Wetland D	PEM2Er	0.03 acres	Isolated	Isolated wetland in former industrial area. No apparent surface connection was observed between this wetland feature and other WOTUS features. Photograph 44.
Wetland E	PEM2E	0.20 acres	Adjacent and abutting	Wetland adjacent to open water habitat of Wetland Pond 4. Wetland Pond 4 is an impoundment of Non-wetland Waters 4. Photographs 12 & 34.
Wetland F	PFO1E	0.25 acres	Adjacent and abutting	Wetland in swale between commercial developments. Receives runoff from Wetland pond 5. Adjacent to left descending bank of Non-wetland Waters 5. Photographs 45 & 46.
Wetland G	PFO1c/PEM1B	0.22 acres	Adjacent and abutting	Wetland in swale between commercial developments. Receives runoff from Wetland pond 6. Non-wetland Waters 5 arises in this wetland. Photograph 47.
Wetland Acreage		3.37 acres		
Non-wetland Waters 1 ¹	R4SBC	125.33 linear feet (In ft) 0.01 acres	Non-RPW	Headwaters non-relatively permanent tributary that drains a small area on the northwest side of Verdae Boulevard. Photographs 15 & 16.
Non-wetland Waters 2	R2UB1/2H	1,829.61 In ft 0.32 acres	RPW	Headwaters relatively permanent tributary that drains Woodruff Road and the southeast side of Verdae Blvd. Arises from a culvert under Woodruff Road Photographs 17 through 19.
Non-wetland Waters 2.1 ¹	R2UB2H	135.43 In ft 0.01 acres	RPW	Headwaters non-relatively permanent tributary that discharges into Non-wetland Waters 2 and drains a small area along the south side of Woodruff Road. Photograph 20.
Non-wetland Waters 2.2 ¹	R2UB2H	342.78 In ft 0.02 acres	RPW	Headwaters relatively permanent tributary that discharges into Non-wetland Waters 2. Drains a small area south of Verdae Boulevard. Drains Wetland A. Photograph 21.

Location Number	Cowardin Class	Estimated Extent of Aquatic Resource in Study Area	Aquatic Resource Class	Comments
Non-wetland Waters 2.2.1 ¹	R4UB2/3S	89.83 ln ft 0.01 acres	RPW	Headwaters relatively permanent tributary that discharges into Non-wetland Waters 2.2. Drains Wetland A.
Non-wetland Waters 2.2.2 ¹	R4UB2/3S	75.71 ln ft 0.01 acres	RPW	Headwaters relatively permanent tributary that discharges into Non-wetland Waters 2.2. Drains Wetland A.
Non-wetland Waters 2.3	R2UB1/2H	1,138.65 ln ft 0.28 acres	RPW	Headwaters relatively permanent tributary that drains Woodruff Road and Magnolia Place shopping complex and discharges into Non-wetland Waters 2. Arises from a pipe. Photographs 22 through 24.
Non-wetland Waters 2.4	R2UB1/2H	457.22 ln ft 0.09 acres	RPW	Headwaters relatively permanent tributary that arises near the western end of Green Heron Road and discharges into Non-wetland Waters 2. Wetland SW 2 drains into this feature. Photograph 25.
Non-wetland Waters 3	R2UB1/2H	1,113.38 ln ft 0.20 acres	RPW	Headwaters relatively permanent tributary that drains commercial area between Woodruff Industrial Blvd. and Interstate highway 85. Arises from a piped discharge. Photographs 26 through 28.
Non-wetland Waters 3.1 ¹	R4UB1/2S	321.41 ln ft 0.02 acres	Non-RPW/RPW	Headwaters tributary that drains the north side of Interstate highway 85 west of Woodruff Road that discharges into Non-wetland Waters 3. Non-RPW upstream from head cut. Downstream from the headcut, the Non-wetland Waters is an RPW. Photographs 29 & 30.
Non-wetland Waters 3.1.1 ¹	R2UB1/2H	112.34 ln ft 0.01 acres	RPW	Headwaters relatively permanent tributary that arises from a head cut and receives both overland flow and groundwater discharges. Discharges into Non-wetland Waters 3.1. Photographs 31 & 32.
Non-wetland Waters 3.2 ¹	R2UB2H	73.72 ln ft 0.01 acres	RPW	Headwaters relatively permanent tributary that drains a small area along the north side of Interstate Highway 85. Discharges into Non-wetland Waters 3. Photograph 33.
Non-wetland Waters 3.2.1 ¹	R4UB2S	55.91 ln ft 0.004 acres	Non-RPW	Headwaters non-relatively permanent tributary that arises from a head cut and discharges into Non-wetland Waters 3.2. Discharges into Non-wetland Waters 3.
Non-wetland Waters 3.3 ¹	R2UB2H	150.45 ln ft 0.01 acres	RPW	Headwaters relatively permanent tributary that arises from a head cut and drains a small area along the southeast side of Woodruff Industrial Blvd. Discharges into Non-wetland Waters 3.
Non-wetland Waters 3.4	R2UB2H	17.78 ln ft 0.002 acres	RPW	Headwaters relatively permanent tributary that arises from a head cut along the right descending bank of Non-wetland Waters 3. Discharges into Non-wetland Waters 3.

Location Number	Cowardin Class	Estimated Extent of Aquatic Resource in Study Area	Aquatic Resource Class	Comments
Non-wetland Waters 3.5 ¹	R2UB2H	74.42 ln ft 0.02 acres	RPW	Headwaters relatively permanent tributary that arises from a head cut along the right descending bank of Non-wetland Waters 3. Receives storm water runoff from a commercial area on the southeast side of Woodruff Industrial Boulevard. Discharges into Non-wetland Waters 3.
Non-wetland Waters 3.5.1 ¹	R4UB2S	60.79 ln ft 0.004 acres	Non-RPW	Headwaters non-relatively permanent tributary that conveys storm water runoff from a small drainage area on the southeast side of Woodruff Industrial Blvd. Discharges into Non-wetland Waters 3.5.
Non-wetland Waters 3.6	R4UB1/2S	156.86 ln ft 0.03 acres	Non-RPW	Headwaters non-relatively permanent tributary that conveys Wetland runoff from the northwest side of Interstate Highway 85. Discharges into Non-wetland Waters 3.
Non-wetland Waters 4	R2UB2H	167.82 ln ft 0.04 acres	RPW	Headwaters relatively permanent tributary that receives runoff from commercial properties on both sides of Market Point Drive. Most of the headwaters mapped on the National Wetland Inventory has been filled and consists of piped conveyances. Non-wetland Waters 4 has been impounded to form Non-wetland Waters 4.1 Photograph 34.
Non-wetland Waters 4.1	PUBHh	0.82 acres	Non-Section 10, Open Water Impoundment	Impounded storm water management feature that drains developed properties along Marketplace Drive. Impoundment of Non-wetland Waters 4. Wetland E is adjacent to Non-wetland Waters 4.1 Depicted in the foreground of Photograph 12
Non-wetland Waters 5 ²	R2UB2H	1,872.67 ln ft 0.26 acres	RPW	Headwaters relatively permanent tributary that drains commercial properties south of Woodruff Road and west of Interstate Highway 385. Non-wetland Waters 5 arises in and flows through Wetland F. Photographs 35 through 37.
Non-wetland Waters 5.1 ¹	R4UB2S	39.68 ln ft 0.003 acres	Non-RPW	Headwaters non-relatively permanent tributary that arises from a culvert that conveys Wetland runoff from Interstate Highway 385. Discharges into Non-wetland Waters 5. Photograph 38.
Non-wetland Waters 5.2 ¹	R4UB2S	81.21 ln ft 0.01 acres	Non-RPW	Headwaters non-relatively permanent tributary that conveys storm water runoff from Thousand Oaks Blvd. Discharges into Non-wetland Waters 5.
Non-wetland Waters 5.3 ¹	R4UB2S	130.32 ln ft 0.01 acres	Non-RPW	Headwaters non-relatively permanent tributary that conveys storm water runoff from Interstate Highway 385. Discharges into Non-wetland Waters 5.
Non-wetland Waters		7,335.31 linear feet 1.46 acres		

Notes:

1. The width of this Non-wetland Water is less than 3 feet. The area has been calculated by multiplying the linear feet of stream bed by 3 feet.
2. The average width of Non-wetland Water 5 is assumed to be 6 feet. The area has been calculated by multiplying the linear feet of stream bed by 6 feet.

4.1.1 Wetlands

Approximately 3.37 acres of wetland habitat are located in the Study Area. Most of the features exhibiting wetland characteristics are manmade features constructed to manage storm water runoff from adjoining uplands. Many of these storm water management features are dominated by emergent vegetation. The predominant emergent plants in these features are soft rush, wool grass, narrow-leaf cattail. One exhibits a mixture of emergent and scrub/shrub vegetation, and one feature is forested.

Four wetland features are palustrine wooded wetlands adjacent to streams. Two of these are seeps that are likely due to groundwater discharges. The dominant vegetation in these consists of black gum, red maple, and arrow-leaved viburnum. Herbaceous vegetation is sparse in the middle of these wetlands, but the edges are bordered with a mixture of ferns, club moss, and flowering plants.

4.1.2 Non-Wetland Waters (Streams and Deep Water Habitats)

The predominant non-wetland waters in the Study Area are unnamed, relatively permanent, first order headwaters tributaries. The upper reaches of all but one of these tributaries have been filled by development activities and converted to piped conveyances. Channel morphology in all of these features has substantially been altered by development, and all exhibit deeply incised channels. Within the Study Area these non-wetland waters measure approximately 7,335 linear feet (1.46 acres), and channel widths range from less than three feet to twenty feet.

One open water, non-wetland feature is located in the Study Area. This is a large storm water pond created by impounding non-wetland water 4 that has a surface area of approximately 0.82 acres. This feature is bordered by emergent wetlands.

4.2 Clean Water Act Permitting

Section 404 of the Clean Water Act authorizes the federal government to regulate discharges of dredged or fill material into "Waters of the United States." The CWA 404 permitting program is administered by the USACE. Activities that impact federally jurisdictional waters require a Department of the Army Clean Water Act (CWA) section 404 permit. The type of USACE permit required would depend on the type of activity and the extent of the activity's effect on WOTUS. Small activities (less than 0.1 acres of permanent disturbance) may often be undertaken without prior USACE authorization; whereas larger activities may require an individual USACE permit. Typically, the applicant is required to submit a mitigation plan that compensates the federal government for lost WOTUS resources by preserving, restoring and/or enhancing other WOTUS features.

Before the USACE can issue a CWA 404 permit, the State of South Carolina Department of Health and Environmental Control must first provide a CWA section 401 Water Quality Certification. In the state of South Carolina, the USACE and the SC DHEC administer the CWA program through a joint permit process, which requires submittal of one Pre-construction Notification to the USACE. Through this process, both agencies concurrently review the notification.

Since the Study Area does not have navigable waters, there is no need to obtain either a federal Rivers and Harbors Act section 10 permit or a State of South Carolina navigable waters permit.

5.0 Protected Biological Resources

Federal and state laws have been enacted to protect biological resources include the federal Endangered Species Act (ESA) of 1973; the South Carolina Code of Laws, Title 50, Chapter 15, Article 1, Nongame and Endangered Wildlife Species; the federal Bald and Golden Eagle Protection Act; and the federal Migratory Bird protection Act (MBTA). All three federal laws are administered by the US FWS. The SC DNR administers the South Carolina Nongame and Endangered Species law, which includes bald eagle protection. These laws and TRC's assessment of species that they protect with regard to the Study Area are discussed in the following narrative.

5.1 Endangered and Threatened Species

The ESA was enacted with the purpose to protect and recover imperiled species and the ecosystems upon which they depend. It is jointly administered by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife such as whales and anadromous fish such as salmon. The USFWS is the federal agency with jurisdiction over federally protected species in the WRRC Study Area.

Under the ESA, species may be listed as either endangered or threatened. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. The FWS also maintains a list of "candidate" species. These are species for which the FWS has enough information to warrant proposing them for listing but is precluded from doing so by higher listing priorities.

The ESA provides the following mechanisms to the federal government to accomplish the ESA's objectives:

- Determining a species status and listing as threatened or endangered species requiring protection;
- Prohibiting the unauthorized taking, possession, sale, and transport of listed species (Note: The ESA does not prohibit the unauthorized taking of listed plants inhabiting private property);
- Using federal land and water conservation appropriations to acquire habitat of protected species;
- Establishing cooperative agreements with the states and territories and offering grants-in-aid to facilitate development of state-led programs that protect and conserve animals and plants;
- Pursuing civil and criminal prosecution of individual who violate the ESA;
- Offering monetary rewards to anyone who furnishes information leading to arrest and conviction of persons who violate the ESA.

Section 4 of the ESA requires species to be listed as solely on the basis of their biological status and threats to their existence. Species listed as Endangered (E), Threatened (T), or Threatened by Similarity of Appearance (T[S/A]) are afforded ESA protection. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future.

The ESA also requires the designation of "critical habitat" for listed species when "prudent and determinable." Critical habitat includes geographic areas that contain the physical or biological features

that are essential to the conservation of the species and that may need special management or protection. Critical habitat designations affect only Federal agency actions or federally funded or permitted activities. Federal agencies are required to avoid “destruction” or “adverse modification” of designated critical habitat.

Title 50, Chapter 15, Article 1 of the South Carolina Code of Laws was enacted to protect non-game and endangered wildlife species. This law authorizes the South Carolina Department of Natural Resources (SC DNR) to establish rules and programs authorized by the law to protect endangered wildlife. This law applies only to animal species. As such, South Carolina’s law does not afford protection to plants. The SC DNR maintains a list of threatened and endangered wildlife in the State of South Carolina. This list is periodically updated and is not identical to the federal list of threatened and endangered species.

The USFWS Information for Planning and Consultation (IPaC) internet site (<https://ecos.fws.gov/ipac>) was accessed to identify federally protected species that might occur in the Study Area. A copy of the official USFWS consultation is attached at Appendix C. The IPaC consultation identified two animals, seven plants and one lichen species that may occur within the Study Area, as listed on Table 3.

The SC DNR on-line inventory of threatened and endangered species (<http://www.dnr.sc.gov/species/county.html>) was reviewed for information on state protected wildlife species reported for Greenville County. The SC DNR lists four state protected wildlife species, three of which are also federally protected, as listed on Table 3. The SC DNR database also listed ten species identified by the USFWS as “at risk.” At risk species are taxa that are undergoing population decline. Appendix D is a table of SC DNR’s records of all species of concern, including federal and state protected species, at risk species and species of concern, reported from Greenville County.

TRC also reviewed the US FWS At-Risk Species Finder (<https://www.fws.gov/southeast/finder/#/query/custom>) for proposed or candidate ESA-protected species that might occur in the Study Area. This search identified no candidate species that would be expected to occur in the Study Area.

The following narrative presents TRC’s review of species listed on Table 3. Information was obtained from NatureServe Explorer (<http://explorer.natureserve.org/>) and, where available, USFWS species accounts.

Corynorhinus rafinesquii (Rafinesque's Big-eared Bat): Rafinesque's Big-eared Bat is a South Carolina listed endangered species. It is a medium-sized bat with long rabbit-like ears (27-37 mm). This bat has large facial glands protruding from each side of its snout. Its fur is grayish brown above and conspicuously bicolored underneath; each individual hair has a dark brown base and whitish tip. Unlike other bat species in Greenville County, Rafinesque's Big-eared Bats are nocturnal (become active when it is completely dark). Like others in the order Chiroptera, these bats are insectivores, feeding on mostly moths, but they will consume mosquitoes, beetles and flies as well. Foraging habitat includes mature bottomland hardwoods, young pine stands, oak-hickory forests, open field edges, and riparian habitats such as swamps and stream edges. Foraging habitats must contain a high diversity of woody plants in order to satisfy the needs of their lepidopteran prey. The Study Area provides suitable roosting and foraging habitat for Rafinesque’s Big Eared Bat.

Falco peregrinus anatum (American Peregrine Falcon): The American Peregrine Falcon is an aerial predator, feeding mostly on birds. It is protected by the State of South Carolina, but is not federally protected. It typically stoops from a height with the intention of stunning its target, knocking the target to the ground. This species nests on high rock outcrops, or, in urban areas, ledges on tall buildings. It tends to feed over open land or water. This species has adapted to urban life, where it feeds primarily on pigeons. Nesting peregrine falcon have been reported from northern Greenville County, but none have been reported in the vicinity of the Study Area. Peregrine falcon may pass through the Study Area during migration, but would not likely nest in this area.

Glyptemys muhlenbergii (Bog Turtle): The Bog turtle is a highly specialized species that occupies a relatively narrow range of shallow and rather ephemeral wetland types. It is both federally and state protected. The preferred habitat is saturated, usually spring-fed wetlands such as bogs, fens, wet meadows, sedge marshes, and alder, tamarack, or spruce swamps ranging from sea level up to 1300 meters elevation. Bog turtles occupy a highly discontinuous and fragmented range in the eastern United States of America; within this range they tend occur in small, often widely separated colonies. For management purposes two general "populations" are often recognized-- a northern population from eastern New York and western Massachusetts south through southeastern Pennsylvania and New Jersey to northern Maryland and Delaware (with outliers in northcentral New York and western Pennsylvania), and a southern population (generally at higher elevations, up to 4000 feet) from southern Virginia, western North Carolina, and eastern Tennessee to extreme northeastern Georgia. The northern population was listed as threatened; however, the southern population was also listed due to its similarity of appearance. No suitable habitat in the Study Area was identified for this species during field reconnaissance activities.

Myotis leibii (Eastern Small-footed Myotis): Eastern small-footed bats are native to the United States and Canada. It is not federally protected but is listed as threatened by the State of South Carolina. Even though this species is widely distributed, it is one of the rarest bats in North America. The species ranges from northern Ontario south to Georgia, and west to Oklahoma. In the southern parts of its range, including South Carolina, eastern small-footed bats are limited to caves and rocky outcrops. Eastern small-footed bats roost during the spring and summer in buildings, bridges, caves, mines, in hollow trees, tunnels, rock crevices, beneath rocks, and in rocky outcrops. They prefer short caves that are often colder and drier hibernacula than other *Myotis* species. They feed nocturnally and have been reported to forage in a variety of habitats, such as over open water and in deep forests. Suitable nesting and hibernating habitat for this species is not present in the Study Area.

Myotis septentrionalis (Northern Long-eared Bat): The northern long-eared bat is widely ranging, but breeding populations are sparsely distributed across its range. It is federally listed, but not on the state list of protected wildlife. The species is found in forested regions of the eastern North America from the Canadian maritime provinces south to Florida and its range extends west into British Columbia, Canada. This species typically forages over open water, in forest clearings and along forest edges. Females prefer to give birth and raise their young in trees with exfoliating bark, however they may also roost and raise young in tree cavities and buildings. The USFWS has issued an ESA section 4D rule authorizing incidental take due to tree removal activities as long as the action will neither remove a known material roost tree or remove any trees within 150 feet of a known maternal roost tree, nor remove trees within 0.25 miles of a known hibernaculum. The Study Area does provide suitable roosting and foraging habitat for this species. There are no known hibernation sites for this species within 0.25 miles of the Study Area.

Gymnoderma lineare (Rocky Gnome Lichen): This federally listed species is restricted to high humidity habitats, such as deep gorges or higher elevation cliff faces (Natureserve, 2019). It is most often found on large, stream-side boulders or vertical rock faces, where seepage water from forest soils above flows at (and only at) very wet times. The preferred habitat is moderately open, but not subject to prolonged sun exposure. In the most recent USFWS 5-year review of this species, one population was reported from South Carolina (USFWS, 2013). The Study Area does not provide suitable habitat for the Rocky Gnome lichen.

Helonias bullata (Swamp-pink): Swamp pink is a diminutive, obligate wetland species found in mountain bogs, swampy forested wetlands bordering small streams, wet meadows, and spring seepage areas. In the most recent USFWS 5-year review of this species, one population from northern Greenville County was reported from South Carolina (USFWS, 2014). The Study Area does not provide suitable habitat for this species.

Hexastylis naniflora (Dwarf-flowered heart leaf): Dwarf-flowered heartleaf is a low-growing evergreen perennial plant that has four to six centimeters long, dark-green, leathery, heart-shaped leaves. Small, jug-shaped, beige to dark-brown flowers appear from mid-March to early June. The flowers are small and inconspicuous and are found near the base of the leaf stems, often buried beneath the leaf litter. Dwarf-flowered heartleaf grows in acidic soils along bluffs and adjacent slopes, in boggy areas next to streams and creek heads, and along the slopes of nearby hillsides and ravines. It is easily confused with the littlebrownjug, *Hexastylis arifolia*, which is more common and unprotected. Wooded areas of the Study Area south of Woodruff Road and west of Interstate Highway 85 may provide suitable habitat for this species; however, Dwarf-flowered heartleaf was not observed during the field investigations.

Isotria medeoloides (Small-whorled pogonia): Small-whorled pogonia gets its common name from the five or six grayish-green leaves that are displayed in a single whorl around the greenish-white stem that grows to between three and 13 inches tall. When the leaves are well developed, a single or a paired yellow-green flower arises from the middle of the whorl. The flowers, which are surrounded by three equally long sepals, are scentless, lack nectar, and are primarily self-pollinating. The species seems to require small light gaps, or canopy breaks. It is most often found in mixed deciduous or mixed deciduous/coniferous forests under canopies that are relatively open or near features that create long-persisting breaks in the forest canopy such as a road or a stream. South Carolina is the southern limit of this plant's range, and current federal and state records list it as occurring only in Oconee County, South Carolina. Wooded areas of the Study Area south of Woodruff Road and west of Interstate Highway 85 may provide suitable habitat for this species; however, Small-whorled pogonia was not observed during the field investigations.

Platanthera integrilabia (White fringeless orchid): White fringeless orchid is a perennial herb that blooms from late July to early September. The showy inflorescence consists of large, ghost-white flowers with conspicuous long spurs, clustered in loose racemes. This is an obligate wetland species that inhabits partially shaded, flat, boggy areas at the head of streams or seepage slopes. The species is often found in association with Sphagnum species, cinnamon fern, netted veined chain fern and New York fern. In Greenville County, the only reported population of this species in Greenville County was from the northern part of the County. Potential habitat for white fringeless orchid was observed within the refined Study Area, but this species was not observed during the field investigations.

Sagittaria fasciculata (Bunched arrowhead): Bunched arrowhead is a small, obligate wetland, herbaceous plant that grows to 15 - 16 inches tall in saturated soils. The leaves attained lengths of 12 inches, and are broad and tapered at the ends. This is the only *Sagittaria* species in the Southern Appalachians that does not have arrowhead-shaped leaves. It has white flowers that bloom from mid-May through July. The fruits mature a few weeks after flowering. Bunched arrowhead occurs in undisturbed sites that are typically located just below the origin of slow, clean, continuous seeps on gently sloping terrain in deciduous woodlands. The known range of this species is restricted to Henderson County North Carolina and Greenville County South Carolina. In Greenville County, no populations of this species have been recorded south of the City of Greenville. This species was not observed during the field investigations.

Sarracenia rubra subspecies *jonesii* (Mountain sweet pitcher-plant): Mountain sweet pitcher-plant is an insectivorous perennial herb with waxy-green, maroon-veined leaves that form erect, vase-like "pitchers" with ascending "lids." Flowers are sweet-smelling and borne singly on erect flowering stems that are usually taller than the pitcher. The flower petals are maroon on the outside and yellowish, tinged with red on the inner surface. This species is known only from a few mountain bogs and seepages on both side of the Blue Ridge Divide in southwest North Carolina and northwest South Carolina. The refined Study Area lies outside of this species' range. The Study Area does not provide suitable habitat for this species.

Sisyrinchium dichotomum (Reflexed blue-eyed grass): Reflexed blue-eyed grass is a perennial herb with winged, branching stems that rise above basal clumps of blue-green, grass-like leaves. The white flowers and dichotomous branching pattern of its stems distinguish it from similar species. Tiny, white flowers are bloom at the ends of the stems from late May through July. It is most often found in rich, basic soils in clearings and near the edges of upland woods where the canopy cover is thin and in places where the humus or mineral soil layers have been exposed by downslope runoff. In undisturbed sites, the combination of thin canopy cover and exposed soils with little leaf litter would be maintained by periodic fires and by native grazing animals. Currently, most reported populations are located in artificially disturbed areas, such as power line and road rights-of-way. This species has been reported from northern Greenville County. The Study Area does not provide suitable habitat for this species.

**Table 3. Greenville County
 State and/or Federally Listed Threatened and Endangered Species**

Animals

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	--	SE: Endangered	G3G4	S2
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	--	ST: Threatened	G4T4	SNR
<i>Glyptemys muhlenbergii</i>	Bog Turtle	LT: Threatened	ST- Threatened	G3	S1
<i>Myotis leibii</i>	Eastern Small-footed Myotis	ARS*: Risk, priority	ST: Threatened	G4	S1
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	LT: Threatened	--	G1G2	S1

Plants

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
<i>Gymnoderma lineare</i>	Rocky Gnome Lichen	LE: Endangered	--	G3	S1
<i>Helonias bullata</i>	Swamp-pink	LT: Threatened	--	G3	S1
<i>Hexastylis naniflora</i>	Dwarf-flowered Heartleaf	LT: Threatened	--	G3	S3
<i>Isotria medeoloides</i>	Small Whorled Pogonia	LT: Threatened	--	G2?	S2
<i>Platanthera integrilabia</i>	White Fringeless Orchid	LT: Threatened	--	G2G3	S1
<i>Sagittaria fasciculata</i>	Bunched Arrowhead	LE: Endangered	--	G2	S2
<i>Sarracenia rubra</i> ssp. <i>jonesii</i>	Mountain Sweet Pitcher-plant	LE: Endangered	--	G4T2	S1S2
<i>Sisyrinchium dichotomum</i>	Reflexed Blue-eyed Grass	LE: Endangered	--	G2	S1

5.2 Bald and Golden Eagles

This Bald and Golden Eagle Act, originally passed in 1940 and amended in 1962, protects the bald eagle and the golden eagle by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. "Taking" under this law means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb any bald or golden eagle.

South Carolina is outside of the golden eagle range.

The Study Area is within the range of the bald eagle, and the USFWS IPaC report included the bald eagle as a species warranting attention. The SC DNR monitors bald eagle nesting by routine aerial surveys. Annual aerial monitoring is conducted such that every three years the entire state is surveyed. TRC accessed the Sc DNR’s on-line compendium of bald eagle nesting locations (<http://www.dnr.sc.gov/wildlife/baldeagle/locations.html>). Two bald eagle nesting sites have been reported from Greenville County, one adjacent to Table Rock State Reservoir (SC DNR N734) on the northwestern corner of the county and the other (SC DNR N981) along the Holiday Dam reservoir in the southwestern corner of the county. Both nests were surveyed in 2019 and are located along impoundments of the Saluda River.

Bald eagle typically nest in wooded areas adjacent to large water bodies. The Study Area does not have preferred bald eagle nesting or foraging habitat. In TRC’s opinion, bald eagle may be transient foragers but would not nest within the Study Area.

5.3 Migratory Birds

The MBTA is one of the oldest federal laws enacted to protect biological resources. The statute makes it unlawful without a federal waiver or permit to pursue, hunt, take, capture, kill, or sell birds listed therein as [migratory birds](#). The statute does not discriminate between live or dead birds and also grants full protection to any bird parts including feathers, eggs, and nests. Over 800 species are currently on the list of migratory birds.

The USFWS IPaC report identified eight migratory bird species in addition to the bald eagle (discussed in subsection 5.2, above) that have been reported from the Study Area. Table 4 presents a short narrative for each of these species. TRC did not conduct a detailed survey of the Study area for MBTA protected birds. Prior to undertaking land disturbing activities, a migratory bird survey may be appropriate.

Table 4. Migratory birds identified by the United States Fish and Wildlife Service Information for Planning and Conservation report that could occur in the Woodruff Road Congestion Relief Project Study Area.

Taxon (Common name, <i>scientific name</i>)	Likelihood of Occurrence in Woodruff Road Study Area. ^{1, 2}
Cerulean warbler (<i>Dendroica cerulea</i>)	USFWS identifies this as a year-round resident. Prefers open, mature pine forest. Little suitable habitat is present in the Study Area. This species is not likely to breed in the Study Area.
Blue-winged Warbler (<i>Vermivora pinus</i>)	USFWS identifies this as a breeding resident. Inhabits old fields undergoing secondary succession and breeds on forest and field edges. Suitable habitat is available in the Study Area for this species.
Prairie Warbler (<i>Dendroica discolor</i>)	USFWS identifies this as a breeding resident. Prefers open woodlands. Small patches of open woods in the Study Area may provide suitable habitat for this species
Prothonotary Warbler (<i>Protonotaria citrea</i>)	USFWS identifies this as a breeding resident. Prefers wooded wetlands and moist, riparian forest. Suitable habitat for this species is present along tributaries in the Study Area.
Eastern whip-poor-will (<i>Antrostomus vociferous</i>)	USFWS identifies this as a year-round resident. This species prefers to breed in dry deciduous or evergreen-deciduous forest with little or no underbrush, close to open areas. They seem to avoid large tracts of uninterrupted forest with dense canopy. Small patches of open woods in the Study Area may provide suitable habitat for this species.
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	USFWS identifies this as a year-round resident. Prefers open forest with little understory vegetation. Several patches of open, hardwood forest in the Study Area may provide suitable habitat for this species.
Rusty Blackbird (<i>Euphagus carolinus</i>)	USFWS identifies this as an over-wintering resident. Wintering birds prefer to forage in wet, wooded wetlands. Wetland areas adjacent to tributaries in the Study Area could provide suitable winter foraging habitat for this species.
Wood Thrush (<i>Hylocichla mustelina</i>)	USFWS identifies this as a breeding resident. This species prefers to nest and forage in mature, hardwood forest with moderate understory vegetation. Wooded areas adjacent to Interstate Highway 85, southwest of Old Sulphur Springs Road between Woodruff Road and Verdae Boulevard, and on both sides of Salters Road between Woodruff Road and Verdae Boulevard are suitable habitat for this species.

Notes:

1. Likelihood of occurrence is based on USFWS species accounts and SC DNR Heritage Database information, as per a July 21, 2019 communication from SC DNR.
2. The Cornell Lab of Ornithology on-line database (<https://www.allaboutbirds.org/guide/>) was accessed for preferred habitat information.

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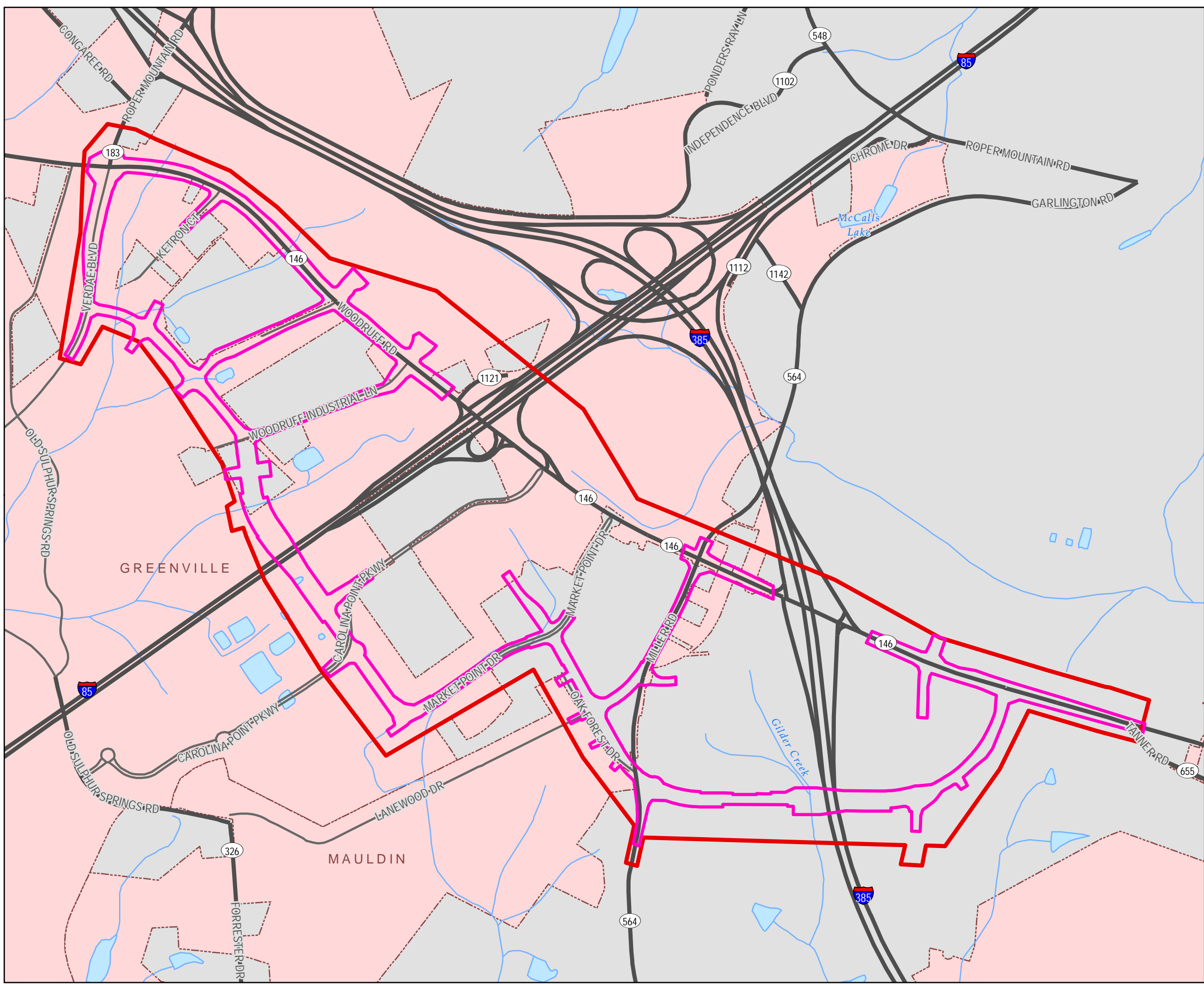
USFWS. 2013. Rock Gnome Lichen (*Gymnoderma lineare*), 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Southeast Region, Asheville Ecological Services Field Office. Asheville, North Carolina.

USFWS. 2014. Swamp pink (*Helionas bullata*), 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Southeast Region, Asheville Ecological Services Field Office. Asheville, North Carolina.

Appendix A

Figures

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
 Map Rotation: 0
 Plot Date: 7/24/2019 09:37:07 AM by PJACQUES - LAYOUT: ANSIB(11"x17")
 Path: S:\PROJECTS\SCDOT\258900-WoodruffRd\Parallel\Fig_1_SLM.mxd



LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 ac)
- HIGHWAY
- PRIMARY/SECONDARY ROAD
- STREAM/CREEK
- WATERBODY
- MUNICIPAL AREA

SCDOT PIN: P028743

NOTES:

- MUNICIPAL AREAS AND ROAD DATA ACQUIRED FROM SC DOT
 <<http://info2.scdot.org/sites/GIS>>
- STREAM AND WATERBODY DATA ACQUIRED FROM NATIONAL HYDROGRAPHY DATASET (NHD).

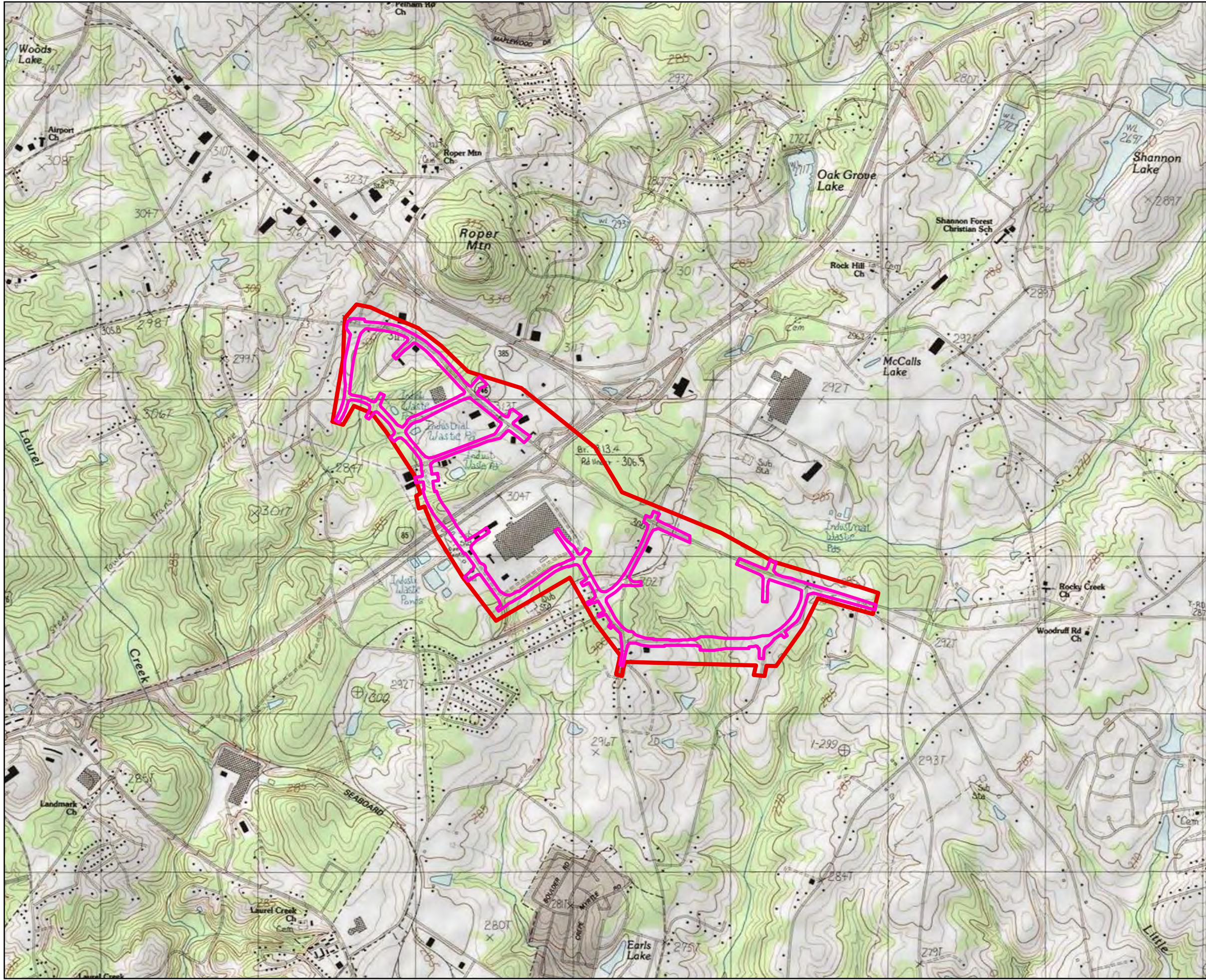
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SCALE: 1:12,000
 1" = 1,000' (WHEN PRINTED AT 11"x17")

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TITLE: SITE LOCATION MAP			
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 1	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

50 International Drive
 Suite 150
 Greenville, SC 29615
 Phone: 864.281.0030

FILE NO: Fig_1_SLM.mxd



LEGEND

- PREFERRED PSA (115.40 ac)
- PROJECT STUDY AREA (745.07 ac)

SCDOT PIN: P028743

- NOTES:**
- BASEMAP FROM ESRI/USGS "USA TOPO MAPS" ONLINE SERVICE LAYER, 7.5' QUADRANGLE: MAULDIN (1984), SOUTH CAROLINA.

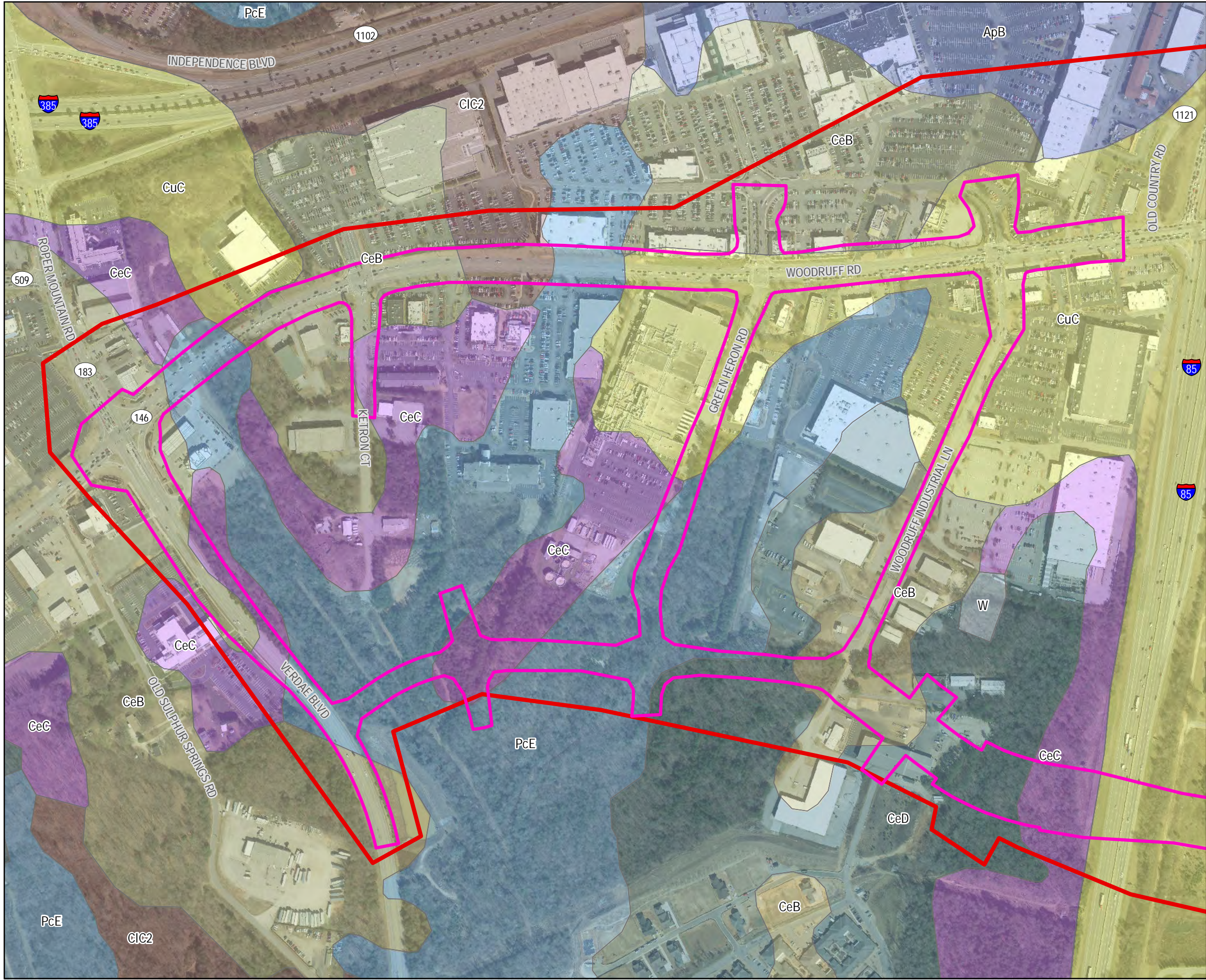
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SCALE: 1:24,000
1" = 2,000' (WHEN PRINTED AT 11"x17")

0 2,000 4,000 Feet

Mauldin Quad Project Location

PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		USGS TOPOGRAPHY	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 2	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		
		50 International Drive Suite 150 Greenville, SC 29615 Phone: 864.281.0030	
FILE NO.:	Fig 2_USGS.mxd		



LEGEND

- PREFERRED PSA (115.40)
- PROJECT STUDY AREA (745.07 ac)

NRCS SOILS:

SOILS HYDRIC RATING %:

- NOT RATED (0%)

MAP UNIT SYMBOL: NAME (HYDRIC RATING %):

- ApB: Appling sandy loam, 2 to 6 percent slopes (0%)
- CeB: Cecil sandy loam, 2 to 6 percent slopes (0%)
- CeC: Cecil sandy loam, 6 to 10 percent slopes (0%)
- CeD: Cecil sandy loam, 10 to 15 percent slopes (0%)
- CIC2: Cecil clay loam, 6 to 10 percent slopes, eroded (0%)
- CuC: Cecil-Urban land complex, 2 to 10 percent slopes (0%)
- PcE: Pacolet sandy loam, 15 to 25 percent slopes (0%)
- W: Water (0%)

SCDOT PIN: P028743

- NOTES:**
1. BASEMAP ACQUIRED FROM GREENVILLE COUNTY GIS, 2017.
 2. SOILS ACQUIRED FROM NRCS SSURGO DATABASE, 2018-09-15.

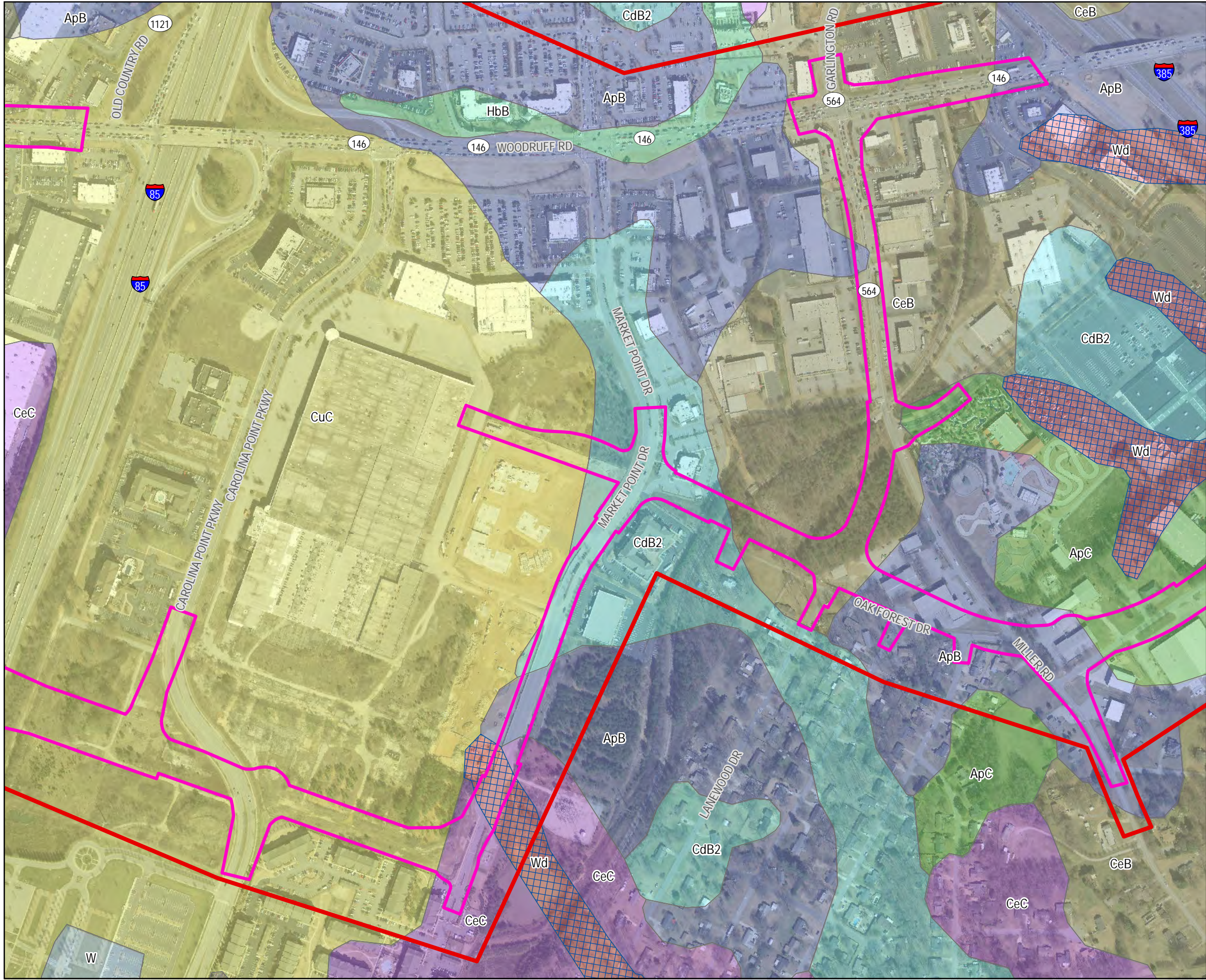
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0 400 800 Feet

PROJECT: NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE: SOILS	
DRAWN BY: R. SPRING	PROJ. NO.: 258900
CHECKED BY: R. HANLEY	FIGURE 3A
APPROVED BY: P. BUTLER	
DATE: JULY 2019	

TRC 50 International Drive
Suite 150
Greenville, SC 29615
Phone: 864.281.0030

FILE NO: Fig 3_Soils.mxd



LEGEND

- PREFERRED PSA (115.40)
- PROJECT STUDY AREA (745.07 ac)

NRCS SOILS:

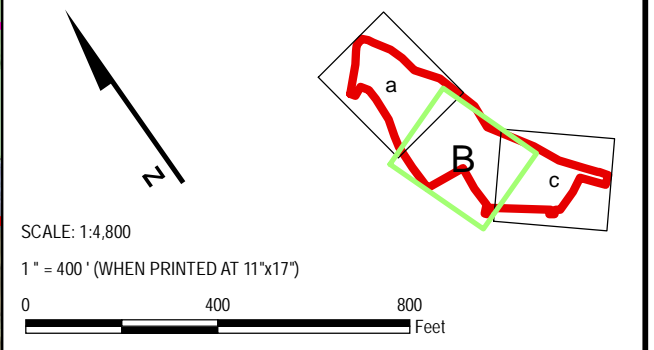
SOILS HYDRIC RATING %:

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- HYDRIC (100%)

MAP UNIT SYMBOL: NAME (HYDRIC RATING %):

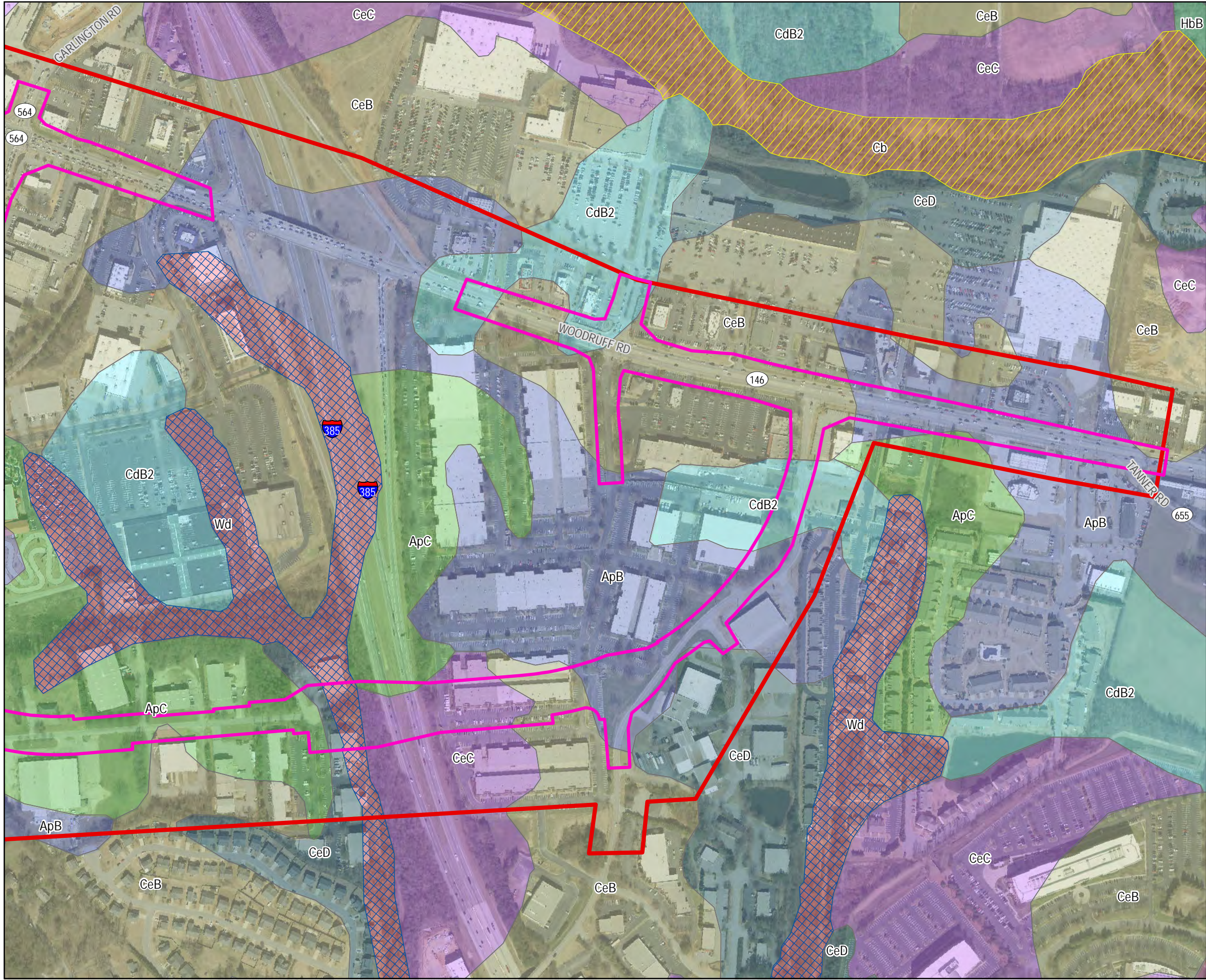
- ApB: Appling sandy loam, 2 to 6 percent slopes (0%)
- ApC: Appling sandy loam, 6 to 10 percent slopes (0%)
- CdB2: Cataula sandy loam, 2 to 6 percent slopes, moderately eroded (0%)
- CeB: Cecil sandy loam, 2 to 6 percent slopes (0%)
- CeC: Cecil sandy loam, 6 to 10 percent slopes (0%)
- CeD: Cecil sandy loam, 10 to 15 percent slopes (0%)
- CuC: Cecil-Urban land complex, 2 to 10 percent slopes (0%)
- HbB: Helena sandy loam, 2 to 6 percent slopes (0%)
- W: Water (0%)
- Wd: Wehadkee soils (100%)

- SCDOT PIN: P028743
- NOTES:**
1. BASEMAP ACQUIRED FROM GREENVILLE COUNTY GIS, 2017.
 2. SOILS ACQUIRED FROM NRCS SSURGO DATABASE, 2018-09-15.



PROJECT: NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE: SOILS	
DRAWN BY: R. SPRING	PROJ. NO.: 258900
CHECKED BY: R. HANLEY	FIGURE 3B
APPROVED BY: P. BUTLER	
DATE: JULY 2019	
50 International Drive Suite 150 Greenville, SC 29615 Phone: 864.281.0030	
FILE NO:	Fig 3_Soils.mxd

TRC - GIS
 Coordinate System: MAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
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 Plot Date: 7/24/2019 09:07:17 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
 Path: S:\PROJECTS\SCDOT\258900-WoodruffRd\Parallel\Fig 3_Soils.mxd



LEGEND

- PREFERRED PSA (115.40)
- PROJECT STUDY AREA (745.07 ac)

NRCS SOILS:

SOILS HYDRIC RATING %:

- NOT RATED (0%)
- PREDOMINANTLY NON-HYDRIC (10%)
- HYDRIC (100%)

MAP UNIT SYMBOL: NAME (HYDRIC RATING %):

- ApB: Appling sandy loam, 2 to 6 percent slopes (0%)
- ApC: Appling sandy loam, 6 to 10 percent slopes (0%)
- Cb: Cartecay and Toccoa soils (10%)
- CdB2: Cataula sandy loam, 2 to 6 percent slopes, moderately eroded (0%)
- CdB2: Cataula sandy loam, 6 to 10 percent slopes, eroded (0%)
- CeB: Cecil sandy loam, 2 to 6 percent slopes (0%)
- CeC: Cecil sandy loam, 6 to 10 percent slopes (0%)
- CeD: Cecil sandy loam, 10 to 15 percent slopes (0%)
- HbB: Helena sandy loam, 2 to 6 percent slopes (0%)
- W: Water (0%)
- Wd: Wehadkee soils (100%)

SCDOT PIN: P028743

NOTES:

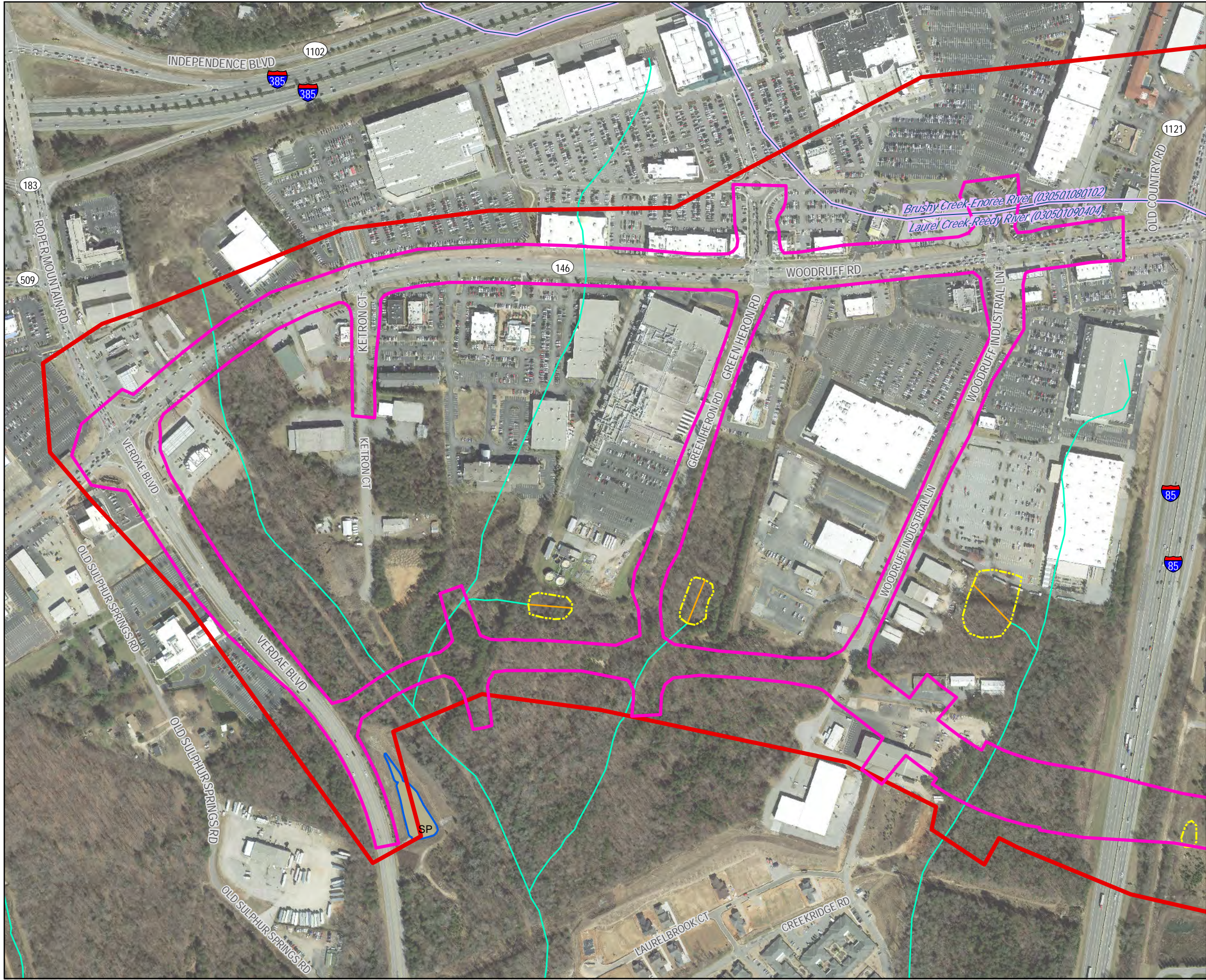
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2. SOILS ACQUIRED FROM NRCS SSURGO DATABASE, 2018-09-15.

SCALE: 1:4,800
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PROJECT: NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE: SOILS	
DRAWN BY: R. SPRING	PROJ. NO.: 258900
CHECKED BY: R. HANLEY	FIGURE 3C
APPROVED BY: P. BUTLER	
DATE: JULY 2019	

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Phone: 864.281.0030

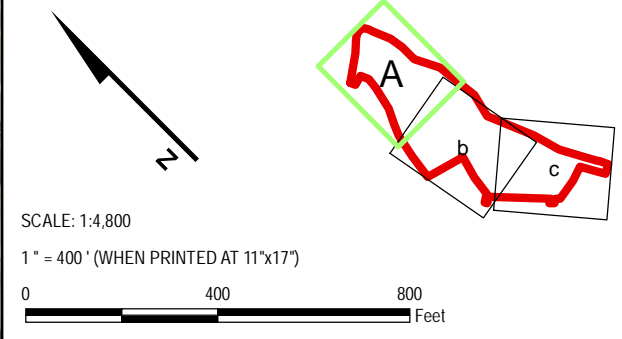
FILE NO.: Fig 3_Soils.mxd



- PREFERRED PSA (115.40)
 - PROJECT STUDY AREA (745.07 ac)
 - GREENVILLE COUNTY
 - WATERBODY (NHD)
 - HUC-12 BOUNDARY (WBD)
- NHD FLOWLINE**
- ARTIFICIAL PATH
 - STREAM/RIVER

SCDOT PIN: P028743

- NOTES:**
- BASEMAP ACQUIRED FROM GREENVILLE COUNTY GIS, 2017.
 - STREAMS AND WATERBODIES ACQUIRED FROM GREENVILLE COUNTY GIS AND NATIONAL HYDROGRAPHY DATASET (NHD).
 - WATER SHED BOUNDARY DATSET (WBD) ACQUIRED FROM UNITED STATES GEOLOGICAL SURVEY, USGS.



PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		NATIONAL HYDROGRAPHY DATA (NHD) & NATIONAL WATERSHED BOUNDARY DATA (WBD)	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 4A	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		



50 International Drive
Suite 150
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Phone: 864.281.0030

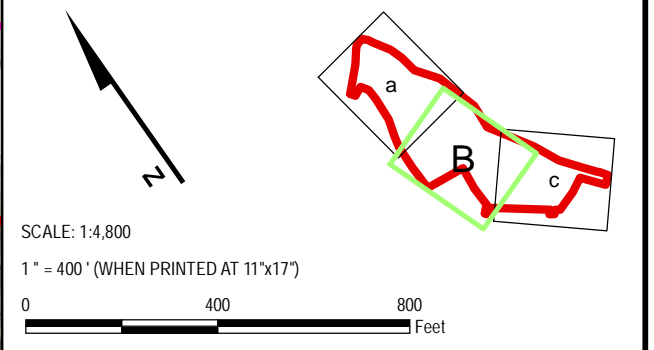
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- PREFERRED PSA (115.40)
 - PROJECT STUDY AREA (745.07 ac)
 - GREENVILLE COUNTY
 - WATERBODY (NHD)
 - HUC-12 BOUNDARY (WBD)
- NHD FLOWLINE**
- STREAM/RIVER

SCDOT PIN: P028743

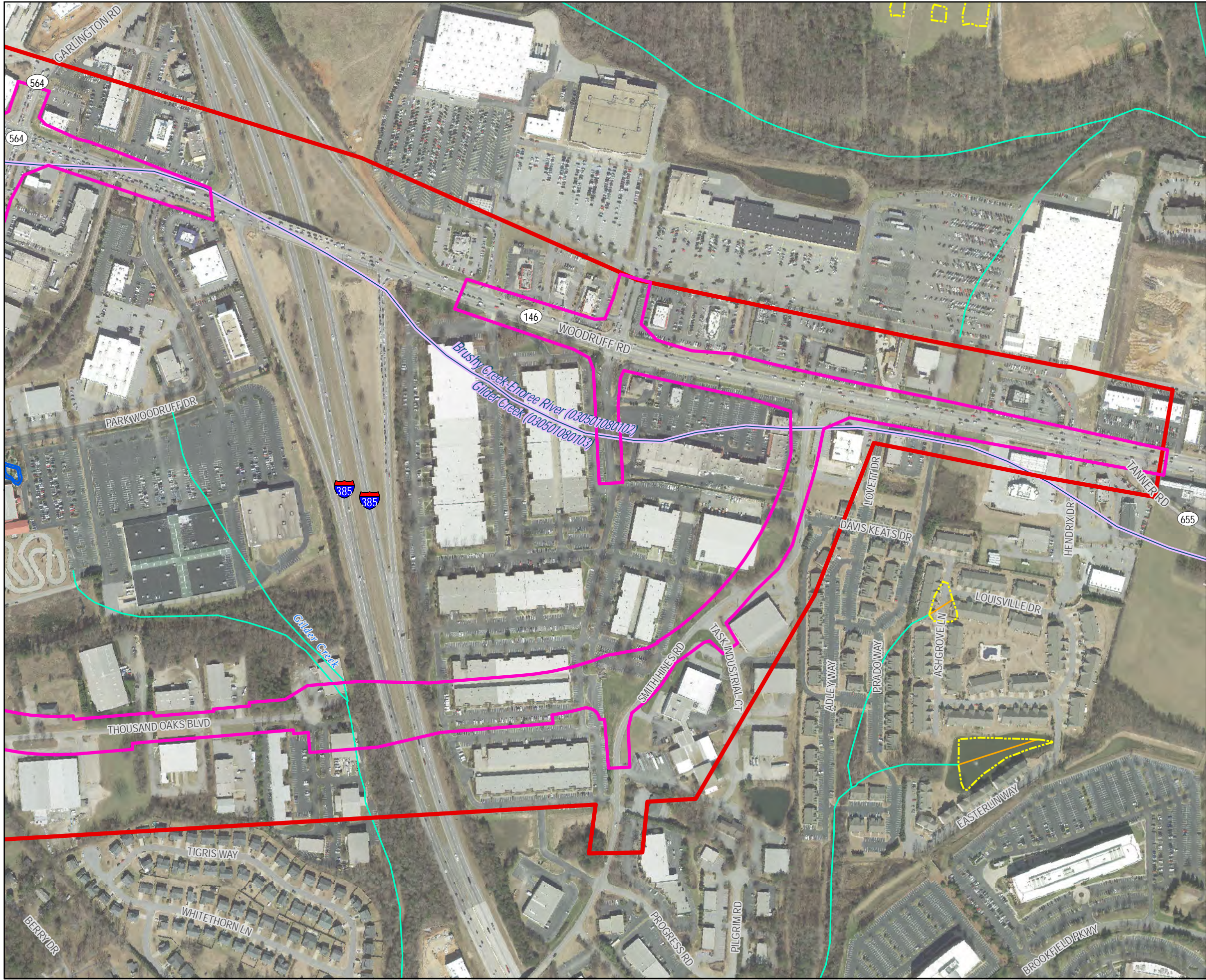
- NOTES:**
1. BASEMAP ACQUIRED FROM GREENVILLE COUNTY GIS, 2017.
 2. STREAMS AND WATERBODIES ACQUIRED FROM GREENVILLE COUNTY GIS AND NATIONAL HYDROGRAPHY DATASET (NHD).
 3. WATER SHED BOUNDARY DATSET (WBD) ACQUIRED FROM UNITED STATES GEOLOGICAL SURVEY, USGS.



PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		NATIONAL HYDROGRAPHY DATA (NHD) & NATIONAL WATERSHED BOUNDARY DATA (WBD)	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 4B	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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Phone: 864.281.0030

FILE NO: Fig 4_NHD_WBD.mxd



LEGEND

- PREFERRED PSA (115.40 ac)
- PROJECT STUDY AREA (745.07 ac)
- GREENVILLE COUNTY LAKES
- WATERBODY (NHD)
- HUC-12 BOUNDARY (WBD)

NHD FLOWLINE

- ARTIFICIAL PATH
- STREAM/RIVER

SCDOT PIN: P028743

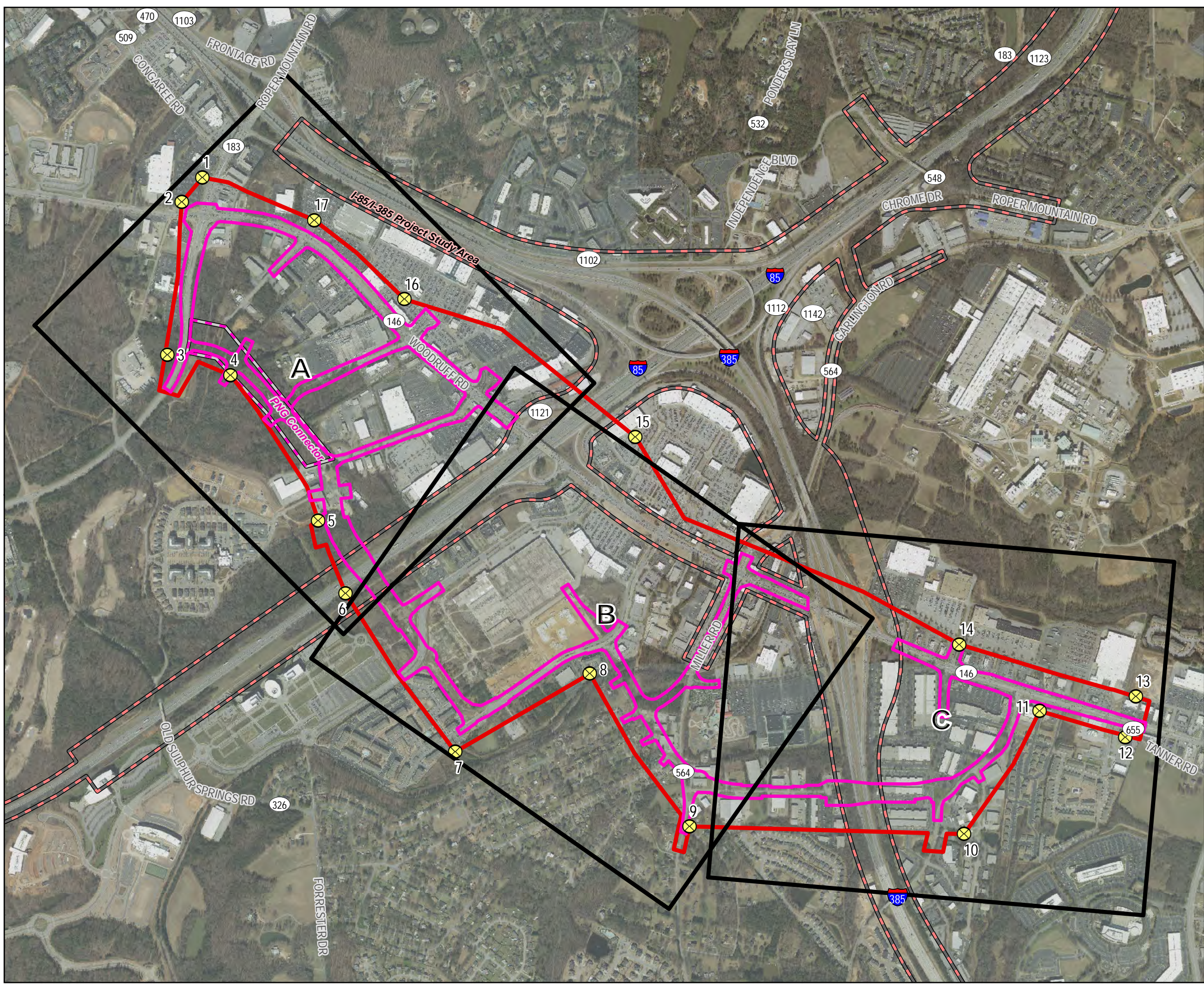
- NOTES:**
1. BASEMAP ACQUIRED FROM GREENVILLE COUNTY GIS, 2017.
 2. STREAMS AND WATERBODIES ACQUIRED FROM GREENVILLE COUNTY GIS AND NATIONAL HYDROGRAPHY DATASET (NHD).
 3. WATER SHED BOUNDARY DATSET (WBD) ACQUIRED FROM UNITED STATES GEOLOGICAL SURVEY, USGS.

N

SCALE: 1:4,800
1" = 400' (WHEN PRINTED AT 11"x17")

PROJECT: NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE: NATIONAL HYDROGRAPHY DATA (NHD) & NATIONAL WATERSHED BOUNDARY DATA (WBD)	
DRAWN BY: R. SPRING	PROJ. NO.: 258900
CHECKED BY: R. HANLEY	FIGURE 4C
APPROVED BY: P. BUTLER	
DATE: JULY 2019	
50 International Drive Suite 150 Greenville, SC 29615 Phone: 864.281.0030	
FILE NO:	Fig 4_NHD_WBD.mxd

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACOUES - LAYOUT:ANSI B(11"x17")
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LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- X PROJECT COORDINATES
- I-85/I-385 PROJECT
(USACE Preliminary JD 2012-SAC-00588 DS)
- PNG CONNECTOR
(USACE Approved JD 2017-SAC-00588 DS)

LOCATION	LATITUDE	LONGITUDE
1	34.837507	-82.316305
2	34.836720	-82.317098
3	34.831890	-82.317563
4	34.831270	-82.315145
5	34.826702	-82.311710
6	34.824424	-82.310624
7	34.819454	-82.306339
8	34.821975	-82.301229
9	34.817192	-82.297331
10	34.817053	-82.286816
11	34.820972	-82.283972
12	34.820180	-82.280681
13	34.821466	-82.280293
14	34.823043	-82.287086
15	34.829469	-82.299594
16	34.833724	-82.308502
17	34.836201	-82.312006

SCDOT PIN: P028743

- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

SCALE: 1:13,200
 1" = 1,100' (WHEN PRINTED AT 11"x17")

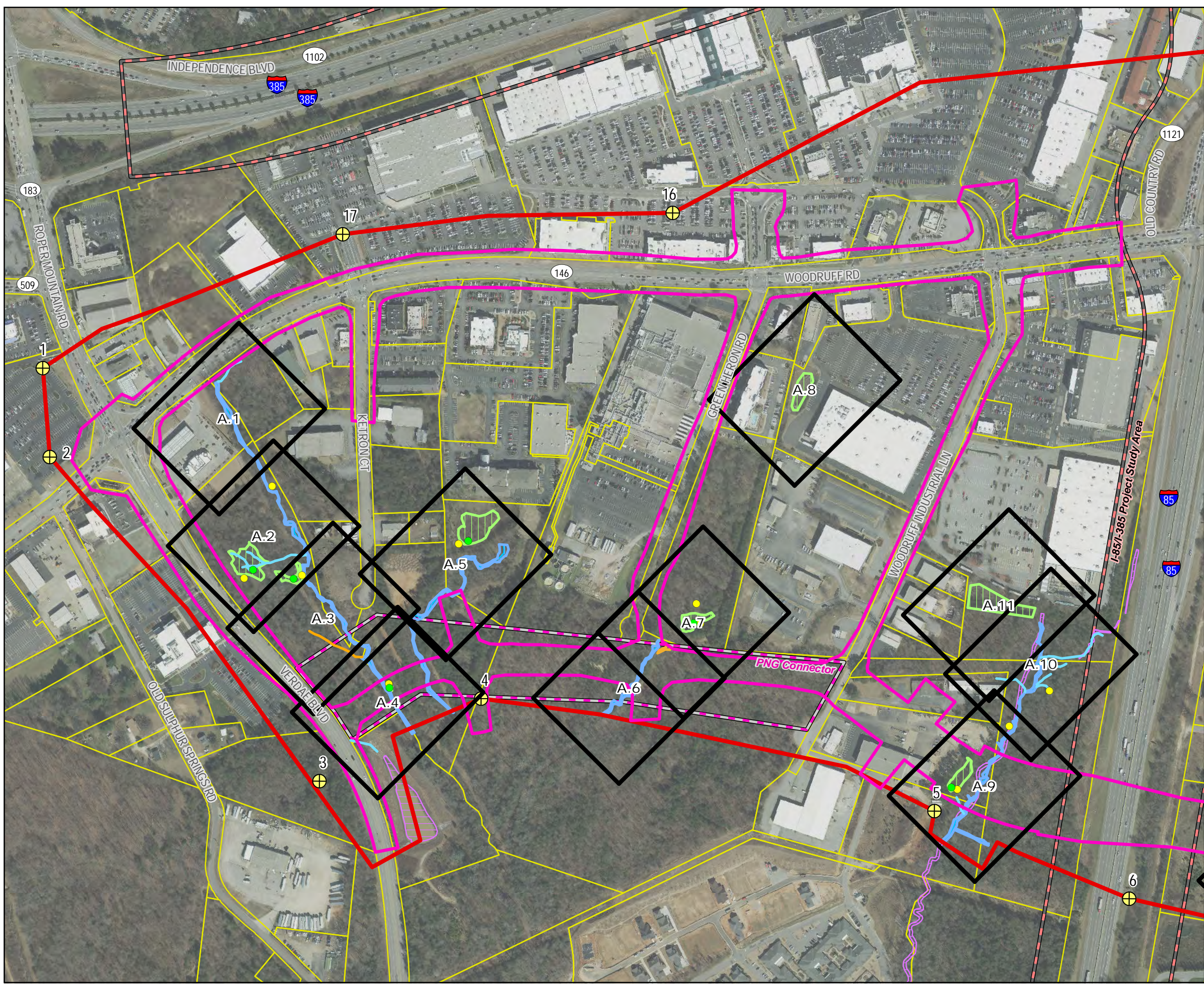
PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-OVERVIEW	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

TRC

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 Phone: 864.281.0030

FILE NO: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
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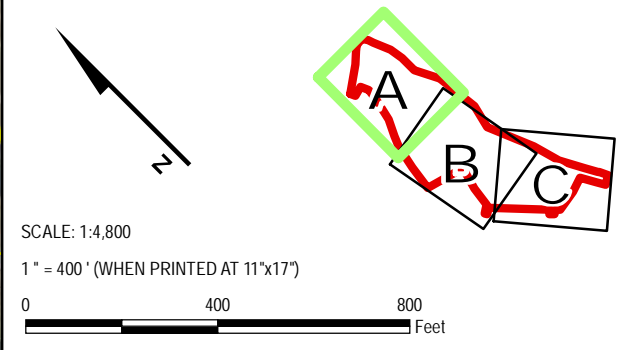


LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- ⊕ PROJECT COORDINATES
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-AQUATIC RESOURCE (LINE)
- NON-WETLAND WATERS - LINEAR (AREA)
- WETLAND (AREA)
- NON-AQUATIC RESOURCE (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT
(USACE Preliminary JD 2012-SAC-00588 DS)
- I-85/I-385 PROJECT JD FEATURE
- PNG CONNECTOR
(USACE Approved JD 2017-SAC-00588 DS)

SCDOT PIN: P028743

- NOTES:**
1. BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 2. WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.



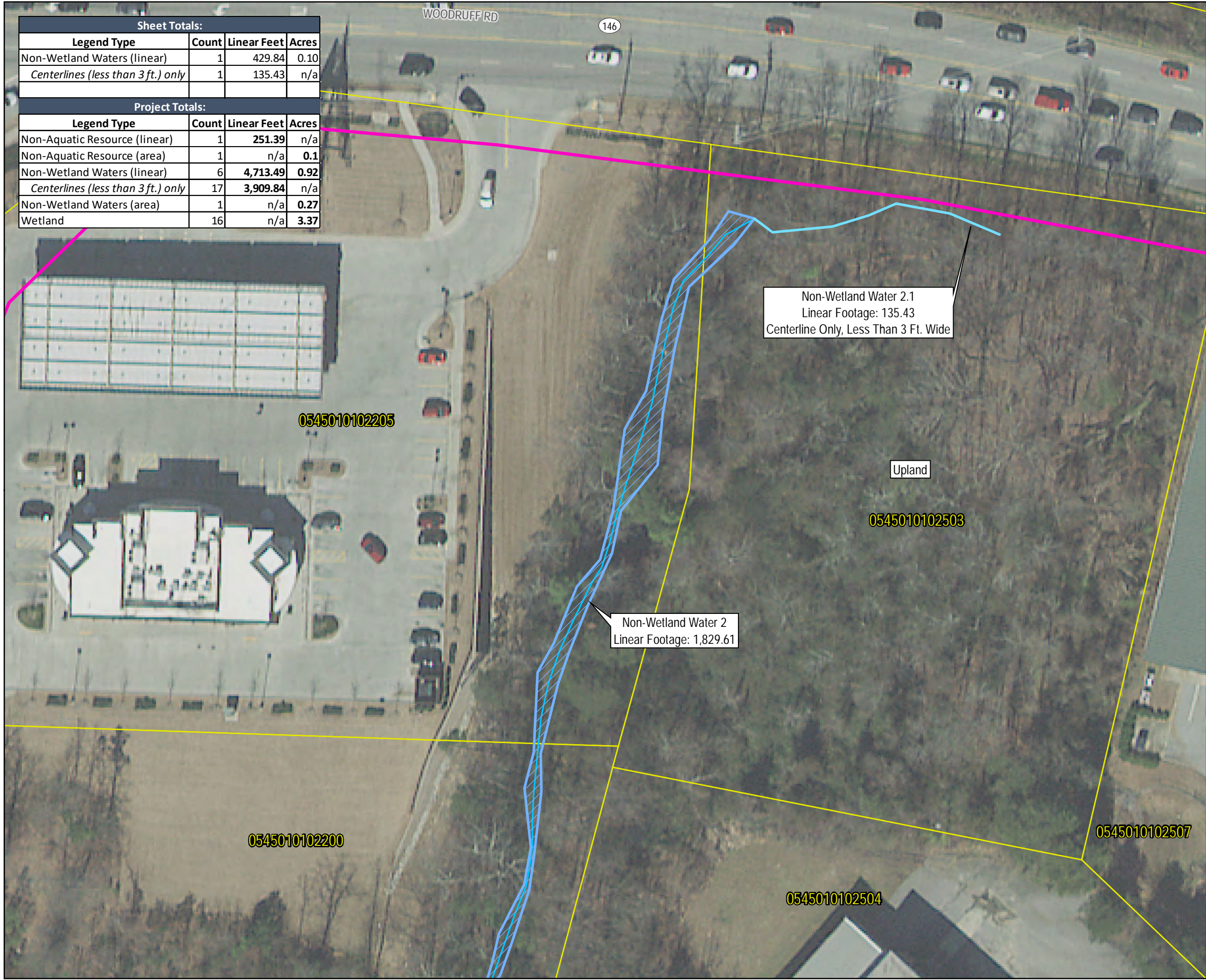
PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

TRC

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 Suite 150
 Greenville, SC 29615
 Phone: 864.281.0030

FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
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 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
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Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters (linear)	1	429.84	0.10
Centerlines (less than 3 ft.) only	1	135.43	n/a
Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-WETLAND WATERS - LINEAR (AREA)
- TAX PARCEL

Non-Wetland Water 2.1
 Linear Footage: 135.43
 Centerline Only, Less Than 3 Ft. Wide

Non-Wetland Water 2
 Linear Footage: 1,829.61

SCDOT PIN: P028743

NOTES:

- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
- WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

SCALE: 1:600
 1" = 50' (WHEN PRINTED AT 11"x17")

PROJECT: NATURAL RESOURCES TECHNICAL MEMORANDUM
 WOODRUFF ROAD CONGESTION RELIEF
 GREENVILLE COUNTY, SOUTH CAROLINA

TITLE: APPROXIMATE WATERS OF THE US
 AND WETLANDS LOCATIONS

DRAWN BY: R. SPRING	PROJ. NO.: 258900
CHECKED BY: R. HANLEY	FIGURE 5-A.1
APPROVED BY: P. BUTLER	
DATE: JULY 2019	

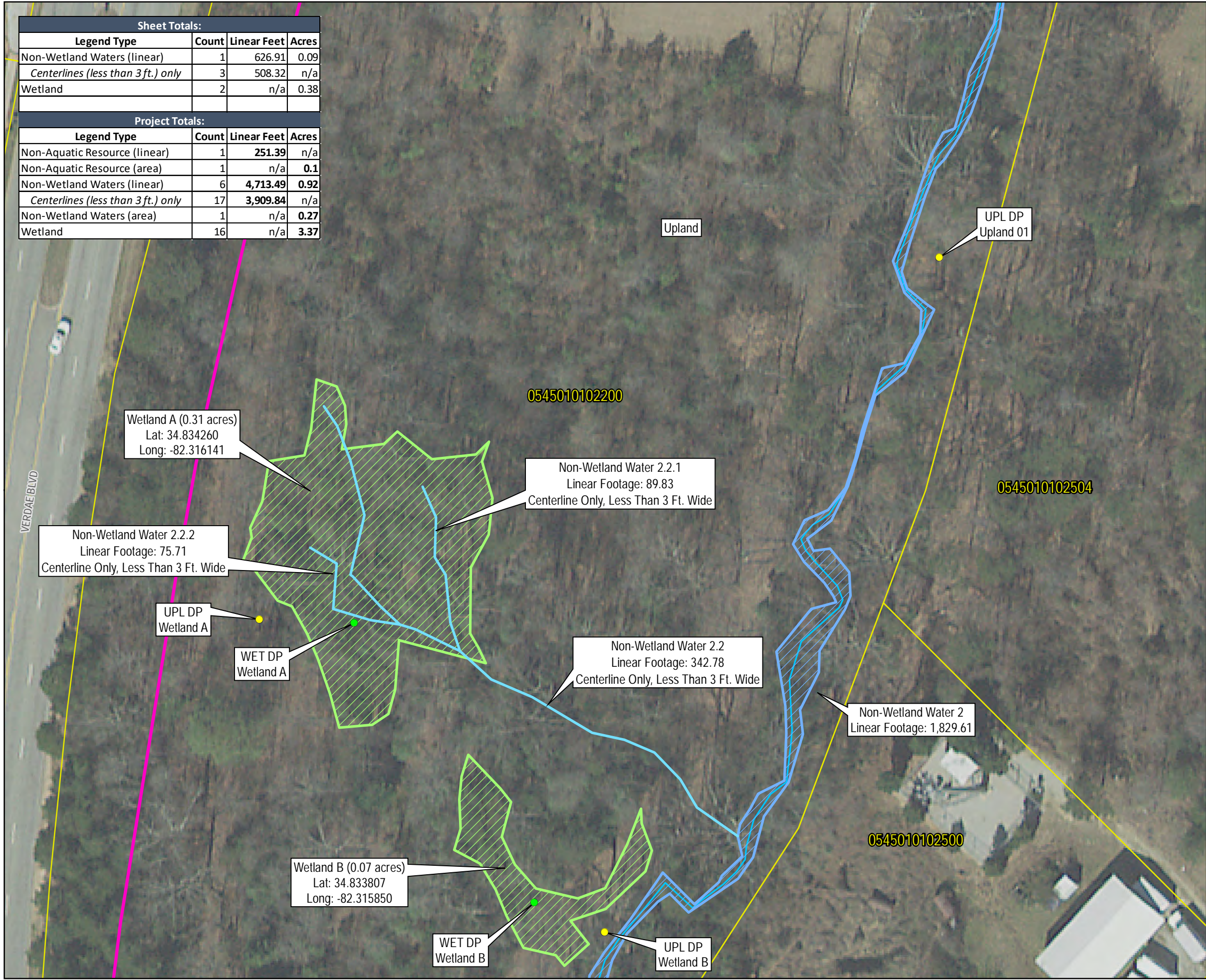
50 International Drive
 Suite 150
 Greenville, SC 29615
 Phone: 864.281.0030

FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
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Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters (linear)	1	626.91	0.09
Centerlines (less than 3 ft.) only	3	508.32	n/a
Wetland	2	n/a	0.38

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37



LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-WETLAND WATERS - LINEAR (AREA)
- WETLAND (AREA)
- TAX PARCEL

SCDOT PIN: P028743

NOTES:

- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
- WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

N

SCALE: 1:600
 1" = 50' (WHEN PRINTED AT 11"x17")

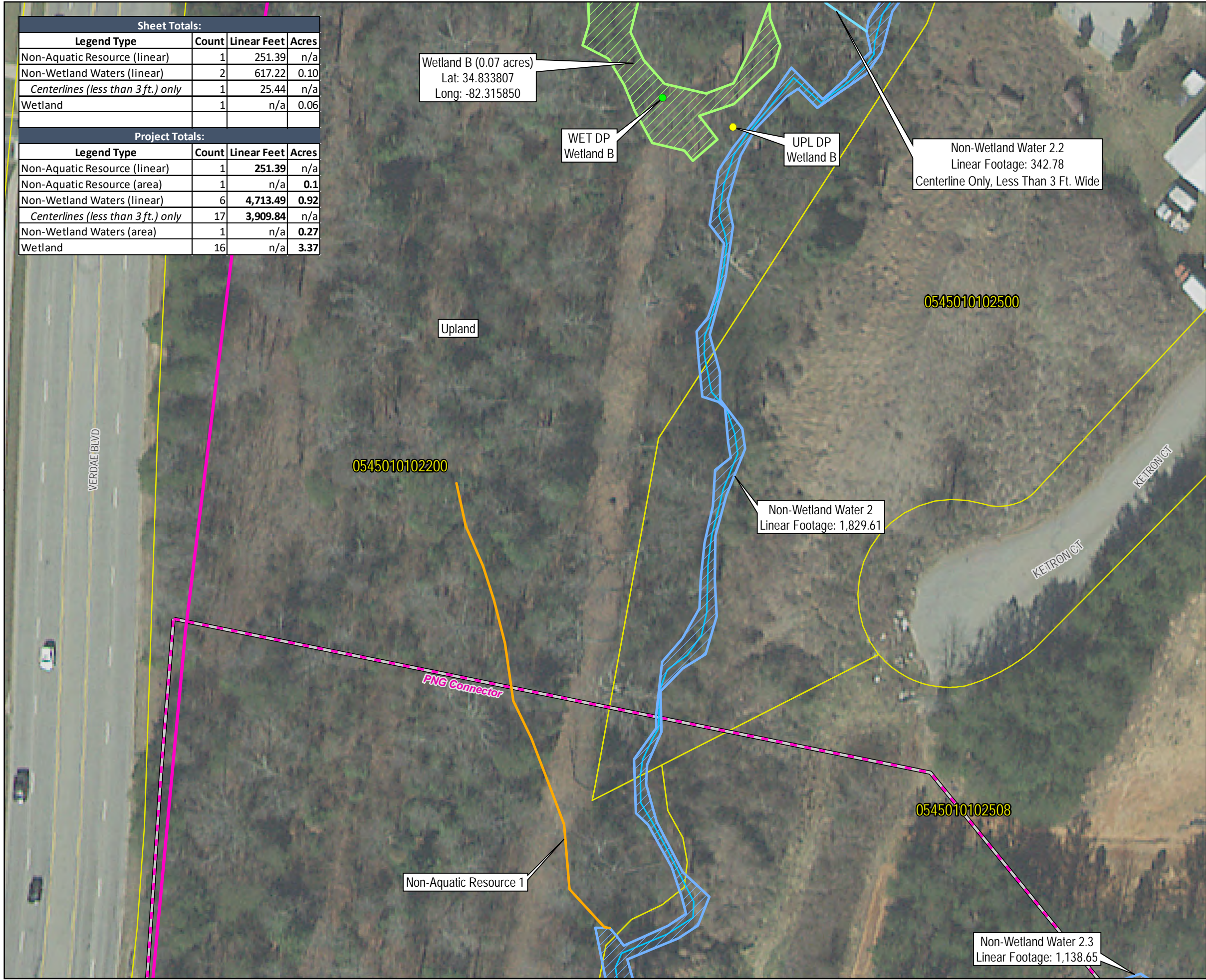
PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.2	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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Greenville, SC 29615
Phone: 864.281.0030

FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Wetland Waters (linear)	2	617.22	0.10
Centerlines (less than 3 ft.) only	1	25.44	n/a
Wetland	1	n/a	0.06

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37



LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-AQUATIC RESOURCE (LINE)
- NON-WETLAND WATERS - LINEAR (AREA)
- WETLAND (AREA)
- TAX PARCEL
- PNG CONNECTOR
(USACE Approved JD 2017-SAC-00588 DS)

SCDOT PIN: P028743

NOTES:

- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
- WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

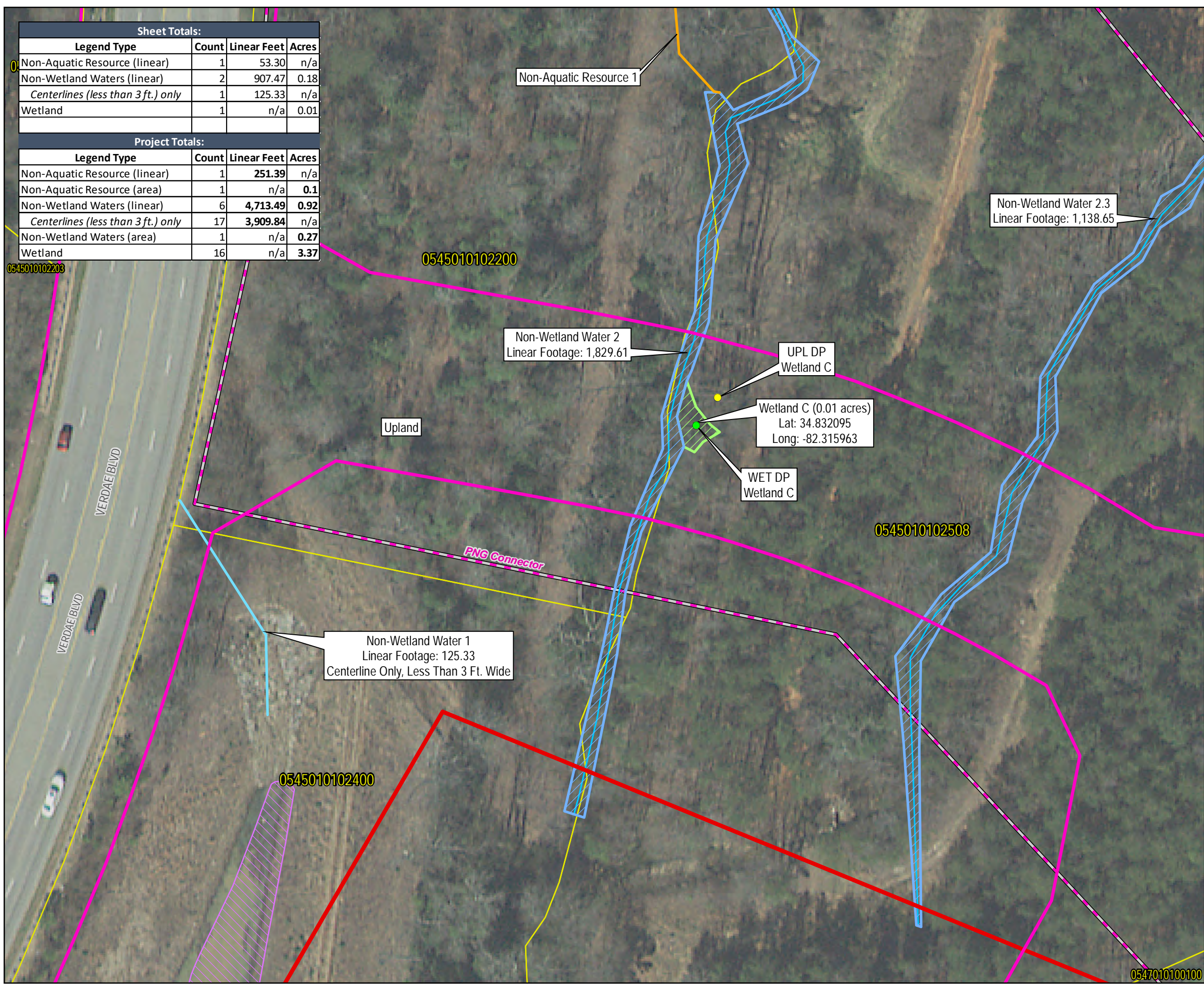
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PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.3	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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 Phone: 864.281.0030

FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
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 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES - LAYOUT: ANSIB(11"x17")
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Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	53.30	n/a
Non-Wetland Waters (linear)	2	907.47	0.18
Centerlines (less than 3 ft.) only	1	125.33	n/a
Wetland	1	n/a	0.01

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-AQUATIC RESOURCE (LINE)
- NON-WETLAND WATERS - LINEAR (AREA)
- WETLAND (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT JD FEATURE
- PNG CONNECTOR (USACE Approved JD 2017-SAC-00588 DS)

SCDOT PIN: P028743

NOTES:

- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
- WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

SCALE: 1:600
 1" = 50' (WHEN PRINTED AT 11"x17")

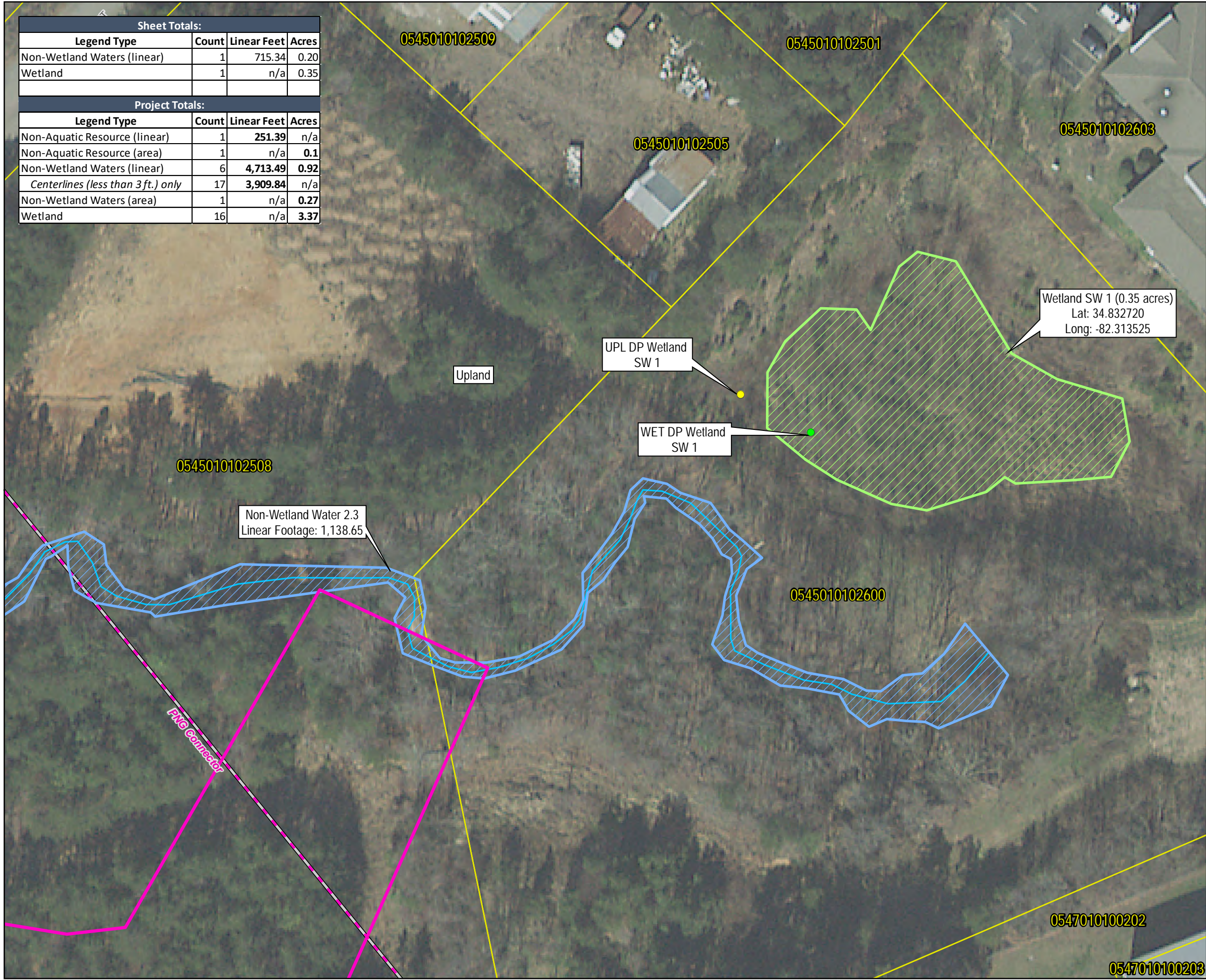
PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.4	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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Phone: 864.281.0030

FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
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Non-Wetland Waters (linear)	1	715.34	0.20
Wetland	1	n/a	0.35
Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

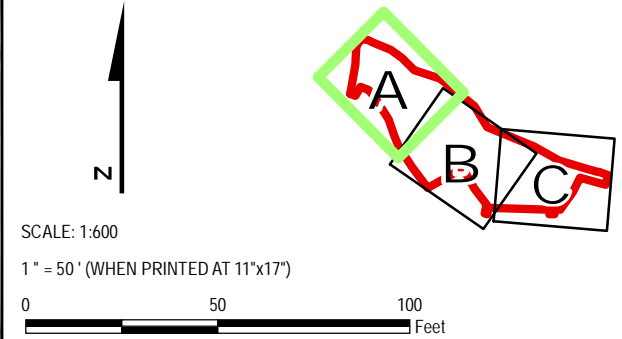


LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (AREA)
- WETLAND (AREA)
- TAX PARCEL
- PNG CONNECTOR
(USACE Approved JD 2017-SAC-00588 DS)

SCDOT PIN: P028743

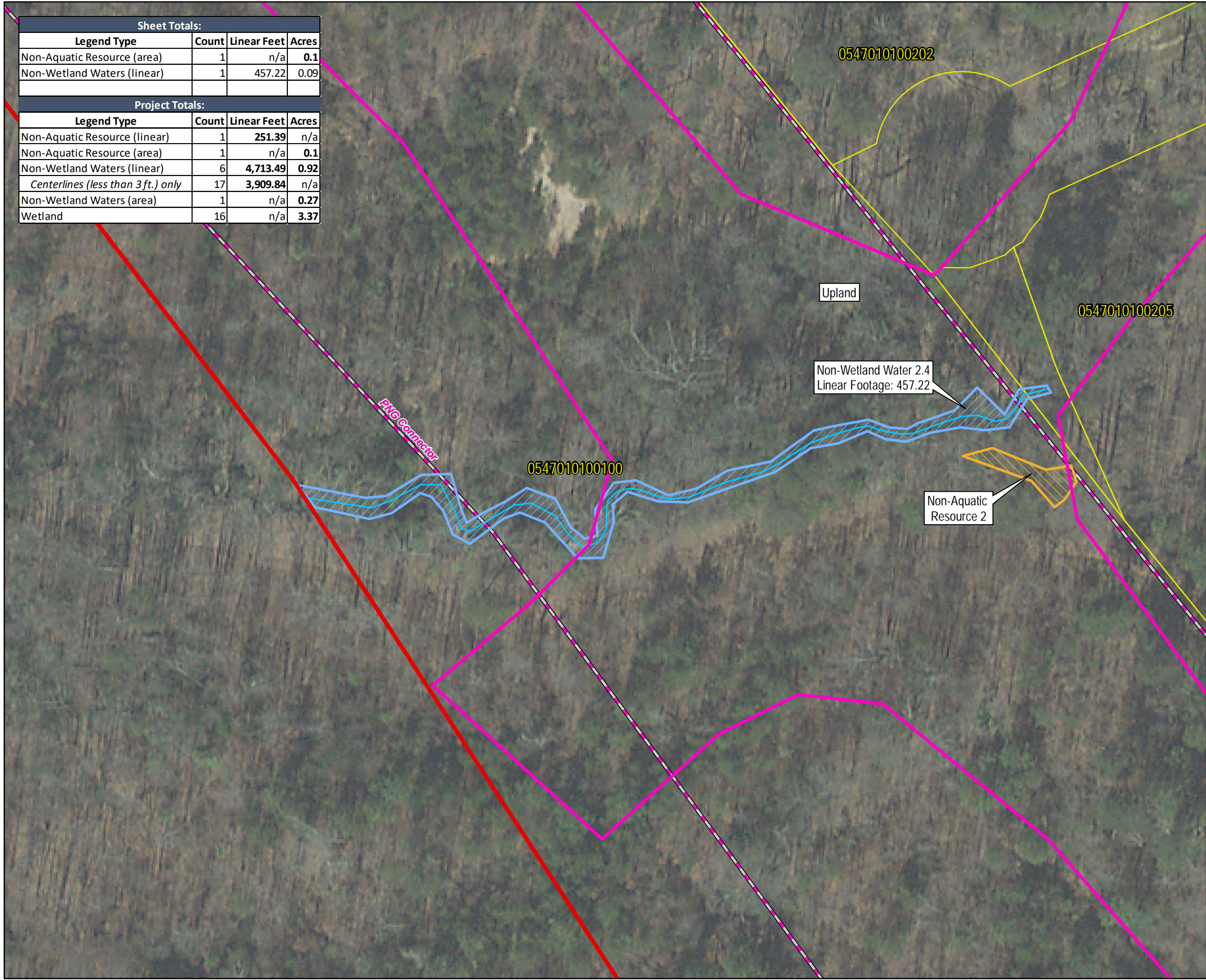
- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.



PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.5	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		
		50 International Drive Suite 150 Greenville, SC 29615 Phone: 864.281.0030	
FILE NO.:	Fig 5_WOTUS_2019-Jun-revision.mxd		

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
 Path: S:\PROJECTS\SCDOT\258900-WoodruffRd\Parallel\Fig 5_WOTUS_2019-Jun-revision.mxd

Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	1	457.22	0.09
Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

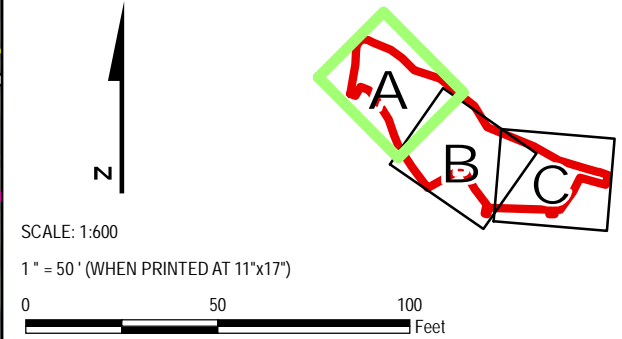


LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- NON-WETLAND WATERS - LINEAR (AREA)
- NON-AQUATIC RESOURCE (AREA)
- TAX PARCEL
- PNG CONNECTOR
(USACE Approved JD 2017-SAC-00588 DS)

SCDOT PIN: P028743

- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

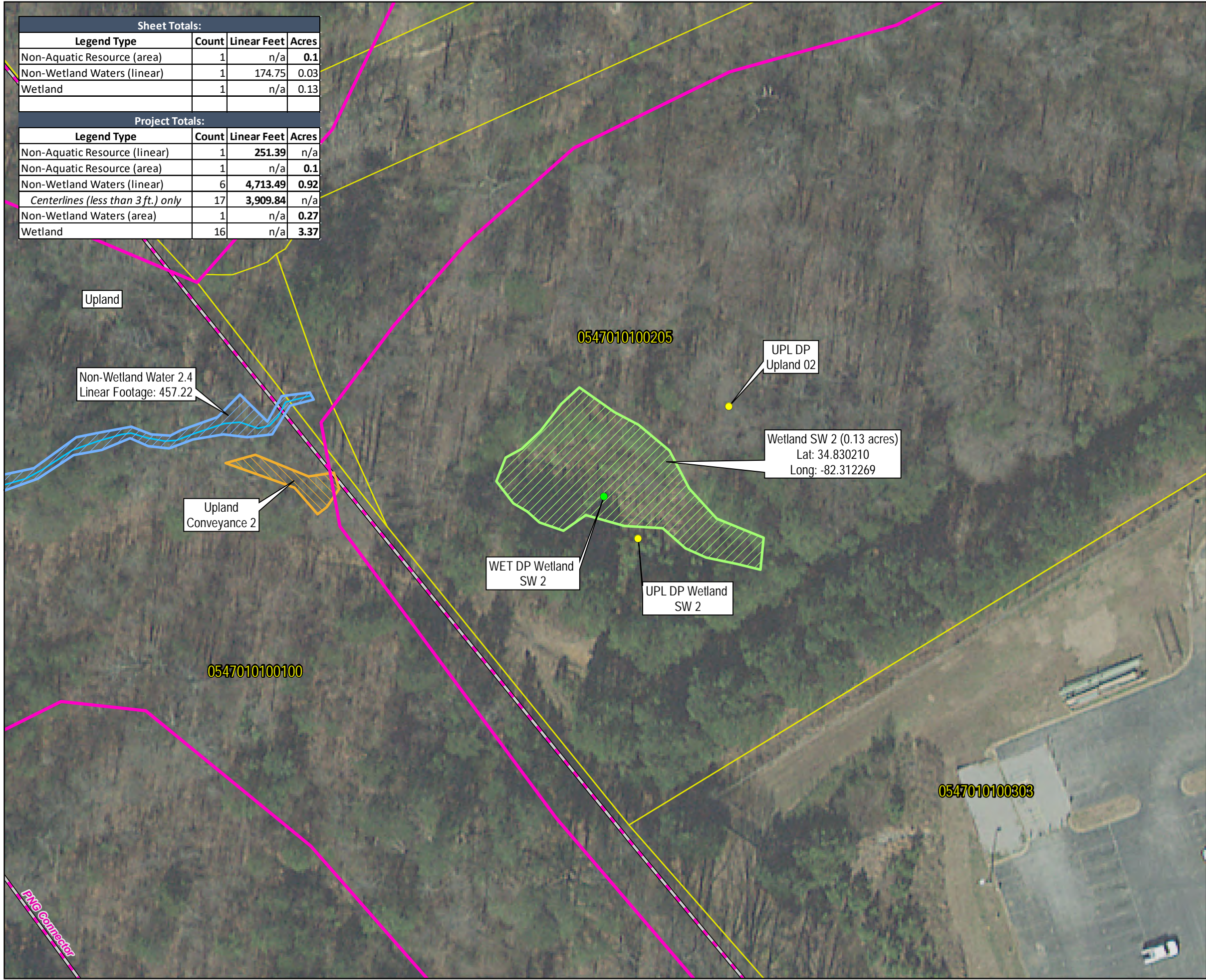


PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.6	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		
		50 International Drive Suite 150 Greenville, SC 29615 Phone: 864.281.0030	
FILE NO.:		Fig 5_WOTUS_2019-Jun-revision.mxd	

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
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Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	1	174.75	0.03
Wetland	1	n/a	0.13

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37



LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (AREA)
- WETLAND (AREA)
- NON-AQUATIC RESOURCE (AREA)
- TAX PARCEL
- PNG CONNECTOR
(USACE Approved JD 2017-SAC-00588 DS)

SCDOT PIN: P028743

NOTES:

- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
- WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

SCALE: 1:600
 1" = 50' (WHEN PRINTED AT 11"x17")

PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.7	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		
		50 International Drive Suite 150 Greenville, SC 29615 Phone: 864.281.0030	
FILE NO.:		Fig 5_WOTUS_2019-Jun-revision.mxd	

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
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Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Wetland	1	n/a	0.16

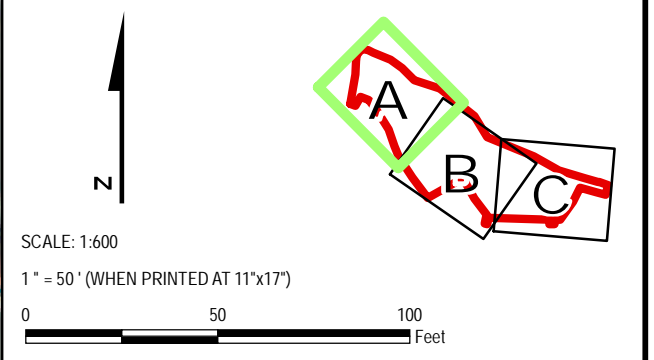
Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

LEGEND

	PREFERRED PSA (115.40 AC)
	PROJECT STUDY AREA (745.07 AC)
	WETLAND (AREA)
	TAX PARCEL

SCDOT PIN: P028743

- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.



PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.8	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

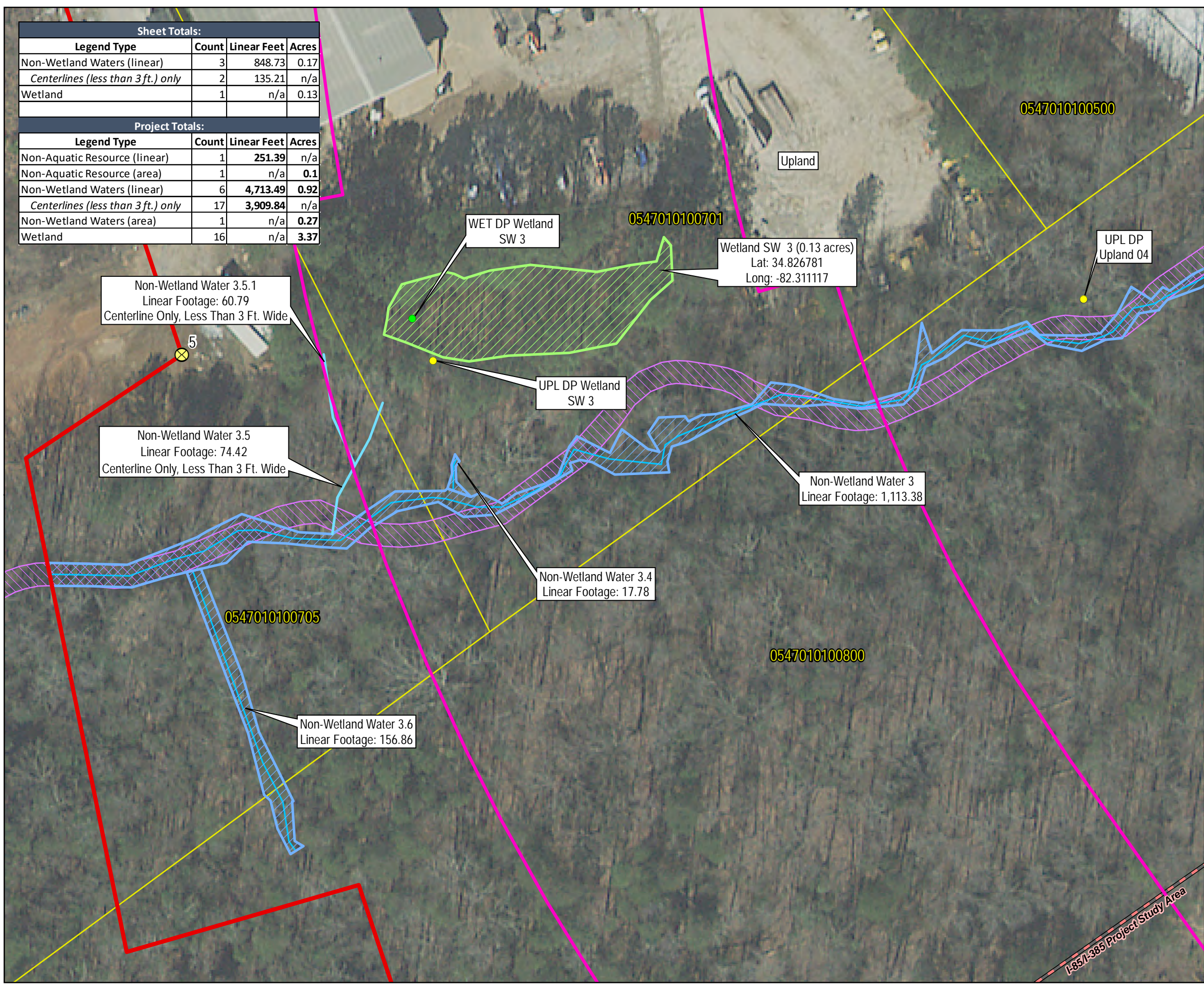
50 International Drive
 Suite 150
 Greenville, SC 29615
 Phone: 864.281.0030

FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
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Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters (linear)	3	848.73	0.17
Centerlines (less than 3 ft.) only	2	135.21	n/a
Wetland	1	n/a	0.13

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37



LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- ⊗ PROJECT COORDINATES
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-WETLAND WATERS - LINEAR (AREA)
- WETLAND (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT (USACE Preliminary JD 2012-SAC-00588 DS)
- I-85/I-385 PROJECT JD FEATURE

SCDOT PIN: P028743

NOTES:

- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
- WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

N

SCALE: 1:600
 1" = 50' (WHEN PRINTED AT 11"x17")

PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.9	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

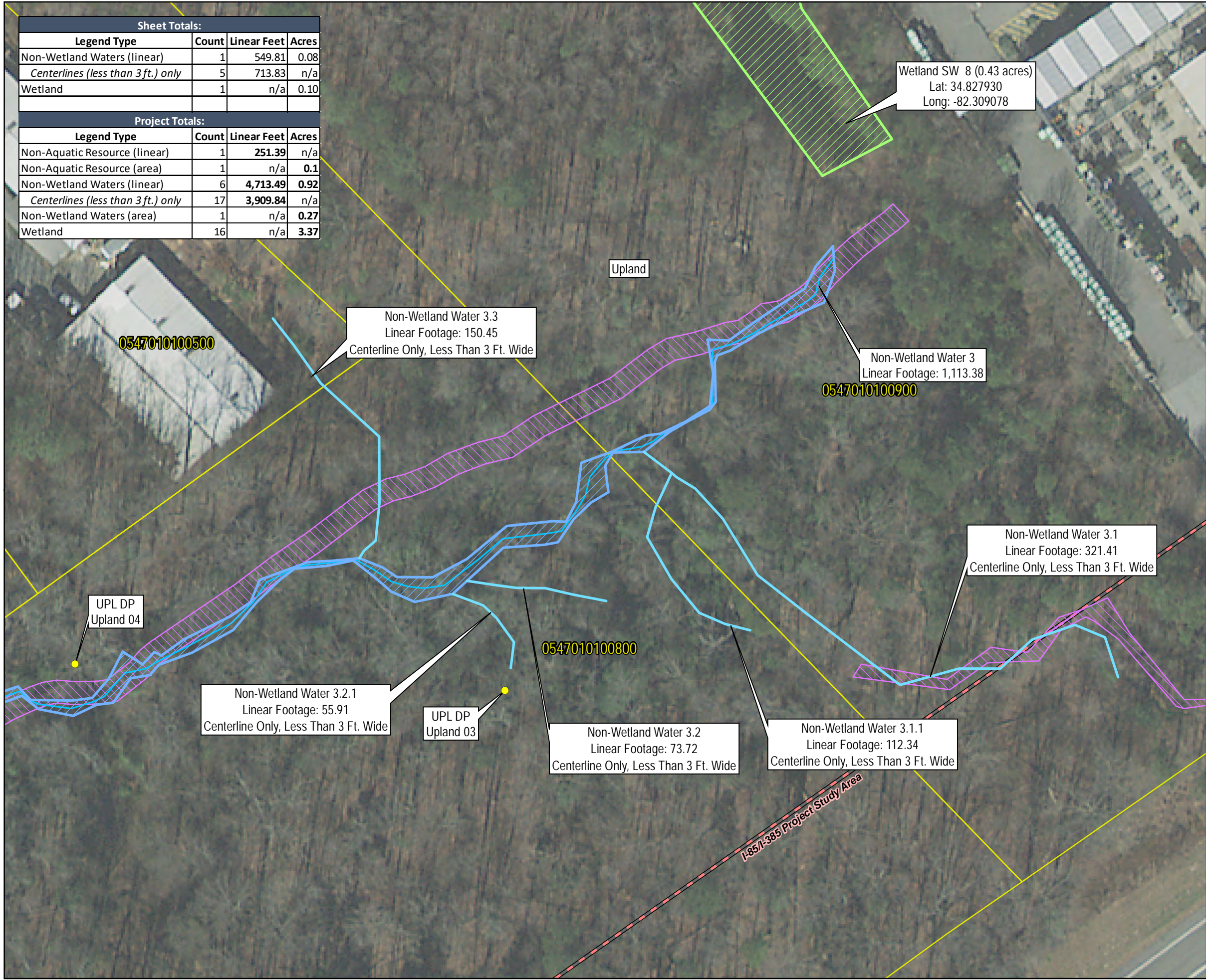
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FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

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 Path: S:\PROJECTS\SCDOT\258900-WoodruffRd\Parallel\Fig 5_WOTUS_2019-Jun-revision.mxd

Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters (linear)	1	549.81	0.08
Centerlines (less than 3 ft.) only	5	713.83	n/a
Wetland	1	n/a	0.10

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37



LEGEND

- PREFERRED PSA (115.40)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-WETLAND WATERS - LINEAR (AREA)
- WETLAND (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT
(USACE Preliminary JD 2012-SAC-00588 DS)
- I-85/I-385 PROJECT JD FEATURE

SCDOT PIN: P028743

NOTES:

1. BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
2. WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

SCALE: 1:600
 1" = 50' (WHEN PRINTED AT 11"x17")

PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.10	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

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 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
 Path: S:\PROJECTS\SCDOT\258900-WoodruffR\Parallel\Fig 5_WOTUS_2019-Jun-revision.mxd

Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters (linear)	1	111.32	0.02
Centerlines (less than 3 ft.) only	1	58.11	n/a
Wetland	1	n/a	0.43
Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

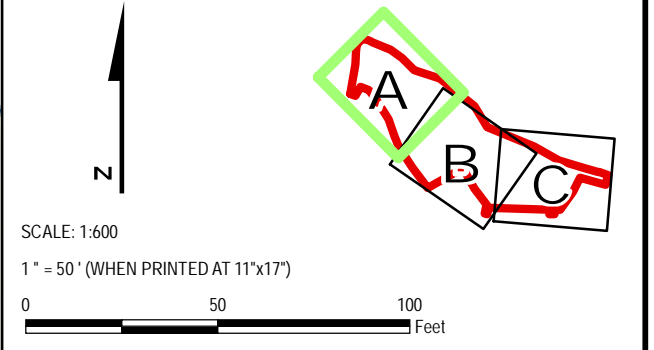


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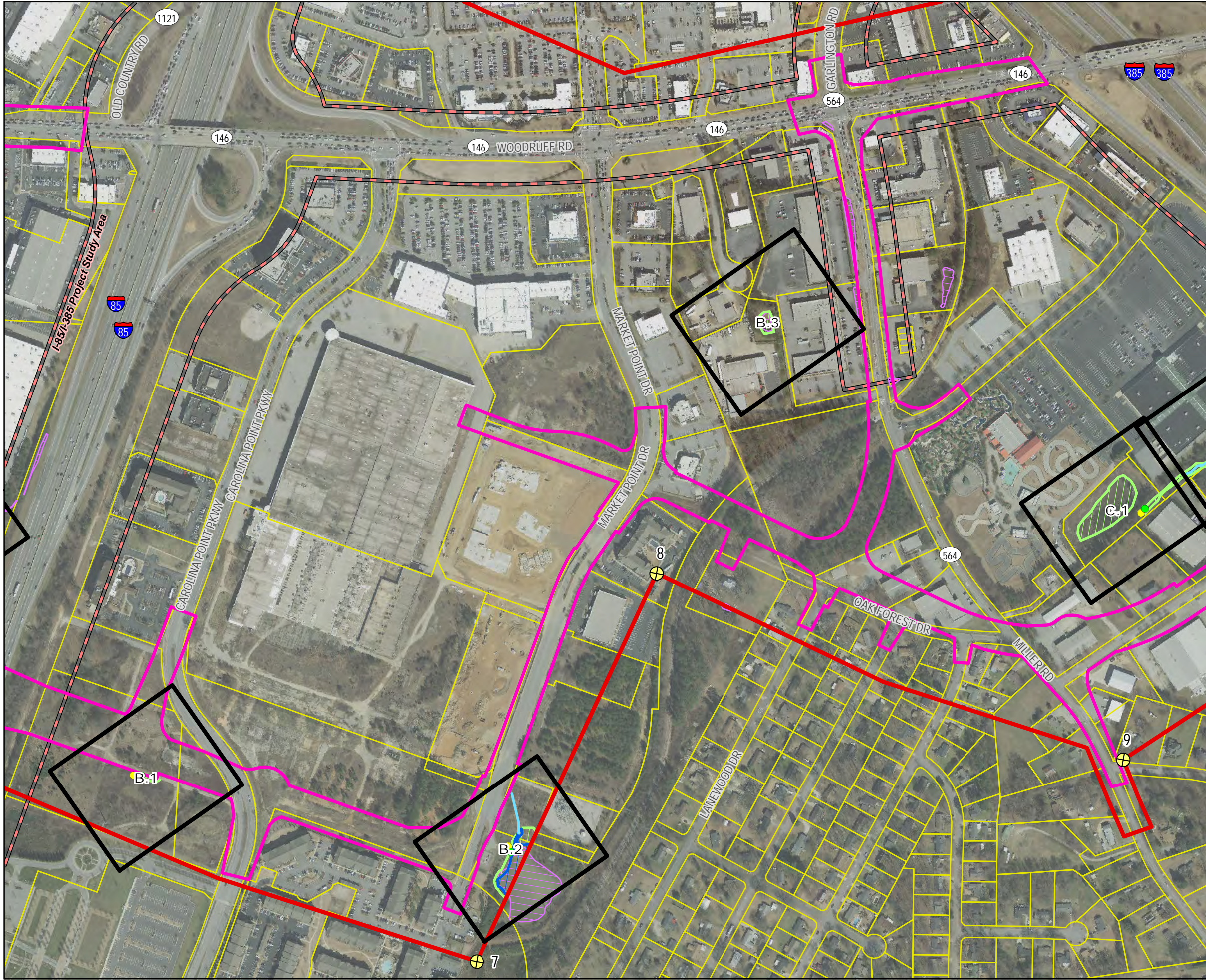
- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-WETLAND WATERS - LINEAR (AREA)
- WETLAND (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT JD FEATURE

SCDOT PIN: P028743

- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.



PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-A.11	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		
		50 International Drive Suite 150 Greenville, SC 29615 Phone: 864.281.0030	
FILE NO.:	Fig 5_WOTUS_2019-Jun-revision.mxd		

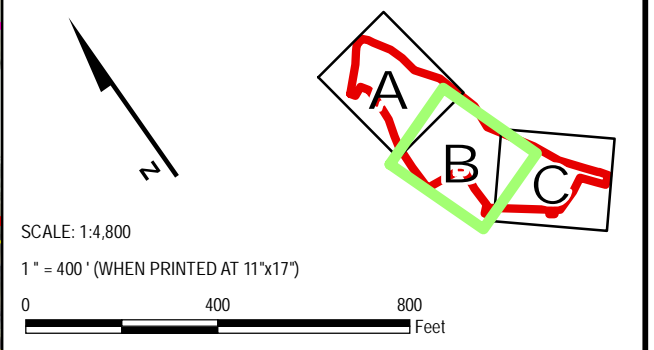


LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- PROJECT COORDINATES
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-WETLAND WATER (AREA)
- WETLAND (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT
(USACE Preliminary JD 2012-SAC-00588 DS)
- I-85/I-385 PROJECT JD FEATURE

SCDOT PIN: P028743

- NOTES:**
1. BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 2. WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.



PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-B	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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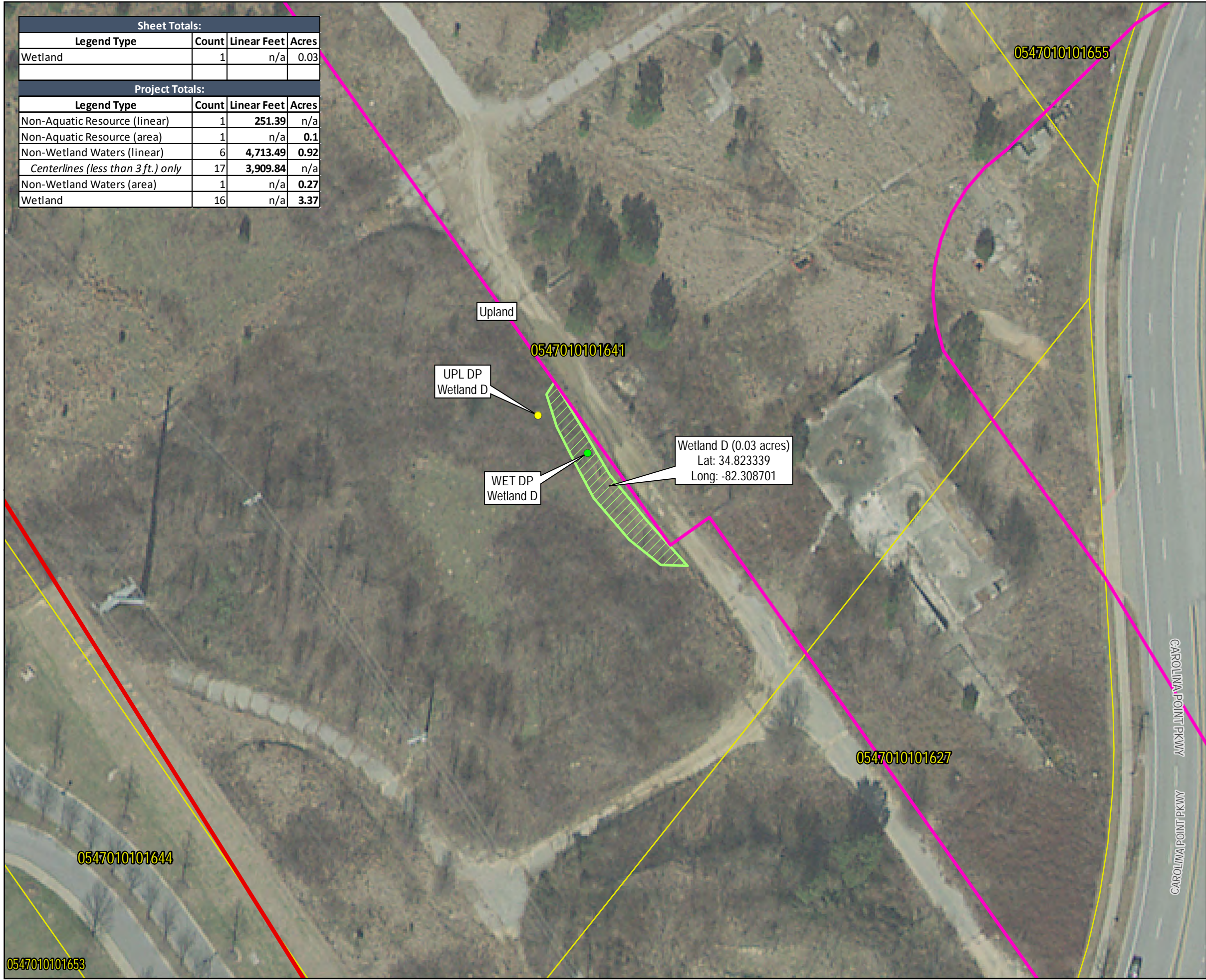
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FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
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 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
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Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Wetland	1	n/a	0.03

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37



LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- WETLAND (AREA)
- TAX PARCEL

SCDOT PIN: P028743

NOTES:

- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
- WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

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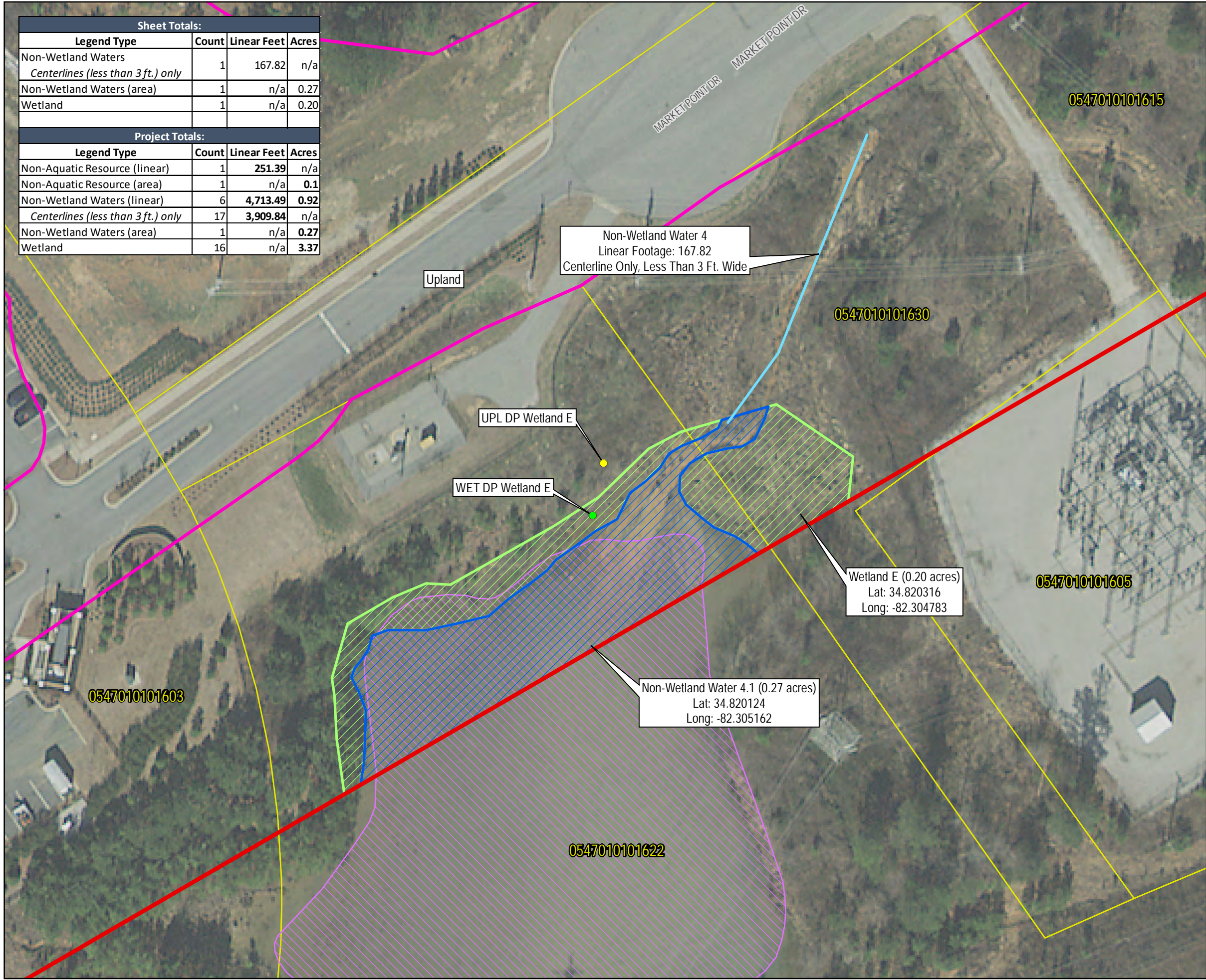
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PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-B.1	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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Phone: 864.281.0030

FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
 Path: S:\1-PROJECTS\SCDOT\258900-WoodruffR\Parallel\Fig 5_WOTUS_2019-Jun-revision.mxd



Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters <i>Centerlines (less than 3 ft.) only</i>	1	167.82	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	1	n/a	0.20

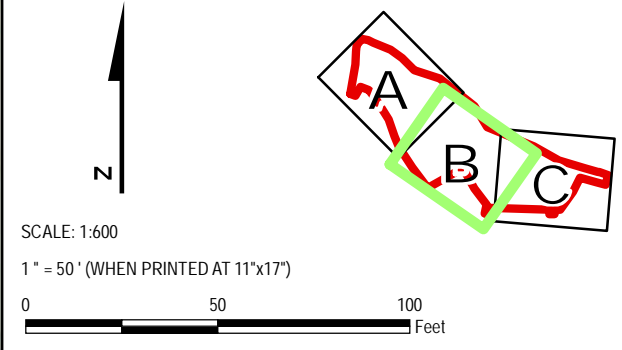
Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
<i>Centerlines (less than 3 ft.) only</i>	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- NON-WETLAND WATER (AREA)
- WETLAND (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT JD FEATURE

SCDOT PIN: P028743

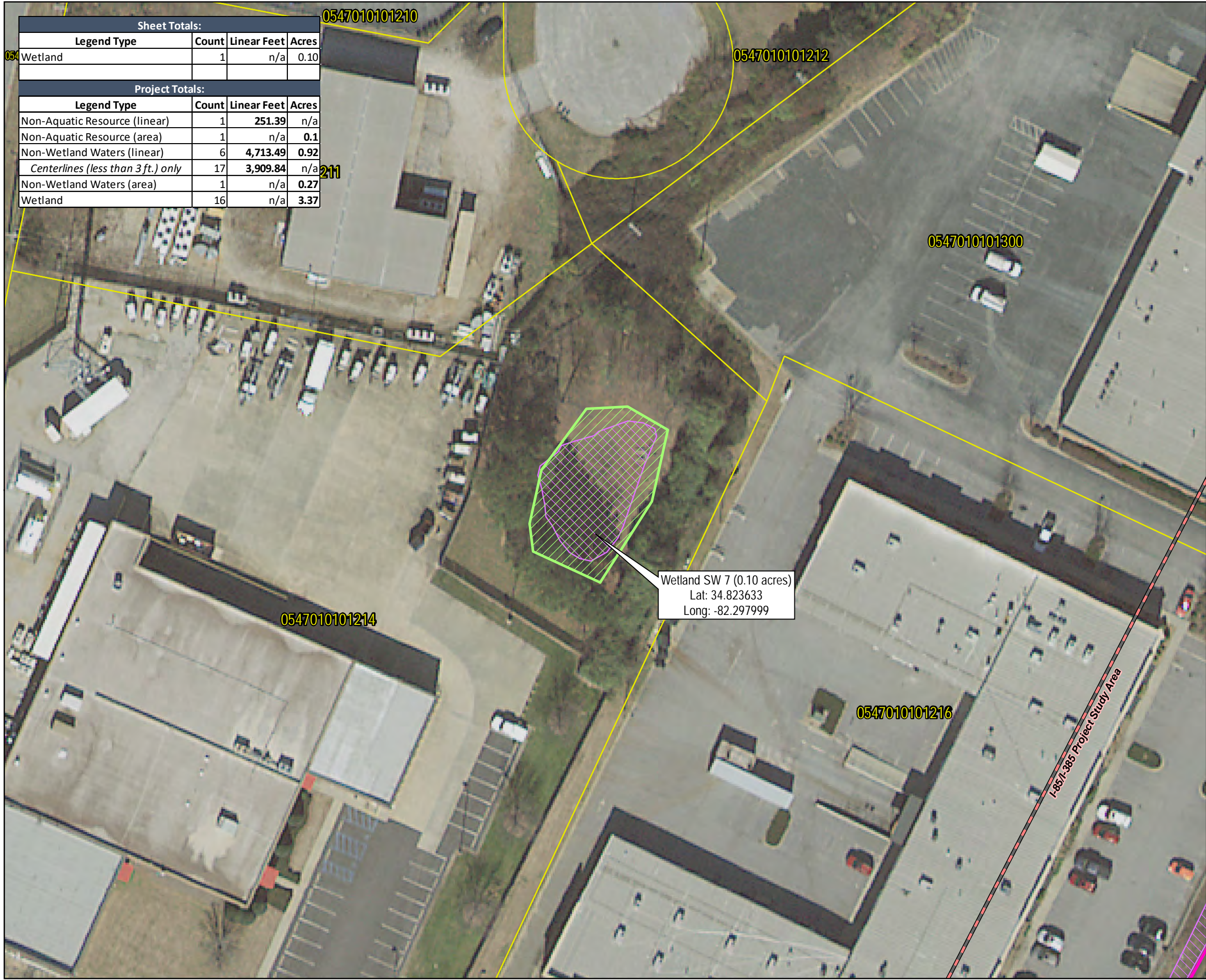
- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.



PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-B.2	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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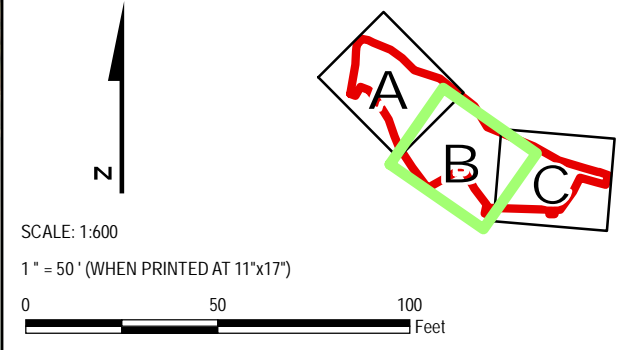
Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Wetland	1	n/a	0.10
Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- WETLAND (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT
(USACE Preliminary JD 2012-SAC-00588 DS)
- I-85/I-385 PROJECT JD FEATURE

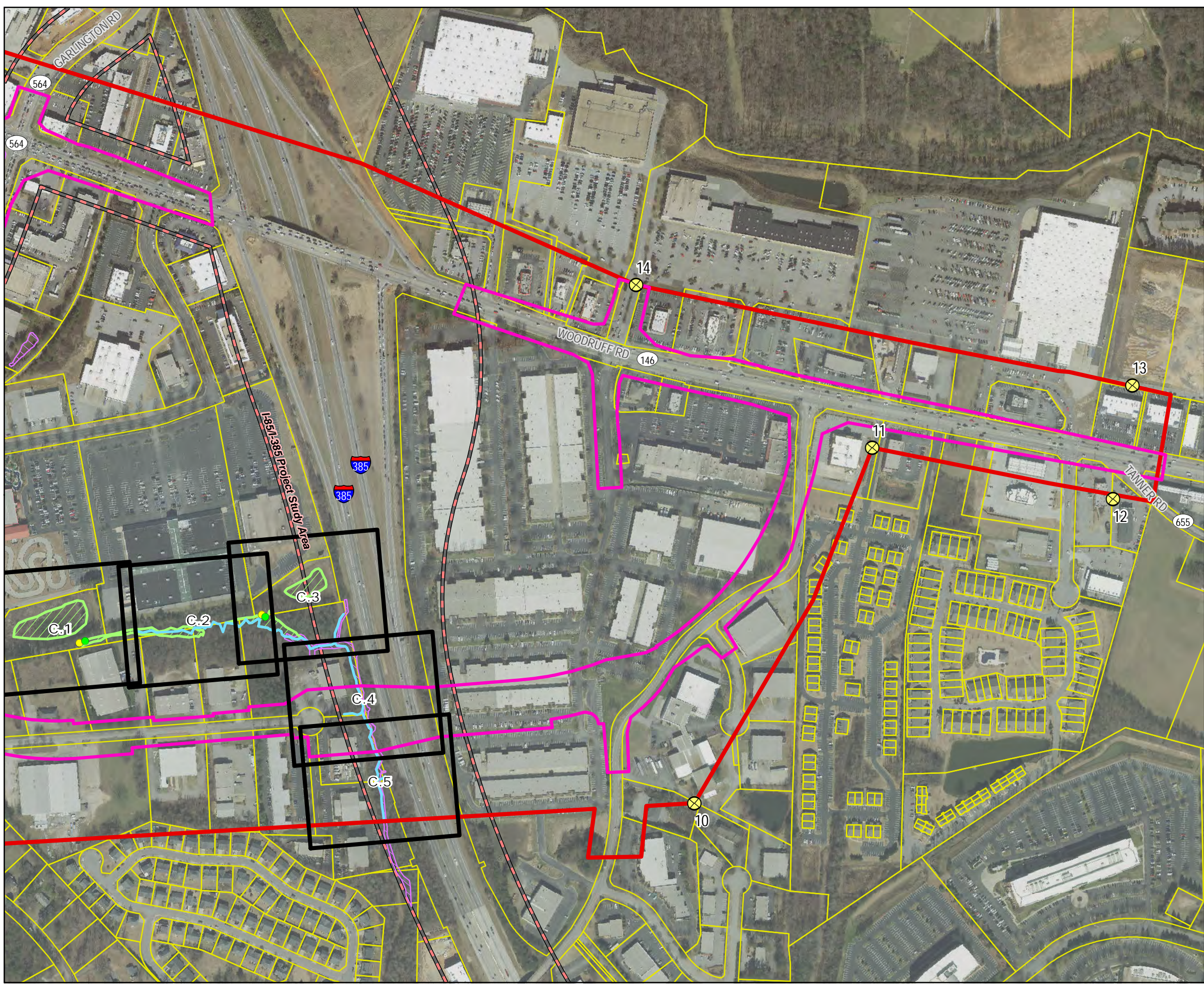
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- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.



PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-B.3	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
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LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- X PROJECT COORDINATES
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- WETLAND (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT
(USACE Preliminary JD 2012-SAC-00588 DS)
- I-85/I-385 PROJECT JD FEATURE

SCDOT PIN: P028743

- NOTES:**
1. BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 2. WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

N

SCALE: 1:4,800
 1" = 400' (WHEN PRINTED AT 11"x17")

PROJECT: NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE: APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY: R. SPRING	PROJ. NO.: 258900
CHECKED BY: R. HANLEY	FIGURE 5-C
APPROVED BY: P. BUTLER	
DATE: JULY 2019	
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FILE NO.:	Fig 5_WOTUS_2019-Jun-revision.mxd

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Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Wetland	2	n/a	0.78

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

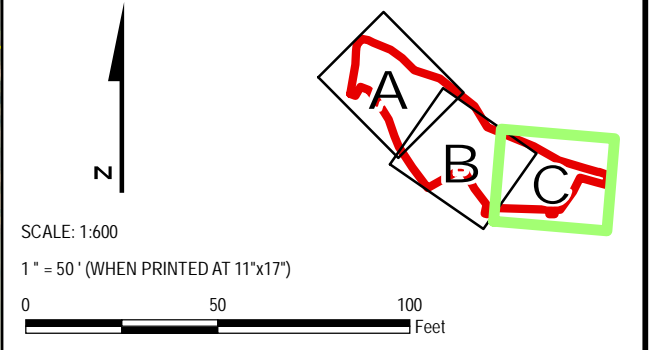


LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- WETLAND (AREA)
- TAX PARCEL

SCDOT PIN: P028743

- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.



PROJECT:		NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA
TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS
DRAWN BY:	R. SPRING	PROJ. NO.: 258900
CHECKED BY:	R. HANLEY	FIGURE 5-C.1
APPROVED BY:	P. BUTLER	
DATE:	JULY 2019	

TRC

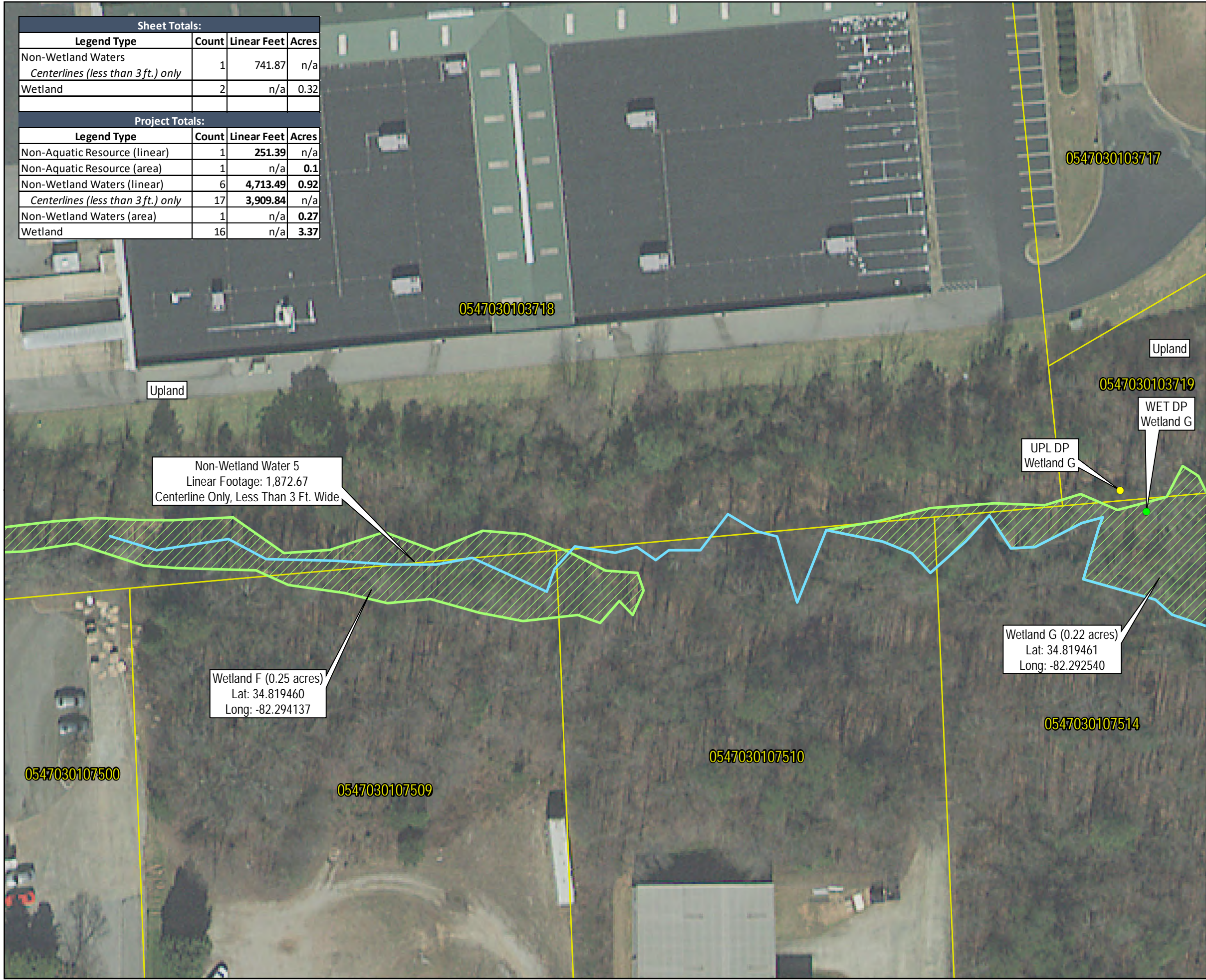
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 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
 Path: S:\PROJECTS\SCDOT\258900-WoodruffR\Parallel\Fig 5_WOTUS_2019-Jun-revision.mxd

Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters <i>Centerlines (less than 3 ft.) only</i>	1	741.87	n/a
Wetland	2	n/a	0.32

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
<i>Centerlines (less than 3 ft.) only</i>	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37



LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- WETLAND (AREA)
- TAX PARCEL

SCDOT PIN: P028743

NOTES:

- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
- WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

N

SCALE: 1:600
 1" = 50' (WHEN PRINTED AT 11"x17")

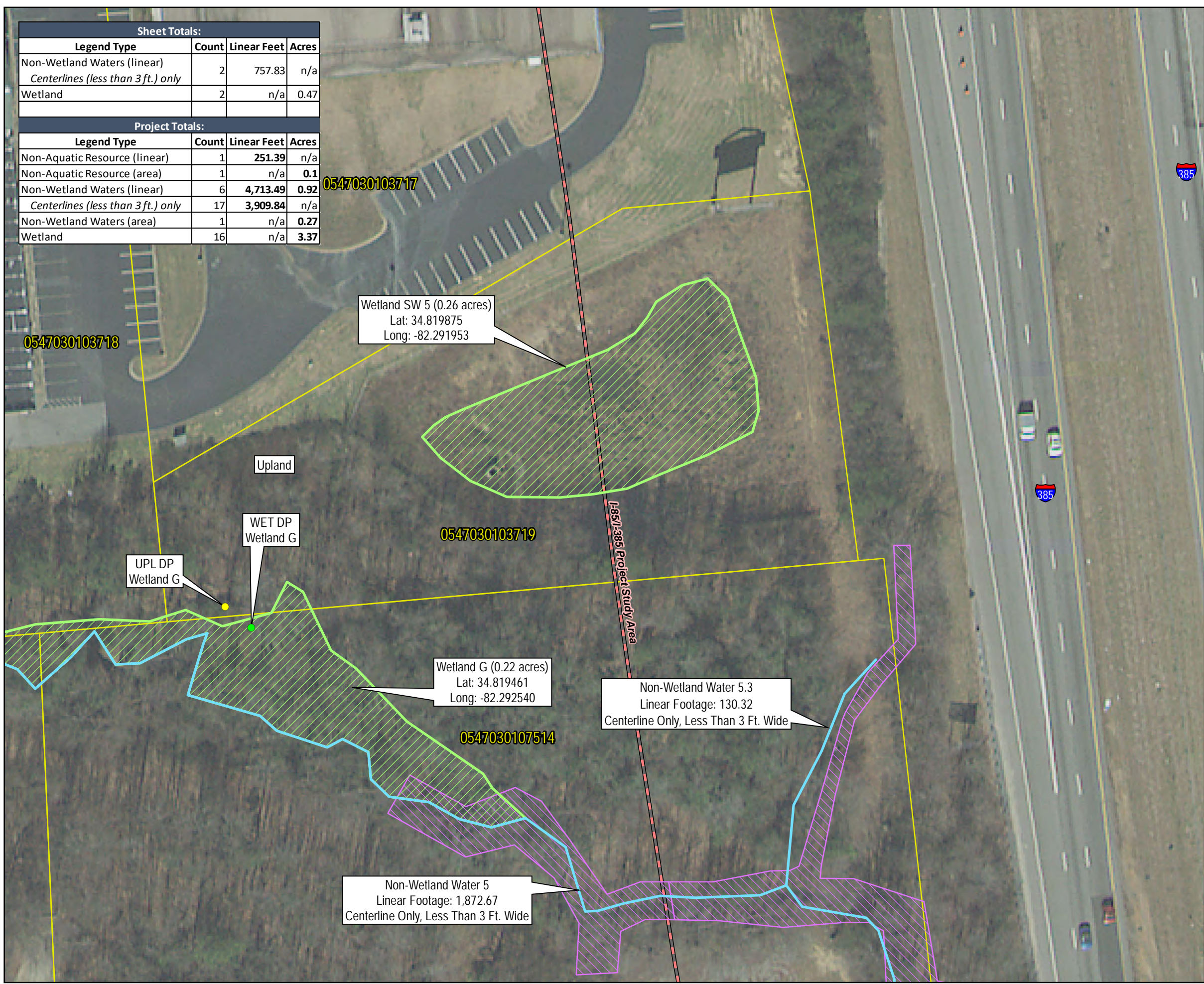
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TITLE:		APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY:	R. SPRING	PROJ. NO.:	258900
CHECKED BY:	R. HANLEY	FIGURE 5-C.2	
APPROVED BY:	P. BUTLER		
DATE:	JULY 2019		

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Greenville, SC 29615
Phone: 864.281.0030

FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

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Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters (linear) <i>Centerlines (less than 3 ft.) only</i>	2	757.83	n/a
Wetland	2	n/a	0.47
Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
<i>Centerlines (less than 3 ft.) only</i>	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

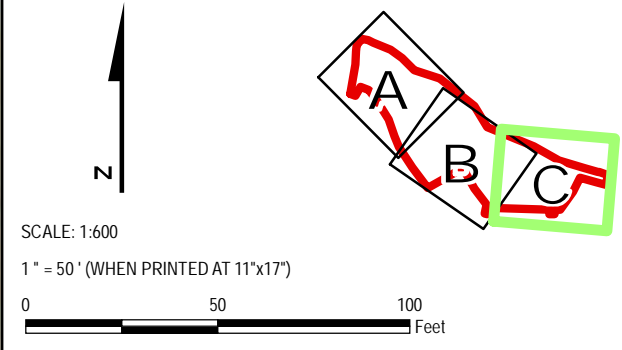


LEGEND

- PREFERRED PSA (115.40)
- PROJECT STUDY AREA (745.07 AC)
- UPLAND DATA POINT (UPL DP)
- WETLAND DATA POINT (WET DP)
- NON-WETLAND WATERS - LINEAR (LINE)
- WETLAND (AREA)
- TAX PARCEL
- I-85/I-385 PROJECT
(USACE Preliminary JD 2012-SAC-00588 DS)
- I-85/I-385 PROJECT JD FEATURE

SCDOT PIN: P028743

- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

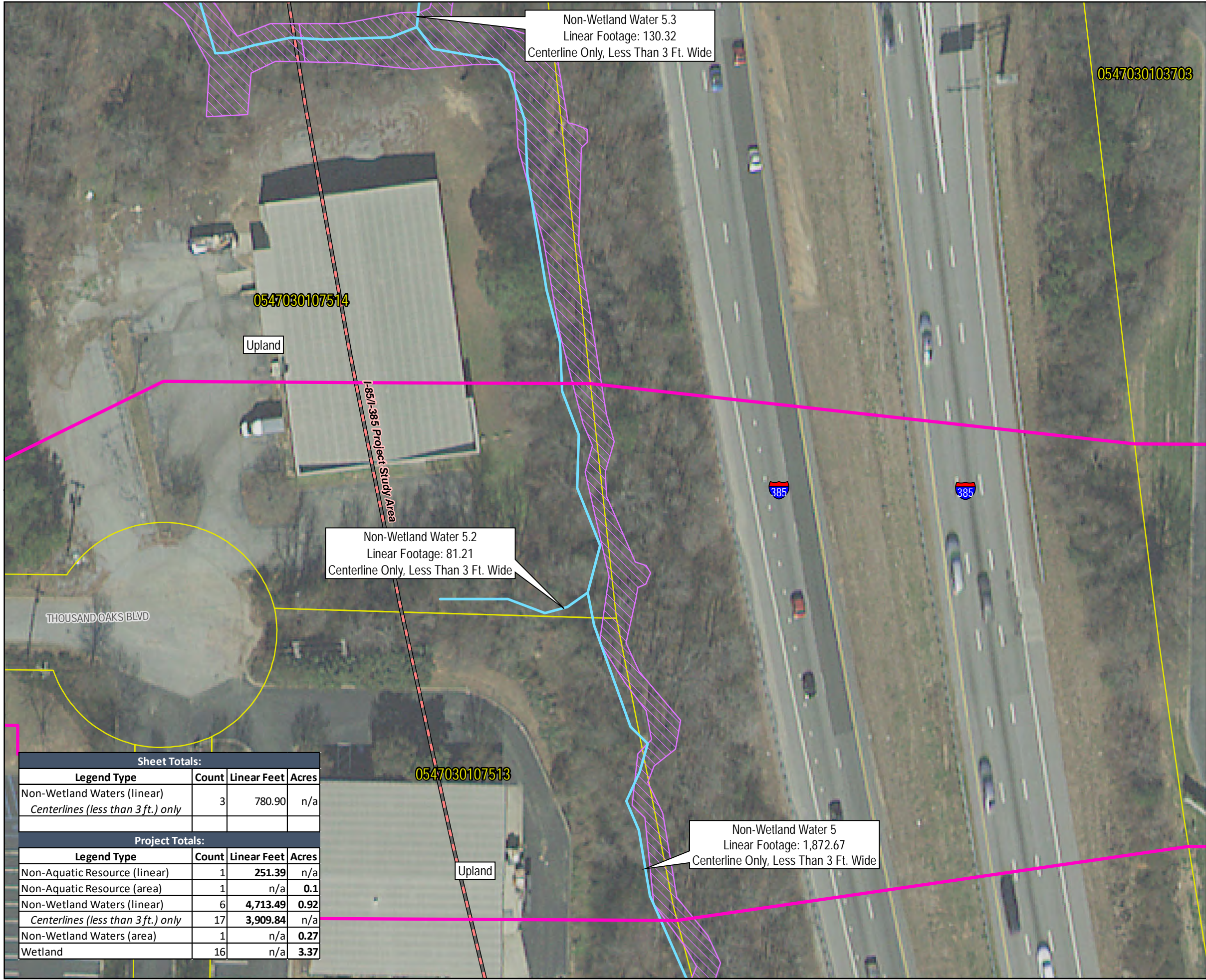


PROJECT:		
NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA		
TITLE:		
APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS		
DRAWN BY:	R. SPRING	PROJ. NO.: 258900
CHECKED BY:	R. HANLEY	FIGURE 5-C.3
APPROVED BY:	P. BUTLER	
DATE:	JULY 2019	

50 International Drive
 Suite 150
 Greenville, SC 29615
 Phone: 864.281.0030

FILE NO: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES - LAYOUT:ANSI/B(11"x17")
 Path: S:\PROJECTS\SCDOT\258900-WoodruffRd\Parallel\Fig 5_WOTUS_2019-Jun-revision.mxd



LEGEND

- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- NON-WETLAND WATERS - LINEAR (LINE)
- TAX PARCEL
- I-85/I-385 PROJECT
(USACE Preliminary JD 2012-SAC-00588 DS)
- I-85/I-385 PROJECT JD FEATURE

SCDOT PIN: P028743

- NOTES:**
1. BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 2. WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.

SCALE: 1:600
 1" = 50' (WHEN PRINTED AT 11"x17")

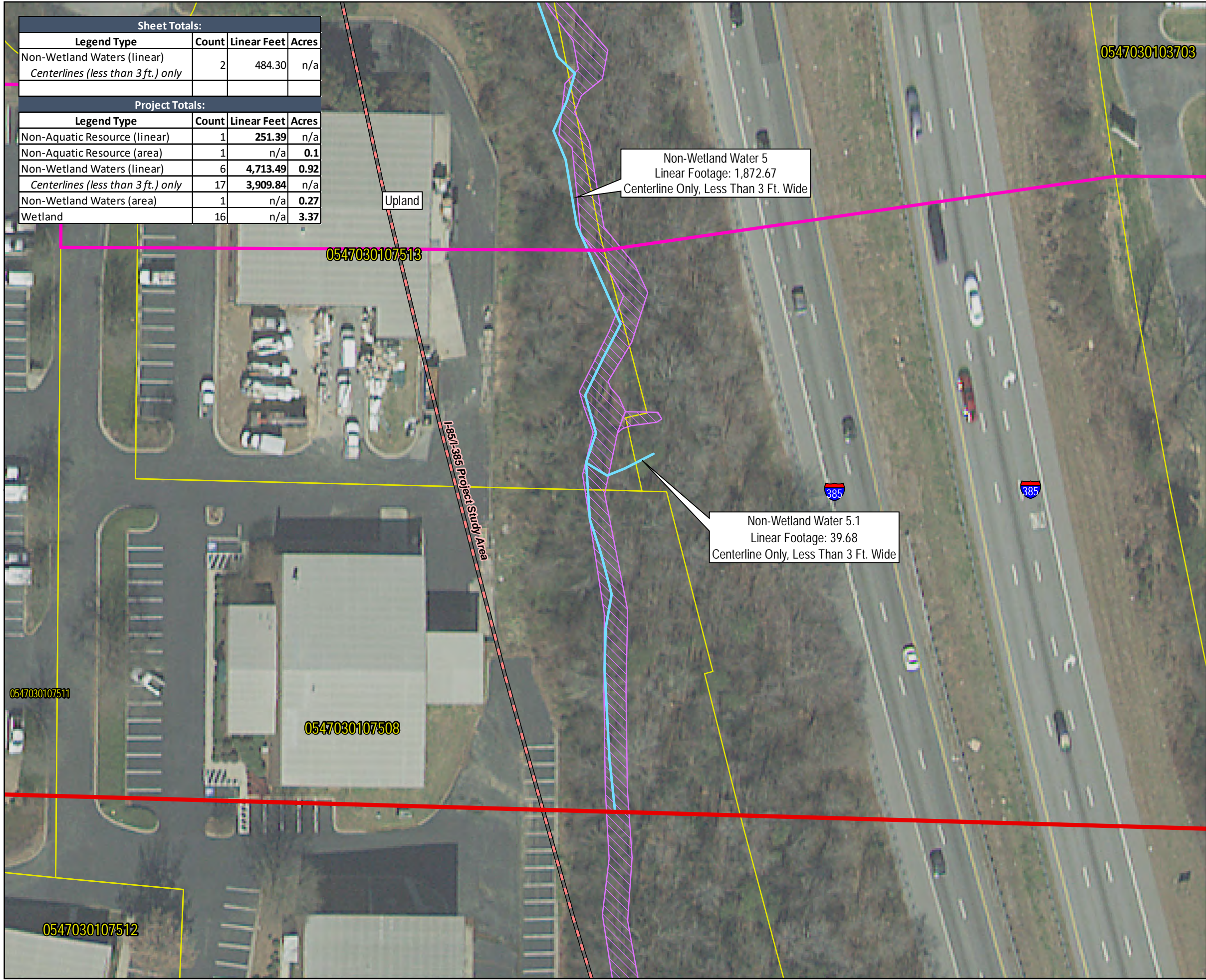
Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters (linear) <i>Centerlines (less than 3 ft.) only</i>	3	780.90	n/a
Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
<i>Centerlines (less than 3 ft.) only</i>	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

PROJECT: NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA	
TITLE: APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS	
DRAWN BY: R. SPRING	PROJ. NO.: 258900
CHECKED BY: R. HANLEY	FIGURE 5-C.4
APPROVED BY: P. BUTLER	
DATE: JULY 2019	

50 International Drive
Suite 150
Greenville, SC 29615
Phone: 864.281.0030

FILE NO.: Fig 5_WOTUS_2019-Jun-revision.mxd

TRC - GIS
 Coordinate System: NAD 1983 StatePlane South Carolina FIPS 3900 Feet (Foot US)
 Map Rotation: 0
 Plot Date: 7/24/2019 09:51:56 AM by PJACQUES -- LAYOUT: ANSIB(11"x17")
 Path: S:\PROJECTS\SCDOT\258900-WoodruffRd\Parallel\Fig 5_WOTUS_2019-Jun-revision.mxd



Sheet Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Wetland Waters (linear)	2	484.30	n/a
Centerlines (less than 3 ft.) only			

Project Totals:			
Legend Type	Count	Linear Feet	Acres
Non-Aquatic Resource (linear)	1	251.39	n/a
Non-Aquatic Resource (area)	1	n/a	0.1
Non-Wetland Waters (linear)	6	4,713.49	0.92
Centerlines (less than 3 ft.) only	17	3,909.84	n/a
Non-Wetland Waters (area)	1	n/a	0.27
Wetland	16	n/a	3.37

LEGEND

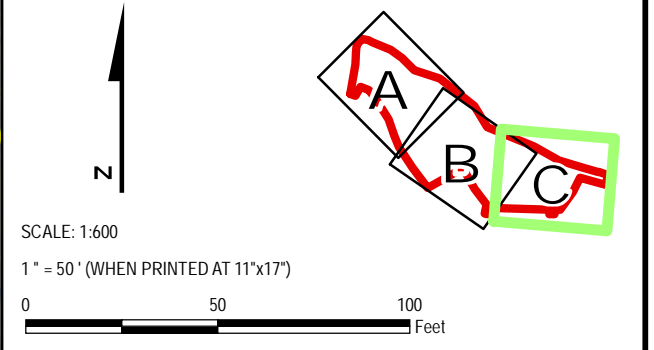
- PREFERRED PSA (115.40 AC)
- PROJECT STUDY AREA (745.07 AC)
- NON-WETLAND WATERS - LINEAR (LINE)
- TAX PARCEL
- I-85/I-385 PROJECT (USACE Preliminary JD 2012-SAC-00588 DS)
- I-85/I-385 PROJECT JD FEATURE

Non-Wetland Water 5
 Linear Footage: 1,872.67
 Centerline Only, Less Than 3 Ft. Wide

Non-Wetland Water 5.1
 Linear Footage: 39.68
 Centerline Only, Less Than 3 Ft. Wide

SCDOT PIN: P028743

- NOTES:**
- BASEMAP IMAGERY AND PARCEL DATA ACQUIRED FROM GREENVILLE COUNTY GIS, 2017 & 2018.
 - WETLAND AND STREAMS DATA COLLECTED BY TRC, 2018.



PROJECT: NATURAL RESOURCES TECHNICAL MEMORANDUM WOODRUFF ROAD CONGESTION RELIEF GREENVILLE COUNTY, SOUTH CAROLINA		
TITLE: APPROXIMATE WATERS OF THE US AND WETLANDS LOCATIONS		
DRAWN BY: R. SPRING	PROJ. NO.: 258900	
CHECKED BY: R. HANLEY	FIGURE 5-C.5	
APPROVED BY: P. BUTLER		
DATE: JULY 2019		



50 International Drive
 Suite 150
 Greenville, SC 29615
 Phone: 864.281.0030

FILE NO: Fig 5_WOTUS_2019-Jun-revision.mxd

Appendix B Photographs

Photographic Log



Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
1	June 28, 2017		
Description			
Woodruff Road, facing west southwest. The intersection with Verdae Boulevard is in the background.		2017/06/28	

Photo No.	Date		
2	June 28, 2017		
Description			
Woodruff Road, facing east, from the same location as Photograph 1		2017/06/28	

Photographic Log


Client Name: South Carolina Dept. of Transportation		Site Location: Woodruff Road Congestion Relief, Greenville County, South Carolina	Project No.: 258900.0000.0000
Photo No. 3	Date June 5, 2018		
Description Entrance to Green Ridge Shopping Center. Woodruff Road is to the left. The National Wetland Inventory shows a riverine wetland and palustrine forested wetland in this area.			

Photo No. 4	Date May 24, 2018		
Description Smith Hines Road, facing north toward Woodruff Road. This is the eastern limit of the Study Area.			

Photographic Log


Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
5	May 24, 2018		
Description			
Site of a former industrial plant that is being redeveloped for residential and commercial property.			

Photo No.	Date		
6	May 24, 2018		
Description			
Study area south of Interstate Highway 85 and west of Woodruff Road. View facing west, southwest.			

Photographic Log


Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
7	May 22, 2018		
Description			
Wetland SW-01, facing south, southeast. Wetland Data Point is in the foreground.			

Photo No.	Date		
8	May 23, 2018		
Description			
Wetland SW-02, facing east from wetland data point. The inlet structure is in the background.			

Photographic Log


Client Name: South Carolina Dept. of Transportation		Site Location: Woodruff Road Congestion Relief, Greenville County, South Carolina	Project No.: 258900.0000.0000
Photo No. 9	Date May 23, 2018		
Description Wetland SW-02, showing the piped storm water conveyance that discharges into this feature.			

Photo No. 10	Date May 23, 2018		
Description Upland data point north of Wetland SW-02, showing a bed of sensitive fern.			

Photographic Log

Client Name: South Carolina Dept. of Transportation	Site Location: Woodruff Road Congestion Relief, Greenville County, South Carolina	Project No.: 258900.0000.0000
---	--	---



Photo No. 11	Date May 24, 2018	
Description Wetland SW-03, facing southwest.		

Photo No. 12	Date May 24, 2018	
Description Non-wetland Water 4 and Wetland SW-04, which is an impoundment of Non-wetland Water Tributary 4. Non-wetland Water Tributary 4 flows into the pond from the right. Wetland E is in the foreground.		

Photographic Log


Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
13	June 5, 2018		
Description Non-wetland Water SW-05, facing west, northwest. Outlet structure is visible near the left foreground.		2018/06/05	

Photo No.	Date		
14	June 18, 2017		
Description Non-wetland Water SW-08, facing north.		2017/06/18	

Photographic Log


Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
15	June 5, 2018		
Description			
Non-wetland Water Tributary 1, facing downstream toward Verdae Boulevard.			

Photo No.	Date	
16	April 1, 2019	
Description		
Non-wetland Water Tributary 1, in the same location as Photograph 7, taken after development of this property. This view is facing upstream. The culvert in the background is approximately the location of the headwaters where a storm water conveyance discharged.		

Photographic Log



Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
17	May 22, 2018		
Description			
Non-wetland Water Tributary 2, looking upstream at point where the tributary arises from a piped, storm water conveyance discharge. Woodruff Road is in the background.			

Photo No.	Date		
18	May 22, 2018		
Description			
Non-wetland Water Tributary 2, looking upstream near the southernmost reach in the Study Area.			

Photographic Log


Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
19	May 22, 2018		
Description Non-wetland Water Tributary 2: Bench adjacent to left descending bank. Location of Non-wetland Water Tributary 2 Upland Data Point.			

Photo No.	Date		
20	May 22, 2018		
Description Non-wetland Water Tributary 2.1, looking upstream from Non-wetland Water Tributary 2. Woodruff Road is to the left.			

Photographic Log



Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
21	May 22, 2018		
Description Non-wetland Water Tributary 2.2, looking upstream from confluence with Non-wetland Water Tributary 2 and toward Wetland A			

Photo No.	Date		
22	May 22, 2018		
Description Non-wetland Water Tributary 2.3, looking upstream to the point where the tributary arises from a piped storm water conveyance discharge. The pipe is in the background behind the vegetation.			

Photographic Log


Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
23	May 22, 2018		
Description			
Non-wetland Water Tributary 2.3, facing downstream from the same location at Photograph		2018/05/22	

Photo No.	Date		
24	May 22, 2018		
Description			
Non-wetland Water Tributary 2.3, facing downstream near outlet from Wetland SW-01.		2018/05/22	

Photographic Log




Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
25	May 22, 2018		
Description			
Non-wetland Water Tributary 2.4, facing downstream from headwaters reach.			

Photo No.	Date		
26	May 23, 2018		
Description			
Non-wetland Water Tributary 3, at its headwaters where it arises from a piped storm water conveyance that drains a commercial shopping center.			

Photographic Log

Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
27	May 23, 2018		
Description			
Non-wetland Water Tributary 3, looking downstream from the same location as Figure 26.			
Photo No.	Date		
28	May 23, 2018		
Description			
Non-wetland Water Tributary 3 near downstream reach within Study Area and Upland Data Point 3, which was collected upslope from the right descending bank.			

Photographic Log



Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
29	May 24, 2018		
Description			
Non-wetland Water Tributary 3.1, facing downstream near its confluence with Non-wetland Water Tributary 3.			

Photo No.	Date		
30	May 24, 2018		
Description			
Non-wetland Water Tributary 3.1, facing upstream from its confluence with Non- wetland Water Tributary 3.			

Photographic Log


Client Name: South Carolina Dept. of Transportation		Site Location: Woodruff Road Congestion Relief, Greenville County, South Carolina	Project No.: 258900.0000.0000
Photo No. 31	Date May 24, 2018		
Description Non-wetland Water Tributary 3.1.1, facing downstream toward its confluence with Non-wetland Water Tributary 3.1.			

Photo No. 32	Date May 24, 2018		
Description Drainage area of Non-wetland Water Tributary 3.1 and 3.1.1 facing east, north east. The southbound lanes of Interstate 85 are to the right.			

Photographic Log



Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
33	June 28, 2017		
Description			
<p>Non-wetland Water Tributary 3.2, facing upstream from its confluence with Non-wetland Water Tributary 3.</p>			

Photo No.	Date		
34	May 24, 2018		
Description			
<p>Non-wetland Water Tributary 4, facing upstream from the rock check dam over which Non-wetland Water Tributary 4 flows into Non-wetland Water SW-04. Non-wetland Water Tributary 4 arises from the piped storm water conveyance that can be seen in the background. Wetland E is in the foreground and to the right.</p>			

Photographic Log


Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
35	June 5, 2018		
Description Non-wetland Water Tributary 5, facing upstream from the southern limits of the Study Area. Interstate Highway 385 is to the left.			

Photo No.	Date		
36	June 5, 2018		
Description Non-wetland Water Tributary 5, facing upstream from the confluence with Non-wetland Water Tributary 5.3.			

Photographic Log




Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
37	June 5, 2018		
Description			
Non-wetland Water Tributary 5, facing upstream at outlet from Wetland SW-05.			

Photo No.	Date		
38	June 5, 2018		
Description			
Non-wetland Water Tributary 5.1, facing upstream from its confluence with Non- wetland Water Tributary 5. This tributary arises from a storm water conveyance under Interstate Highway 385, which can be seen in the background.			

Photographic Log

Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
39	May 22, 2018		
Description			
Wetland A, facing southeast near Upland data point.			
Photo No.	Date		
40	May 22, 2018		
Description			
Upland woods adjacent to Wetland A facing northeast toward Verdae Boulevard.			

Photographic Log



Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
41	May 22, 2018		
Description Wetland B, facing north showing sewer line looking upstream toward Non-wetland Water Tributary 2.2. Non-wetland Water Tributary 2 is to the right.			

Photo No.	Date		
42	April 7, 2017		
Description Wetland C looking upstream. Non-wetland Water Tributary 2 is to the left.			

Photographic Log


Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
43	April 7, 2017		
Description			
<p>Wetland C from Non-wetland Water Tributary 2. Wetland C is in the background, adjacent to the left descending bank of Non-wetland Water Tributary 2.</p>			

Photo No.	Date		
44	May 24, 2018		
Description			
<p>Wetland D, facing south. This wetland is adjacent to a former paved road and has not apparent surface connection to other waters or wetlands.</p>			

Photographic Log



Client Name:		Site Location:	Project No.:
South Carolina Dept. of Transportation		Woodruff Road Congestion Relief, Greenville County, South Carolina	258900.0000.0000
Photo No.	Date		
45	June 5, 2018		
Description			
<p>Wetland F, facing upslope toward wooded portion. The pin flag is the headwaters reach of Non-wetland Water Tributary 5, which arises in this wetland.</p>		2018/06/05	

Photo No.	Date		
46	June 5, 2018		
Description			
<p>Wetland F, facing east. Non-wetland Water Tributary 5 flows through this wetland.</p>		2018/06/05	



Photographic Log

Client Name: South Carolina Dept. of Transportation		Site Location: Woodruff Road Congestion Relief, Greenville County, South Carolina	Project No.: 258900.0000.0000
Photo No. 47	Date June 5, 2018		
Description Wetland G, facing west. Non-wetland Water Tributary 5 is to the left.			

Appendix C
**United States Fish and Wildlife Service Information for Planning
and Conservation Consultation**



United States Department of the Interior



FISH AND WILDLIFE SERVICE

South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
Phone: (843) 727-4707 Fax: (843) 727-4218
<http://www.fws.gov/charleston/>

In Reply Refer To:

July 21, 2019

Consultation Code: 04ES1000-2019-SLI-0697

Event Code: 04ES1000-2019-E-01395

Project Name: Woodruff Road Congestion Relief

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
(843) 727-4707

Project Summary

Consultation Code: 04ES1000-2019-SLI-0697

Event Code: 04ES1000-2019-E-01395

Project Name: Woodruff Road Congestion Relief

Project Type: TRANSPORTATION

Project Description: Upgrade the surface transportation network to relieve traffic congestion on Woodruff Road.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/34.827726364492875N82.3042238203738W>



Counties: Greenville, SC

Endangered Species Act Species

There is a total of 10 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Bog Turtle <i>Clemmys muhlenbergii</i> Population: U.S.A. (GA, NC, SC, TN, VA) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962	Similarity of Appearance (Threatened)

Flowering Plants

NAME	STATUS
Bunched Arrowhead <i>Sagittaria fasciculata</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1720	Endangered
Dwarf-flowered Heartleaf <i>Hexastylis naniflora</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2458	Threatened
Mountain Sweet Pitcher-plant <i>Sarracenia rubra ssp. jonesii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4283	Endangered
Small Whorled Pogonia <i>Isotria medeoloides</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened
Swamp Pink <i>Helonias bullata</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4333	Threatened
White Fringeless Orchid <i>Platanthera integrilabia</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1889	Threatened
White Irisette <i>Sisyrinchium dichotomum</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8097	Endangered

Lichens

NAME	STATUS
Rock Gnome Lichen <i>Gymnoderma lineare</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3933	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

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1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Blue-winged Warbler <i>Vermivora pinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jun 30

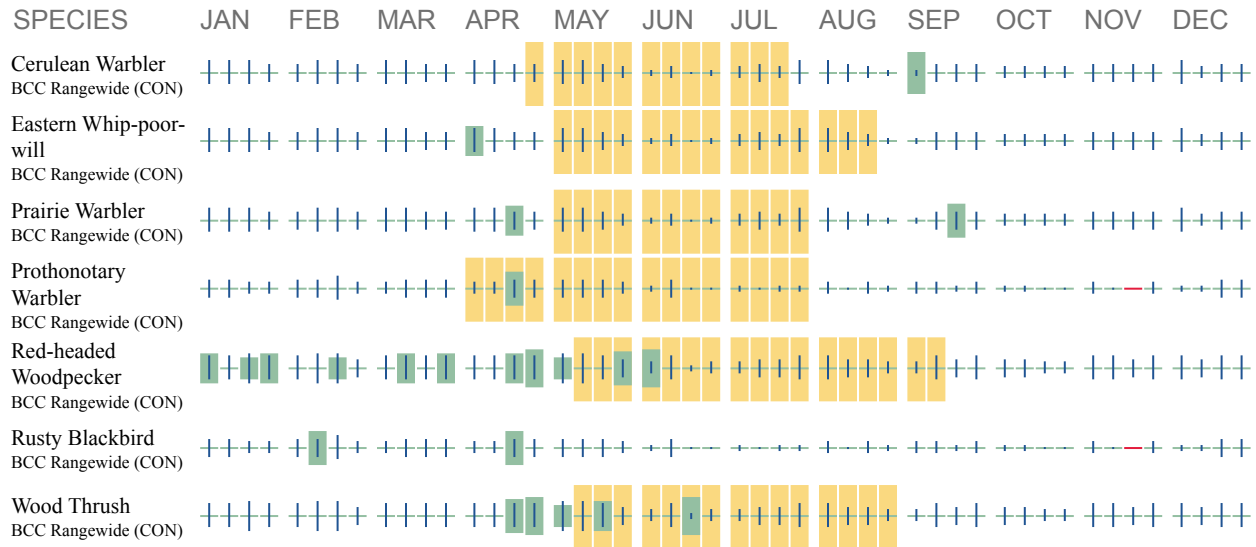
NAME	BREEDING SEASON
Cerulean Warbler <i>Dendroica cerulea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 28 to Jul 20
Eastern Whip-poor-will <i>Antrostomus vociferus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Prairie Warbler <i>Dendroica discolor</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler <i>Protonotaria citrea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.



Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
 2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
 3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).
-

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location?”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Appendix D
Federal and State Species of Concern
for Greenville County South Carolina

Animals

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
<i>Aneides aeneus</i>	Green Salamander	ARS*: Risk, priority	--	G3G4	S1
<i>Cambarus spicatus</i>	Broad River Spiny Crayfish	ARS*: Risk, priority	--	G3	S3
<i>Condylura cristata</i>	Star-nosed Mole	--	--	G5	S3?
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	--	SE: Endangered	G3G4	S2
<i>Danaus plexippus</i>	Monarch Butterfly	ARS*: Risk, Priority	--	G4	SNR
<i>Distocambarus carlsoni</i>	Mimic Crayfish	ARS*: Risk, priority	--	G2G3	SNR
<i>Eptesicus fuscus</i>	Big Brown Bat	--	--	G5	S5?
<i>Etheostoma brevispinum</i>	Carolina Fantail Darter	--	--	G4	S1
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	--	ST: Threatened	G4T4	SNR
<i>Glyptemys muhlenbergii</i>	Bog Turtle	LT: Threatened	ST-Threatened	G3	S1
<i>Lampropeltis triangulum</i>	Milk Snake	--	--	G5	S2
<i>Lasionycteris noctivagans</i>	Silver-haired Bat	--	--	G3G4	SNR
<i>Lasiurus borealis</i>	Eastern Red Bat	--	--	G3G4	S4S5
<i>Lithobates palustris</i>	Pickerel Frog	--	--	G5	SNR
<i>Microtus pennsylvanicus</i>	Meadow Vole	--	--	G5	S3?
<i>Mustela vison</i>	Mink	--	--	G5	S4

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
Myotis austroriparius	Southeastern Bat	--	--	G4	S1S2
Myotis leibii	Eastern Small-footed Myotis	ARS*: Risk, priority	ST: Threatened	G4	S1
Myotis lucifugus	Little Brown Myotis	--	--	G3	S1S2
Myotis septentrionalis	Northern Long-eared Bat	LT: Threatened	--	G1G2	S1
Napaeozapus insignis	Woodland Jumping Mouse	--	--	G5	S2S3
Neotoma floridana haematorea	Eastern Woodrat	--	--	G5T4Q	S3S4
Parascalops breweri	Hairy-tailed Mole	--	--	G5	S2?
Perimyotis subflavus	Tricolored Bat	ARS*: Risk, priority	--	G2G3	S1S2
Rhinichthys obtusus	Blacknose Dace	--	--	G5	S1
Sorex cinereus	Masked Shrew	--	--	G5	S2
Sorex fumeus	Smoky Shrew	--	--	G5	S4?
Sorex hoyi	Southern Pygmy Shrew	--	--	G5	S3
Spilogale putorius	Eastern Spotted Skunk	--	--	G4	S3
Sylvilagus obscurus	Appalachian Cottontail	--	--	G4	S3?
Tamiasciurus hudsonicus	Red Squirrel	--	--	G5	S3?
Tyto alba	Barn-owl	--	--	G5	S4
Vermivora chrysoptera	Golden-winged Warbler	ARS*: Risk, priority	--	G4	SNA

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
Zapus hudsonius	Meadow Jumping Mouse	--	--	G5	S3?

Plants

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
Acer pensylvanicum	Striped Maple	--	--	G5	S2
Aconitum uncinatum	Blue Monkshood	--	--	G4	S2
Agrimonia pubescens	Soft Groovebur	--	--	G5	S1
Amorpha glabra	Smooth Indigobush	--	--	G4?	S2
Anemone berlandieri	Southern Thimble-weed	--	--	G4?	S1
Arethusa bulbosa	Bog Rose	--	--	G5	SH
Aristolochia macrophylla	Pipevine	--	--	G5	S2
Asplenium pinnatifidum	Lobed Spleenwort	--	--	G4	S1
Asplenium resiliens	Black-stem Spleenwort	--	--	G5	S1
Asplenium rhizophyllum	Walking-fern Spleenwort	--	--	G5	S2
Asplenium trichomanes	Maidenhair Spleenwort	--	--	G5	S2
Betula alleghaniensis	Yellow Birch	--	--	G5	S1
Campanulastrum americanum	Tall Bellflower	--	--	G5	S1
Carex appalachica	Appalachian Sedge	--	--	G4	S1
Carex austrocaroliniana	South Carolina Sedge	--	--	G4	S3
Carex biltmoreana	Biltmore Sedge	--	--	G3	S1
Carex folliculata	Long Sedge	--	--	G5	S1
Carex gracillima	Graceful Sedge	--	--	G5	S2
Carex radfordii	Radford's Sedge	--	--	G3	S3
Castilleja coccinea	Scarlet Indian-paintbrush	--	--	G5	S2
Caulophyllum thalictroides	Blue Cohosh	--	--	G5	S2
Chelone lyonii	Pink Turtlehead	--	--	G4	S2?

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
<i>Chrysosplenium americanum</i>	American Golden-saxifrage	--	--	G5	S1
<i>Cimicifuga americana</i>	Mountain Bugbane	--	--	G4	SNR
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	Enchanter's Nightshade	--	--	G5T5	S3
<i>Cladrastis kentukea</i>	Yellowwood	--	--	G4	S1
<i>Comptonia peregrina</i>	Sweet Fern	--	--	G5	S1
<i>Convallaria majuscula</i>	American Lily-of-the-valley	--	--	G4?	S1
<i>Coreopsis latifolia</i>	Broad-leaved Tickseed	--	--	G3	S1
<i>Cornus racemosa</i>	Stiff Dogwood	--	--	G5	S1?
<i>Cypripedium pubescens</i>	Large Yellow Lady's-slipper	--	--	G5T5	S3
<i>Cystopteris protrusa</i>	Lowland Brittle Fern	--	--	G5	S2
<i>Deschampsia flexuosa</i>	Crinkled Hairgrass	--	--	G5	S1
<i>Diphylleia cymosa</i>	Umbrella-leaf	--	--	G4	S2
<i>Dryopteris intermedia</i>	Evergreen Woodfern	--	--	G5	S2
<i>Eupatorium fistulosum</i>	Hollow Joe-pye Weed	--	--	G5?	SNR
<i>Fothergilla major</i>	Mountain Witch-alder	--	--	G3	S2
<i>Galearis spectabilis</i>	Showy Orchis	--	--	G5	S3
<i>Gaultheria procumbens</i>	Teaberry	--	--	G5	S3
<i>Gymnoderma lineare</i>	Rocky Gnome Lichen	LE: Endangered	--	G3	S1
<i>Hackelia virginiana</i>	Virginia Stickseed	--	--	G5	S1
<i>Helenium brevifolium</i>	Shortleaf Sneezeweed	--	--	G4	S1
<i>Helianthus glaucophyllus</i>	White-leaved Sunflower	--	--	G3G4	S2
<i>Helonias bullata</i>	Swamp-pink	LT: Threatened	--	G3	S1
<i>Hepatica nobilis</i> var. <i>acuta</i>	Liverleaf	--	--	G5T5	S3
<i>Heuchera parviflora</i>	Little-leaved Alumroot	--	--	G4	S2
<i>Hexastylis naniflora</i>	Dwarf-flowered Heartleaf	LT: Threatened	--	G3	S3
<i>Hydrocotyle americana</i>	American Water pennywort	--	--	G5	S1
<i>Hydrophyllum canadense</i>	Blunt-leaf Waterleaf	--	--	G5	S2

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
<i>Impatiens pallida</i>	Pale Jewel-weed	--	--	G5	S1
<i>Isotria medeoloides</i>	Small Whorled Pogonia	LT: Threatened	--	G2?	S2
<i>Juglans cinerea</i>	Butternut	--	--	G4	S3
<i>Juncus gymnocarpus</i>	Naked-fruited Rush	--	--	G4	S3
<i>Juncus subcaudatus</i>	Woods-rush	--	--	G5	S1
<i>Juniperus communis</i>	Ground Juniper	--	--	G5	SNR
<i>Krigia montana</i>	False Dandelion	--	--	G3	S2
<i>Lilium canadense</i>	Canada Lily	--	--	G5	S1
<i>Lonicera flava</i>	Yellow Honeysuckle	--	--	G5?	S2
<i>Lycopodium porophyllum</i>	Rock Clubmoss	--	--	G4	S1
<i>Lycopodium tristachyum</i>	Deep-root Clubmoss	--	--	G5	S1
<i>Lygodium palmatum</i>	Climbing Fern	--	--	G4	S3
<i>Monarda didyma</i>	Oswego Tea	--	--	G5	S2
<i>Monotropsis odorata</i>	Sweet Pinesap	--	--	G3	S2
<i>Ophioglossum vulgatum</i>	Adder's-tongue	--	--	G5	S2
<i>Osmorhiza claytonii</i>	Hairy Sweet-cicely	--	--	G5	S2
<i>Panax quinquefolius</i>	American Ginseng	--	--	G3G4	S4
<i>Parnassia grandifolia</i>	Large-leaved Grass-of-parnassus	--	--	G3	S2
<i>Phacelia bipinnatifida</i>	Fernleaf Phacelia	--	--	G5	S1
<i>Philadelphus hirsutus</i>	Streambank Mock-orange	--	--	G5	S2
<i>Platanthera integrilabia</i>	White Fringeless Orchid	LT: Threatened	--	G2G3	S1
<i>Platanthera lacera</i>	Green-fringe Orchid	--	--	G5	S2
<i>Platanthera peramoena</i>	Purple Fringeless Orchid	--	--	G5	SX
<i>Polygala paucifolia</i>	Gay-wing Milkwort	--	--	G5	S2
<i>Pycnanthemum montanum</i>	Single-haired Mountain-mint	--	--	G3G5	S3
<i>Rhododendron catawbiense</i>	Catawba Rhododendron	--	--	G5	S1

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
Rudbeckia heliopsidis	Sun-facing Coneflower	ARS*: Risk, priority	--	G2	S1S2
Sagittaria fasciculata	Bunched Arrowhead	LE: Endangered	--	G2	S2
Sanicula trifoliata	Large-fruited Sanicle	--	--	G4	S1
Sarracenia purpurea var. montana	Southern Appalachian Purple Pitcherplant	ARS*: Risk, priority	--	G5T1T3	SNR
Sarracenia rubra ssp. jonesii	Mountain Sweet Pitcher-plant	LE: Endangered	--	G4T2	S1S2
Saxifraga careyana	Carey Saxifrage	--	--	G3	S1
Saxifraga micranthidifolia	Lettuce-leaf Saxifrage	--	--	G5	S2
Senecio millefolium	Piedmont Ragwort	--	--	G3	S2
Shortia galacifolia	Oconee-bells	--	--	G3	S3
Silphium terebinthinaceum	Prairie Rosinweed	--	--	G4G5	S1
Sisyrinchium dichotomum	Reflexed Blue-eyed Grass	LE: Endangered	--	G2	S1
Smilax biltmoreana	Biltmore Greenbrier	--	--	G4	S2
Solidago bicolor	White Goldenrod	--	--	G5	S2
Stachys latidens	Broad-toothed Hedge-nettle	--	--	G4G5	S2
Stewartia ovata	Mountain Camellia	--	--	G4	S2
Thermopsis mollis	Soft-haired Thermopsis	--	--	G4?	S1
Tiarella cordifolia var. cordifolia	Heart-leaved Foam Flower	--	--	G5T5	S2
Trautvetteria caroliniensis	Carolina Tassel-rue	--	--	G5	S3
Trichomanes boschianum	Bristle-fern	--	--	G4	S1
Trillium undulatum	Painted Trillium	--	--	G5	S2
Triphora trianthophora	Nodding Pogonia	--	--	G3G4	S2
Tsuga caroliniana	Carolina Hemlock	ARS*: Risk, priority	--	G3	SNR
Viola pubescens var. leiocarpon	Yellow Violet	--	--	G5T5	S2
Xerophyllum asphodeloides	Eastern Turkeybeard	--	--	G4	S2
Xyris torta	Twisted Yellow-eyed-grass	--	--	G5	S1