WEST 526 LOWCOUNTRY CORRIDOR

Appendix L

Natural Resources Technical Memorandum

NOAA Biological Assessment
USFWS Biological Assessment

NOAA & USFWS Consultation

NATURAL RESOURCES TECHNICAL MEMORANDUM

I-526 Lowcountry Corridor West
CHARLESTON COUNTY, SOUTH CAROLINA

PREPARED FOR

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
COLUMBIA, SOUTH CAROLINA

PREPARED BY:

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1.0 INTRODUCTION

This Natural Resources Technical Memorandum (NRTM) was prepared to assist the (SCDOT) and the Federal Highway Administration (FHWA) with developing an Environmental Impact Statement (EIS), regarding proposed infrastructure improvements and widening of Interstate 526 (I-526). Stantec, in cooperation with Civil Engineering Consulting Services (CECS), and other subconsultants (the Project Team), has been contracted by SCDOT to provide environmental services and design plans for the proposed improvements to I-526. This document serves to outline the natural resources and environment within the Project Study Area (PSA) (see Appendix A, Figure 1). This report provides an overall description of the project vicinity, and specifically describes natural resources within the PSA, including wetlands, water resources, plant communities, and protected species.

1.1 Project Description

The proposed I-526 Lowcountry Corridor West project extends approximately 11.4 miles from near Paul Cantrell Boulevard in West Ashley to Virginia Avenue in North Charleston in Charleston County, SC. SCDOT currently ranks the segment of I-526 between I-26 and Virginia Avenue as the most congested segment of interstate highway in the state. The remainder of the I-526 LCC West project, from I-26 to Paul Cantrell Boulevard, ranks among the top ten of the state's existing most congested corridors. Traffic forecasts show that segments of that corridor will continue to be among the state's most congested in 2040. The interchange of I-526 and I-26 is the major source of the congestion.

An EIS is being completed that outlines potential alternatives to satisfy the purpose and need of the project. These alternatives are being assessed to determine the alternative that meets the project needs while also avoiding and minimizing construction impacts on the human and natural environment where feasible. Through various reasonable build alternatives, SCDOT proposes to add two travel lanes in each direction along I-526 and to upgrade the interchange of I-526 and I-26. Improvements to access I-526 from Paul Cantrell Boulevard, North Rhett Avenue, and Virginia Avenue are also proposed.

1.2 Purpose

The purpose of this project is to increase capacity and improve operations at the I-26/I-526 interchange and along the I-526 mainline from Paul Cantrell Boulevard to Virginia Avenue.

1.3 Methodology

Prior to conducting fieldwork, the following materials were referenced:

- U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles. Johns Island, South Carolina (2017); Ladson, South Carolina (2011); and N. Charleston, South Carolina (2011)
- Natural Resources Conservation Service (NRCS) Soil Data Mart, Soil Series Mapping. Charleston

County, South Carolina (1971)

- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Wetlands On-Line Mapper
- NRCS-U.S. Department of Agriculture (USDA) National List of Hydric Soils Database; National List, All States. (Accessed: February 2020)
- South Carolina Department of Natural Resources (SCDNR) LiDAR Digital Elevation Model Dataset. Charleston County, 2007.
- USFWS South Carolina Field Office. Endangered, Candidate, and At-Risk Species. County Listings for Charleston County (Last Updated: December 2018; Accessed: February 2020)
- USFWS Information for Planning and Conservation (IPaC) web tool. Charleston County (Accessed February 2020)
- SCDNR. Rare, Threatened, and Endangered Species and Communities Known to Occur in Charleston County (Last Updated June 2014; Accessed: February 2020)
- SCDNR South Carolina Heritage Trust (SCHT). Geographic Database of Rare, Threatened, and Endangered Species Inventory Species Found in Charleston County (Last Updated January 2006; Accessed: February 2020)
- South Carolina Department of Health and Environmental Control (SCDHEC). Integrated Report for 2016. Part I: *Section 303(d) List of Impaired Waters*
- SCDHEC. Integrated Report for 2018. Part I: *Section 303(d) List of Impaired Waters Draft*
- National Agriculture Imagery Program Aerial Photography. Charleston County (2016)

Following review of available background data, site visits were conducted on several occasions between August to December 2016, January to February 2017, and September 2019 to document the presence of WOUS and to identify and document habitat communities where protected species may occur.

2.0 PHYSICAL RESOURCES

2.1 Land Use

The area surrounding the PSA is a densely populated region to the west of the City of Charleston, South Carolina. Based on the size of this project and the density of development in greater Charleston, the land use with this vicinity varied greatly. The majority of the land within this buffer has been developed for residential, commercial, and industrial uses. Large tracts include the Roper St. Francis Hospital, Limestone College, Charleston International Airport, the Boeing Company manufacturing facility, office parks, and large commercial shopping centers. Several active rail lines are also present in the PSA.

Undeveloped land primarily consists of maintained rights of way, landscaped lawns, wooded forests, and tidal marshes. The Ashley River flows through the PSA and is surrounded by tidal mudflats and vegetated marshes. Filbin Creek and its floodplain parallel and cross through PSA; this area is largely undeveloped forested wetlands.

2.2 Physiography and Topography

2.2.1 Level III Ecoregion

The PSA is located in the Coastal Plain physiographic province of South Carolina, and is specifically situated within the Southern Coastal Plain (75) Level III Ecoregion (Griffith, et al., 2002). The Southern Coastal Plain extends from South Carolina and Georgia through much of central Florida, and along the Gulf coast lowlands of the Florida Panhandle, Alabama, and Mississippi. It appears to be mostly flat plains, but it is a heterogeneous region also containing barrier islands, coastal lagoons, marshes, and swampy lowlands along the Gulf and Atlantic coasts. Once covered by a variety of forest communities that included trees of longleaf pine, slash pine, pond pine, beech, sweetgum, southern magnolia, white oak, and laurel oak, land cover in the ecoregion as a whole is now mostly slash and loblolly pine with oak-gum-cypress forest in some low lying areas, pasture for beef cattle, and urban land uses.

The PSA is further characterized by falling within the Sea Islands / Coastal Marsh (75j) Level IV Ecoregion (Griffith, et al., 2002).

2.2.2 Level IV Ecoregion

The Sea Islands/Coastal Marsh region contains the lowest elevations in South Carolina and is a highly dynamic environment affected by ocean wave, wind, and river action. Mostly organic and clayey soils occur in the freshwater, brackish, and salt marshes. Maritime forests of live oak, red cedar, slash pine, and cabbage palmetto grow on parts of the sea islands, and various species of cordgrass, saltgrass, and rushes are dominant in the marshes.

Based on USGS topographic mapping (see Appendix A, Figure 2), elevations in the PSA range from approximately 5 feet above National Geodetic Vertical Datum (NGVD) to 40 feet NGVD. The PSA drains to numerous waterbodies which include tributaries of the Stono River, Bulls Creek, the Ashley River, Brickyard Creek, Filbin Creek, Turkey Creek, and the Cooper River.

2.3 Geology and Soils

Sediments of the Southern Coastal Plain were deposited during periodic transgressive and regressive cycles caused by sea level fluctuations. Sea level fluctuations were caused, in part, by the expansion and recession of glacial ice caps. Depositions created by fluctuating sea levels formed an uneven land surface that generally decreases in elevation seaward. As a result of these transgressive and regressive cycles, progressively younger sequences of deposits lie nearer the modem coast, and at lower elevations, than older sequences. Pluvial sediments from the Cretaceous and Tertiary periods

overlay pre-Mesozoic basement rocks of the Coastal Plain (Horton and Zullo, 1991).

According to the USDA NRCS Soil Survey of Charleston County (USDA, 1976), nineteen (19) soil map units (SMU) are mapped within the PSA (see Appendix A, Figure 3). The soils mapped within the PSA are depicted in Appendix A. Farmland Classification and Hydric Rating for each SMU is located in Table 1. The Farmland Protection Policy Act (FPPA) of 1981 requires evaluation of farmland conversions to nonagricultural uses. Farmland can be prime farmland, unique farmland, or farmland of statewide importance.

Table 1: Charleston County Soils within Project Study Area

CHARLESTON COUNTY, SOUTH CAROLINA					
Map Symbol	**Map Unit Name**	**Farmland Classification**	**Hydric Rating**	**Acres within PSA**	**Percentage within PSA**
Cg	Capers silty clay loam	Not prime farmland	Hydric soil	25.4	1.5
Cm	Chipley loamy fine sand	Not prime farmland	Not hydric	9.3	0.6
HoA	Hockley loamy fine sand, 0-2 percent slopes	All areas are prime farmland	Hydric soil	49.3	2.9
HoB	Hockley loamy fine sand, 2-6 percent slopes	All areas are prime farmland	Not hydric	4.4	0.3
LaB	Lakeland sand, 0 to 6 percent slopes	Not prime farmland	Not hydric	3.5	0.2
Mp	Mine pits and dumps	Not prime farmland	Not hydric	1.8	0.1
Qu	Quitman loamy sand	Prime farmland if drained	Not hydric	29.8	1.8
Rg	Rutledge loamy fine sand	Not prime farmland	Hydric soil	17.3	1.0
Sa	St. Johns fine sand	Not prime farmland	Hydric soil	3.2	0.2
Se	Santee loam	Farmland of statewide importance	Hydric soil	2.2	0.1
Sm	Seewee complex	Not prime farmland	Not hydric	0.8	0.1
St	Stono fine sandy loam	Farmland of statewide importance	Hydric soil	0.8	0.1
Ts	Tidal marsh, soft	Not prime farmland	Hydric soil	29.1	1.7
UR	Urban land	Not prime farmland	Not hydric	1,354.6	80.9
W	Water	Not prime farmland	Not hydric	36.1	2.2
Wa	Wadmalaw fine sandy loam	Farmland of statewide importance	Hydric soil	52.2	3.1

CHARLESTON COUNTY, SOUTH CAROLINA					
Map Symbol	**Map Unit Name**	**Farmland Classification**	**Hydric Rating**	**Acres within PSA**	**Percentage within PSA**
WgB	Wagram loamy fine sand 0-6 percent slopes	Farmland of statewide importance	Not hydric	19.3	1.2
WoB	Wicksburg loamy fine sand 0-6 percent slopes	Farmland of statewide importance	Not hydric	63	6.6
Yo	Yonges loamy fine sand	Farmland of statewide importance	Hydric soil	34.1	2.0
			SUBTOTALS FOR SOIL SURVEY AREA	**1673.8**	**100.0%**

The following describes the SMUs found within the PSA.

Capers silty clay loam (Cg)-This soil is formed in silty clay to silty clay loam sediments and occurs on tidal flats. All Capers silty clay loam is in marsh grass. It is used for range pasture. It is not suited to crops and wood-land, because of its salt and sulfur content. If this soil is drained it becomes so extremely acid that plants die. This soil constitutes approximately 25 acres within the PSA and is found along Bulls Creek in the southern portion of the PSA.

Chipley loamy fine sand (Cm) - This is a deep, nearly level, moderately well drained to somewhat poorly drained soil that is sandy throughout. This soil is easily friable and easy to work. Most areas are wooded. This soil constitutes approximately 9 acres within the PSA and is located near Ashley Commons Road in the southern portion of the PSA.

Hockley loamy fine sand, 0 to 2 percent slopes (HoA) - This is a moderately well drained, friable, acid soil that contains a moderately fine textured subsoil. It has a high water table. This soil constitutes approximately 49 acres within the PSA and is located near commercial shopping areas in the extreme southern portion of the PSA.

Hockley loamy fine sand, 2 to 6 percent slopes (HoB) - This is a moderately well drained, friable, acid soil. This soil constitutes approximately 4 acres within the PSA and is located along the banks of Bulls Creek in the southern portion of the PSA.

Lakeland sand, 0 to 6 percent slopes (LaB) - This is a deep, acid, nearly level to gently sloping, sandy soil. This soil constitutes approximately 4 acres within the PSA and is located near Savage road in the southern portion of the PSA.

Mine pits and dumps (Mp) - consists of (1) open pits that remain after phosphate rock, soil material, and sand has been removed from the soil and (2) areas where soil material removed during mining operations has been dumped. This soil constitutes approximately 2 acres within the PSA and is located south of Paul Cantrell Boulevard in the southern portion of the PSA.

Quitman loamy sand (Qu) - This is a level, somewhat poorly drained acid soil that has a loamy fragipan in the subsoil. This soil constitutes approximately 30 acres within the PSA and is located south of Paul Cantrell Boulevard in the southern portion of the PSA.

Rutlege loamy fine sand (Rg) - This is a poorly drained to very poorly drained deep soil that is sandy throughout. This soil constitutes approximately 17 acres within the PSA and is located along two drainage features that are perpendicular to I-526 in the southern portion of the PSA.

St. Johns fine sand (Sa) - This is a deep, poorly drained, acid soil that is sandy throughout. This soil constitutes approximately 3 acres within the PSA and is located behind a commercial development in the southern portion of the PSA.

Santee loam (Se) - This is a very poorly drained soil that has a clayey layer in the subsoil. This soil constitutes approximately 2 acres within the PSA and is located near the Citadel Mall in the southern portion of the PSA.

Seewee complex (Sm) - This is a complex of sandy soils. These soils are level and somewhat poorly drained to moderately well drained. Typically, they have a surface layer of loamy fine sand. This soil constitutes less than 1 acre within the PSA and is located near the Citadel Mall in the southern portion of the PSA.

Stono fine sandy loam (St) - This is a level and very poorly drained soil that has a thick black surface layer and a loamy subsoil. This soil constitutes less than 1 acre within the PSA and is located along a drainage in the southern portion of the PSA.

Tidal marsh, soft (Ts) - This a miscellaneous land type occurring on the coast and along tidal streams and rivers between the ocean and the uplands. It is in broad, level, tidal flats that are covered by 6 to 24 inches of salt water at high tide. The surface layer is dark colored soft clay, clay loam, muck, or peat and is saturated. It is covered by salt-tolerant plants, such as black rush and smooth cordgrass. This designation constitutes approximately 29 acres within the PSA and is located along the banks of the Ashley River in the southern portion of the PSA and along the bank of the Cooper River in the eastern portion of the PSA.

Urban Land (UR) – These soils underlay developed sites and may be a mix of native material and fill material. It is difficult to determine characteristics because of the blending of soils. These soils are often suited for development. This soil constitutes approximately 1,355 acres within the PSA and is by far the dominant soil type within the PSA. It can be found throughout the central, northern, and eastern portions of the PSA.

Wadmalaw fine sandy loam (0 to 2 percent slopes) (Wa) - This is a nearly level, poorly drained soil

that is loamy throughout. This soil constitutes approximately 52 acres within the PSA and is located near the Citadel Mall in the southern portion of the PSA.

Wagram loamy fine sand, 0 to 6 percent slopes (WgB) - This is a nearly level, well-drained soil that has a thick sandy surface layer and loamy subsoil. This soil constitutes approximately 19 acres within the PSA and is located near Paul Cantrell Boulevard in the southern portion of the PSA.

Yonges loamy fine sand (Yo) - This is a level, deep, poorly drained soil that has a loamy to clayey subsoil. Surface runoff is slow, and ponding occurs during rainy periods. This soil constitutes approximately 34 acres within the PSA and is located south of the Ashley River in the southern portion of the PSA.

The project would have both short-term construction-related impacts as well as long-term operational impacts on soils in the PSA; however, these impacts are not considered substantial.

Some areas of the PSA have been previously disturbed due to phosphate mining. In these areas, native soils, and phosphate rock were manually or mechanically stripped away. This mining activity left a landscape with a ridge and swale topography that was devoid of all vegetation. The areas re-vegetated with shrubs and trees that grew well on the ridges left on the land. The swales left over from the mining activities tended to accumulate water due to the hydrologic alteration and restricted or impeded water flow.

This phosphate mining occurred in the late 19th, early 20th century but continues to affect the site today. The low swales in which the phosphate was removed mimic true wetlands in that they may support hydrophytic vegetation and are subject to inundation by surface water or groundwater. Residual exposed phosphate could leach excess phosphorus into exposed waters. These particular wetlands share hydrologic connectivity downstream to Filbin Creek (USGS, 2016).

2.4 Water Resources and Water Quality

2.4.1 SCDHEC Water Classifications

SCDHEC has classified the waterbodies (streams and rivers) of South Carolina based on the desired uses of each waterbody. SCDHEC has established standards for various parameters to protect all uses within each waterbody classification. Waterbody classifications are set out in South Carolina Regulation 61-68 (R.61-68), Water Classifications and Standards. All waters of South Carolina are classified even if they are not specifically named or listed in R.61-69. Waters not listed are assigned the classification of the receiving waterbody to which they flow. Waters classifications in the PSA are shown in Appendix A, Figure 4.

2.4.2 Shellfish Harvesting

SCDHEC administers the Shellfish Sanitation Program is to ensure that shellfish (oysters, clams, and mussels) and the areas from which they are harvested meet the health and environmental quality standards provided by federal guidelines and state regulations. South Carolina currently has 25 management areas comprising approximately 578,000 surface acres of estuarine and coastal riverine habitat suitable for the cultivation and harvest of molluscan shellfish. These management areas are assigned water quality classifications for the primary purpose of public health protection. SCDHEC uses combinations of the following harvesting classifications for shellfish area management:

Approved areas are those that are normally open for the direct marketing of shellfish for human consumption. Approved areas must not exceed an established water quality standard.

Conditionally Approved areas are those that meet criteria for an Approved classification except under predictable conditions. Closure criteria and subsequent re-opening procedures are described in an area-specific management plan. Conditions that normally result in these temporary closures are often rainfall-induced (non-point source runoff or excessive river levels/flows).

Restricted areas are those that exceed "approved" area water quality standards and are normally closed for direct harvesting activities but where harvesting may be allowed by special permit. Shellfish from these areas are frequently relocated to "approved" areas where they remain planted for a period of time adequate to allow natural cleansing.

Prohibited areas are those that are administratively closed for the harvesting of shellfish for any purposes related to human consumption. These closures are established adjacent to permitted wastewater discharges, marina facilities, or areas containing multiple point sources of pollution. This classification is not based upon violation of a bacteriological standard.

A large portion of the PSA is within Shellfish Growing Area 10B (see Appendix A, Figure 5). This area encompasses the Charleston Harbor, Ashley River, Cooper River, and their tributaries that support shellfish. Waters within this management area in the PSA have been given the classification of "prohibited" and as such, these areas are closed to all human consumption.

The extreme southern portion of the PSA, lies within Shellfish Growing Area 11. This area encompasses the Stono River, Wallace River, Wapoo Creek, Kiawah River, Seabrook Island and Kiawah Island. This management area has been given the classification of "restricted" and as such, waters are closed for direct harvesting without a special permit.

2.4.3 River Basins

The US Geological Society (USGS) categorizes drainages areas by specific numbers, or hydrologic unit codes (HUC). Sub river basins within larger river basins are given an eight-digit HUC (i.e. 03050201).

Ten-digit HUCs are also provided for watersheds within 8-digit HUCs (i.e. 03050201-07). In South Carolina, SCDHEC divides South Carolina into eight major river basins. The proposed PSA is located entirely within the Santee River Basin.

The Santee River Basin, located immediately south of the Pee Dee and north of the Edisto River Basin, extends through a central portion of the Atlantic Coastal Plain of eastern South Carolina. The Santee River Basin is subdivided into sub-basins and the PSA is predominantly located within the Cooper River sub-basin (HUC 03050201). The extreme southern portion of the PSA extends into the Stono River sub-basin (HUC 03050202).

The Cooper River sub-basin is located in Berkeley, Charleston and Dorchester Counties and encompasses approximately 1,545 square miles within South Carolina. Of the approximately 1 million acres of the Cooper River Sub-basin, 35.5% is forested land, 25.8% is forested wetland, 13.5% is urban land, 10% is open water, 8.0% is non-forested wetland 6.6% is agricultural land, and 0.6% is barren land. The urban land is comprised chiefly of the greater City of Charleston area.

There are a total of 2,037.2 stream miles in the Cooper River sub-basin, together with 60,829.1 acres of lake waters and 29,134.6 acres of estuarine areas. The diverted Santee River flows into Lake Moultrie, out of the Lake Moultrie Pinopolis Dam, along the Tailrace Canal, and joins with Biggin Creek to form the West Branch Cooper River. The West Branch Cooper River then converges with the East Branch Cooper River at "The Tee" to form the Cooper River. The Cooper River then accepts drainage from the Back River, Goose Creek, the Wando River, and the Ashley River before flowing into Charleston Harbor and the Atlantic Ocean.

2.4.4 Watersheds

The Cooper River and Stono River Sub-Basins are further divided into watersheds. Of these, the PSA is located within the Stono River Watershed (03050202-02), the Ashley River Watershed (HUC 03050201-06), and the Cooper River Watershed (03050201-07) (see Appendix A, Figure 6).

The Stono River watershed is located in Charleston County, consists primarily of the Stono River and its tributaries. The watershed occupies 97,672 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. Land use/land cover in the watershed includes: 29.1% forested land, 23.4% nonforested wetland, 16.4% forested wetland, 12.8% urban land, 9.5% water, 7.7% agricultural land, and 1.1% barren land. Within the PSA, the Stono River Watershed extends from approximately 2,800 feet (0.5 mile) north of US Highway 17 to 1,800 feet (0.3 mile) north of Paul Cantrell Boulevard. While this area does not include USGS named features within the PSA, several streams and wetlands are present in the PSA in the Stono River Watershed, including forested wetlands, emergent wetlands, tidal influenced streams, and freshwater streams.

The Ashley River Watershed is located in Berkeley, Charleston, and Dorchester Counties and consists

primarily of the Ashley River and its tributaries. The watershed occupies 86,887 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. Land use/land cover in the watershed includes: 43.3% urban land, 20.0% forested land, 19.5% forested wetland, 9.4% nonforested wetland, 4.9% water, 2.5% agricultural land, and 0.4% barren land. Within the PSA, the Ashley River Watershed approximately extends 1,800 feet (0.3 mile) north of Paul Cantrell Boulevard, north across the Ashley River, to 2,500 feet (0.5 mile) north of International Boulevard. It includes portions of two USGS-named water bodies including the Ashley River and Bulls Creek. Several streams and wetlands are present in the PSA in the Ashley River Watershed, including forested wetlands, emergent wetlands, tidally influenced streams, and freshwater streams.

The Cooper River Watershed is located in Berkeley, Charleston, and Dorchester Counties and consists primarily of the Cooper River and its tributaries draining into the Charleston Harbor. The watershed occupies 206,457 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. Land use/land cover in the watershed includes: 26.9% forested land, 25.9% urban land, 20.3% forested wetland (swamp), 10.5% nonforested wetland (marsh), 10.3% water, 4.6% agricultural land, and 1.5% barren land. Within the PSA, this watershed extends from approximately to 2,500 feet (0.5 mile) north of International Boulevard and branches off in diverging directions towards I-26 and east to the Cooper River. The area of the Cooper River Watershed within the PSA terminates to the north at the Eagle Drive overpass and to the east at the Cooper River. It includes portion of two USGS-named features, Turkey Creek and Filbin Creek. Several streams and wetlands are present in the PSA in the Cooper River Watershed, including forested wetlands, emergent wetlands, tidally influenced streams, and freshwater streams.

2.4.5 303(d) List of Impaired Waters

In accordance with Section 303(d) of the Clean Water Act (CWA), SCDHEC evaluates water bodies identified as impaired from pollutants for appropriate inclusion on the Section 303(d) list. The 303(d) list is a State list of waters that are not meeting water quality standards or have impaired uses. The 303(d) list targets water bodies that do not meet water quality standards set for the state for water quality management, as well as identifying the cause(s) of the impairment and the designated classifications. The current 303(d) List of Impaired Waters was approved in 2016. An updated 303(d) List of Impaired Waters has been proposed as of 2018. As of January 24, 2020, adjustments have been made to the draft 2018 303(d). Since the initial public notice of the proposed updated list in 2018, SCDHEC has determined that some of the 303(d) impaired waters and waters of concern have changed. These changes are the result of an assessment of data using updated calculations for instream metals criteria. An addendum to the draft list is being made available for public comment for a period of thirty-one days, from January 27, 2020 – February 26, 2020. This report includes the currently listed waters from the 2016 approved list and if later available, should be updated following the approval of the modified 2018 list.

According to SCDHEC's 2016 Section 303(d) list and the draft 2018 303(d) list, there are two monitoring stations listed within or just upstream of the PSA (Figure 6). MD-249 is located within the PSA along Filbin Creek. At this station recreational use is not supported in Filbin Creek due to elevated levels of *Enterococcus* bacteria. *Enterococcus* is a large genus of bacteria that can be harmful when found in elevated levels in water (SCDHEC 2016, 2018).

Monitoring station MD-049 is located upstream of the PSA, along the Ashley River. At this station recreational use is not supported in due to elevated levels of *Enterococcus* bacteria. Additionally, aquatic life uses are not supported at MD-049 based on pH and turbidity. The term pH is a measure of the hydrogen ion concentration of water, and is used to indicate degree of acidity. The pH scale ranges from 0 to 14. A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic. Low pH values are found in natural waters rich in dissolved organic matter, especially in coastal plain swamps and black water rivers. The tannic acid released from the decomposition of vegetation causes the tea coloration of the water and low pH. High pH values in lakes during warmer months are associated with high phytoplankton (algae) densities. Turbidity is an expression of the scattering and absorption of light through water. The presence of clay, silt, fine organic and inorganic matter, plankton, and other microscopic organisms increases turbidity. Increasing turbidity can be an indication of increased runoff from land. It is an important consideration for drinking water there are turbidity limits for water for consumption. Recreation is only partially supported at this same site (MD-049), based on elevated fecal coliform levels. A fish consumption advisory due to elevated mercury levels in certain types of fish is in place for the Ashley River, including the area at the I-526/General William C. Westmoreland Bridge and northwards/upstream of the project to SC 165.

2.4.6 Total Maximum Daily Loads

Once a site is included on the 303(d) list of impaired waters, a Total Maximum Daily Load (TMDL) must be developed. TMDL is the amount of a single pollutant (e.g., bacteria, nutrients, metals) that can enter a waterbody on a daily basis and still meet water quality standards set forth by SCDHEC. "TMDL" refers to both a calculation of a pollutant entering a waterbody as well as a document that incorporates the calculation along with source assessments, watershed, land use information, pollutant reductions and allocation information, implementation and additional relevant information, maps, figures and pictures. TMDLs are a requirement found in Section 303(d) of the CWA.

TMDLs are calculated by adding all point and nonpoint sources for the pollutant which leads to the impairment. After a TMDL is calculated, the amount of load entering from point and nonpoint sources is compared to the water quality standards for that waterbody. The total loading is reduced to the levels where the water quality standards can be met. This reduced loading is then divided among all the point and nonpoint sources.

The goal of a TMDL is to identify potential pollution sources, calculate and quantify the reduction of those sources, and provide general implementation information needed to meet water quality standards and improve water quality. After the approval of the TMDL, an implementation plan can be developed to realize the goals of the written TMDL document. Implementation of a TMDL has a potential to reduce sources of pollution within a watershed and a potential to restore the full use of the waterbody.

A TMDL has been developed for the Charleston Harbor, Cooper, Ashley, and Wando Rivers and approved by the EPA to identify opportunities to increase dissolved oxygen (DO) in the watershed. Many coastal waters in South Carolina have DO levels below the established DO criteria. Wastewater dischargers and other anthropogenic influences may contribute to low DO in coastal waters. Natural factors such as organic loading and reduced oxygen levels from wetlands and marshes and estuarine dynamics in the mixing zone where freshwater and saltwater come together can create naturally low DO conditions. The waters in and around Charleston Harbor are considered to be both naturally low in DO and further impacted by wastewater dischargers. Potential sources of oxygen demand loading that were considered include National Pollutant Discharge Elimination System (NPDES) wastewater discharges (continuous point sources), NPDES stormwater discharges (noncontinuous point sources), non-point sources, and natural background sources.

2.4.7 National Pollutant Discharge Elimination System

Point source discharge means a discharge which is released to the waters of the State by a discernible, confined and discrete conveyance, including but not limited to a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel, or other floating craft from which waste is or may be discharged. The NPDES Permit Program was created by Section 402 of the CWA. In 1975, the Bureau of Water received authority from the EPA to administer the NPDES Permit Program in South Carolina. The SCDHEC Bureau of Water is responsible for the permitting, compliance, monitoring and enforcement activities of the program.

Persons with point source discharges to surface waters are required to have NPDES permits. Typical regulated point source discharges are:

- discharges from wastewater treatment systems owned by municipalities, industries, private utilities, State and Federal government, etc.;
- discharges such as cooling water, boiler blow down, etc.;
- storm water discharges from municipal separate storm sewer systems (MS4s);
- storm water discharges associated with industrial activity; and,

- Storm water dischargers from construction sites.

According to the Water Quality Assessment Report for the Santee River Basin (SCDHEC, 2013) and the SC Watershed Atlas (SCDHEC, 2018), six NPDES major discharge permitted facilities are authorized directly in, or within close proximity to the PSA (Figure 6). One is in the PSA and the remaining five are located north and south of the PSA.

- Kapstone Charleston Craft, LLC (SC0001759) holds a permit to discharge as a paperboard mill. This is located just north of Filbin Creek within the PSA and a second site is located just outside of the PSA.

Five NPDES major discharge permits have been issued for areas near to (within 2.5 miles), but outside of the PSA. These sites are all associated with the industrial area along the west side of the Cooper River to the north and south of the PSA.

- Kapstone Charleston Craft, LLC (SC0001759) holds an additional permit to discharge as a paperboard mill on the west side of the Cooper River.

- Buckeye Terminal (SC0002852) holds a permit to discharge as a petroleum bulk station and/or terminal along the west side of the Cooper River.

- Delfin Group USA, LLC (SC0003026) holds a permit to discharge as a lubricating oils/greases facility. This location is along the west side of the Cooper River, outside of the PSA.

- Detyens Shipyard (SC0047562) holds a permit as a ship building and repairing site along the west side of the Cooper River, outside of the PSA.

- Seacrest Marine Holdings, LLC (SC0048518) holds a permit as a ship building and repairing site along the west side of the Cooper River, outside of the PSA.

According to the Water Quality Assessment Report for the Santee River Basin (SCDHEC, 2013) and the SC Watershed Atlas (SCDHEC, 2018), six NPDES General Permits have been issued within or near the PSA (Figure 6).

- One NPDES General Permit has been issued to Defense Fuel Support (SCG340022) to discharge as a petroleum bulk station and/or terminal. This discharge location is situated within the PSA near Virginia Avenue.

Five NPDES discharge General Permits have been issued for areas near to (within 2.5 miles), but outside of the PSA.

- Kinder Morgan Bulk Terminal (SCG340015) holds a General Permit to discharge as a petroleum bulk station and/or terminal. This location is along a CSX railroad near the Cooper River.

- Buckeye Terminal (SCG340026) holds a General Permit to discharge as a petroleum bulk station and/or terminal along the west side of the Cooper River.

- Charleston Airforce Base Pipeline Site (SCG830031) holds a General Permit to discharge near Turkey Creek, just west of I-26.

- The Boeing facility (SCG250270) holds a permit to discharge as an aircraft facility. This is a General Permit and represents two discharge locations. Neither discharge location is within the immediate PSA.

2.4.8 Water Quality Summary

SCDHEC's Watershed and Water Quality Information was reviewed through an online query in February 2020. A TMDL for DO has been established within Charleston Harbor, Cooper, Ashley, and Wando Rivers (Stations MD-115, MD-264, CSTL-102, MD-049, RT-032046, MD-052, RO-09363, CSTL-085, and MD-152, portions of HUC 03050201), as stated in the Basinwide Watershed Water Quality Assessment Report for the Santee River Basin (SCDHEC, 2013). Please see Appendix B for a copy of the SCDHEC Watershed and Water Quality Information Reports.

The proposed project is not anticipated to contribute to these impairments or have long term impacts on water quality within the watershed; however, due to the existing water quality impairments and approved TMDL within watershed 03050201, SCDHEC may require additional water quality protection and stormwater treatment measures during and after construction.

During construction activities, temporary siltation may occur in adjacent waters and erosion may be of a greater degree than presently occurring. Recommendations would be set forth that the contractor minimize this impact through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and S.C. Code of Regulations 72-400. SCDOT has also issued an Engineering Directive Memorandum (Number 23), dated March 10, 2009, regarding Department procedures to be followed in order to ensure compliance with S.C. Code of 72-400, Standards for Stormwater Management and Sediment Reduction. Exposed areas may be stabilized by following the Department's Supplemental Technical Specification for Seeding (SCDOT Designation: SC-M-810-4(07/17)).

3.0 BIOTIC RESOURCES

The PSA comprises a long, linear corridor that traverses numerous types of habitats and human

influenced areas.

Specific surveys for commonly occurring wildlife species were not conducted; however, wildlife readily observed and documented during the field reviews, or those likely to occur within the PSA, are summarized below.

Common bird species either observed during field reviews or known to occur within the PSA include Carolina chickadee, northern mockingbird, blue jay, northern cardinal, brown thrasher, common grackle, American crow, American goldfinch, American robin, eastern towhee, Carolina wren, eastern bluebird, chipping sparrow, red-bellied woodpecker, barred owl, red-tailed hawk, red-shouldered hawk, turkey vulture, and osprey. Wading birds and waterfowl include Canada goose, Muscovy duck, mallard, great egret, green heron, and great blue heron.

Some crayfish, common fishes, and other aquatic organisms were readily observed in the PSA in both brackish and freshwater areas. Those species, as well as others that are likely to be present in the PSA include marsh fiddler crab, periwinkle snail, eastern mudsnail, mosquito fish, channel catfish, sailfin molly, bluegill, silver perch, Atlantic menhaden, and bay anchovy.

There are many common reptile and amphibian species that could occur in the PSA including American alligator, green tree frog, various leopard frog species, skink, Carolina anole, eastern glass lizard, eastern garter snake, eastern king snake, black racer, pond sliders, eastern box turtle, snapping turtle, and American toad.

Common mammal species likely to occur in the PSA include white-tailed deer, striped skunk, river otter, raccoon, bats, cotton mouse, opossum, eastern gray squirrel, and eastern cottontail rabbit.

The majority of PSA is comprised of existing roadway. Areas which are not developed were classified based upon vegetation and land form types. Vegetative terrestrial communities within the PSA were distinguished by dominant plant species and community types, location in the landscape, past disturbances, and hydrologic characteristics. Only those habitats which were located directly within the PSA are characterized. The PSA was examined through current and historical Google Earth imagery, USDA ortho imagery, and USGS topographic maps to discern areas with similar signatures, and the data were verified and classified through on-site field review. Essential Fish Habitat (EFH) is also present within the PSA and is addressed in a separate document. A brief summary of the habitat communities found within the PSA is as follows:

3.1 Habitat Types

3.1.1 Maintained Development

Maintained developments were classified as areas or regions which have altered the native state of the land for consumptive human use. Man-maintained and disturbed communities within the PSA

also include roadside shoulders and utility rights of way. Most of the naturally-occurring plants associated with these maintained or disturbed communities have been eliminated and/or replaced with cultivated grasses or taken over by naturally occurring opportunistic species characteristic of disturbed areas. These areas encompassed land uses such as residential homes, commercial developments, roadway surfaces, and parking lots. Most of the disturbed roadway edges are comprised of herbaceous species and sparse shrubs, including various grasses such as common fescue (*Festuca sp*.), ryegrass (*Lolium perenne*), bahia grass (P*aspalum notatum*), and bluegrass (*Poa sp*.).

3.1.2 Mixed Pine/Hardwood Forest

Mixed pine/hardwood forest is a dominant community type located throughout the majority of the PSA. Dominant vegetation consists of pine species including loblolly pine (*Pinus taeda*), long-leaf pine (*Pinus palustris*) and pond pine (*Pinus serotina*). Hardwood species observed include sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), water oak (*Quercus nigra*), and tulip poplar (*Liriodendron tulipifera*). Smaller hardwood/ sapling species include eastern red cedar (*Juniperus virginiana*), American holly (*Ilex opaca*), and wax myrtle (*Morella cerifera*). Groundcover and vine strata include saw palmetto (*Serenoa repens*), blueberry (*Vaccinium sp.*), greenbrier (*Smilax sp.*), and partridge berry (*Michella repens*).

3.1.3 Scrub/ Shrub

These areas are characterized as being cleared within the past five years. They do not have the established species found in the mixed hardwood forest but are not frequently mowed like roadsides and lawns. Notable areas include dry drainages, areas beneath overpasses and interchanges, and spaces that have been maintained in the past but have been allowed to lie fallow. These communities often include ruderal species and non-native species. These species tend to be more widespread and occupy numerous habitat types. These areas include an early diverse array of herbaceous species within the initial phases of disturbance and transition towards the climax community, replacing primary colonizers. Species observed include sweetgum, Chinese tallow tree (*Triadica sebifera*), blackberry (*Rubus sp.*), eastern baccharis (*Baccharis halimifolia*), Chinese privet (*Ligustrum sinense*), Autumn olive (*Eleagnus umbellata*), honey suckle (*Lonicera japonica*), and broomsedge (*Andropogon sp.*).

3.1.4 Bottomland Hardwood Forest

Bottomland hardwood forest are present in small locations within the limits of the PSA. These areas are confined to the floodplain zones of creeks and perennial tributaries where out of bank flooding seasonally inundates benches and terraces. These areas are typically mapped within flood zones of waterways. This community type within the PSA is comprised of dominant vegetation of hardwood tree species that includes red maple, tulip poplar, sweetgum, and water oak. Mid canopy species

comprise a low density layer of younger individuals where gaps within the upper canopy allow for sunlight to penetrate. Shrub components within the community may be comprised of Chinese privet and giant cane (*Arundinaria gigantea*). Herbaceous ground cover is sparse to bare, with a dense duff layer holding moisture within the soil column for extended periods.

3.1.5 Tidal Wetlands

The tidal wetland communities are characterized by being periodically inundated in correlation with ocean tides. Within the PSA these areas were noted within SCDHEC OCRM critical areas. Soils consist of soft organics and alluvial deposits and support a variety of herbaceous vegetation. Species observed include smooth cordgrass (*Spartina alterniflora*), black needlerush (*Juncus roemerianus*), and saltmeadow cordgrass (*Spartina patens*), occurring in tidally flooded areas. Along the banks, eastern baccharis and wax myrtle were observed.

3.1.6 Brackish Marsh

Brackish marshes are representative of an estuarine transition zone where a mixture of fresh and saltwater occurs, resulting in brackish water with lower salinity levels, and thereby allowing the presence of both fresh and saltwater plant species. Other species that may be found in the brackish marsh community include big cordgrass (*Spartina cynosuroides*), narrow-leaf cattail (*Typha angustifolia*), saltmeadow cordgrass, bulrush (*Scirpus spp.*), salt grass (*Distichlis spicata*), annual wildrice (*Zizania aquatica*), and Jamaica sawgrass (*Cladium mariscus*).

3.1.7 Freshwater Herbaceous Wetlands

This habitat type does not support woody vegetation but is characterized by a mix of herbaceous species often growing in standing or perennially moist soils. These areas are not tidally influenced and within the project area were commonly noted along margins of larger water bodies or as stormwater retention areas. Cattail, wool grass (*Scirpus*), sedges (*Carex* sp.), rushes (*Juncus* sp., *Eleocharis* sp.) were common in these areas. Margins of these open areas are often lined with sapling woody species such as alder (*Alnus serrulata*), birch (*Betula nigra*), and willow (*Salix nigra*).

3.1.8 Forested Wetlands

This is the most common wetland type throughout the site. These features have hydric soils and may or may not have evidence of periodic standing surface water. Canopy species are mixed hardwood with a sapling and shrub stratum. Ground cover may or may not be present. Notable species include: sweet gum, red maple and southern magnolia (*Magnolia grandiflora*) as canopy species with water oak, yaupon (*Ilex vomitoria*) and cabbage palmetto (*Sabal palmetto*) composing a sampling stratum. Shrubs include Chinese privet, fetterbush (*Lyonia lucida*), and giant cane. Herbaceous species include rushes, and a mix of sedges. Vines such as greenbrier and honey suckle were often observed in this habitat type.

3.1.9 Cypress-tupelo Wetlands

This is a mature forested habitat type characterized by an overstory of bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*). Other species present include swamp tupelo (*Nyssa biflora*), red maple, swamp cottonwood (*Populus eterophylla*), and Carolina ash (*Fraxinus caroliniana*). Shrub and herbaceous layers are less diverse or absent. This habitat type is open and may have standing water for all or part of the year.

3.1.10 Open Freshwater

Open freshwater communities within the PSA include man-made ponds and naturalized borrow pits. These areas typically consist of open, deepwater within the central portion and vegetated, shallow water along the outer portion. Several man-made freshwater ponds exist throughout the study area and are usually hydrologically connected to other wetlands, streams, and ditches. Plant species common to the shallow, vegetated portions of the ponds and borrow pits include black willow, wax myrtle, duckweed (*Lemna* sp.), and various species of cattail.

4.0. WATERS OF THE U.S.

4.1 Waters of the U.S. Regulations

Waters of the U.S. (WOUS) are defined by 33 CFR 328.3(b) and protected by Section 404 of the CWA (33 U.S.C. 1344), which is administered and enforced in South Carolina by the USACE, Charleston District. The term "waters of the U.S." is defined in 33 CFR Part 328 as:

1. All waters which are currently used, or 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. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    - which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    - from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    - which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;

5. Tributaries of waters identified in paragraphs 1 – 4 above;
6. The territorial seas; and
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in 1 – 6 above.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not WOUS. WOUS do not include 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 CWA, the final authority regarding CWA jurisdiction remains with the EPA.

Wetlands are defined as those 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 generally include swamps, marshes, bogs, and similar areas. Wetlands are defined in the field as areas that display positive evidence of three environmental parameters including dominance of hydrophytic vegetation, wetland hydrology, and hydric soils (USACE, 1987).

The USACE Charleston District regulates WOUS, including wetlands in South Carolina. The USACE's authority to regulate impacts to WOUS comes from Section 404 of the CWA. The USACE utilizes specific hydrologic, soil, and vegetation criteria in establishing the boundary of wetlands within their jurisdiction. In addition to wetlands, the USACE defines WOUS within CWA as Traditional Navigable Waters (TNWs) – including territorial seas and surface waters that flow to TNWs. Impoundments of these waters (ponds, lakes, and reservoirs) are also considered to be WOUS.

SCDHEC also has jurisdiction over WOUS in South Carolina. SCDHEC's regulatory authority derives from Section 401 of the CWA. A Section 401 water quality certification from SCDHEC is required whenever a project needs a federal license or permit for an activity that may result in a discharge to a navigable water or other WOUS. In South Carolina, the SCDHEC Ocean and Coastal Resource Management (OCRM) is the regulatory agency responsible for implementing the Coastal Zone Management Act and the South Carolina Coastal Tidelands and Wetland Act of 1977, which was enacted by the state to protect, preserve, restore and enhance the coastal resources of South Carolina. OCRM's objective is to manage wetland alterations, stormwater and land disturbance activities, and alterations to tidally influenced critical areas. Critical area is defined by the SCDHEC OCRM as any of the following: 1) coastal waters; 2) tidelands; 3) beach/dune systems; and 4) beaches. The PSA contains WOUS that are defined as "critical area". Critical Area plats that have been approved by SCDHEC OCRM are included in Appendix A, Figure 7.

4.2 Aquatic Resources

Following review of available background data, site visits were conducted on several occasions between August to December 2016, January to February 2017, and September 2019 to document the potential of WOUS, including wetlands. WOUS were determined using the Routine On-Site Determination Method as outlined by the USACE Wetland Delineation Manual (USACE 1987) and the Atlantic and Gulf Coastal Plain Region Regional Supplement, Version 2.0. Limits of stream boundaries were determined through identification of characteristics as outlined through Regulatory Guidance Letter 05-05. Delineated WOUS were identified and the boundaries demarcated with orange flagging tape with alpha and numeric labels for unique identification. The delineated boundaries of potential jurisdictional waters were spatially recorded utilizing a Trimble GeoXH 7 handheld GPS with Hurricane antennae for sub-meter accuracy. The GeoXH 7 settings used included a PDOP of 4.0, an elevation mask of 15-degrees and a minimum SNR of 33.0. GPS coordinates were validated using Trimble Pathfinder Office and analyzed through ESRI ArcGIS 10.6.1 software. Additional investigations may be necessary if the PSA is altered or expanded.

In addition, field surveys identified and documented habitat communities within the PSA where protected species may occur.

Surveyors from Davis and Floyd were tasked with taking survey points at each flag and developing a Critical Area plat and line file of WOUS.

The USACE was provided a preliminary jurisdictional determination (PJD), which identifies the locations and boundaries of wetlands and other aquatic resources on-site that are presumed to be the subject of regulatory jurisdiction (see Appendix A, Figure 8). The USACE approved the PJD on October 31, 2019 (see Appendix C).

4.2.1 Wetlands

A total of 86 areas were identified within the PSA during site reviews which met the criteria for classification as wetlands. Wetlands were classified based upon type of hydrophytic species present, percentage of cover within the recorded data point, and proximity to saline environment. Wetland types identified within the PSA include palustrine emergent wetlands, palustrine forested wetlands, and estuarine wetlands.

4.2.1.1 Palustrine Emergent Wetlands

Field surveys identified fifteen areas (15) encompassing 120.05 acres exhibiting ecological characters consistent for designation as palustrine emergent wetland communities (Table 2). Palustrine wetlands are those that are not tidally influenced. Typical vegetation within these wetlands typically consisted of facultative wetland species including sedges, rushes, and other grasses.

Table 2: Palustrine Emergent Wetlands Identified in the PSA

PALUSTRINE EMERGENT WETLANDS	
Wetland Identification	**Acreage**
Wetland FA-2	0.49
Wetland FB-1	0.17
Wetland FH-1A	2.32
Wetland FL-2	0.03
Wetland FQ-1A	0.56
Wetland FQ-1B	0.36
Wetland FS-1	0.05
Wetland FS-2A	0.24
Wetland FT-1	0.12
Wetland FT-2	1.49
Wetland FU-2	0.02
Wetland FV-1	113.72
Wetland WWAB	0.09
Wetland WWAA	0.17
Wetland WAB	0.21
Total	**120.05ac**

4.2.1.2 Palustrine Forested Wetlands

Field surveys identified fifty-nine (59) areas encompassing 111.79 acres exhibiting ecological characters consistent for designation as palustrine forested wetland communities (Table 3). Typical vegetation within these communities included oak trees, maple trees, gum trees, and elm trees.

Table 3: Palustrine Forested Wetlands Identified in the PSA

PALUSTRINE FORESTED WETLANDS	
Wetland Identification	**Acreage**
Wetland FA-1	0.06
Wetland FA-3A	0.04
Wetland FA-3B	0.11
Wetland FB-2	0.93
Wetland FB-3	0.95
Wetland FC-1	3.50
Wetland FD-1	0.12
Wetland FE-1	4.47

PALUSTRINE FORESTED WETLANDS	
Wetland Identification	**Acreage**
Wetland FF-1	0.75
Wetland FF-2	0.25
Wetland FF-3	0.86
Wetland FG-1	0.50
Wetland FG-2	0.08
Wetland FH-1B	0.23
Wetland FH-2	0.42
Wetland FI-1	0.42
Wetland FI-2	0.18
Wetland FI-3	1.04
Wetland FJ-1	0.67
Wetland FK-1	0.47
Wetland FM-1	0.25
Wetland FN-1	3.40
Wetland FN-2	1.28
Wetland FN-3	0.53
Wetland FN-4	0.68
Wetland FO-1	2.33
Wetland FO-5	24.77
Wetland FO-6	0.99
Wetland FO-7	1.52
Wetland FP-1	12.98
Wetland FP-5	0.31
Wetland FP-8	5.58
Wetland FR-1	0.11
Wetland FR-2	0.05
Wetland FS-2B	1.38
Wetland FV-1A	10.60
Wetland FW-1	0.44
Wetland FW-2	0.61
Wetland FW-6	0.18
Wetland FW-8	0.21
Wetland WWA	0.22
Wetland WWD	0.17
Wetland WAD	0.21
Wetland WWC	0.12

Palustrine Forested Wetlands	
Wetland Identification	**Acreage**
Wetland WWB	1.13
Wetland WRAR	0.26
Wetland WRV	4.81
Wetland WAE	2.54
Wetland WTA	0.95
Wetland WJV	2.08
Wetland WJY	1.35
Wetland WJU	0.28
Wetland WRS	2.52
Wetland WRU	1.53
Wetland WJX	0.91
Wetland WJT	0.09
Wetland WTZ	0.29
Wetland FU-1	7.93
Wetland FZ-1	0.12
Total	**111.79**

4.2.1.2 Palustrine Scrub Shrub Wetlands

Field surveys identified one (1) area encompassing 3.02 acres exhibiting ecological characters consistent for designation as a scrub shrub wetland (identified as Wetland WAC). Typical vegetation within this community comprised species such as myrtle trees, maple trees, gum trees, and privets.

4.2.1.2 Estuarine Emergent Wetlands

Field surveys identified nine (9) areas encompassing 90.27 acres exhibiting ecological characters consistent for designation as estuarine emergent wetland communities (Table 4). Typical vegetation within these communities included saltmarsh cordgrass, black needlerush, salt grass, and groundsel bush. These are tidally influenced waters and subject to Section 10 permitting by USACE.

Table 4: Estuarine Emergent Wetlands Identified within the PSA

Estuarine Intertidal Emergent Wetlands	
Wetland Identification	**Acreage**
Wetland CW-1B	0.35
Wetland CW-1C	5.88
Wetland CW-1E	0.64
Wetland CW-2H	16.43
Wetland CW-1L	3.76

Estuarine Intertidal Emergent Wetlands	
Wetland Identification	**Acreage**
Wetland CW-1J	2.30
Wetland CW-2C	3.00
Wetland CW-1G	1.86
Wetland CW-2G	5.71
Wetland CW-1H	11.88
Wetland CART	38.45
Total	**90.27**

4.2.2 Streams

4.2.2.1 Freshwater streams

Freshwater streams (identified in the JD as non-wetlands waters) were identified within the PSA were evaluated in the field (Table 5). Ecological and morphological characteristics pertaining to stream type, function, size, and extents were recorded. Field surveys identified twenty-six (26) streams, totaling 37,899.68 combined linear feet. This includes 24 unnamed streams and two named streams (Turkey Creek and Filbin Creek west of Virginia Avenue). Typical vegetation adjacent to these freshwater streams included ash trees, oak trees, pine trees, and privet.

Table 5: Freshwater Streams Identified within the PSA

Freshwater Streams	
Wetland Identification	**Linear Footage**
Non-wetlands waters FS-H1A (Filbin Creek)	8831.15
Non-wetlands waters FS-H1B	9204.92
Non-wetlands waters FS-B1	198.35
Non-wetlands waters FS-C1	1011.36
Non-wetlands waters FS-D1	95.16
Non-wetlands waters FS-F1	1575.16
Non-wetlands waters FS-G1	207.35
Non-wetlands waters FS-G2	485.54
Non-wetlands waters FS-H2	4568.80
Non-wetlands waters FS-H3	3028.81
Non-wetlands waters FS-H4	1236.77
Non-wetlands waters FS-H5	1278.41
Non-wetlands waters FS-H7	1081.98
Non-wetlands waters FS-H8	115.31
Non-wetlands waters FS-H9	264.60
Non-wetlands waters FS-H10	560.97
Non-wetlands waters FS-H11	590.61
Non-wetlands waters FS-H12	500.05
Non-wetlands waters FS-J1 (Turkey Creek)	144.98
Non-wetlands waters FS-K2	68.72
Non-wetlands waters FS-L1	625.65

FRESHWATER STREAMS	
Wetland Identification	**Linear Footage**
Non-wetlands waters FS-L2	764.18
Non-wetlands waters FS-L3	851.18
Non-wetlands waters FS-L4	174.53
Non-wetlands waters WWB	304.75
Non-wetlands waters WRAR	130.39
Total	**37,899.68**

4.2.2.2 Tidally Influenced Streams

Tidally influenced streams (identified in the JD as non-wetlands waters) were identified within the PSA and were evaluated in the field (Table 6). Ecological and morphological characteristics pertaining to stream type, function, size, and extents were recorded. Field surveys identified eight (8) tidal streams, totaling 9,559.21 combined linear feet. This includes 6 unnamed streams and two named streams (Bulls Creek and Filbin Creek east of Virginia Avenue). Typical vegetation adjacent to the tidal streams included saltmarsh cordgrass, black needlerush, and salt grass.

Table 6. Tidally Influenced Streams Identified within the PSA

TIDALLY INFLUENCED STREAMS	
Wetland Identification	**Acreage**
Non-wetlands waters TCS-A1	632.43
Non-wetlands waters TCS-A2 (Bulls Creek)	237.85
Non-wetlands waters TCS-B1	1405.30
Non-wetlands waters TCS-C1	1368.48
Non-wetlands waters TCS-D1	966.12
Non-wetlands waters TCS-E1	604.40
Non-wetlands waters TCS-F1	769.21
Non-wetland waters FS-H1C (Filbin Creek)	3575.42
Total	**9,559.21**

4.2.3 Open Water Ponds

Field surveys identified ten (10) areas, totaling 6.89 acres, exhibiting ecological characters consistent for designation as lacustrine communities, or jurisdictional open water ponds (Table 7). Typical vegetation within these communities included duckweed and cattails. Adjacent vegetation typically included willow trees, oak trees, and privet.

Table 7: Open Waters (Ponds) Identified within the PSA

OPEN WATERS (PONDS) IDENTIFIED WITHIN THE PSA	
Wetland Identification	**Acreage**
Non-wetlands waters OA-1	1.18
Non-wetlands waters OC-1	0.85
Non-wetlands waters OG-1	0.07
Non-wetlands waters OH-1	0.33
Non-wetlands waters OB-1	0.40
Non-wetlands waters OE-1	0.25
Non-wetlands waters OF-1	0.03
Non-wetlands waters OJ-1	0.21
Non-wetlands waters OD-1	3.38
Non-wetlands waters OZ-1	0.19
Total	**6.89**

4.3 Permitting

The USACE Charleston District regulates impacts to WOUS, including wetlands in South Carolina. Prior to commencement of construction, submittal and review of a CWA Section 404 permit to the USACE would be required for activities that may impact WOUS such as the placement of fill material, rip rap, pipes, culverts, etc. The extents of impacts of the proposed project would determine the level and type of permitting necessary for compliance. Section 404 permitting requirements range from activities considered exempt or preauthorized; to those requiring pre-construction notification under authorization of a Nationwide Permit; General Permit; or, Individual Permit (IP) from the USACE.

A Coastal Zone Management Act (CZMA) Consistency Determination from the SCDHEC would be required because this project is located in the coastal zone. Additionally, the PSA is located in the 'Critical Area', as defined by the SCDHEC-OCRM. Therefore, an application to OCRM for a 'Critical Area' permit would also be required for impacts to these areas. Because the proposed project is in a 'Critical Area', the 'Critical Area' permit would also incorporate the Section 401 Water Quality Certification (WQC) and the CZMA Consistency Determination. SCDHEC must grant, deny, or waive a WQC, in accordance with Section 401 of the CWA. Waters considered by SCDHEC to be sensitive may also require additional consideration during the 401 WQC process. These include, but are not limited to, Outstanding Resource Waters, Shellfish Harvesting Waters, trout waters, areas draining to waters included on the 303(d) list of impaired waters, and areas draining to waters with an approved TMDL. As discussed previously, the PSA drains to waters listed as a water with an EPA approved TMDL. Additionally, there are prohibited and restricted shellfish harvesting waters in or very near the PSA. Depending on the type of impairments, extent of the project, and other factors, SCDHEC may require

additional water quality protection and storm water treatment measures during and after construction.

Based upon preliminary review of the proposed alternatives and the anticipated impacts to wetlands and/or streams, an IP is anticipated. Specific permitting requirements and strategies for the project would be finalized once impacts to WOUS are quantified, following establishment of design and construction limits.

The permit application must include a delineation of affected WOUS, description of impact avoidance and minimization strategies, and measures to meet the requirements of compensatory mitigation.

4.4 Compensatory Mitigation

Compensatory mitigation is the third step in a sequence of actions that must be followed to offset impacts to aquatic resources. The 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the Department of Army establishes a three-part process, known as the mitigation sequence to help guide mitigation decisions and determine the type and level of mitigation required under Clean Water Act Section 404 regulations.

> Step 1. Avoid - Adverse impacts to aquatic resources are to be avoided and no discharge shall be permitted if there is a practicable alternative with less adverse impact.
>
> Step 2. Minimize - If impacts cannot be avoided, appropriate and practicable steps to minimize adverse impacts must be taken.
>
> Step 3. Compensate - Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain. The amount and quality of compensatory mitigation may not substitute for avoiding and minimizing impacts.

Compensatory mitigation is normally required to offset unavoidable losses of WOUS. The Council on Environmental Quality has defined mitigation in 40 CFR Part 1508.20 to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts. Compensatory mitigation usually consists of the restoration of existing degraded wetlands or waters, or the creation of wetlands/waters of equal or greater value than those to be impacted. This type of mitigation is only undertaken after avoidance and minimization actions are exhausted. Specific mitigation requirements would be established during the Section 404 permitting process.

Utilizing the online resource Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS) and the "I-526 West Lowcountry Corridor Permittee Responsible Mitigation Analysis" (February 25, 2020) there are several USACE mitigation banks with service areas that cover, or partially cover, the PSA (Table 8).

Table 8: Mitigation Banks that Could Potentially Offset WOUS Impacts*

Mitigation Bank	Service Area	Credit Type		
		Freshwater Wetlands	Freshwater Streams	Critical Area
Caton Creek	Primary	Yes	Yes	N/A
Clydesdale Club	Tertiary	N/A	N/A	Yes
Murray Hill (associated with Clydesdale Club)	Tertiary	N/A	N/A	Unknown
Palmetto Umbrella – Big Run	Primary	Yes	Yes	N/A
SCDOT Huspa Creek - East	Primary	N/A	N/A	Yes
Brosnan Forest Coldwater Branch	Tertiary - Pending	Unknown	Unknown	N/A
Caw Caw Swamp	Secondary - Pending	Unknown	Unknown	Unknown
Daniel Island Mitigation Bank	Primary – Pending	N/A	N/A	Unknown
French Quarter Creek	Tertiary – Pending	Unknown	Unknown	N/A
Halidon Hill	Primary – Pending	Unknown	Unknown	Unknown
Robert F Haggerty – Jehossee Farm	Primary - Pending	Unknown	Unknown	Unknown

***Note:** Credit availability and bank status frequently changes and updates to RIBITS may be delayed.
Additional coordination would be required to determine if use of these banks would be feasible to offset impacts from the proposed project.

These operating and pending banks may not have enough credits to satisfy the estimated impacts of the project. It is unknown at this time if a mitigation bank or banks would be able to provide enough credits to offset the estimated impacts, or if the credits would be available at the time of the permitting and construction schedule. If mitigation bank credits cannot be purchased, compensatory mitigation for unavoidable impacts to aquatic resources could be met by establishing a permittee responsible mitigation (PRM) plan. Under a PRM plan, restoration, establishment, enhancement or preservation of wetlands and streams would be undertaken by the permittee. This requires protection and restoration of a wetland and/or stream system, to be reviewed and approved by the USACE.

5.0 Floodplains

Floodplains are low-lying areas located near the channel of a river, stream, or other type of waterbody. These areas are subject to periodic flooding during heavy rains and/or long periods of wet weather. These areas provide important functions in the natural environment such as providing storage for flood waters, protecting the surrounding environment from erosion, and providing habitat for wildlife. As such, agencies are required to take actions that reduce the risk of impacts to

floodplains and their associated floodway, or main channel of flow. Floodplain areas exist within the PSA, and this section describes the floodplains and potential impacts to those areas.

Floodplain and floodway protections are required under several federal, state, and local laws, including Executive Order 11988 entitled "Floodplain Management," which requires federal agencies to avoid making modifications to and supporting development in floodplains wherever practical. Floodplains subject to inundation by the 1% annual chance flood event are regulated by the Federal Emergency Management Agency (FEMA). FEMA publishes maps which depict areas of regulated floodplains and floodways. The Flood Insurance Rate Map (FIRM) is the most common of these flood maps. The FIRM is an official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community. FIRMs depict the boundaries of flood hazard areas and differentiates them by zone.

Several flood zones that are designated by FEMA as Special Flood Hazard Area (SFHA) are present within the PSA. The SFHA is the area where the National Flood Insurance Program's (NFIP) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA zones within the PSA include AE and VE.

In addition to national guidelines for development in a floodplain, local municipalities have specialized requirements for impacts to floodplains:

- The City of Charleston requires Elevation and Engineering Certificates be obtained for new buildings within the SFHA.
- The City of North Charleston requires an Elevation Certificate and compliance with city ordinances.
- Charleston County has developed the Charleston County Flood Damage and Flood Prevention Ordinance that mandates that certain procedures be followed for construction-related work within properties designated as flood zones on FIRMs.

Based upon a review of the floodplain mapping and a GIS analysis of the PSA, the proposed project crosses several areas designated by FEMA as floodplains (see Appendix A, Figure 9).

Zone AE floodplains are areas subject to inundation by the 1-percent-annual-chance flood event and are determined by detailed methods. Base flood elevations (BFEs) are available for Zone AE floodplains and are provided on FIRMs.

Zone VE floodplains are areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. VE Zones are also known as the coastal high hazard areas. BFEs derived from detailed hydraulic analyses are shown in the FEMA

mapping of zone VE areas.

Zone X500 is a moderate flood hazard area and is an area between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. Zone X500 includes areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile.

As shown in the following figures, the majority of the PSA is within a FEMA-regulated flood zone. The majority of these areas are within zone AE. The Ashley River and a portion of the tidal marshes surrounding the Ashley River are in zone VE.

In accordance with Executive Order 11988, a hydraulic analysis must be conducted for an encroachment of a FEMA-regulated floodplain. The hydraulic analysis is used to determine if the project is likely to increase the risk of flooding within the floodplain. In order to meet the requirements of a "No-Rise" condition, FEMA requires projects which would encroach on Regulated Floodways and Zone AE floodplains to result in a change no greater than 0.1 feet from the established 100-year flood elevations. A preliminary hydraulic analysis will be performed for each encroachment of a FEMA-regulated floodplain and a detailed hydraulic analysis will be performed during final design.

Hydrology studies have not yet been conducted at this stage of project development; however, the project would be designed in an effort to meet "No-Rise" requirements. In the event a "No-Rise" condition cannot be achieved, coordination with FEMA will require the preparation of a CLOMR (Conditional Letter of Map Revision)/ LOMR (Letter of Map Revision) package for the encroachment. This includes a detailed hydraulic analysis, determination of floodplain impacts, and preparation of the CLOMR. Following construction, impacts to the floodplain would be verified prior to the issuance of the LOMR. A LOMR is FEMA's modification to an effective FIRM, or Flood Boundary and Floodway Map (FBFM), or to the Flood Insurance Study.. LOMRs are generally based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective BFEs, or the Special Flood Hazard Area (SFHA).

6.0 THREATENED, ENDANGERED, AND PROTECTED SPECIES

The Federal Endangered Species Act (ESA) of 1973 (50 CFR Part 402), as amended, is the federal regulatory tool that serves to administer permits, implement recovery plans, and monitor federally protected (endangered and threatened) species. The ESA is administered and regulated by the USFWS and/or National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA-NMFS). A Biological Assessment (BA) to address the effect of ESA listed species is being produced as part of the Section 7 consultation with these federal agencies. One BA is being prepared for species under the jurisdiction of NOAA-NMFS and a second BA is being prepared for species under

jurisdiction of USFWS. Upon completion, these BA documents will be appended to this report.

Species with the federal classification of endangered or threatened are protected under the ESA. The term “endangered species” is defined as “any species which is in danger of extinction throughout all or a significant portion of its range”, and the term “threatened species” is defined as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range” (16 U.S.C. 1532).

When a species is proposed for listing as endangered or threatened under the ESA, USFWS must consider whether there are areas of habitat believed to be essential to the species' conservation. Those areas may be proposed for designation as critical habitat.

“At-Risk Species” (ARS) is an informal term that refers to those species which may be in need of concentrated conservation actions, and have been petitioned for listing as threatened or endangered. The USFWS designations of ARS does not provide federal protection and requires no Section 7 consultation under the ESA. At-Risk Species do not currently receive legal protection from the ESA; therefore, these species have not been included in this analysis. In the event additional species are listed as federally threatened or endangered prior to the construction of the project, SCDOT would consult with USFWS on the results of the surveys performed, if necessary, and would follow any USFWS regulations/requirements resulting from that consultation.

Because of the federal nexus of the proposed project, consultation with the USFWS is required under Section 7 of the ESA, for proposed projects that “may affect” federally endangered and threatened species. This assessment analyzes potential impacts to federally endangered and threatened species associated with the proposed project, and is intended to initiate informal consultation, as needed. In response to the Letter of Intent sent by SCDOT, USFWS provided a list of species in Charleston County that are currently protected by the ESA (see Appendix D). Additionally, the updated list of protected species Charleston County, as published by USFWS, was most recently accessed in January 2020 (Appendix D). Representative site photographs of the PSA that were taken during field surveys are included in Appendix F.

6.1 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations (16 USC § 703–712). Executive Order 13186 “Responsibilities of Federal Agencies to Protect Migratory Birds” also directs and guides Federal agencies in implementing the MBTA. The migratory bird species protected by the MBTA are listed in 5 0 CFR § 10.13. The USFWS has statutory authority and responsibility for enforcing the MBTA. Any activity which results in the “take” of

migratory birds or eagles is prohibited unless authorized by USFWS.

6.2 Bald and Golden Eagle Protection Act

The bald eagle is listed under the Bald and Golden Eagle Protection Act but was removed from the federal list of Threatened and Endangered Species, effective August 8, 2007. The bald eagle is no longer protected under the ESA, but the species is afforded federal protection through the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as well as the MBTA. The BGEPA, 16 U.S.C. 668-668c, prohibits the take of bald eagles including their parts, nests, or eggs by anyone, without a permit issued by the Secretary of the Interior.

6.3 State Protected Species

Animal species that are on the South Carolina state protected species list receive protection under the South Carolina Nongame and Endangered Species Conservation Act (South Carolina Code, Title 50). State endangered species are defined as any species or subspecies of wildlife whose prospects of survival or recruitment within the state are in jeopardy or are likely within the foreseeable future to become so. It is unlawful for any person to take, possess, transport, export, process, sell or offer for sale or ship, and for any common or contract carrier knowingly to transport or receive for shipment any species or subspecies of wildlife appearing on the state list of protected species without appropriate authorization.

6.4 Protected Species Documented within Charleston County

A review of the USFWS species list provided existing information concerning the potential occurrence of threatened or endangered species within Charleston County. A copy of the list provided by the USFWS in 2016 (published October 20, 2015) is included in Appendix D. Since that time, an updated species list has been posted by the USFWS for Charleston County (published September 9, 2019; see Appendix D). This updated list was reviewed and four additional species are included, when compared to the older list. This includes the Eastern black rail, northern long-eared bat, sei whale, and sperm whale. This USFWS online listing identifies twenty-four (24) federally threatened or endangered species known to occur or to have formerly occurred in Charleston County, as listed in Table 9.

The SCDNR Rare, Threatened, and Endangered Species Inventory database was also reviewed for information regarding species with state endangered or threatened status. Nine (9) additional species are currently listed as state threatened or endangered in Charleston.

Per review of the USFWS Information, Planning, and Conservation (IPaC) online database, there is no critical habitat for threatened or endangered species within the PSA.

Table 9: Federal and State Protected Species in Charleston County.[1]

Common Name	Scientific name	Federal Status	State Status
Amphibian			
Dwarf siren	*Pseudobranchus striatus*	--	Threatened
Flatwoods salamander	*Ambystoma cingulatum*	Threatened	Endangered
Gopher frog	*Lithobates capito*	--	Endangered
Bird			
American swallow-tailed kite	*Elanoides forficatus*	--	Endangered
American wood stork	*Mycteria americana*	Threatened	Endangered
Bachman's warbler	*Vermivora bachmanii*	Endangered	Endangered
Bald eagle	*Haliaeetus leucocephalus*	*BGEPA	Threatened
Eastern black rail	*Laterallus jamaicensis*	**Proposed Threatened	--
Least tern	*Sterna antillarum*	--	Threatened
Piping plover	*Charadrius melodus*	Threatened	Endangered
Red-cockaded woodpecker	*Picoides borealis*	Endangered	Endangered
Red knot	*Calidris canutus rufa*	Threatened	--
Wilson's plover	*Charadrius wilsonia*	--	Threatened
Crustacean	None found		
Fish			
Atlantic sturgeon	*Acispenser oxyrinchus*	Endangered	--
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered	Endangered
Insect	None found		
Mammal			
Finback whale	*Balaenoptera physalus*	Endangered	Endangered
Humpback whale	*Megaptera novaengliae*	Endangered	Endangered
Northern long-eared bat	*Myotis septentrionalis*	Threatened	--
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	--	Endangered
Right whale	*Balaena glacialis*	Endangered	--
Sei whale	*Balaenoptera borealis*	Endangered	--

[1] Source: USFWS https://www.fws.gov/southeast/pdf/fact-sheet/south-carolina-species-list-by-county.pdf; updated September 9, 2019 and SCDNR Rare, Threatened, and Endangered Species Inventory http://www.dnr.sc.gov/species/charleston.html; accessed January 30, 2020.

Common Name	Scientific name	Federal Status	State Status
Sperm whale	*Physeter macrocephalus*	Endangered	--
West Indian manatee	*Trichechus manatus*	Threatened	Endangered
Mollusk			
Atlantic pigtoe	*Fusconaia masoni*	--	Endangered
Plant			
American chaff seed	*Schwalbea americana*	Endangered	--
Canby's dropwort	*Oxypolis canbyi*	Endangered	--
Pondberry	*Lindera melissifolia*	Endangered	--
Seabeach amaranth	*Amaranthus pumilus*	Threatened	--
Reptile			
Green sea turtle	*Chelonia mydas*	Threatened	Threatened
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	--
Loggerhead sea turtle	*Carretta carretta*	Threatened	Threatened
Southern hognose snake	*Heterodon simus*	--	Threatened
Spotted turtle	*Clemmys guttata*	--	Threatened

*Bald and Golden Eagle Protection Act, ** Proposed for listing in the Federal Register

ARS species are included in Table 10 for informational purposes. These species do not receive legal protection from the ESA; therefore, specific surveys for the species were not conducted. During field surveys, none of the ARS species shown in Table 10 were identified within the PSA.

Table 10: Federal At-Risk Species (ARS) Found in Charleston County[2].

Common Name	Scientific name	Federal Status
Amphibian		
Gopher frog	*Lithobates capito*	ARS
Bird		
Black-capped petrel	*Pterodroma hasitata*	ARS
Saltmarsh sparrow	*Ammospiza caudacuta*	ARS
Crustacean	None found	

[2] Source: USFWS https://www.fws.gov/southeast/pdf/fact-sheet/south-carolina-species-list-by-county.pdf; updated September 9, 2019 and SCDNR Rare, Threatened, and Endangered Species Inventory

Fish	None found	
Insect	None found	
Frosted elfin	*Callophrys irus*	ARS
Monarch butterfly	*Danaus plexippus*	ARS
Mammal		
Tri-colored bat	*Perimyotis subflavus*	ARS
Mollusk		
Plant		
Boykin's lobelia	*Lobelia boykinii*	ARS
Ciliate-leaf tickseed	*Coreopsis integrifolia*	ARS
Reptile		
Eastern diamondback rattlesnake	*Crotalus adamanteus*	ARS
Southern hognose snake	*Heterodon simus*	ARS
Spotted turtle	*Clemmys guttata*	ARS

The state and federal lists of protected species for Charleston County were reviewed, and literature and field reviews were performed to determine the presence of potential habitat for the protected species within the PSA. Specifically, field reviews of the PSA were conducted between July to December 2016, January to February 2017, and April 2019. Areas that matched the descriptions of preferred habitat for protected species were classified as protected species habitat and surveyed accordingly for the presence of individuals. Descriptions of the federal and/or state-listed endangered and threatened species, determinations of potential suitable habitat, and survey methodology are included below.

Amphibian

Dwarf siren (*Pseudobranchus striatus*) – State Threatened

This siren is the smallest of its family and is a slender, eel and salamander-like amphibian that lives in dense, submerged vegetation along the bottom of freshwater ponds, swamps and ditches. During periods of drought, the dwarf siren is able to burrow into mud and survive for up to two months. Potential habitat for state threatened dwarf siren exists along the bottom of freshwater ponds, swamps and ditches within the PSA. No dwarf sirens were noted during site visits or field surveys.

Flatwoods salamander (*Ambystoma cingulatum*) – Federal Threatened; State Endangered

The flatwoods salamander is a small salamander containing variable coloration, ranging from dark brown to black bodies with grayish specks or lines that resemble a frosted or lichen-like reticulated pattern. Habitat consists of wet pine flatwoods and pine savannas in the southern U.S. Traditionally, habitat consisted of sandy, seasonally wet longleaf pine communities but many of these areas have been replaced with slash pine or destroyed altogether. Adult flatwood salamanders are subterranean, living mainly underground in root channels or crayfish burrows. These salamanders are typically found under logs near small cypress ponds. There is no suitable habitat for this species within the PSA.

Gopher frog (*Lithobates capito*) - State Endangered

The gopher frog is a stout-bodied, highly secretive upland frog, often found in association with gopher tortoises, using the tortoise burrows for shelter. The frog can also be found in moist meadows, prairie woodlands, and pine scrub habitats. The frog is brown or black in color with irregular dark spots on the back and sides, and its skin is smooth. There is no suitable habitat for this species within the PSA.

Bird

American swallow-tailed kite (*Elanoides forficatus*) – State Endangered

Adult American swallow-tailed kite have a long, deeply forked tail and distinctive black and white plumage. The head and underparts are white, except for the black back, tail, and primary flight feathers. Habitat includes wooded swamps, marshes, river bottoms, and glades in open forest. Nesting sites include the very tops of tall, slender trees, up to 200 feet high. The American swallow-tailed kite can be found in South Carolina during its breeding season, from March to June. Suitable habitat for the state endangered American swallow-tailed kite exists within the Ashley River and surrounding marsh and forested wetlands located within the PSA. No active nests or instances of the bird were found during surveys.

American wood stork *(Mycteria americana)* – Federal Threatened; State Endangered

American wood storks are the largest wading bird and only stork species that breeds in the United States. These birds are large, long legged with a head to tail length of up to 45 inches and a wingspan of up to 65 inches. Adult wood storks are white except for the primary and

secondary wing feathers and the tail feathers, which are black with a greenish sheen. Adults also have an unfeathered head and neck with a long, thick black bill. The breeding range of the wood stork extends down the southeastern coast of the United States, including South Carolina. American wood storks are colonial nesters with colonies ranging from less than 12 to more than 500 in size. Nesting occurs in small to large trees typically on small islands surrounded by standing water, or in extensive forested and flooded wetlands. The species generally forages in water six to 10 inches deep. They feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools. Suitable habitat and foraging habitat for the American wood stork exists near open waters located within the PSA including wetlands, ponds, the Ashley River, Filbin Creek, and other smaller streams. During surveys, American wood storks were documented foraging in freshwater wetlands near Faber Place Drive and I-526. No active nesting rookeries were found during surveys. The closest known nesting population is over 3 miles north of the PSA.

Bachman's warbler (*Vermivora bachmanii*) – Federal Endangered; State Endangered

This species of warbler is presumed to be extinct, historically occurring in the southeastern U.S. during its breeding season. Historically, the bird inhabited seasonally flooded swamp forests, especially with cane thickets and containing variable amounts of water, but usually with some permanent water. The Bachman's warbler is a small bird with olive-green upperparts, yellow forehead, throat, and underparts, and a faint white eye-ring and black crown and bib. The bird was last observed in the U.S. in 1962 near Charleston, South Carolina. Suitable habitat for Bachman's warbler exists within the PSA. Small areas of cane thickets and seasonally flooded swamp forests with variable amounts of water were observed. Evidence of Bachman's warbler was not noted within the PSA.

Bald eagle (*Haliaeetus leucocephalus)* – Bald and Golden Eagle Protection Act (Federal)

Adult bald eagles have a blackish-brown back and breast with a white head, neck, and tail and a yellow bill. This bird nests in mature live pines or cypress trees in the transition zone between mature forests and large bodies of water. Nests are very large, up to six feet in width, and are usually less than two miles from open water. Winter roosts are usually in mature trees, similar to nesting trees, but may be somewhat farther from water. Suitable habitat for the bald eagle exists within close proximity to the Ashley and Cooper Rivers and adjacent mature forested woodlands located within the PSA. There is a known active bald eagle nest (N366-Y2019) located approximately 1,400 feet from the western boundary of the PSA near Paul Cantrell Boulevard.

Bald eagle. Photo credit: Glen Cox, 2019

Eastern black rail (*Laterallus jamaicensis*) – Federal Threatened (Proposed)

The Eastern black rail is a small rail species that is usually grey or black-grey in color. It breeds in a wide diversity of habitats such as fresh and saline marshes, wet meadows, and savannas. Eastern black rail habitat can be tidally or non-tidally influenced, and range in salinity from salt to brackish to fresh. Its natural history is the best known in its genus due to work in temperate North America where it primarily feeds on small aquatic and terrestrial invertebrates. Minimally suitable habitat for Eastern black rail exists in the marshes associated with the Ashley River. No black rails were identified during field surveys and there are no known populations within the PSA.

Eastern Black Rail. Photo credit: Danika Tsao, US Geological Society, 2010

Least tern (*Sterna antillarum*) – State Threatened

The least tern is a migratory bird, wintering in Central America, the Caribbean, and northern South America and breeding in North America, including the South Carolina coast beginning in late April. This bird is a small tern, up to nine inches in length with a pale grey upper body and white belly. The preferred habitat for the least tern is sandy, pebbly beaches along marine and estuarine shores and large rivers containing sand bar islands. In South Carolina, least tern has been documented using building rooftops as nesting sites. The least tern is most likely to occur in large open areas, free of vegetation and human disturbance, with sand as the dominant substrate. Other than open rooftops, there is no suitable habitat for this species within the PSA.

Piping plover (*Charadrius melodus*) – Federal Threatened; State Endangered

The piping plover is a small and stocky sparrow sized bird that is pale or sandy white with a black breast band and yellow bill and legs. Breeding birds have a prominent black collar and black band that runs across the forehead. The piping plover inhabits sandy beaches, mudflats and sandbars along rivers and lakes. In South Carolina, the piping plover occurs from August to April and generally overwinters in the southern United States from North Carolina to the Gulf of Mexico. Suitable foraging habitat for piping plover may exist on mudflats and sandbars associated with the Ashley or Cooper Rivers. No piping plovers were identified during field surveys and there are no known populations within the PSA.

Piping Plover. Photo credit: Wikimedia User Mdf, 2008

Red-cockaded woodpecker (*Picoides borealis)* – Federal Endangered; State Endangered

Adult red-cockaded woodpeckers are a small woodpecker with a black cap, throat, and stripe on the side of the neck and white cheeks and underparts. Adult males have a small red spot on each side of the black cap. The bird is native to southern pine forest and typically nests within open pine stands containing trees 80 years or older. Habitat preference typically consists of longleaf pine stands with open grassland understory. Roosting cavities are excavated within live pines, which are often infected with a fungus. Foraging may occur in pine and/or mixed pine/hardwood stands 30 years or older with trees 10 inches or larger in diameter at breast height. Pine forests within the PSA are young and there is no suitable habitat for this species.

Red knot (*Calidris canutus rufa*) – Federal Threatened

The red knot is a fairly large sandpiper with a medium sized bill and rufous colored plumage in the breeding season. Red knots breed in the tundra of the high Arctic and a portion of the species spends the winter on the southeastern coast of the U.S. including South Carolina, Georgia, and Florida. South Carolina provides habitat for both migrating and wintering birds. Red knot flocks roost on inlets of barrier beaches and islands in South Carolina. There is no suitable habitat for this species within the PSA.

Wilson's plover (*Charadrius wilsonia)* – State Threatened

Wilson's plover is a small, banded plover with dull legs and a distinctive long, heavy, black bill. Habitat is strictly coastal including open sand or shell beaches and tidal mud flats where it forages for fiddler crabs and other crustaceans. Nesting habitat includes areas near the beach containing sand or bare soil and salt or brackish water nearby. Suitable foraging habitat for the state endangered Wilson's plover may exist on tidal mudflats associated with the Ashley or Cooper Rivers. No Wilson's plovers were identified during field surveys and there are no known populations within the PSA.

Crustacean

None present

Fish

Atlantic sturgeon (*Acispenser oxyrinchus oxyrinchus*) – Federal Endangered

The Atlantic sturgeon is an anadromous fish species, similar in habitat requirements and appearance to the shortnose sturgeon. The Atlantic sturgeon can be distinguished by their large size, snout shape, and bony plates called scutes. They can grow up to 14 feet in length and weigh up to 800 pounds. The Atlantic

Atlantic Sturgeon. Photo credit: Wikimedia User Cephas, 2012

sturgeon is bluish-black or olive brown dorsally with paler sides and a white belly. The sides of its body also contain five rows of scutes. Adults are commonly found in brackish and estuarine waters along the coastline. The adult Atlantic sturgeon will migrate upstream to fresh water to spawn in the spring, and can go as far inland as the fall line in South Carolina to spawn, as long the stream is unobstructed. In South Carolina, Atlantic sturgeon have been captured in the Great Pee Dee, Waccamaw, Santee, Cooper, Edisto, Combahee, and Savannah Rivers. Suitable spawning habitat for this species is not present within the PSA however, suitable foraging habitat for the Atlantic sturgeon exists within the Ashley River within the PSA. The Atlantic sturgeon may use Filbin Creek up to Virginia Avenue for foraging by way of the Cooper River but would not likely not use it for spawning.

Shortnose sturgeon *(Acipenser brevirostrum)* – Federal Endangered; State Endangered

The shortnose sturgeon is an anadromous fish species which spends most of the year in brackish or salt water and moves into fresh water only to spawn. Spawning season for the shortnose sturgeon occurs from late winter to early spring. The shortnose sturgeon is dark-colored on its dorsal side and light on the ventral side. This species of sturgeon has a wide mouth pointed downward beneath a short snout and can grow up to three feet long. The shortnose sturgeon inhabits the lower portions of large rivers and coastal rivers along the Atlantic Coast. In South Carolina shortnose sturgeon have been found in the Great Pee Dee, Waccamaw, Edisto, Cooper, Santee, and Savannah Rivers. They may also be found in the Black, Sampit, and Ashley Rivers. Suitable spawning habitat for this species is not present within the PSA however, suitable foraging habitat for the shortnose sturgeon exists within the Ashley River within the PSA. The shortnose sturgeon may use Filbin Creek up to Virginia Avenue for foraging by way of the Cooper River but would not likely not use it for spawning.

Shortnose Sturgeon. Photo credit: NOAA-NMFS, Nancey Haley,2006

Insect

None present

Mammal

West Indian manatee (*Trichechus manatus)* – Federal Threatened; State Endangered

The West Indian manatee is a large gray to brown aquatic mammal, averaging about ten feet in length and 1,000 pounds in weight. This mammal has no hind limbs, and the forelimbs are modified flippers. West Indian manatees have flattened horizontal and rounded tails used for locomotion. Manatees inhabit

West Indian Manatee. Photo credit: NASA, 2004.

both fresh and salt water, including canals, rivers, estuarine habitats and saltwater bays, throughout their range. West Indian manatees concentrate in areas of warm water, primarily the Florida Gulf Coast waters, from October to April. In the summer months, the West Indian manatee will migrate as far north as coastal Virginia on the east coast and coastal Louisiana on the Gulf of Mexico. Suitable habitat for the West Indian manatee exists in the PSA within the Ashley River. West Indian manatees migrate into estuarine water off the coast of South Carolina during the warmer, summer months and early fall from May to September when water temperatures exceed 70 degrees Fahrenheit. Particular care and consideration should be taken during construction in summer months or early fall as this is when the waterways provide potential habitat. There are known occurrences of manatees within the Cooper River near the WestRock paper facility located just outside the PSA, as well as within the Ashley River. A trained spotter would likely be needed from May to October for in-water work in the Ashley River. Other conditions, such as operating vessels as slow speeds and halting in-water work if a manatee is spotted may also be required.

Northern long-eared bat (*Myotis septentrionalis*) – Federal Threatened

The northern long-eared bat is a medium-sized bat that is medium to dark brown on the back and tawny to pale-brown on the underside. The species is distinguished by its long ears. During the winter months, the northern long-eared bat can be found hibernating in caves and mines. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer, northern long-eared bats roost underneath bark and in cavities or in crevices of both live trees and dead trees. Individuals of the species have also been found rarely roosting in structures, like barns and sheds. Habitat conducive to seasonal occupation for northern long-eared bat is located within the PSA. The PSA contains potentially suitable summer roosting and foraging habitat for this species within forested areas. The preferred winter hibernation habitat for this species does not exist within the PSA or its immediate vicinity. While the forested areas onsite could be considered suitable habitat, the narrow nature of these areas is a limiting factor for the suitability of this habitat. No northern long-eared bats were identified during pedestrian field surveys and there are no known populations or hibernacula within the PSA.

Northern Long-eared Bat. Photo credit: USFWS, Al Hicks, 2007

Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) – State Endangered

Rafinesque's big-eared bat is a medium-sized bat that is brown in color with white-tipped fur on its belly. The species gets its name from its large ears, approximately 1.25 inches long. The species can be found in nearly all forest types within its range but tend to concentrate more heavily in forested swamps. Roosting sites consist of artificial and natural habitats, including unoccupied buildings or

hollowed-out tree cavities, especially black gum trees, near water. Occurrences of roosts under bridges have also been documented. Hibernating bats can be found in caves, wells, and other similar habitats. Potential habitat for the state endangered Rafinesque's big-eared bat is present within the PSA. Specifically, roosting habitat for Rafinesque's big-eared bat may exist in tree cavities near waterbodies within the PSA. Additionally, bridges and large culverts within the PSA also provide day-roosting habitat for the species. No bats were identified during pedestrian field surveys and there are no known populations within the PSA. Charleston County is included in the white-nose syndrome zone[3].

Right whale (*Balaena glacialis*) – Federal Endangered

Right whales average 46 feet and can weigh up to 70 tons. They are black in color with white patches. The right whale prefers coastal waters more than other baleen whales. Pregnant females migrate to an area off the coast of Georgia and Florida to give birth between December and March and then migrate north to their feeding grounds. This species has been protected since the 1930s but their number have failed to increase and the number of individuals is thought to remain steady at 350 - 400. There is no suitable habitat for this species within the PSA.

Sei whale (*Balaenoptera borealis*) – Federal Endangered

Sei whales average 40 to 60 feet and can weigh up to 50 tons. Sei whales have a long, sleek body that is dark bluish-gray to black in color and white or cream-colored on the underside. Sei whales have a wide distribution and prefer temperate waters in the mid-latitudes, and can be found in the Atlantic, Indian, and Pacific Oceans. This species has been protected since the 1980s, and while their numbers are unknown it is believed there are approximately 8,600 in the north pacific. There is no suitable habitat for this species within the PSA.

Sperm whale (*Physeter macrocephalus*) – Federal Endangered

Sperm whales average 40 feet (females) to 52 feet (males) in length and 15 tons (females) to 45 tons (males) in weight. Sperm whales are mostly dark grey, though some whales have white patches on the belly. Sperm whales are the largest of the toothed whales and have one of the widest global distributions of any marine mammal species. This species has been protected since 1986 and the best estimate of worldwide sperm whale population is between 300,000 and 450,000 individuals. There is no suitable habitat for this species within the PSA.

Finback whale (*Balaenoptera physalus*) – Federal Endangered; State Endangered

The finback whale or fin whale is the second largest living creature, after the blue whale. They average 60 feet in length and weigh about 50 tons. They are found in all oceans of the world. It is thought that the fin whale migrates to cooler waters in winter to feed on krill and other plankton and

[3] https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf

to warmer waters in the summer to reproduce. Fin whales are pelagic and coastal species, sometimes occurring in shallow waters. There is no suitable habitat for this species within the PSA.

Humpback whale (*Megaptera novaengliae*) – Federal Endangered; State Endangered

This large marine mammal weighs between 25 and 40 tons at adulthood and can reach lengths of up to 60 feet. Humpback whales are dark grey with areas of white and can be seen breaching or jumping out of the water. In the winter they migrate to feeding grounds at high latitudes in the winter they travel to calving grounds close to the equator. Humpback whales are found near the surface of the ocean and prefer shallow waters around reef systems, islands or continental shores. There is no suitable habitat for this species within the PSA.

Mollusk

Atlantic pigtoe (*Fusconaia masoni*) – State Endangered

The shell of the Atlantic pigtoe freshwater mussel is yellow to dark brown and is shaped like that of a pig's hoof or toe. The Atlantic pigtoe is a southern Atlantic slope species that is found from the Ogeechee River Basin in Georgia north to the James River Basin in Virginia. The Atlantic pigtoe inhabits mostly medium to large streams. It prefers very clean, swift waters with stable gravel, or sand and gravel substrate. Swift waters are typically needed to maintain a clear water column with little silt. There is no suitable habitat for this species within the PSA.

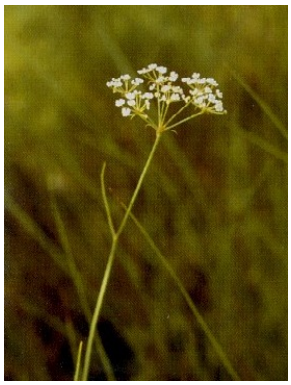
Plant

American chaff seed (*Schwalbea americana)* – Federal Endangered

American chaff seed is a perennial herbaceous plant with erect, densely hairy, unbranched stems up to 24 inches tall. The flowers are yellowish or purplish and grouped in a long terminal cluster. American chaffseed typically grows in open, moist pine flatwoods, fire-maintained pine savannas, ecotone areas between peaty wetlands and xeric sandy soils, and other open grass and sedge dominant areas. This plant is dependent on factors such as mowing, fire, and fluctuating water tables for survival. There is no suitable habitat for this species within the PSA.

Canby's dropwort (*Oxypolis canbyi)* – Federal Endangered

Canby's dropwort is a perennial herbaceous plant with tuberous roots and pale, fleshy rhizomes and erect stems up to 39 inches tall. The flowers are small and white with five petals and grow in umbels or flat-topped clusters. Canby's dropwort grows in moist areas in the coastal plain and sandhills, including wet meadows, wet pineland savannas, ditches, sloughs, and around the edges of Cypress-pine ponds. The plant seems to be more prolific when the habitat has been burned. Suitable habitat for Canby's dropwort exists within ditches and other open wet areas (i.e., grass and sedge fields) located within the PSA. Surveys were conducted during the



Canby's Dropwort. Photo credit: USFWS, 2011

flowering period and this species was not observed.

Pondberry (*Lindera melissifolia*) – Federal Endangered

Pondberry is a deciduous shrub that grows up to six feet tall and spreads by underground stolons. The leaves are ovately to elliptically shaped, thin, membranaceous and drooping and have a strong sassafras-like odor when brushed. The flowers are pale yellow and bloom in the spring before the appearance of leaves. Fruits are bright red and oval-shaped and mature in the fall. Pondberry generally occupies wetland habitats that are normally flooded or saturated during the dormant season, but infrequently flooded during the growing season for extended periods. The plant is typically associated with bottomland hardwoods in the inner coastal plain, and margins of sinks, ponds, and other depressions in the outer coastal plain. Suitable habitat for pondberry exists within freshwater depressional wetlands and along the margins of ponds located within the PSA. Surveys were conducted during the flowering period and this species was not observed.

Seabeach amaranth (*Amaranthus pumilus*) – Federal Threatened

Seabeach amaranth is an annual herbaceous plant found on Atlantic barrier island beaches, where its primary habitat consists of overwash flats and the lower foredunes of beaches. The plant is intolerant of competition and does not occur in densely vegetated areas. The stems of seabeach amaranth are fleshy and reddish in color, while the leaves are small and round and approximately one inch in diameter. Flowering occurs in early summer, and fruits are produced in late summer. There is no suitable habitat for this species within the PSA.

Reptile

Green sea turtle (*Chelonia mydas*) – Federal Threatened; State Threatened

Green sea turtles, the second largest sea turtle, has a grayish colored shell and forages on submerged grasses. Juveniles are found along the South Carolina coast in shallow creeks, bays, and salt marshes, where they feed on epiphytic green algae such as sea lettuce. There is no suitable habitat for this species within the PSA.

Kemp's ridley sea turtle *(Lepidochelys kempii)* – Federal Endangered; State Endangered

Kemp's ridley sea turtle, the smallest sea turtle, has a round grayish-black to olive colored shell which lightens as the turtle matures. The Kemp's ridley only nests on the Gulf Coast of Mexico and Texas. Juveniles can be found along the South Carolina coast during the summer where they feed on fast-swimming crabs, such as the blue crab. There is no suitable habitat for this species within the PSA.

Leatherback sea turtle (*Dermochelys coriacea*) – Federal Endangered

Leatherback sea turtles are the largest reptiles in the world, commonly exceeding 1,000 pounds with an average shell length of five feet. These turtles have a rubber-like, black shell with white spots and a pinkish-white spot on the head. Leatherbacks have the most extensive geographic distribution of

any reptile, typically occurring at low densities in the open ocean. Leatherbacks are common visitors throughout South Carolina's coastal waters during the spring while they feed on abundant numbers of cannonball jellyfish. Leatherbacks are also seen in the fall, although in lesser numbers. There is no suitable habitat for this species within the PSA.

Loggerhead sea turtle (*Carretta carretta*) – Federal Threatened; State Threatened

The loggerhead sea turtle, South Carolina's state reptile, has a dark reddish shell. The major nesting area for the loggerhead in the western Atlantic is open beaches of the southeastern United States, including South Carolina. In South Carolina, the primary nesting beaches are between North Inlet and Prices' Inlet, but other beaches along the southern part of the state are also used in moderate densities. The nesting season runs from mid-May to mid-August. In the winter, loggerheads leave the cold coastal waters and are often seen along the western edge of the Gulf Stream. There is no suitable habitat for this species within the PSA.

Spotted turtle (*Clemmys guttata*) – State Threatened

The spotted turtle is small, only reaching lengths of up to 5 inches. The shell or carapace is black and sprinkled with numerous orange-yellow dots. The head and neck also have orange-yellow blotches. The spotted turtle is a semi-aquatic species that inhabits a variety of wetland types including small shallow ponds, small streams, swamps, and flooded forests. Potential habitat for the state threatened spotted turtle exists within shallow ponds, small freshwater streams, and flooded freshwater forested wetlands located within the PSA.

Southern hognose snake (*Heterodon simus*) – State Threatened

The Southern hognose snake is a heavy-bodied snake that may reach up to 24 inches in length. The key defining feature of the species and genera is the upturned snout. Hognose snakes may reside under the surface for long periods of time. Habitat and distribution of the species is primarily within the coastal plain of the eastern United States where soils are comprised of deep sand and dune habitats. Commonly associated with the longleaf pine ecosystem, southern hognose snakes occupy very dry upland habitat with well-drained, sandy soils. They favor habitat where the canopy is open with a grassy understory. The species has declined in population as habitat conversion and the introduction of fire ants have had adverse effects. There is no suitable habitat for this species within the PSA.

Species Presence and Suitable Habitat Summary

Within the PSA, there is no potential suitable habitat for the federally protected flatwoods salamander, red-cockaded woodpecker, red knot, finback whale, humpback whale, right whale, sei whale, sperm whale, American chaffseed, seabeach amaranth, green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, or loggerhead sea. With respect to state protected species, there is no

potential habitat within the PSA for gopher frog, least tern, Atlantic pigtoe, or Southern hognose snake.

Based on literature and field surveys, suitable habitat in the PSA exists for the federally protected American wood stork, Bachman's warbler, Eastern black rail (proposed), piping plover, Atlantic sturgeon, shortnose sturgeon, Northern long-eared bat, West Indian manatee, Canby's dropwort, and pondberry. American wood storks were found foraging within the PSA. An active bald eagle nest is located approximately 1,400 feet outside of the PSA and habitat for bald eagle exists within the PSA.

With respect to state protected species, there is potential habitat within the PSA for dwarf siren, American swallow-tailed kite, Wilson's plover, Rafinesque's big-eared bat, and spotted turtle.

Migratory Birds

There are hundreds of species of migratory birds protected by the MBTA that may nest in, forage in, or fly through, the PSA. Birds that are considered non-native species such as the house sparrow and the European starling are examples of species that are not protected under the MBTA. In addition, many groups of hunted or game birds, such as ducks, geese, doves, and some shorebirds are subject to limited protection and can be hunted in specific seasons. Migratory birds that may be foraging or moving through the PSA are less likely to be affected by project impacts as they can generally move more readily from construction-related disturbances. Ground nests, arboreal nests, and nests built on man-made structures could occur within the project area. Active nests were not noted on any structures, however nests in shrubs and trees are present throughout the PSA.

Great blue heron foraging in the I-526 PSA.

6.5 Potential Species Impacts (Migratory Birds and Bald Eagle)

Project impacts to protected species, including federally designated endangered or threatened species and migratory birds, were determined by the literature and field reviews of the PSA conducted by the project team. A project affect determination on bald eagle is not necessary as the species is no longer protected by the ESA and does not require Section 7 consultation. As proposed, there would be no impacts to bald eagle as a result of the Reasonable Alternatives.

Migratory birds have been documented to use bridges and other artificial roadway drainage structures, such as large culverts, as nesting sites. The PSA contains many bridges and large drainage structures; and a mud nest likely constructed by a barn swallow or eastern phoebe was observed during field reviews underneath the I-526 overpass near Attaway Street. Based on the field reviews, it has been determined that the proposed project would not impact any migratory bird species.

Migratory birds that may be utilizing habitats within the PSA are also less likely to be affected by project impacts as they can generally move more readily from construction-related disturbances.

6.6 Construction Overview

This project is expected to be delivered either via the design build or bid build process and final construction and design plans would be determined by the contractor and/or SCDOT. To maintain competitiveness during the bid process, means and methods of construction may not be final, giving contractors the ability to propose specific methods and equipment. The following is an outline of the likely construction activities and project designs.

- Widening of the roadway approaches to the Westmoreland Bridges.
- Construction of temporary access areas in and near the Ashley River to include matting, barges, and work trestles.
- Construction of a new structure to the south, or downstream side, of the existing Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts with poured concrete support.
- Construction of a new structure within the center of the existing Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts.
- Extension of the existing fender system to the south of the existing Westmoreland Bridge.
- Painting existing and new bridge structures.
- Lighting to be installed for navigation and to meet SCDOT urban interstate lighting requirements ("Roadway Lighting on Interstate Routes in South Carolina").

6.7 Biological Conclusions (Threatened and Endangered Species)

Concurrence with USFWS and NOAA-NMFS regarding determinations of potential habitat and project-related impacts would be conducted during the Section 7 consultation phase of the proposed project for those species that are federally protected. Based on the literature and field reviews it is expected that the proposed project would have 'no effect' on federally protected flatwoods salamander, red-cockaded woodpecker, red knot, finback whale, humpback whale, right whale, sei whale, sperm whale, American chaffseed, seabeach amaranth, green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, or loggerhead sea, as there is no suitable habitat for these species within the PSA.

It is expected that the proposed project 'may affect, not likely to adversely affect' American wood

stork, Bachman's warbler, Eastern black rail, piping plover, Atlantic sturgeon, shortnose sturgeon, West Indian manatee, Canby's dropwort, and pondberry.

Federal agencies often utilize the "Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form" regarding potential impacts to this species. This framework allows federal agencies to rely upon the USFWS January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance. According to the 4(d) rule, the proposed project may affect the NLEB, but any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule. A draft version of this form is included in Appendix E.

In complying with Section 7 of the ESA, the project team will coordinate with the USFWS and NOAA-NMFS regarding the proposed effect determinations to listed species. Consultation will be coordinated, to include Biological Assessments to address potential species effects. Table 11 summarizes the determinations of potential habitat and biological conclusions.

Table 11: Summary of Federally Protected Species and Biological Conclusions or Impacts

Species	Protection Status	Biological Conclusion or Impacts
Flatwoods salamander (*Ambystoma cingulatum)*	Threatened	No effect
American wood stork (*Mycteria americana*)	Threatened	May affect, not likely to adversely affect
Bachman's warbler (*Vermivora bachmanii*)	Endangered	May affect, not likely to adversely affect
Bald eagle (*Haliaeetus leucocephalus*)	BGEPA	No impact
Black rail (*Laterallus jamaicensis*)	Threatened (proposed)	May affect, not likely to adversely affect
Piping plover (*Charadrius melodus)*	Threatened	May affect, not likely to adversely affect
Red-cockaded woodpecker (*Picoides borealis)*	Endangered	No effect
Red knot *(Calidris canutus rufa)*	Threatened	No effect
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Endangered	May affect, not likely to adversely affect
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	May affect, not likely to adversely affect
Finback whale *(Balaenoptera physalus)*	Endangered	No effect
Humpback whale *(Megaptera novaengliae)*	Endangered	No effect
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	May affect, but any resulting incidental take is not prohibited by the final 4(d) rule
Right whale *(Balaena glacialis)*	Endangered	No effect
Sei whale *(Balaenoptera borealis)*	Endangered	No effect

Species	Protection Status	Biological Conclusion or Impacts
Sperm whale *(Physeter macrocephalus)*	Endangered	No effect
West Indian manatee (*Trichechus manatus)*	Threatened	May affect, not likely to adversely affect
American chaff seed *(Schwalbea americana)*	Endangered	No effect
Canby's dropwort (*Oxypolis canbyi*)	Endangered	May affect, not likely to adversely affect
Pondberry (*Lindera melissifolia*)	Endangered	May affect, not likely to adversely affect
Seabeach amaranth *(Amaranthus pumilus)*	Threatened	No effect
Green sea turtle *(Chelonia mydas)*	Threatened	No effect
Kemp's ridley sea turtle *(Lepidochelys kempii)*	Endangered	No effect
Leatherback sea turtle (D*ermochelys coriacea)*	Endangered	No effect
Loggerhead sea turtle *(Carretta carretta)*	Threatened	No effect

6.7.1 Recommended Species Commitments

6.7.1.1 Threatened and Endangered Species

Special conditions are expected to avoid impacts some protected species. Following submittal of the Biological Assessments to the USFWS and NOAA-NMFS, and coordination regarding the biological conclusions, any required special commitments would be included in the project NEPA documentation.

6.7.1.2 Migratory Birds

SCDOT would comply with the MBTA to avoid taking individual migratory birds or destroying their active nests. The contractor shall notify the Resident Construction Engineer (RCE) at least four (4) weeks prior to construction/demolition/maintenance of bridges and box culverts. The RCE would coordinate with SCDOT Environmental Services Office (ESO), Compliance Division, to determine if there are any active birds using the structure. After this coordination, it would be determined when construction/demolition/maintenance can begin. If a nest is observed that was not discovered after construction/demolition/maintenance has begun, the contractor would cease work and immediately notify the RCE, who will notify the ESO Compliance Division. The use of any deterrents by the contractor designed to prevent birds from nesting, shall be approved by the RCE with coordination from the ESO Compliance Division.

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WEST 526 LOWCOUNTRY CORRIDOR

Biological Assessment

for National Oceanic and Atmostpheric Administration, National Marine Fisheries Service

Prepared For:

SCDOT South Carolina Department of Transportation

Prepared By:

Civil Engineering Consulting Services, Inc.

DRAFT May 15, 2020

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Appendices

1. Project Overview

1.1 Federal Nexus

The purpose of this Biological Assessment (BA) is to address the effect of the I-526 Lowcountry Corridor West project on U.S. Endangered Species Act (ESA) listed species, listed as endangered or threatened, or their designated critical habitat, under the jurisdiction of the National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA-NMFS). Those species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) are addressed in a separate BA.

The South Carolina Department of Transportation (SCDOT), on behalf of the Federal Highway Administration (FHWA), is pursuing informal consultation under Section 7 of the ESA on the impacts to species that will result from the proposed I-526 West project. Section 7 of the ESA assures that, through consultation with NOAA-NMFS and/or the USFWS, federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species, or result in the destruction or adverse modification of critical habitat.

1.2 Project Description

The proposed I-526 Lowcountry Corridor West project extends approximately 11.4 miles from near Paul Cantrell Boulevard in West Ashley to Virginia Avenue in North Charleston in Charleston County, SC. SCDOT currently ranks the segment of I-526 between I-26 and Virginia Avenue as the most congested segment of interstate highway in the state. The remainder of the I-526 LCC West project, from I-26 to Paul Cantrell Boulevard, ranks among the top ten of the state's existing most congested corridors. Traffic forecasts show that segments of that corridor will continue to be among the state's most congested in 2040. The interchange of I-526 and I-26 is the major source of the congestion.

Through various reasonable build alternatives, SCDOT proposes to add two travel lanes in each direction along I-526 (for a total of four lanes in each direction) and to upgrade the interchange of I-526 and I-26. Improvements to access I-526 from Paul Cantrell Boulevard, North Rhett Avenue, and Virginia Avenue are also proposed. Proposed improvements to I-526 would include providing additional travel lanes over the Ashley River, through widening the existing bridges. An EIS is being completed that outlines potential alternatives to satisfy the purpose and need of the project.

1.3 Project Area and Setting

The area surrounding the project study area (PSA) is a densely populated region to the west of the City of Charleston, South Carolina (Figure 1). Based on the size of this project and the density of development in greater Charleston, the land use with this vicinity varies greatly. A large portion of the land within this

PSA has been developed for residential, commercial, and industrial uses. Undeveloped land primarily consists of maintained rights of way, landscaped lawns, wooded forests, and tidal marshes. Filbin Creek and its floodplain parallel and cross through the PSA, flowing to the Cooper River; this area is largely undeveloped forested wetlands. The Ashley River flows through the PSA and is surrounded by tidal mudflats and vegetated marshes. Within the PSA, the Ashley River Watershed extends approximately 1,800 feet (0.3 mile) north of Paul Cantrell Boulevard, north across the Ashley River, to 2,500 feet (0.5 mile) north of International Boulevard. It includes portions of two named water bodies including the Ashley River and Bulls Creek. Numerous streams and wetlands are present in the PSA in the Ashley River Watershed, including forested wetlands, emergent wetlands, tidally influenced streams, and freshwater streams.

The General William C. Westmoreland Bridge (Westmoreland Bridge) is located along I-526 and connects the City of North Charleston with the West Ashley area of Charleston. The twin span bridge carries two lanes of I-526 in each direction across the Ashley River and the surrounding tidal marshes and creeks. The 3,908-foot long bridge was constructed in 1980 and each bridge is approximately 43 feet wide. The existing bridge deck consists of two 12-foot travel lanes, two in each direction; a 5-foot, 6-inch inside left shoulder; and a 10-foot outside right shoulder. Additionally, there are barriers on each side of the bridge (2 total) that are 1-foot, 8-inches wide each. The Westmoreland Bridge spans the Ashley River with a horizontal clearance of 60 feet and a vertical clearance of 35 feet when measured from mean high water (MHW). This is a twin span fixed bridge with four main spans. The longest span is approximately 120 feet. The concrete deck is approximately 43 feet wide.

General William C. Westmoreland Bridge over the Ashley River.

1.4 Consultation History

A Letter of Intent was sent to the USFWS and NOAA-NMFS by SCDOT on January 27, 2016. A Notice of Intent was published in the Federal Register on November 11, 2019. The project has been discussed at several Agency Coordination Effort meetings with the USFWS, NOAA-NMFS, U.S. Environmental Protection Agency, FHWA, U.S. Army Corps of Engineers, South Carolina Department of Natural Resources (SCDNR), and FHWA on March 14, 2019; July 10, 2019; July 25, 2019; August 14, 2019; September 11, 2019; October 9, 2019; November 13, 2019; December 11, 2019; January 8, 2020; February 12, 2020; and March 11, 2020. The project was also discussed via telephone with Andrew Herndon, NOAA-NMFS and SCDOT and via email with Bill Post, SCNDR (March 23 and April 9, 2020).

2. Federally Proposed & Listed Species & Designated Critical Habitat

The project is located within the range of two species listed under the ESA within the jurisdiction of NOAA-NMFS. There are no proposed or candidate species and no Critical Habitat in or near the PSA. Additional species information is available in the I-526 West Lowcountry Corridor Natural Resources Technical Memorandum (Appendix C).

Fish

Shortnose sturgeon (*Acipenser brevirostrum*) (32 Federal Register (FR) 4001; Recovery plan: NMFS 1998)

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) (77 FR 5880 and 77 FR 5914)

2.1 Shortnose Sturgeon

The shortnose sturgeon is an anadromous fish species which spends most of the year in brackish or salt water and moves into fresh water only to spawn. The shortnose sturgeon was listed as endangered in 1967 and remained on the list with enactment of the ESA in 1974 when NOAA-NMFS assumed its jurisdiction. There are 19 Distinct Population Segments (DPS) rangewide with 11 DPS occurring in the southeastern U.S. A recovery plan exists for this species and was issued in 1998. Spawning season for the shortnose sturgeon occurs from late winter to early spring. The shortnose sturgeon is dark-colored on its dorsal side and light on the ventral side. This species of sturgeon has a wide mouth pointed downward beneath a short snout and can grow up to three feet long. The shortnose sturgeon inhabits the lower portions of large rivers and coastal rivers along the Atlantic Coast. Shortnose sturgeon feed on invertebrates and the stems and leaves of macrophytes. Adults forage at night in shallows immediately adjacent to deep-water areas occupied during the day. Juveniles generally remain in deep-water areas throughout the day. In South Carolina shortnose sturgeon have been found in the Great Pee Dee,

Waccamaw, Edisto, Cooper, Santee, and Savannah Rivers. They may also be found in the Black, Sampit, and Ashley Rivers. Suitable freshwater spawning habitat for this species is not present within the PSA however, suitable foraging habitat for the shortnose sturgeon exists within the Ashley River within the PSA. The shortnose sturgeon may use Filbin Creek up to Virginia Avenue for foraging by way of the Cooper River but would not likely not use it for spawning. Additionally, water quality in Filbin Creek is impaired due to elevated levels of *Enterococcus* bacteria and is listed on the Section 303(d) list. This is a State list of waters that are not meeting water quality standards or have impaired uses

2.2 Atlantic Sturgeon

The Atlantic sturgeon is an anadromous fish species, similar in habitat requirements and appearance to the shortnose sturgeon. In 2007, NOAA-NMFS conducted a status review for the Atlantic sturgeon and determined at least three of the distinct population segments (DPS) warranted listing under the ESA. In 2012, NOAA-NMFS issued the final rule to list the Carolina DPS and South Atlantic DPS as endangered. The Atlantic sturgeon can be distinguished by their large size, snout shape, and bony plates called scutes. They can grow up to 14 feet in length and weigh up to 800 pounds. The Atlantic sturgeon is bluish-black or olive brown dorsally with paler sides and a white belly. The sides of its body also contain five rows of scutes. Adults are commonly found in brackish and estuarine waters along the coastline. The adult Atlantic sturgeon will migrate upstream to fresh water to spawn in the spring, and can go as far inland as the fall line in South Carolina, as long the stream is unobstructed. Following spawning, Atlantic sturgeon typically inhabit coastal estuarine waters with gravel or sand substrate. Adult sturgeon typically feed on benthic invertebrates such as mussels, worms, and shrimp. In South Carolina, Atlantic sturgeon have been captured in the Great Pee Dee, Waccamaw, Santee, Cooper, Edisto, Combahee, and Savannah Rivers. Atlantic sturgeon have been tagged in the Ashley River (W. Post, personal communication, April 9, 2020). Suitable freshwater spawning habitat for this species is not present within the PSA however, suitable foraging habitat for the Atlantic sturgeon exists within the Ashley River within the PSA. The Atlantic sturgeon may use Filbin Creek up to Virginia Avenue for foraging by way of the Cooper River but would not likely not use it for spawning. Use of Filbin Creek would also be limited due to the previously noted Section 303(d) listing for impairments. The Cooper River contains designated Critical Habitat for the Atlantic sturgeon. The area near the Cooper River is included in the PSA, however there is no proposed in-water work and there are no effects expected to the Cooper River.

3. Environmental Baseline

The Ashley River is a tidally influenced river with the headwaters originating in Dorchester County. The river eventually joins the Cooper River to form the Charleston Harbor before discharging eastward into the Atlantic Ocean. The entire drainage of the Ashley River system, including its headwaters in Cypress and Wassamassaw swamps, extends approximately 60 river miles. At the project site, the width of the main navigational channel of the Ashley River is approximately 60 feet wide. The full width of the Ashley River at the project site is approximately 1,500 feet wide. Water depths in the river range from approximately 0 to 20 feet. The Ashley River is a designated State Scenic River, largely in part to numerous historic properties located along the riverbanks. Per the NOAA Ashley River bridge station (Station ID 8665099) the mean tidal range is 5.68 feet and the diurnal range is 6.23 feet. Mean high water is approximately 3.08 feet and mean low water is -3.16 feet at the center of the channel. Salinity at the PSA ranges from 12 to 17 parts per thousand (ppt).

SCDHEC has classified the waterbodies (streams and rivers) of South Carolina based on the desired uses of each waterbody. SCDHEC has established standards for various parameters to protect all uses within each waterbody classification. The Ashley River is classified as salt water (Figure 2). Monitoring station MD-049 is located approximately 4 miles upstream of the PSA, along the Ashley River (Figure 3). Aquatic life uses are not supported at MD-049 based on pH and turbidity. The term pH is a measure of the hydrogen ion concentration of water, and is used to indicate degree of acidity. The pH scale ranges from 0 to 14. A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic. Low pH values are found in natural waters rich in dissolved organic matter, especially in coastal plain swamps and black water rivers. Turbidity is an expression of the scattering and absorption of light through water. The presence of clay, silt, fine organic and inorganic matter, plankton, and other microscopic organisms increases turbidity. Increasing turbidity can be an indication of increased runoff from land. Recreation is only partially supported at this same site (MD-049), based on elevated fecal coliform levels. A fish consumption advisory due to elevated mercury levels in certain types of fish is in place for the Ashley River, including the area at the I-526/General William C. Westmoreland Bridge and northwards/upstream of the project to SC 165.

A Total Maximum Daily Load (TMDL) has been developed for the Charleston Harbor, Cooper, Ashley, and Wando Rivers and approved by the Environmental Protection Agency to identify opportunities to increase

dissolved oxygen (DO) in the watershed[1]. Many coastal waters in South Carolina have DO levels below the established DO criteria. Wastewater discharges and other anthropogenic influences may contribute to low DO in coastal waters. Natural factors such as organic loading and reduced oxygen levels from wetlands and marshes and estuarine dynamics in the mixing zone where freshwater and saltwater come together can create naturally low DO conditions. The waters in and around Charleston Harbor are considered to be both naturally low in DO and further impacted by wastewater dischargers. Potential sources of oxygen demand loading that were considered include National Pollutant Discharge Elimination System (NPDES) wastewater discharges (continuous point sources), NPDES stormwater discharges (noncontinuous point sources), non-point sources, and natural background sources.

A large portion of the PSA is within Shellfish Growing Area 10B (Figure 4) as designated by SCDHEC. This area encompasses the Charleston Harbor, Ashley River, Cooper River, and their tributaries that support shellfish. Waters within this management area in the PSA have been given the classification of "prohibited" and as such, these areas are closed to all human consumption. Prohibited areas are those that are administratively closed for the harvesting of shellfish for any purposes related to human consumption. These closures are established adjacent to permitted wastewater discharges, marina facilities, or areas containing multiple point sources of pollution. This classification is not based upon violation of a bacteriological standard.

There are various types of navigational activities by numerous vessel types that occur along the Ashley River. To determine the types and extents of activity in the channel, existing documentation was reviewed regarding known vessel use. This included a review of bridge opening records of a nearby moveable downstream facility, the T. Allen Legare Bridges, located at milepoints 2.4 and 2.5. A large portion of marine traffic in the area surrounding the proposed project constitutes recreational and commercial (fishing) boating. The W.O. Thomas Jr. Boat Landing is a public boat ramp managed by the Charleston County Park and Recreation Commission. This facility is located approximately 500 feet southeast or downstream of the proposed project. The landing is used by private recreational and commercial boats. There is a private marina located adjacent to the proposed project (Rivers Edge Marina Sales). The marina is used to launch, store, maintain and fuel private, recreational boats. Emergency operations are conducted by the U.S. Coast Guard (USCG), SCDNR, Charleston County, and the City of Charleston Fire

[1] https://www.scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/Chas_Hbr_DO_TMDL.pdf Last Accessed May 15, 2020.

Department Marine Units in the Ashley River. The Charleston County Volunteer Rescue Squad responds to waterway incidents with a variety of light, medium and heavy rescue vehicles. This includes a variety of boats including an air boat and vessels equipped with specialty equipment such as side scan sonar. The Charleston Fire Department operates one Fireboat, Marine 101. The responding vessel features a 980-horsepower engine, is 40 feet long, and has the capacity to pump 3,800 gallons of water a minute.

4. Project Details

4.1 Construction

4.1.1 Construction Overview

This project is expected to be delivered either via the design build or bid build process and final construction and design plans would be determined by the contractor and/or SCDOT. To maintain competitiveness during the bid process, means and methods of construction may not be final, giving contractors the ability to propose specific methods and equipment. The following is an outline of the likely construction activities and project designs. This may vary slightly depending on the selected contractor and bid process. Any modifications from those proposed in this document that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.

The widened bridge structures would each be approximately 32 feet, 5.5 inches wide (Appendix B, Conceptual Design Plans). During construction of the widened bridge, traffic would be maintained on the existing facility. Maintenance and improvements would be made to the existing Westmoreland Bridges and the structure would be retained at its existing height and length.

The proposed minimum horizontal clearance for the main navigational opening would be 60 feet between fenders. This configuration will be similar to the existing bridge, or would be less restrictive. The vertical clearance of the proposed fixed span bridge would be a minimum of 35 feet from the MHW datum to meet the needs of mariners in the area.

Generally, the project improvements would consist of the following components:

- Widening of the northbound and southbound roadway approaches to the Westmoreland Bridges.
- Construction of temporary access areas to include matting, barges, and work trestles.
- Construction of a new structure to the south, or downstream side, of the existing Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts with poured concrete support.

- Construction of a new structure within the center of the existing northbound and southbound Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts.
- Extension of the existing fender system to the south of the existing Westmoreland Bridge.
- Painting existing and new bridge structures.
- Lighting to be installed for navigation and to meet SCDOT urban interstate lighting requirements ("Roadway Lighting on Interstate Routes in South Carolina").

4.1.2 Temporary Access

Temporary work trestles would be placed in marsh and wetland areas for construction access outside of the existing eastbound bridge (Appendix B, Conceptual Design Plans). Temporary trestle would be approximately 40 feet wide and would be supported by steel pipe piles. The steel piles would be approximately 24-inches in diameter and would be installed using an impact hammer. It is estimated that 240 24-inch steel pipe piles would be needed for temporary work trestle. With one work crew performing installation, approximately 4 piles would be driven per day with an average of 350 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day, however it is estimated that the contractor would have one crew working on the trestle at a time, given space limitations. A second crew could work on the drilled shafts in the Ashley River.

For access over marsh areas between the existing bridges either trestle or a combination of barge, barge mats, and timber mats would be needed due to the limited space between the structures. Deeper water and the main channel of the Ashley River would be accessed via barges for construction. Barges may be delivered and moved via water and transport vessels or via land on flatbed trucks with cranes and other heavy equipment. At no point would barges in the Ashley River block more than 50% of the channel.

4.1.3 Prestressed Concrete Pile Installation

Prestressed concrete piles will be installed outside of the main channel of the Ashley River. These piles would have an H-pile steel "stinger" at the end of the concrete pile to prevent damage to the pile as it is driven into hard subsurface materials. Piles would be installed with a hammer or vibratory hammer. Within the Ashely River, Bents 72 through 79 would be supported by prestressed concrete piles. Additional concrete piles would be installed in the adjacent marshes, outside of the boundaries of the Ashley River. It is estimated that 580 24-inch prestressed concrete piles would be needed for bridge widening. With one work crew performing installation, approximately 6 piles would be driven per day

with an average of 300 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day, however it is expected that one crew would work on the trestle at a time.

4.1.4 Drilled Shaft Installation

At the approaches to, and over the main channel of the Ashley River, drilled shafts are proposed to support the new bridge structures. Each shaft would be approximately 7 feet in diameter. To install, steel casing (approximately 7 feet in diameter) would be installed at each location using a vibratory method. Inside of that casing would be drilled so that rebar cage can be installed. Concrete would then be poured into the casing to create a large support structure in the water. Approximately 120 drilled shafts would be needed for the bridge widening. One shaft per day would be constructed by one work crew, but multiple crews could install supports concurrently. At this point in the project development process, one work crew for the drilled shafts is estimated. Within the Ashley River, these drilled shafts would be installed at bents 48 through 71, and at bents A, B, C, and D (see Appendix C Bridge Plan and Profile design sheets). Bents 48 through 59 are located at the southerly or westerly (West Ashley) approach to the Ashley River. Bents A through D are at the deepest portion of the main channel of the Ashley River. Bents 60 through 71 are located at the northerly or easterly (North Charleston) approach to the Ashley River. Bents 59 through 79 and bents A through D are located within the Ashley River and are the focus of this analysis.

4.1.5 Fender System

The existing fender system will be extended with a system that can accommodate all required uses of the waterway and that meets USCG requirements. The proposed fender system will be designed for both recreational watercraft, as well as larger vessels such as commercial fishing boats and tug boats. The fender elements would likely consist of rubber fenders, with a steel panel and polyethylene facing. Additional prestressed concrete piles will be required to support the new fender systems. These piles would not be load bearing and would not require extensive pile strikes such as those on the permanent bridge system. It is estimated that 60 piles (24-inch) would be impact driven to support the fender extension.

4.1.6 Drainage

Drainage of stormwater from surface runoff from the newly constructed bridges is proposed to be discharged via open scuppers.

4.1.7 Painting

Steel girders would be used in the construction of the new bridge spans over the main channel of the Ashley River and would need to be surface prepped and painted to withstand impacts from weather and

the marine environment. The contractor would be required to submit a painting operation plan to include timing, methodologies to prohibit overspray into waters or adjacent vegetation, and weather and wind thresholds for painting operations.

4.1.8 Project Timeline

Construction is expected to begin in 2022. Construction of the bridge phase over the Ashley River would last approximately 3 years. Within that 3-year period, in-water work of an estimated 5 months would be needed for prestressed pile bents and 16 months would be needed for drilled shaft bents. This project is expected to be delivered via the design build process and final construction sequencing will be determined by the contractor. The following is an outline of the likely construction sequence. This sequence may vary slightly depending on the selected contractor. Any modifications from this proposed by the contractor that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.

4.2 Operations and Maintenance

Routine maintenance is expected on the existing and proposed new bridges including sanding/painting, deck resurfacing, concrete patching, lighting replacement, and periodic fender and dolphin repair from exposure and/or vessel strikes.

5. Project Action Area

5.1 Project Action Area

The action area, as defined under 50 CFR §402.02, includes all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The nearshore action area, as currently proposed, extends 500 meters (1,650 feet) upstream and downstream of the proposed project. The basis for the selection of the 1,650 feet upstream and downstream of the proposed project was due to the limits of the proposed action and potential turbidity effects in the Ashley River. Although sedimentation is not expected to be long lasting or severe based on the velocity of currents in the area, the effects from sedimentation are expected to be wider ranging than noise effects.

The area near the Cooper River is included in the PSA, however there is no proposed in-water work and there are no effects expected to the Cooper River.

6. Effects Analysis

6.1 Direct and Indirect Effects

6.1.1 Hydroacoustic Noise

A temporary increase in underwater noise from construction could cause behavioral changes in sturgeon. Loud levels of intermittent or continuous construction noise from drilled shaft installation and work trestle pile driving could harm sturgeon if they were close to the noise source for prolonged periods. Depending on the duration and intensity of sound produced during construction, aquatic organisms could suffer hearing loss, ranging from temporary to permanent. Other potential percussion injuries include interference with migration, bruising, damage to internal organs, or death.

Typical metrics used to evaluate construction noise impacts for impulsive or non-impulsive activities include peak sound pressure level (dB_{peak}), root mean square (RMS), and sound exposure level (SEL). SEL can be expressed as a value for a single strike and for multiple strikes. SEL is commonly referred to as the cumulative SEL or $SEL_{CUMULATIVE}$.

The Greater Atlantic Regional Fisheries Office (GARFO) Acoustic Tool (2019) and Appendix I (Compendium of Pile Driving Sound Data) from the California Department of Transportation (Caltrans) Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish (2015) were used to estimate underwater sound pressure levels caused by in-water pile driving during construction. These references include data from major and minor projects that used un-attenuated pile driving with varying pile size, pile type, and water depths. Noise levels are generally higher if impact pile driving is used, as compared to vibratory hammer driving or extraction. Impact pile driving creates an impulsive sound, while vibratory hammers generate a continuous, low-level noise that is generally considered non-impulsive.

Table 1 provides a summary of the potential un-attenuated sound pressure levels that may occur during the proposed bridge construction sound pressure levels caused by in-water pile driving during construction. The expected pile sizes for the I-526 West project do not exactly correlate with the guidance documents; therefore, the data was best fit or overestimated. The assumed pile sizes that were used to estimate the potential average sound pressure levels are noted in Table 1.

Table 1. Potential Average Sound Pressure Levels (dB) in the Ashley River during Construction.

Bridge Element	Diameter	Assumed Installation Method	Average Sound Pressure Level (dB)		
			dB (peak)	RMS	SEL
Concrete Drilled Shafts[1]	7 feet	Vibratory Hammer	195	180	180
Concrete Piles[2]	24 inches	Impact Hammer	185	170	160
Temporary Trestle Steel Pipe Piles[3]	24 inches	Impact Hammer	203	189	178
Sturgeon Thresholds:					
			206	*150*	*183 (Fish<2g)* *187 (Fish>2g)*

Source: NOAA Greater Atlantic Regional Fisheries Office Acoustics Tool (Updated 9/23/2019) and Caltrans, 2015.
[1] Based on 6-foot steel pipe piles (loudest measurement) at an average of 5-meters relative water depth.
[2] Based on 24-inch concrete piles at an average of 5-meters relative water depth.
[3] Based on 24-inch steel pipe piles at an average of 5-meters relative water depth.

Construction noise can cause behavioral changes for sturgeon. NOAA-NMFS generally uses 150 dB RMS as the threshold for behavioral effects to listed fish species (Caltrans 2015). Use of the vibratory hammer to install the bridge columns and temporary work trestle may exceed 150 dB and cause a behavioral disturbance or stress. Noise from the vibratory hammer would be intermittent. Permanent piles would require a total of 16 days for installation and temporary trestle piles would require additional auditory strikes. It is reasonable to assume that a sturgeon, upon detecting underwater levels of noise would modify its behavior such that it redirects its course of movement away from the ensonified area. These movements would not amount to substantial changes to essential sturgeon foraging behaviors.

In 2008, the Fisheries Habitat Working Group (FHWG) developed the *Agreement in Principal for Interim Criteria for Injury to Fish from Pile Driving Activities*, which identifies the following thresholds for onset of physical injury to fish: 206 decibels (dB) peak; 187 dB cumulative SEL for fish 2 grams or greater; and 183 dB cumulative SEL for fish of less than 2 grams (FHWG 2008). As shown in Table 1, the SEL thresholds are not expected to be exceeded by the project activities.

6.1.2 Construction Material Strikes or Vessel Strikes

If sturgeon were present within the project area, potential impacts to sturgeon could result from direct strikes by construction equipment (piles, casings, etc) or by construction vessels (work boats or barges). The factors relevant to determining the risk to fish from vessel strikes vary but may be related to the size

and speed of the vessels, navigational clearance (i.e., depth of water and draft of the vessel) in the area where the vessel is operating, and the behavior of individuals in the area. No evidence of ship strike interactions with sturgeon on the Ashley River is available. The use of construction vessels during the construction period will not meaningfully increase the risk of interactions between listed species and vessels in the action area when added to baseline conditions. As such, any increased risk of a vessel strike caused by the project would be too small to be meaningfully measured or detected. As a result, the increased risk of a vessel strike on listed species in the action area is not expected to be substantial.

6.1.3 Water Quality

Turbidity associated with construction may be increased through the placement of fill for bridge approaches and pile driving or construction of drilled shafts. Turbidity from pile driving may temporarily decrease water quality. Pouring concrete into the drilled shaft casings would require a sequencing plan from the contractor to ensure that no spills of material into nearby waters would occur. Temporary formwork for the bent construction and superstructure would need to be removed over the water. The contractor would provide a staged plan for removing the formwork, and would utilize Best Management Practices (BMPs) such as netting, floating barges, and/or other containment measures. The contractor would be required to submit a painting operation plan to include timing, methodologies to prohibit overspray into waters or adjacent vegetation, and weather and wind thresholds for painting operations. Temporary clearing within the salt marsh adjacent to the Ashley River may occur to install erosion and sediment control measures. The contractor would utilize SCDOT BMPs for soil and erosion control, which may include seeding of slopes, silt fences, turbidity curtains, and sediment basins as appropriate, and prepare a spill prevention and pollution control plan to minimize the potential impact on adjacent wetlands. Timber mats and/or barges may cause temporary impacts to salt marsh grasses during construction. However, the SCDOT would minimize these temporary impacts by regularly moving mats and barges to limit compaction of marsh soils and shading of marsh grasses.

6.3 Interrelated and Interdependent Actions and Activities

Interrelated and interdependent actions are those that are part of a larger action and depend on the larger action for their justification. There are no related or dependent actions to the I-526 West project.

7. Effect Determinations

This section includes effect determinations to listed species. There are no proposed species, candidate species, or critical habitat within or near the PSA. **The proposed project may affect, but is not likely to adversely affect, shortnose sturgeon or Atlantic sturgeon.** This biological assessment analyzes the

proposed action to determine the potential adverse effects to these species as a result of bridge construction. Risk factors include being struck by construction equipment (piles, barges, trestles), construction-associated noise and turbidity, temporary or permanent loss of habitat, and temporary disruption of spawning/migratory behaviors.

8. Environmental Commitments and Conservation Measures

The SCDOT commits to implementing the following conservation measures, or actions, to minimize or compensate for effects to each species:

- Follow SCDOT Best Management Practices during construction (Appendix D)
- Obtain NPDES permit and prepare a Stormwater Pollution Prevention Plan
- Ensure equipment does not obstruct or impede passage through more than 50 percent of the Ashley River.
- Use of “slow starts” for pile driving, barge movement, and other vessel movement where activity ramps up slowly in an effort to deter marine species from the work area.
- Avoid demolition of existing in-water structures.

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WEST 526 LOWCOUNTRY CORRIDOR

Biological Assessment

for US Fish and Wildlife Service

Prepared For:

SCDOT South Carolina Department of Transportation

Prepared By:

CES Civil Engineering Consulting Services, Inc.

March 27, 2020

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Appendices

1. Project Overview

1.1 Federal Nexus

The purpose of this Biological Assessment (BA) is to address the effect of the I-526 Lowcountry Corridor West project on U.S. Endangered Species Act (ESA) listed species, listed as endangered or threatened, or their designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). Those species under the jurisdiction of the National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA-NMFS) are addressed in a separate BA.

The South Carolina Department of Transportation (SCDOT), on behalf of the Federal Highway Administration (FHWA), is pursuing informal consultation under Section 7 of the ESA on the impacts to species that will result from the proposed I-526 West project. Section 7 of the ESA assures that, through consultation with USFWS, federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species, or result in the destruction or adverse modification of critical habitat.

1.2 Project Description

The proposed I-526 Lowcountry Corridor West project extends approximately 11.4 miles from near Paul Cantrell Boulevard in West Ashley to Virginia Avenue in North Charleston in Charleston County, SC. SCDOT currently ranks the segment of I-526 between I-26 and Virginia Avenue as the most congested segment of interstate highway in the state. The remainder of the I-526 LCC West project, from I-26 to Paul Cantrell Boulevard, ranks among the top ten of the state's existing most congested corridors. Traffic forecasts show that segments of that corridor will continue to be among the state's most congested in 2040. The interchange of I-526 and I-26 is the major source of the congestion.

Through various reasonable build alternatives, SCDOT proposes to add two travel lanes in each direction along I-526 and to upgrade the interchange of I-526 and I-26. Improvements to access I-526 from Paul Cantrell Boulevard, North Rhett Avenue, and Virginia Avenue are also proposed. Proposed improvements to I-526 would include providing additional travel lanes over the Ashley River, through widening the existing bridges. An Environmental Impact Statement (EIS) is being completed that outlines alternatives to satisfy the purpose and need of the project.

1.3 Project Area and Setting

The area surrounding the project study area (PSA) is a densely populated region to the west of the City of Charleston, South Carolina (Appendix A, Figure 1). Based on the size of this project and the density of development in greater Charleston, the land use with this vicinity varied greatly. A large portion of the land within this PSA has been developed for residential, commercial, and industrial uses. Undeveloped

land primarily consists of maintained rights of way, landscaped lawns, wooded forests, and tidal marshes. Filbin Creek and its floodplain parallel and cross through the PSA, flowing to the Cooper River; this area is largely undeveloped forested wetlands. The Ashley River flows through the PSA and is surrounded by tidal mudflats and vegetated marshes. Numerous streams and wetlands are present in the PSA, including forested wetlands, emergent wetlands, tidally influenced streams, and freshwater streams.

1.4 Consultation History

A Letter of Intent (LOI) was sent to the USFWS and NOAA-NMFS by SCDOT on January 27, 2016. The USFWS provided a response to the LOI on February 1, 2016 (Appendix B). A Notice of Intent was published in the Federal Register on November 11, 2019. The project has been discussed at several Agency Coordination Effort meetings with the USFWS, NOAA-NMFS, U.S. Environmental Protection Agency (EPA), FHWA, U.S. Army Corps of Engineers (USACE), South Carolina Department of Natural Resources (SCDNR), and FHWA on March 14, 2019; April 23, 2019; July 10, 2019; September 11, 2019; October 9, 2019; November 13, 2019; December 11, 2019; January 8, 2020; February 12, 2020; and March 11, 2020.

2. Federally Proposed & Listed Species & Designated Critical Habitat

The PSA is located within the range of twenty-four species listed under the ESA within the jurisdiction of USFWS (Table 1). One of these twenty-four species, Eastern black rail, is listed as "proposed" threatened for the ESA. Proposed species are those candidate species that were found to warrant listing as either threatened or endangered, after completion of a status review and consideration of other protective conservation measures. Two additional listed species (shortnose sturgeon and Atlantic sturgeon) fall within the jurisdiction of NOAA-NMFS. These species are being coordinated directly with NOAA – NMFS. There is no Critical Habitat within the PSA.

Table 1. Species Protected under the Federal ESA.

Species	Federal Protection Status
Flatwoods salamander (*Ambystoma cingulatum)*	Threatened
American wood stork (*Mycteria americana*)	Threatened
Bachman's warbler (*Vermivora bachmanii*)	Endangered
Eastern Black rail (*Laterallus jamaicensis*)	Threatened (proposed)
Piping plover (*Charadrius melodus)*	Threatened

Species	Federal Protection Status
Red-cockaded woodpecker (*Picoides borealis)*	Endangered
Red knot *(Calidris canutus rufa)*	Threatened
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Endangered
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Finback whale *(Balaenoptera physalus)*	Endangered
Humpback whale *(Megaptera novaengliae)*	Endangered
Northern long-eared bat (*Myotis septentrionalis*)	Threatened
Right whale *(Balaena glacialis)*	Endangered
Sei whale *(Balaenoptera borealis)*	Endangered
Sperm whale *(Physeter macrocephalus)*	Endangered
West Indian manatee (*Trichechus manatus)*	Threatened
American chaff seed *(Schwalbea americana)*	Endangered
Canby's dropwort (*Oxypolis canbyi*)	Endangered
Pondberry (*Lindera melissifolia*)	Endangered
Seabeach amaranth *(Amaranthus pumilus)*	Threatened
Green sea turtle *(Chelonia mydas)*	Threatened
Kemp's ridley sea turtle *(Lepidochelys kempii)*	Endangered
Leatherback sea turtle (D*ermochelys coriacea)*	Endangered
Loggerhead sea turtle *(Carretta carretta)*	Threatened

NOAA-NMFS has sole jurisdiction over the Atlantic sturgeon and shortnose sturgeon; these species are evaluated under a separate BA that has been provided to NOAA-NMFS. The bald eagle (*Haliaeetus leucocephalus*) is also protected under the Bald and Golden Eagle Protection Act (BGEPA) and Migratory Bird Treaty Act (MBTA). The following sections detail the eight species that were noted to have suitable

habitat within the PSA. Additional detail regarding remaining species can be found within the "I-526 Lowcountry Corridor West Natural Resources Technical Memorandum" (Appendix F).

2.1 American wood stork

American wood storks (*Mycteria americana*) are the largest wading bird and only stork species that breeds in the United States. These birds are large, long legged with a head to tail length of up to 45 inches and a wingspan of up to 65 inches. Adult wood storks are white except for the primary and secondary wing feathers and the tail feathers, which are black with a greenish sheen. Adults also have an unfeathered head and neck with a long, thick black bill. The breeding range of the wood stork extends down the southeastern coast of the United States, including South Carolina. American wood storks are colonial nesters with colonies ranging from less than 12 to more than 500 in size. Nesting occurs in small to large trees typically on small islands surrounded by standing water, or in extensive forested and flooded wetlands. The species generally forages in water six to ten inches deep. They feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools. Suitable habitat and foraging habitat exists within the forested wetlands near open water located within the PSA including open ponds, wetlands, the Ashley River, and other smaller streams. During surveys, American wood storks were documented foraging in freshwater wetlands near Faber Place Drive and I-526. No active nesting rookeries were found during surveys. The closest known nesting population is approximately 3 miles north of the PSA.

American wood stork foraging in the I-526 PSA.

2.2 Bachman's warbler

Bachman's warbler (*Vermivora bachmanii*) is presumed to be extinct, historically occurring in the southeastern U.S. during its breeding season. Historically, the bird inhabited seasonally flooded swamp forests, especially with cane thickets and containing variable amounts of water, but usually with some permanent water. The Bachman's warbler is a small bird with olive-green upperparts, yellow forehead, throat, and underparts, and a faint white eye-ring and black crown and bib. The bird was last observed in

the United States in 1962 near Charleston, South Carolina. Suitable habitat for Bachman's warbler exists within the PSA. Small areas of cane thickets and seasonally flooded swamp forests with variable amounts of water were observed. Evidence of Bachman's warbler was not noted within the PSA.

2.3 Eastern Black rail

The Eastern black rail (*Laterallus jamaicensis*) is currently proposed by USFWS for listing as a threatened species. No critical habitat is proposed for designation. In addition to proposing threatened species status for the eastern black rail, USFWS is also proposing a special rule under Section 4(d) of the ESA that would tailor protections for the bird. If finalized, this 4(d) rule would exempt certain activities such as mowing from the take prohibitions of the ESA. The Eastern black rail is a small rail species that is usually grey or black-grey in color. It breeds in a wide diversity of habitats such as fresh and saline marshes, wet meadows, and savannas. Eastern black rail habitat can be tidally or non-tidally influenced, and range in salinity from salt to brackish to fresh. Its natural history is the best known in its genus due to work in temperate North America where it primarily feeds on small aquatic and terrestrial invertebrates. Suitable habitat for Eastern black rail exists in the marshes associated with the Ashley River and with other smaller stream systems. No black rails were identified during field surveys and there are no known populations within the PSA.

2.4 Piping plover

The piping plover (*Charadrius melodus*) is a small and stocky sparrow sized bird that is pale or sandy white with a black breast band and yellow bill and legs. Breeding birds have a prominent black collar and black band that runs across the forehead. The piping plover inhabits sandy beaches, mudflats and sandbars along rivers and lakes. In South Carolina, the piping plover occurs from August to April and generally overwinters in the southern United States from North Carolina to the Gulf of Mexico. Suitable foraging habitat for piping plover may exist on mudflats and sandbars associated with the Ashley and the Cooper Rivers. No piping plovers were identified during field surveys and there are no known populations within the PSA.

2.5 Northern long-eared bat

The northern long-eared bat (*Myotis septentrionalis*) is a medium-sized bat that is medium to dark brown on the back and tawny to pale-brown on the underside. The species is distinguished by its long ears. During the winter months, the northern long-eared bat can be found hibernating in caves and mines. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer, northern long-eared bats roost underneath bark and in cavities or in crevices of both

live trees and dead trees. Individuals of the species have also been found rarely roosting in structures, like barns and sheds. Habitat conducive to seasonal occupation for northern long-eared bat is located within the PSA. The PSA contains potentially suitable summer roosting and foraging habitat for this species within forested areas. The preferred winter hibernation habitat for this species does not exist within the PSA or its immediate vicinity. While the forested areas onsite could be considered suitable habitat, the narrow nature of these areas is a limiting factor for the suitability of this habitat. No northern long-eared bats were identified during pedestrian field surveys and there are no known populations or hibernacula within the PSA.

2.6 West Indian Manatee

The West Indian manatee (*Trichechus manatus)* is a large gray to brown aquatic mammal, averaging about ten feet in length and 1,000 pounds in weight. This mammal has no hind limbs, and the forelimbs are modified flippers. West Indian manatees have flattened horizontal and rounded tails used for locomotion. Manatees inhabit both fresh and salt water, including canals, rivers, estuarine habitats and saltwater bays, throughout their range. West Indian manatees concentrate in areas of warm water, primarily the Florida Gulf Coast waters, from October to April. In the summer months, the West Indian manatee will migrate as far north as coastal Virginia on the east coast and coastal Louisiana on the Gulf of Mexico. Suitable habitat for the West Indian manatee exists in the PSA within the Ashley River. West Indian manatees migrate into estuarine waters off the coast of South Carolina during the warmer, summer months and early fall from May to September, typically when water temperatures exceed 70 degrees Fahrenheit. Particular care and consideration should be taken during construction in summer months or early fall as this is when the waterways provide favorable habitat. There are known occurrences of manatees within the Cooper River near the WestRock paper facility located just outside the PSA, as well as within the Ashley River.

2.7 Canby's Dropwort

Canby's dropwort (*Oxypolis canbyi*) is a perennial herbaceous plant with tuberous roots and pale, fleshy rhizomes and erect stems up to 39 inches tall. The flowers are small and white with five petals and grow in umbels or flat-topped clusters. Canby's dropwort grows in moist areas in the coastal plain and sandhills, including wet meadows, wet pineland savannas, ditches, sloughs, and around the edges of Cypress-pine ponds. The plant seems to be more prolific when the habitat has been burned. Suitable habitat for Canby's dropwort exists within ditches and other open wet areas (i.e., grass and sedge fields) located within the PSA. Surveys were conducted during the flowering period and this species was not observed.

2.8 Pondberry

Pondberry is a deciduous shrub that grows up to six feet tall and spreads by underground stolons. The leaves are ovately to elliptically shaped, thin, membranaceous and drooping and have a strong sassafras-like odor when brushed. The flowers are pale yellow and bloom in the spring before the appearance of leaves. Fruits are bright red and oval-shaped and mature in the fall. Pondberry generally occupies wetland habitats that are normally flooded or saturated during the dormant season, but infrequently flooded during the growing season for extended periods. The plant is typically associated with bottomland hardwoods in the inner coastal plain, and margins of sinks, ponds, and other depressions in the outer coastal plain. Suitable habitat for pondberry exists within freshwater depressional wetlands and along the margins of ponds located within the PSA. Surveys were conducted during the flowering period and this species was not observed.

3. Environmental Baseline

The majority of PSA is comprised of existing roadway. Areas which are not developed were classified based upon vegetation and land form types. Vegetative terrestrial communities within the PSA were distinguished by dominant plant species and community types, location in the landscape, past disturbances, and hydrologic characteristics. Only those habitats which were located directly within the PSA are characterized. The PSA was examined through current and historical Google Earth imagery, USDA ortho imagery, and USGS topographic maps to discern areas with similar signatures, and the data were verified and classified through on-site field review. Essential Fish Habitat (EFH) is also present within the PSA and is addressed in a separate EFH Assessment.

Specific surveys for commonly occurring wildlife species were not conducted; however, wildlife readily observed and documented during the field reviews, or those likely to occur within the PSA, are summarized below.

Common bird species either observed during field reviews or known to occur within the PSA include Carolina chickadee, northern mockingbird, blue jay, northern cardinal, brown thrasher, common grackle, American crow, American goldfinch, American robin, eastern towhee, Carolina wren, eastern bluebird, chipping sparrow, red-bellied woodpecker, barred owl, red-tailed hawk, red-shouldered hawk, turkey vulture, and osprey. Wading birds and waterfowl include Canada goose, Muscovy duck, mallard, great egret, green heron, and great blue heron.

Some crayfish, common fishes, and other aquatic organisms were readily observed in the PSA in both brackish and freshwater areas. Those species, as well as others that are likely to be present in the PSA include marsh fiddler crab, periwinkle snail, eastern mudsnail, mosquito fish, channel catfish, sailfin molly, bluegill, silver perch, Atlantic menhaden, and bay anchovy.

There are many common reptile and amphibian species that could occur in the PSA including American alligator, green tree frog, various leopard frog species, skink, Carolina anole, eastern glass lizard, eastern garter snake, eastern king snake, black racer, pond sliders, eastern box turtle, snapping turtle, and American toad.

Common mammal species likely to occur in the PSA include white-tailed deer, striped skunk, river otter, raccoon, bats, cotton mouse, opossum, eastern gray squirrel, and eastern cottontail rabbit. Bottlenose dolphin are likely to occur within the Ashley River.

3.1 Aquatic and open water habitats:

3.1.1 Ashley River:

The Ashley River is a tidally influenced river within the headwaters originating in Dorchester County. The river runs for approximately 30 miles, eventually joining the Cooper River to form the Charleston Harbor before discharging eastward into the Atlantic Ocean. The entire drainage of the Ashley River system, including its headwaters in Cypress and Wassamassaw swamps, extends approximately 60 river miles. At the project site, the width of the main deeper-water navigational channel of the Ashley River is approximately 15 feet wide. The full width of the Ashley River at the project site is approximately 1,500 feet wide. Water depths in the river range from approximately 0 to 20 feet. The Ashley River is a designated State Scenic River, largely in part to numerous historic properties located along the riverbanks. Per the NOAA Ashley River bridge station (Station ID 8665099) the mean tidal range is 5.68 feet and the diurnal range is 6.23 feet. Mean high water is approximately 3.08 feet and mean low water is -3.16 feet at the center of the channel. Salinity at the PSA ranges from 12 to 17 parts per thousand (ppt).

The South Carolina Department of Health and Environmental Control (SCDHEC) has classified the waterbodies (streams and rivers) of South Carolina based on the desired uses of each waterbody. SCDHEC has established standards for various parameters to protect all uses within each waterbody classification. The Ashley River is classified as salt water (Appendix A, Figure 2). Monitoring station MD-049 is located upstream of the PSA, along the Ashley River (Appendix A, Figure 3). Aquatic life uses are not supported at MD-049 based on pH and turbidity. The term pH is a measure of the hydrogen ion concentration of

water, and is used to indicate degree of acidity. The pH scale ranges from 0 to 14. A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic. Low pH values are found in natural waters rich in dissolved organic matter, especially in coastal plain swamps and black water rivers. Turbidity is an expression of the scattering and absorption of light through water. The presence of clay, silt, fine organic and inorganic matter, plankton, and other microscopic organisms increases turbidity. Increasing turbidity can be an indication of increased runoff from land. Recreation is only partially supported at this same site (MD-049), based on elevated fecal coliform levels. A fish consumption advisory due to elevated mercury levels in certain types of fish is in place for the Ashley River, including the area at the I-526/General William C. Westmoreland Bridge and northwards/upstream of the project to SC 165.

A Total Maximum Daily Load (TMDL) has been developed for the Charleston Harbor, Cooper, Ashley, and Wando Rivers and approved by the EPA to identify opportunities to increase dissolved oxygen (DO) in the watershed[1]. Many coastal waters in South Carolina have DO levels below the established DO criteria. Wastewater dischargers and other anthropogenic influences may contribute to low DO in coastal waters. Natural factors such as organic loading and reduced oxygen levels from wetlands and marshes and estuarine dynamics in the mixing zone where freshwater and saltwater come together can create naturally low DO conditions. The waters in and around Charleston Harbor are considered to be both naturally low in DO and further impacted by wastewater dischargers. Potential sources of oxygen demand loading that were considered include National Pollutant Discharge Elimination System (NPDES) wastewater discharges (continuous point sources), NPDES stormwater discharges (noncontinuous point sources), non-point sources, and natural background sources.

A large portion of the PSA is within Shellfish Growing Area 10B (Appendix A, Figure 4). This area encompasses the Charleston Harbor, Ashley River, Cooper River, and their tributaries that support shellfish. Waters within this management area in the PSA have been given the classification of "prohibited" and as such, these areas are closed to all human consumption. Prohibited areas are those that are administratively closed for the harvesting of shellfish for any purposes related to human consumption. These closures are established adjacent to permitted wastewater discharges, marina facilities, or areas containing multiple point sources of pollution. This classification is not based upon violation of a bacteriological standard.

[1] https://www.scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/Chas_Hbr_DO_TMDL.pdf

There are various types of navigational activities by numerous vessel types that occur along the Ashley River. To determine the types and extents of activity in the channel, existing documentation was reviewed regarding known vessel use. This included a review of bridge opening records of a nearby moveable downstream facility, the T. Allen Legare bridges, located at mile points 2.4 and 2.5. A large portion of marine traffic in the area surrounding the proposed project constitutes recreational and commercial (fishing) boating.

3.1.2 Filbin Creek

Filbin Creek is another major drainage located within the PSA. Within the PSA this tributary flows along I-526 between the Charleston International Airport and Tanger Outlets, a commercial shopping center. Filbin Creek flows southwest to northeast crossing the project corridor in several locations and terminating at the Cooper River. This feature flows along I-526 for approximately 4.5 miles of the over 11 mile project corridor. It is an urban stream that has been channelized in portions, and suffers from low water quality as a result of proximity to heavy development and runoff. An SCDHEC water quality monitoring station is located at the mouth of Filbin Creek where it flows into the Cooper River (MD-249). The latest reported data from this station notes that aquatic life uses are partially supported due to dissolved oxygen excursions. There is a significant increasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

3.1.3 Other Streams

Additional named and unnamed streams traverse the PSA. Over 37,900 linear feet (7.18 miles) of streams were identified and delineated within the project area. Additionally, 9,559.21 (1.81 miles) linear feet of tidally influenced stream were identified and delineated within the project area. Project activities such as roadway fill and culvert extension would result in impacts to a portion of these streams.

3.1.4 Open Ponds

Open freshwater communities within the PSA include man-made ponds and naturalized borrow pits. These areas typically consist of open and deeper water within the central portion and vegetated, shallow water along the outer portion of the pond. Several man-made freshwater ponds exist throughout the study area and are often hydrologically connected to other wetlands, streams, and ditches. Plant species

common to the shallow, vegetated portions of the ponds and borrow pits include black willow (*Salix nigra)*, wax myrtle (*Morella cerifera)*, duckweed (*Lemna* sp.), and various species of cattail (*Typha* sp.).

3.2 Terrestrial and mixed aquatic habitats:

3.2.1 Maintained Development

Maintained developments were classified as areas or regions which have altered the native state of the land for consumptive human use. Man-maintained and disturbed communities within the PSA also include roadside shoulders and utility rights of way. Most of the naturally-occurring plants associated with these maintained or disturbed communities have been eliminated and/or replaced with cultivated grasses or taken over by naturally occurring opportunistic species characteristic of disturbed areas. These areas encompassed land uses such as residential homes, commercial developments, roadway surfaces, and parking lots. Most of the disturbed roadway edges are comprised of herbaceous species and sparse shrubs, including various grasses such as common fescue (*Festuca* sp.), ryegrass (*Lolium perenne*), bahia grass (*Paspalum notatum*), and bluegrass (*Poa* sp.).

3.2.2 Mixed Pine/Hardwood Forest

Mixed pine/hardwood forest is a dominant community type located throughout the majority of the PSA. Dominant vegetation consists of pine species including loblolly pine (*Pinus taeda*), long-leaf pine (*Pinus palustris*), and pond pine (*Pinus serotina*). Hardwood species observed include sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), water oak (*Quercus nigra*), and tulip poplar (*Liriodendron tulipifera*). Smaller hardwood/ sapling species include eastern red cedar (*Juniperus virginiana*), American holly (*Ilex opaca*), and wax myrtle. Groundcover and vine strata include saw palmetto (*Serenoa repens*), blueberry (*Vaccinium* sp.), greenbrier (*Smilax* sp.), and partridge berry (*Michella repens*).

3.2.3 Scrub/ Shrub

Scrub shrub habitat is characterized as being cleared within the past five years. These areas do not have the established species found in the mixed hardwood forest but are not frequently mowed like roadsides and lawns. Notable areas include dry drainages, areas beneath overpasses and interchanges, and spaces that have been maintained in the past but have been allowed to lie fallow. These communities often include ruderal and non-native species. These species tend to be more widespread and occupy numerous habitat types. These areas include an early diverse array of herbaceous species within the initial phases of disturbance and transition towards the climax community, replacing primary colonizers. Species observed in the PSA include sweetgum, Chinese tallow tree (*Triadica sebifera*), blackberry (*Rubus sp.*),

eastern baccharis (*Baccharis halimifolia*), Chinese privet (*Ligustrum sinense*), Autumn olive (*Eleagnus umbellata*), honey suckle (*Lonicera japonica*), and broomsedge (*Andropogon sp.*).

3.2.4 Bottomland Hardwood Forest

Bottomland hardwood forest habitat is present in small locations within the limits of the PSA. These areas are confined to the floodplain zones of creeks and perennial tributaries where out of bank flooding seasonally inundates benches and terraces. These areas are typically mapped within flood zones of waterways. This community type within the PSA is comprised of dominant vegetation of hardwood tree species that includes red maple, tulip poplar, sweetgum, and water oak. Mid canopy species comprise a low-density layer of younger individuals where gaps within the upper canopy allow for sunlight to penetrate. Shrub components within the community may be comprised of Chinese privet and giant cane (*Arundinaria gigantea*). Herbaceous ground cover is sparse to bare, with a dense duff layer holding moisture within the soil column for extended periods.

3.2.5 Tidal Wetlands

The tidal wetland communities are characterized by being periodically inundated in correlation with ocean tides. Soils consist of soft organics and alluvial deposits and support a variety of herbaceous vegetation. Species observed include smooth cordgrass (*Spartina alterniflora*), black needlerush (*Juncus roemerianus*), and saltmeadow cordgrass (*Spartina patens*), occurring in tidally flooded areas. Along the banks, Eastern baccharis and wax myrtle were observed.

3.2.6 Brackish Marsh

Brackish marshes are representative of an estuarine transition zone where a mixture of fresh and saltwater occurs, resulting in brackish water with lower salinity levels, and thereby allowing the presence of both fresh and saltwater plant species. Other species that may be found in the brackish marsh community include big cordgrass (*Spartina cynosuroides*), narrow-leaf cattail (*Typha angustifolia*), saltmeadow cordgrass, bulrush (*Scirpus spp.*), salt grass (*Distichlis spicata*), annual wildrice (*Zizania aquatica*), and Jamaica sawgrass (*Cladium mariscus*).

3.2.7 Freshwater Herbaceous Wetlands

This habitat type does not support woody vegetation but is characterized by a mix of herbaceous species often growing in standing or perennially moist soils. These areas are not tidally influenced and within the project area were commonly noted along margins of larger water bodies or as stormwater retention areas. Cattail, wool grass (*Scirpu s*), sedges (*Carex* sp.), rushes (*Juncus* sp., *Eleocharis* sp.) were common in these

areas. Margins of these open areas are often lined with sapling woody species such as alder (*Alnus serrulata*), birch (*Betula nigra*), and black willow.

3.2.8 Forested Wetlands

This is the most common wetland type throughout the site. These features have hydric soils and may or may not have evidence of periodic standing surface water. Canopy species are mixed hardwood with a sapling and shrub stratum. Ground cover may or may not be present. Notable species include: sweet gum, red maple and southern magnolia (*Magnolia grandiflora*) as canopy species with water oak, yaupon (*Ilex vomitoria*) and cabbage palmetto (*Sabal palmetto*) composing a sampling stratum. Shrubs include Chinese privet, fetterbush (*Lyonia lucida*), and giant cane. Herbaceous species include rushes, and a mix of sedges. Vines such as greenbrier and honey suckle were often observed in this habitat type.

3.2.9 Cypress-tupelo Wetlands

This is a mature forested habitat type characterized by an overstory of bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*). Other species present include swamp tupelo (*Nyssa biflora*), red maple, swamp cottonwood (*Populus eterophylla*), and Carolina ash (*Fraxinus caroliniana*). Shrub and herbaceous layers are less diverse or absent. This habitat type is open and may have standing water for all or part of the year.

4. Project Details

4.1 Construction

This project is expected to be delivered either via the design build or bid build process and final construction and design plans would be determined by the contractor and/or SCDOT. To maintain competitiveness during the bid process, means and methods of construction may not be final, giving contractors the ability to propose specific methods and equipment. The following is an outline of the likely construction activities and project designs. This may vary slightly depending on the selected contractor and bid process. Any modifications from those proposed in this document that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.

4.1.1 Roadway Construction

Road construction generally entails the addition of two 12-foot lanes of paved roadway and additional right-of-way. Improvements to local connecting streets, interstate on and off ramps, and roadway drainage would also be constructed. In many areas these impacts would occur to upland maintained habitat that is already disturbed. In some areas, such as bridge approaches, additional habitat would be converted to road right of way.

4.1.2 Ashley River Bridge Construction

The widened bridge structures would each be approximately 32 feet, 5.5 inches wide (Appendix B, Conceptual Design Plans). During construction of the widened bridge, traffic would be maintained on the existing facility. Maintenance and improvements would be made to the existing Westmoreland bridges and the structure would be retained at its existing height and length.

The proposed minimum horizontal clearance for the main navigational opening would be 60 feet between fenders. This configuration will be similar to the existing bridge, or would be less restrictive. The vertical clearance of the proposed fixed span bridge would be a minimum of 35 feet from the MHW datum to meet the needs of mariners in the area.

Generally, the project improvements would consist of the following components:

- Widening of the northbound and southbound roadway approaches to the Westmoreland Bridges.
- Construction of temporary access areas to include matting, barges, and work trestles.
- Construction of a new structure to the south, or downstream side, of the existing Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts with poured concrete support.
- Construction of a new structure within the center of the existing northbound and southbound Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts.
- Extension of the existing fender system to the south of the existing Westmoreland Bridge.
- Painting existing and new bridge structures.
- Lighting to be installed for navigation and to meet SCDOT urban interstate lighting requirements ("Roadway Lighting on Interstate Routes in South Carolina").

4.1.2.1 Temporary Bridge Access

Temporary work trestles would be placed in marsh and wetland areas for construction access outside of the existing eastbound bridge (Appendix B, Conceptual Design Plans). Temporary trestle would be approximately 30 feet wide and would be supported by steel pipe piles. The steel piles would be approximately 24-inches in diameter and would be installed using a vibratory hammer. It is estimated that 240 24-inch steel pipe piles would be needed for temporary work trestle. With one work crew performing installation, approximately 4 piles would be driven per day with an average of 350 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day.

For access over marsh areas between the existing bridges either trestle or a combination of barge, barge mats, and timber mats would be needed due to the limited space between the structures. Deeper water and the main channel of the Ashley River would be accessed via barges for construction. Barges may be delivered and moved via water and transport vessels or via land on flatbed trucks with cranes and other heavy equipment. At no point would barges in the Ashley River block more than 50% of the channel.

4.1.2.2 Prestressed Concrete Pile Installation

Prestressed concrete piles will be installed outside of the main channel of the Ashley River. These piles would have an H-pile steel "stinger" at the end of the concrete pile to prevent damage to the pile as it is driven into hard subsurface materials. Piles would be installed with a hammer or vibratory hammer. Within the Ashely River, Bents 72 through 79 would be supported by prestressed concrete piles. Additional concrete piles would be installed in the adjacent marshes, outside of the boundaries of the Ashley River. It is estimated that 580 24-inch prestressed concrete piles would be needed for bridge widening. With one work crew performing installation, approximately 6 piles would be driven per day with an average of 300 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day.

4.1.2.3 Drilled Shaft Installation

At the approaches to, and over the main channel of the Ashley River, drilled shafts are proposed to support the new bridge structures. Each shaft would be approximately 7 feet in diameter. To install, steel casing would be installed at each location using a vibratory or pile driving hammer. Inside of that casing would be drilled so that rebar cage can be installed. Concrete would then be poured into the casing to create a large support structure in the water. Approximately 120 drilled shafts would be needed for the bridge widening. One shaft per day would be constructed by one work crew, but multiple crews could install supports concurrently. Within the Ashley River, these drilled shafts would be installed at bents 48 through 71, and at bents A, B, C, and D. Bents 48 through 59 are located at the southerly or westerly (West Ashley) approach to the Ashley River. Bents A through D are at the deepest portion of the main channel of the Ashley River. Bents 60 through 71 are located at the northerly or easterly (North Charleston) approach to the Ashley River. Bents 59 through 79 and bents A through D are located within the Ashley River and are the focus of this analysis.

4.1.2.4 Fender System

The existing fender system will be extended with a system that can accommodate all required uses of the waterway. The proposed fender system will be designed for both recreational watercraft, as well as larger vessels such as commercial fishing boats and tug boats. The fender elements would likely consist of

rubber fenders, with a steel panel and polyethylene facing. Additional prestressed concrete piles will be required to support the new fender systems. These piles would not be load bearing and would not require extensive pile strikes such as those on the permanent bridge system.

4.1.2.5 Drainage

Drainage of stormwater from surface runoff from the newly constructed bridges is proposed to be discharged via open scuppers.

4.1.3 Project Timeline

Construction is expected to begin in 2022. Construction of the bridge phase over the Ashley River would last approximately three years, with road construction extending beyond this three-year period. Within that three-year period, in-water work of an estimated 5 months would be needed for prestressed pile bents and 16 months would be needed for drilled shaft bents. This project is expected to be delivered via the design build process and final construction sequencing will be determined by the contractor. The following is an outline of the likely construction sequence. This sequence may vary slightly depending on the selected contractor. Any modifications from this proposed by the contractor that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.

4.1.4 Site Preparation

After additional right-of-way is acquired, surveys are conducted, and utility location work will begin. Site clearing and grubbing will be necessary for some areas outside of the already maintained right-of-way. These specific areas are not known until a Preferred Alternative is selected and the roadway design is finalized. Grading of slopes will be required and will follow the established Stormwater Pollution Prevention Plan (SWPPP).

4.1.5 Construction Access and Staging

Areas for staging, laydown and equipment would primarily be sited outside of aquatic habitats. Best management practices (BMPs), along with other proven procedures would be implemented to mitigate potential temporary impacts from construction. In addition, detailed engineering and construction plans would be developed for the Preferred Alternative, which would specify procedures to mitigate potentially adverse impacts.

4.1.5 Potential Impacts on Water Quality

Ashley River and Filbin Creek may see a temporary increase in turbidity as a result of the in-water work such as driving piles and staging materials from barges. Outside of small repairs no major demolition is planned. BMPs should be followed to avoid paint, solvents and other chemicals from entering the

waterway. Steel girders would be used in the construction of the new bridge spans over the main channel of the Ashley River and would need to be surface prepped and painted to withstand impacts from weather and the marine environment. The contractor would be required to submit a painting operation plan to include timing, methodologies to prohibit overspray into waters or adjacent vegetation, and weather and wind thresholds for painting operations.

Migration of fill material in stormwater runoff would be minimized by following the SWPPP and utilizing BMPs such as double rows of silt fence, sediment basins, turbidity curtains, immediate seeding and matting of slopes, and check dams.

4.2 Operations and Maintenance

Once construction is complete, much of the operations and maintenance of the roadway will take place in upland, maintained roadside habitat. Tasks such as routine mowing, guard rail repairs, road surface repairs, and stormwater infrastructure maintenance would be needed. Routine maintenance is expected on the existing and proposed new bridges including sanding/painting, deck resurfacing, concrete patching, lighting replacement, and periodic fender and dolphin repair from exposure and/or vessel strikes. SCDOT Maintenance would utilize best management practices to limit sediment and non-point source runoff resulting from maintenance activities.

5. Project Action Area

5.1 Project Action Area

The action area, as defined under 50 CFR §402.02, includes all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The project roadway action area includes approximately 1,600 acres, as shown in Appendix A, Figure 1. The action area at the Ashley River bridge, as it relates to potential West Indian manatee impacts, extends 500 meters (1,650 feet) upstream and downstream of the proposed project. The basis for the selection of the 1,650 feet upstream and downstream of the proposed project was due to the limits of the proposed action and potential turbidity effects in the Ashley River. Although sedimentation is not expected to be long lasting or severe based on the velocity of currents in the area, the effects from sedimentation are expected to be wider ranging than noise effects.

5.2 Limits of an Action Area

The limits of the action area are within the PSA. The PSA would likely be refined once a Preferred Alternative is selected. The action area may be slightly modified again as the design team begins final

road, bridge, and drainage design. Any activities that could potentially impact protected species, other than those already outlined in this document may require additional Section 7 coordination.

6. Effects Analysis

6.1 Direct and Indirect Effects

Direct and indirect effects to species will be avoided and minimized to maximum extent practicable. There are no known populations of threatened or endangered species residing in the project area. In the case of the wildlife species, the anticipated direct impacts are to potential foraging habitat, as opposed to known nesting, roosting, or spawning habitat. Generally, secondary or indirect impacts are induced by the initial action. They may be comprised of a variety of effects such as changes in land use, development patterns, water quality, wildlife habitat, and other natural systems. Transportation projects may influence development in localized areas and have environmental impacts resulting from land use changes. Risk factors include being struck by construction equipment or materials (piles, barges, trestles, heavy equipment), construction-associated noise and turbidity, temporary or permanent loss of habitat, and temporary disruption of spawning/migratory behaviors. In the case of the plant species, surveys were conducted within the survey window and no protected species were identified. Activities associated with the widening of I-526 West would cause temporary impacts to the natural environment in the form of noise, habitat conversion, shading, and potential temporary sedimentation. These activities would be avoided and minimized to the maximum extent possible. Potential impacts are as listed:

American wood stork: Three American wood storks were observed feeding within the PSA. There are no known wood stork rookeries within the PSA. The proposed project would affect wood stork foraging habitat. While impacts would be minimized, areas of open waters and wetlands would be filled with widened bridge approaches and widened roadways. Foraging wood storks would likely avoid the construction area when activity and noise increases. The project area contains a system of wetlands, tidal creeks, and marshes, which provide alternative feeding habitats nearby. **Therefore, the proposed project may affect, but is not likely to adversely affect American wood stork.**

Bachman's warbler: Suitable habitat for Bachman's warbler exists within the PSA. Small areas of cane thickets and seasonally flooded swamp forests with variable amounts of water were observed. Evidence of Bachman's warbler was not noted within the PSA. The bird was last observed in the U.S. in 1962 near Charleston, South Carolina. **Therefore, the proposed project may affect, but is not likely to adversely affect Bachman's warbler.**

Eastern black rail: Suitable habitat for Eastern black rail exists in the marshes associated with the Ashley River and other streams within the PSA. No black rails were identified during field surveys and there are no known populations within the PSA. **Therefore, the proposed project may affect, but is not likely to adversely affect Eastern black rail.**

Piping plover: Suitable foraging habitat for piping plover may exist on mudflats and sandbars associated with the Ashley and the Cooper Rivers. No piping plovers were identified during field surveys and there are no known populations within the PSA. **Therefore, the proposed project may affect, but is not likely to adversely affect piping plover.**

Northern long-eared bat: Habitat conducive to seasonal occupation for northern long-eared bat is located within the PSA. The PSA contains potentially suitable summer roosting and foraging habitat for this species within forested areas. The preferred winter hibernation habitat for this species does not exist within the PSA or its immediate vicinity. In addition, the narrow range of forested woodlands within the PSA is a limiting factor to its suitability for this species. No northern long-eared bats were identified during pedestrian field surveys and there are no known populations or hibernacula within the PSA. Federal agencies often utilize the "Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form" regarding potential impacts to this species. This framework allows federal agencies to rely upon the USFWS January 5, 2016, intra-Service Programmatic Biological Opinion on the final 4(d) rule for section 7(a)(2) compliance. According to the 4(d) rule, the proposed project may affect the northern long-eared bat, but any resulting incidental take of the species is not prohibited by the final 4(d) rule. A draft version of this form is included in Appendix D. **Therefore, the proposed project may affect, but is not likely to adversely affect this species and incidental take is not prohibited by the 4(d) rule.**

West Indian manatee: Suitable habitat for the West Indian manatee exists in the PSA within the Ashley River. West Indian manatees migrate into estuarine water off the coast of South Carolina during the warmer, summer months and early fall from May to September. There are known occurrences of manatees within the Cooper River near the WestRock paper facility located just outside the PSA, as well as within the Ashley River. Vessel strikes pose a serious threat to the slow-moving manatee (USFWS 2001b). Care and consideration should be taken during construction in summer months or early fall as this is when the waterways would likely support increasing numbers of manatee. The USFWS North Florida Field Office has created Manatee Protection Guidelines (Appendix E) which, if incorporated into construction activities, could reduce the potential of vessel strikes. A trained spotter would be needed from May to October for in-water work in the Ashley River. Other conditions, such as operating vessels

as slow speeds and halting in-water work if a manatee is spotted would reduce the potential to animal strikes.

An additional risk to manatees is created through the generation of in-water construction noise. Manatee's functional hearing range and responsiveness to noise has been disputed in recent studies (Gerstein et al. 2008; Gerstein et al. 1999). Impact thresholds for manatees have not been developed at this time. Bridge construction activities such as impact pile driving and drilled shaft installation could harm manatees if individuals are close to the noise source for prolonged periods. Differing types of installation of support structures could reduce impacts to manatees. Fewer impacts are seen from vibratory installation of casing for drilled shafts as opposed to higher impact pile driving. Vibratory driving of new piles or bridge support structures generates a continuous but low-level noise that is unlikely to cause more than non-injurious, insignificant behavioral effects to the species. During construction, the potential effect of underwater noise impacts would also be minimized through the use of "slow starts", where pile driving ramps up slowly in an effort to deter manatees from the work area. In accordance with Manatee Protection Guidelines, if manatees are observed within 50 feet of active construction equipment, that equipment would be shut down. Utilizing these guidelines would minimize potential adverse effects of underwater construction noise on manatees in the project area.

A minor threat to manatees may be created through increased turbidity during construction. This may come as the result of the placement of bridge pilings and would be temporary. Best management practices would be implemented to minimize turbidity. The indirect effect on manatees would be minimal because manatees often inhabit areas with turbid conditions (FWC 2007). In accordance with Manatee Protection Guidelines, if siltation or turbidity barriers are used, they would be made of material in which manatees cannot become entangled, would be properly secured, and would be regularly monitored to avoid manatee entanglement or entrapment.

Adverse effects on manatees are not expected to occur within the project area because construction operations would follow the Manatee Protection Guidelines. Furthermore, manatees would likely avoid the construction area given the increased vessel traffic and noise. **Therefore, the proposed project may affect, but is not likely to adversely affect West Indian manatee.**

Canby's dropwort: This plant grows in moist areas in the coastal plain and sandhills, including wet meadows, wet pineland savannas, ditches, sloughs, and around the edges of Cypress-pine ponds. Canby's dropwort seems to be more prolific when the habitat has been burned. Suitable habitat for Canby's

dropwort exists within ditches and other open wet areas (i.e., grass and sedge fields) located within the PSA. Surveys were conducted during the flowering period and this species was not observed. **Therefore, the proposed project may affect, but is not likely to adversely affect Canby's dropwort.**

Pondberry: This plant is typically associated with bottomland hardwoods in the inner coastal plain, and margins of sinks, ponds, and other depressions in the outer coastal plain. Suitable habitat for pondberry exists within freshwater depressional wetlands and along the margins of ponds located within the PSA. Surveys were conducted during the flowering period and this species was not observed. **Therefore, the proposed project may affect, but is not likely to adversely affect pondberry.**

6.2 Interrelated and Interdependent Actions and Activities

Interrelated and interdependent actions are those that are part of a larger action and depend on the larger action for their justification. There are no related or dependent actions to the I-526 West project.

7. Effect Determinations

This section includes effect determinations to listed species (Table 2). There are no candidate species, or critical habitat within or near the PSA. There is one proposed threatened species, the Eastern black rail. Proposed threatened species are not protected by the take prohibitions of Section 7, consistent with any protective regulations finalized under section 4(d) of the ESA, until the rule to list is finalized. Under section 7(a)(4) of the ESA, federal agencies must confer with the USFWS if their action will jeopardize the continued existence of a proposed species.

Table 2. Protected Species Effect Determinations

Species	Protection Status	Biological Conclusion
Flatwoods salamander (*Ambystoma cingulatum)*	Threatened	No effect
American wood stork (*Mycteria americana*)	Threatened	May affect, not likely to adversely affect
Bachman's warbler (*Vermivora bachmanii*)	Endangered	May affect, not likely to adversely affect
Eastern Black rail (*Laterallus jamaicensis*)	Threatened (proposed)	May affect, not likely to adversely affect
Piping plover (*Charadrius melodus)*	Threatened	May affect, not likely to adversely affect
Red-cockaded woodpecker (*Picoides borealis)*	Endangered	No effect
Red knot *(Calidris canutus rufa)*	Threatened	No effect
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Endangered	May affect, not likely to adversely affect

Species	Protection Status	Biological Conclusion
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	May affect, not likely to adversely affect
Finback whale *(Balaenoptera physalus)*	Endangered	No effect
Humpback whale *(Megaptera novaengliae)*	Endangered	No effect
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	May affect, but any resulting incidental take is not prohibited by the final 4(d) rule
Right whale *(Balaena glacialis)*	Endangered	No effect
Sei whale *(Balaenoptera borealis)*	Endangered	No effect
Sperm whale *(Physeter macrocephalus)*	Endangered	No effect
West Indian manatee (*Trichechus manatus)*	Threatened	May affect, not likely to adversely affect
American chaff seed *(Schwalbea americana)*	Endangered	No effect
Canby's dropwort (*Oxypolis canbyi*)	Endangered	May affect, not likely to adversely affect
Pondberry (*Lindera melissifolia*)	Endangered	May affect, not likely to adversely affect
Seabeach amaranth *(Amaranthus pumilus)*	Threatened	No effect
Green sea turtle *(Chelonia mydas)*	Threatened	No effect
Kemp's ridley sea turtle *(Lepidochelys kempii)*	Endangered	No effect
Leatherback sea turtle (D*ermochelys coriacea)*	Endangered	No effect
Loggerhead sea turtle *(Carretta carretta)*	Threatened	No effect

An ESA Section 7 project affect determination on bald eagle is not necessary as the species is no longer protected by the ESA and does not require Section 7 consultation. As proposed, there would be no impacts to bald eagle.

8. Conservation Measures and Environmental Commitments

Steps should be taken to avoid impacts to wetlands and aquatic areas to minimize the potential to impact West Indian manatee and American wood stork. The aforementioned species rely on wetland and open water areas for habitat and as such habitat degradation and elimination should be minimized.

Drilled shafts should be used in place of driven piles where possible. Equipment and materials used during the construction of the bridge would not obstruct or impede passage through more than 50 percent of the channel. Underwater noise impacts would also be minimized through the use of "slow starts", where pile-driving ramps up slowly in an effort to deter marine species from the work area.

The SCDOT commits to implementing the following conservation measures, or actions, to minimize or compensate for effects to each species:

- Follow SCDOT Best Management Practices during construction
- Obtain NPDES permit and prepare a Stormwater Pollution Prevention Plan
- Ensure equipment does not obstruct or impede passage through more than 50 percent of the Ashley River.
- Use of "slow starts" for pile driving, barge movement, and other vessel movement where activity ramps up slowly in an effort to deter marine species from the work area.
- Avoid demolition of existing in-water structures.
- Obligations under Section 7 of the Endangered Species Act must be considered if (1) new information reveals impacts associated with this project may affect listed species or critical habitat in a manner not previously considered, (2) the project is subsequently modified in a manner which was not considered in this assessment, or (3) a new species is listed or critical habitat is determined that may be affected by the proposed improvements."
- All contractors involved in the construction will be required to comply with the USFWS Manatee Protection Guidelines (Appendix E) for in-water work.
    - Conservation measures would be undertaken to minimize the three predominate risks to manatees including vessel strikes, noise, and turbidity. The contractor would adhere to the USFWS Manatee Protection Guidelines during project construction to eliminate the possibility of construction related manatee injury or death. To avoid striking manatees, construction vessels would operate at low speeds (no-wake or idle) within the project area and when operating with less than a 4-foot clearance from the bottom. The use of a designated spotter between May 15 and October 15 would provide reasonable assurance against impacts resulting from in-water work. In-water moving equipment would be halted if a manatee is spotted within 50 feet of the in-water construction area. Any collision or injury to manatees will be reported immediately to the USFWS South Carolina Field Office.
    - The project manager and/or contractor would inform all project personnel that manatees may be present in the project area. The project manager would ensure that all construction personnel know the general appearance of the species and their habit of moving about completely or partially submerged in shallow water.

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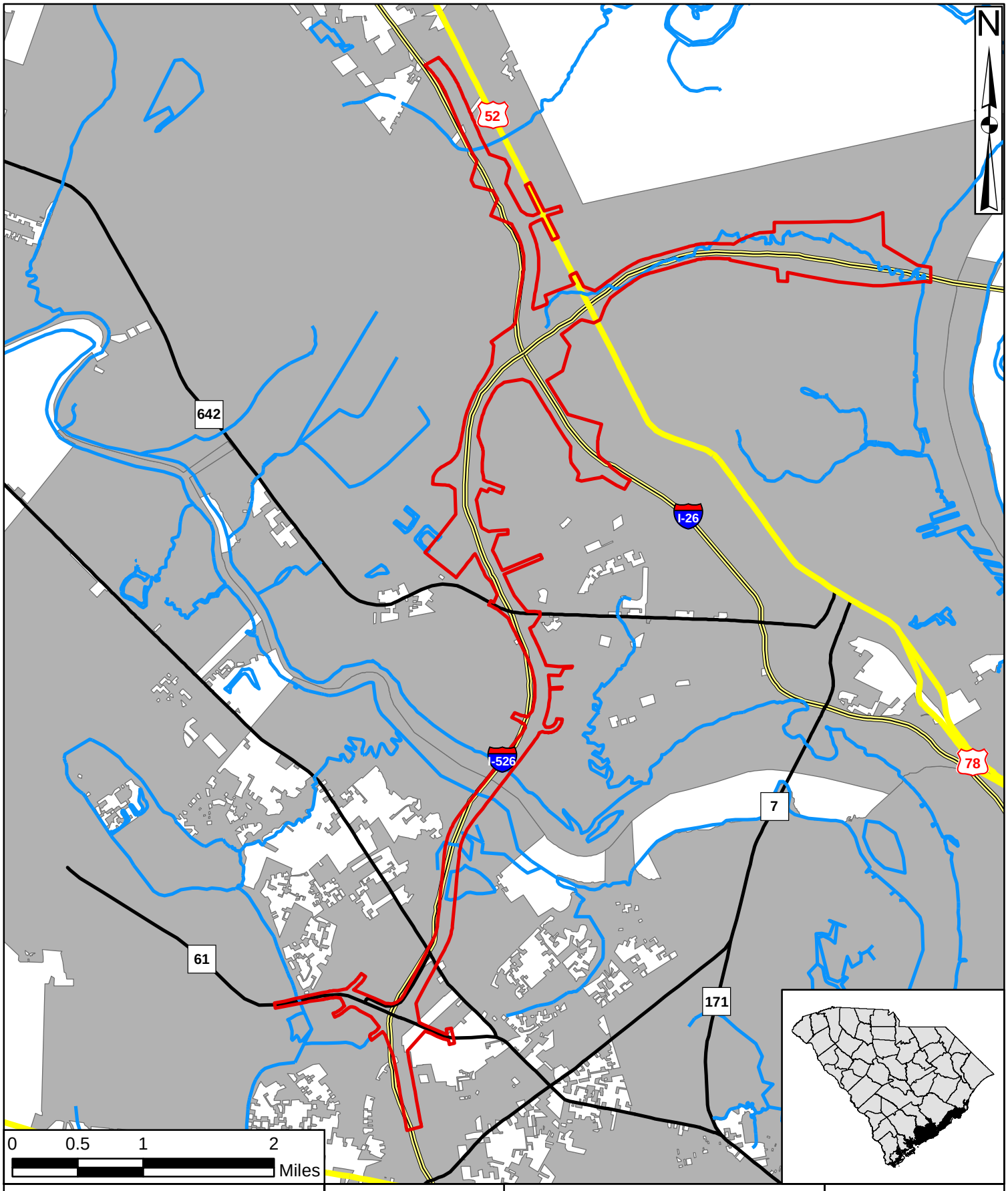
APPENDIX A

FIGURES



SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

Source:
Composite County
Roadway Data

Drawn By: RHH
QA/QC: KLM

I-526 Lowountry Corridor West
Charleston County
SCDOT P032102
February 2020

Project Location

Figure 1

Legend
- Project Study Area
- Streams
- SC Route
- US Route
- Interstate
- Incorporated City Limits

SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

Source:
USGS, 2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

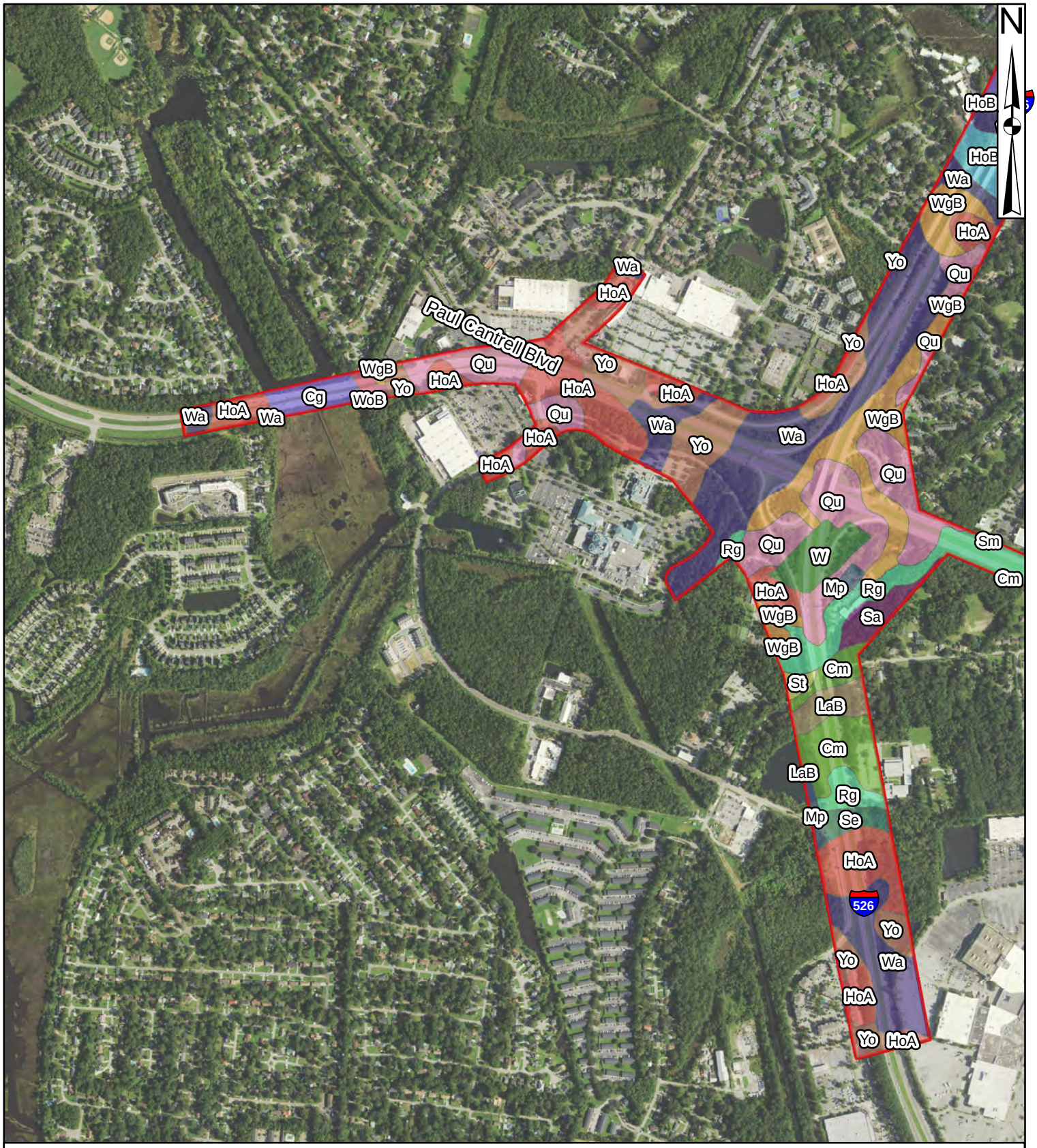
Drawn By: RHH
QA/QC: KLM

Topographic Relief

Figure 2

Legend

Project Study Area



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SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

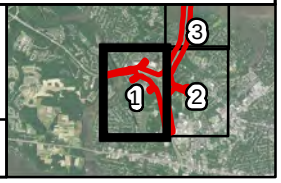
Source:
NRCS Charleston
County Soils

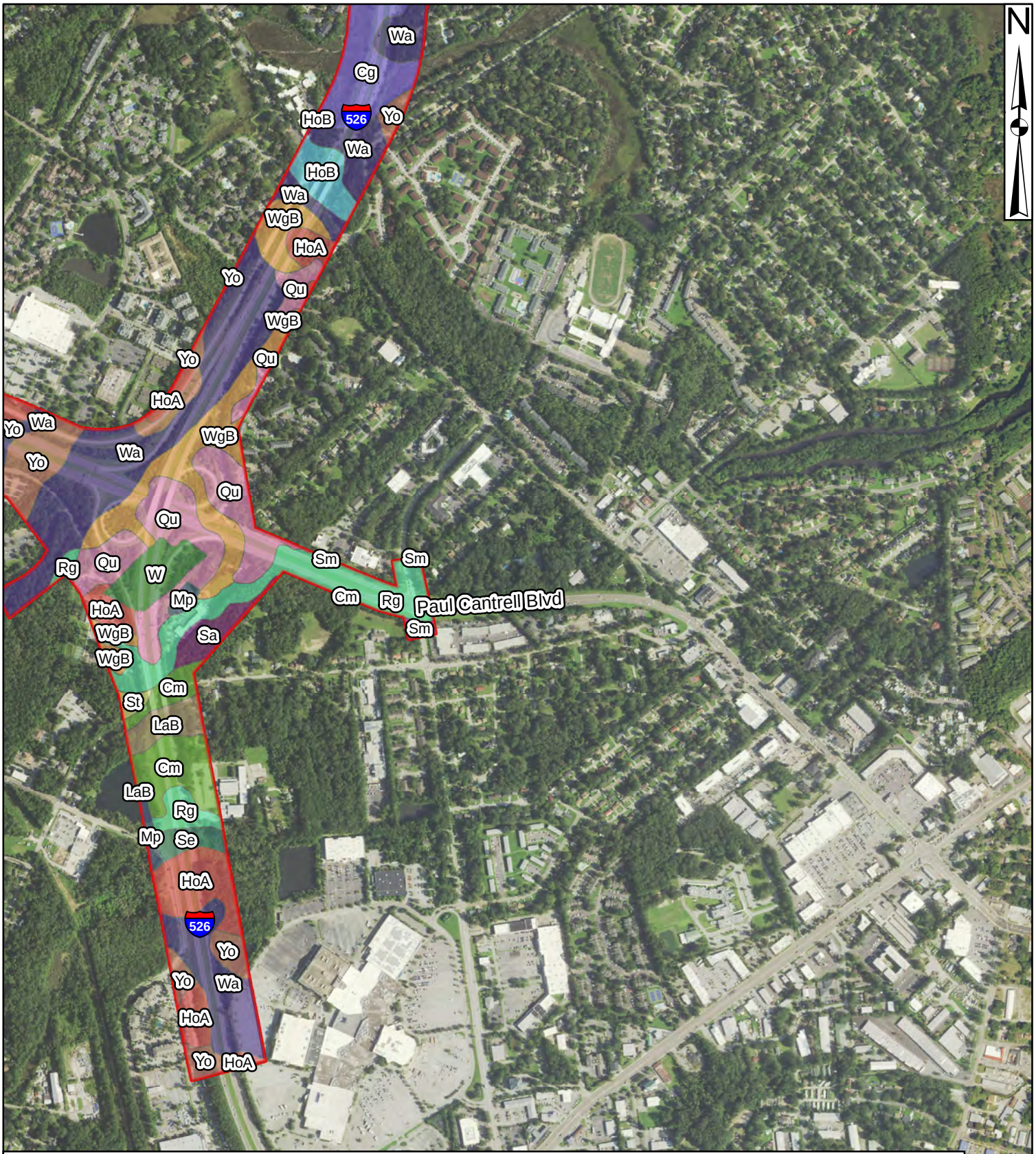
I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

NRCS Soils Data

Figure 3
Sheet 1 of 11





Legend

- Cg (Caspers silty clay loam)
- Cm (Chipley loamy fine sand)
- HoA (Hockley loamy fine sand, 0-2% slopes)
- HoB (Hockley loamy fine sand, 2-6% slopes)
- LaB (Lakeland sand, 0-6% slopes)
- Mp (Mine pits and dumps)
- Qu (Quitman loamy sand)
- Rg (Rutlege loamy fine sand)
- Sa (St. Johns fine sand)
- Se (Santee loam)
- Sm (Seewee complex)
- St (Stono fine sandy loam)
- W (Water)
- Wa (Wadmalaw fine sandy loam)
- WgB (Wagram loamy fine sand, 0-6% slopes)
- Yo (Yonges loamy fine sand)
- Project Study Area

SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

Source:
NRCS Charleston
County Soils

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
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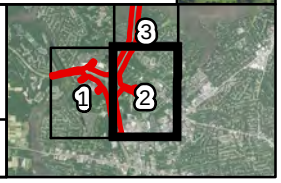
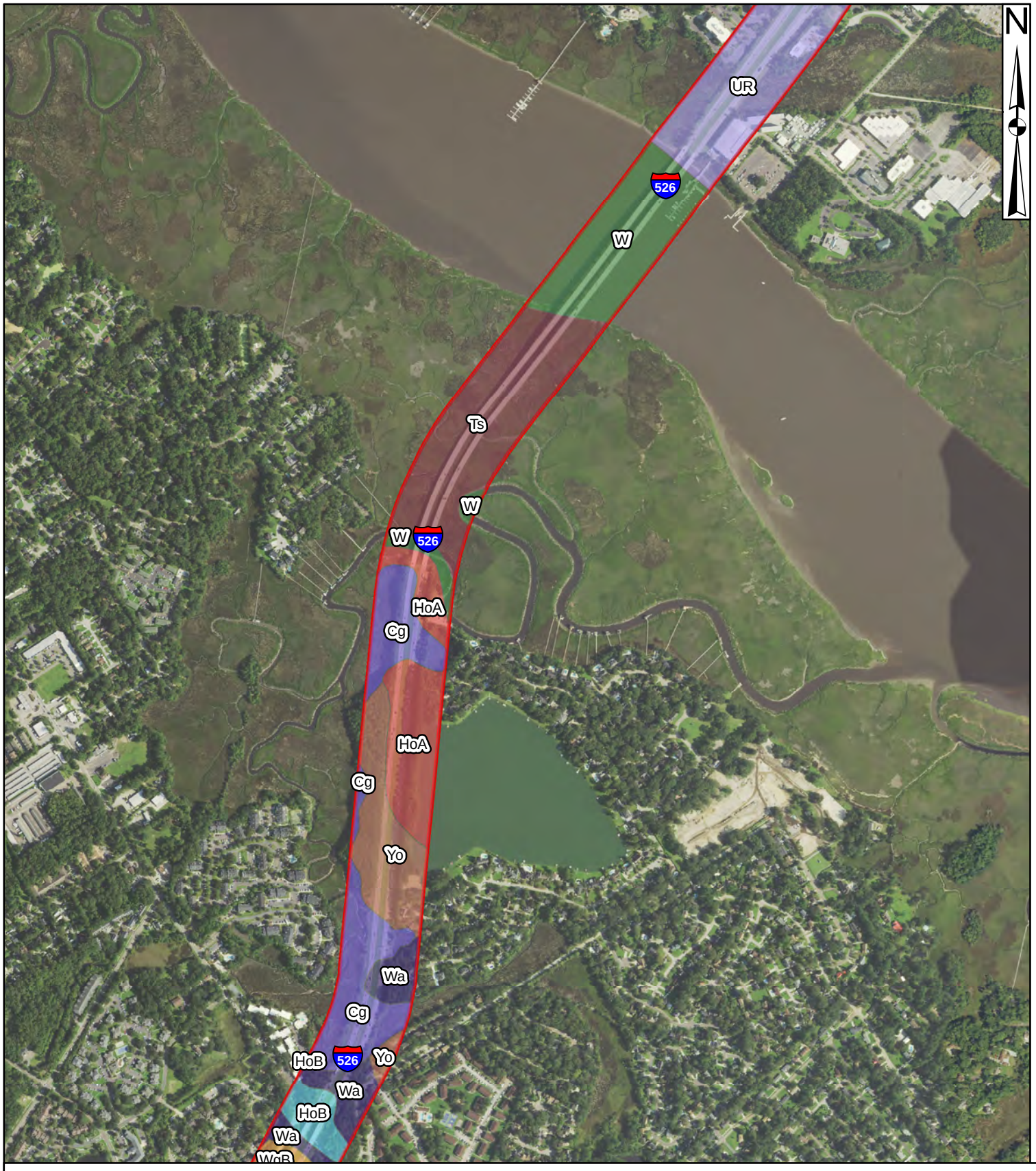
NRCS Soils Data

Figure 3
Sheet 2 of 11





Area

SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

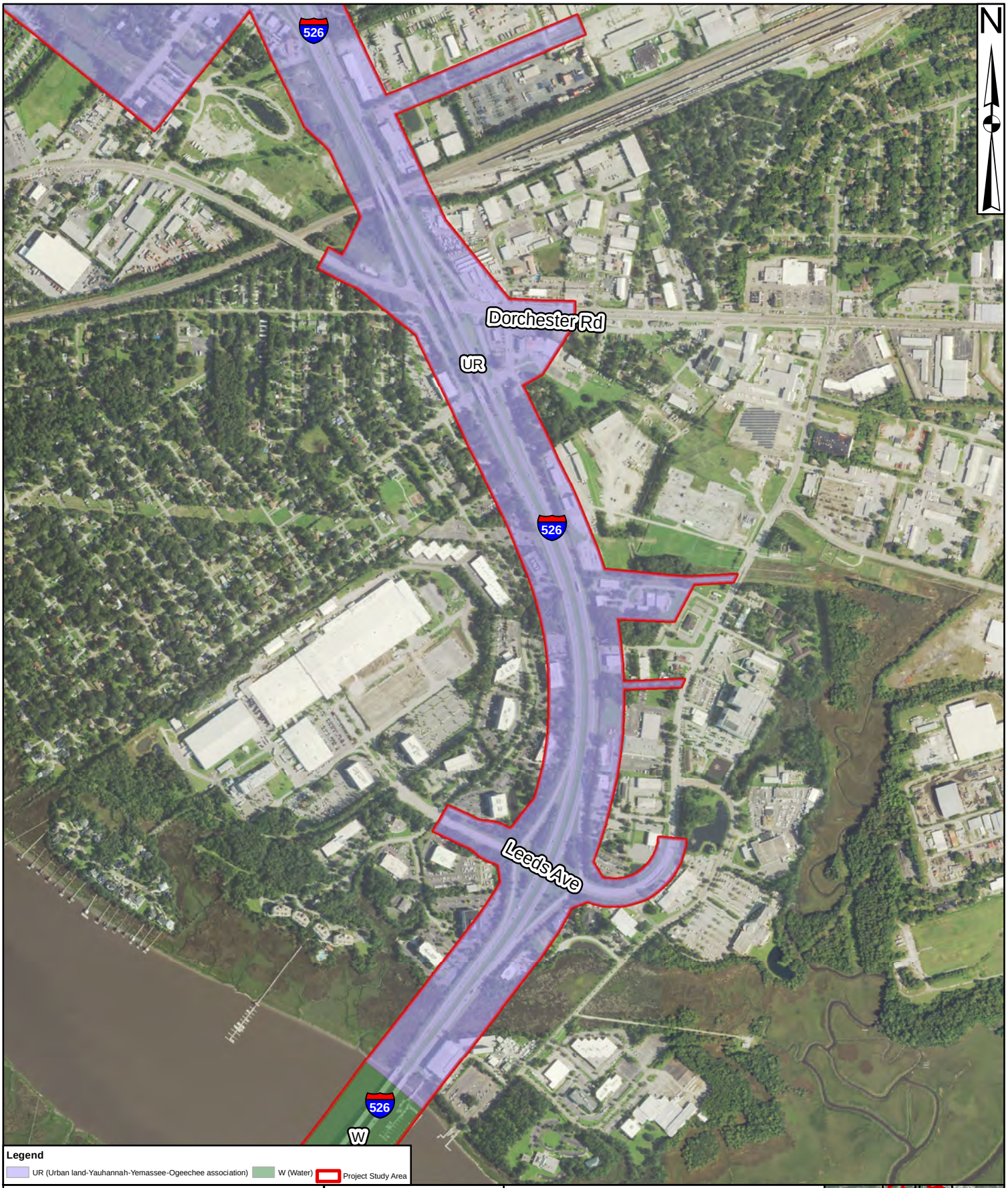
Source:
NRCS Charleston
County Soils

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

NRCS Soils Data

Figure 3
Sheet 3 of 11



South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

Source:
NRCS Charleston
County Soils

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
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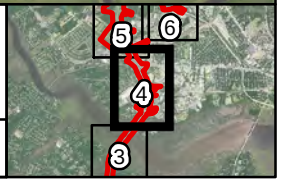
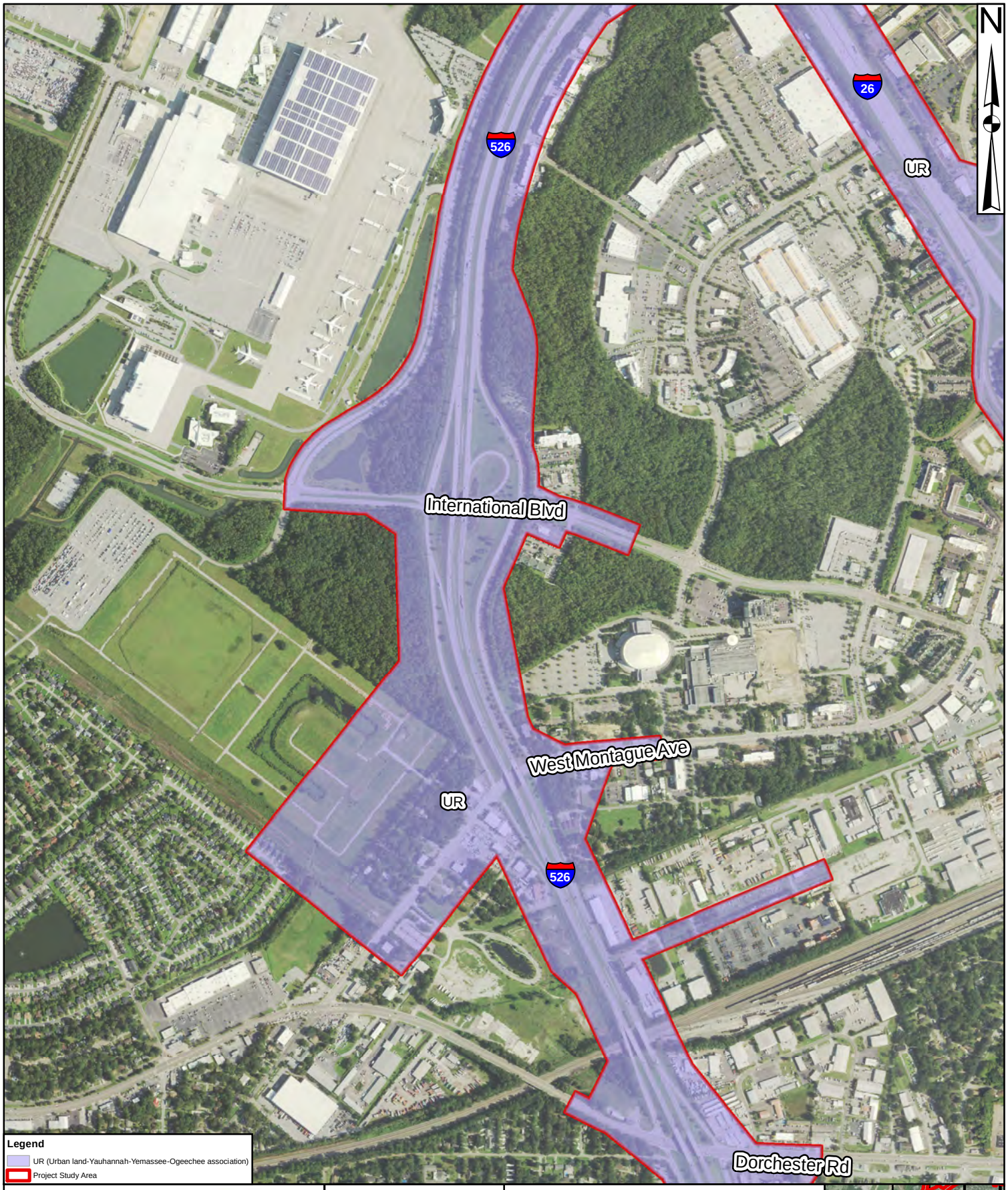
NRCS Soils Data

Figure 3
Sheet 4 of 11





SCDOT South Carolina Department of Transportation

526 WEST LOWCOUNTRY CORRIDOR

Source:
NRCS Charleston
County Soils

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

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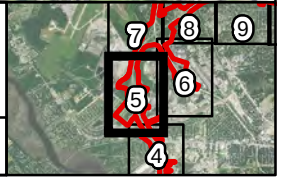
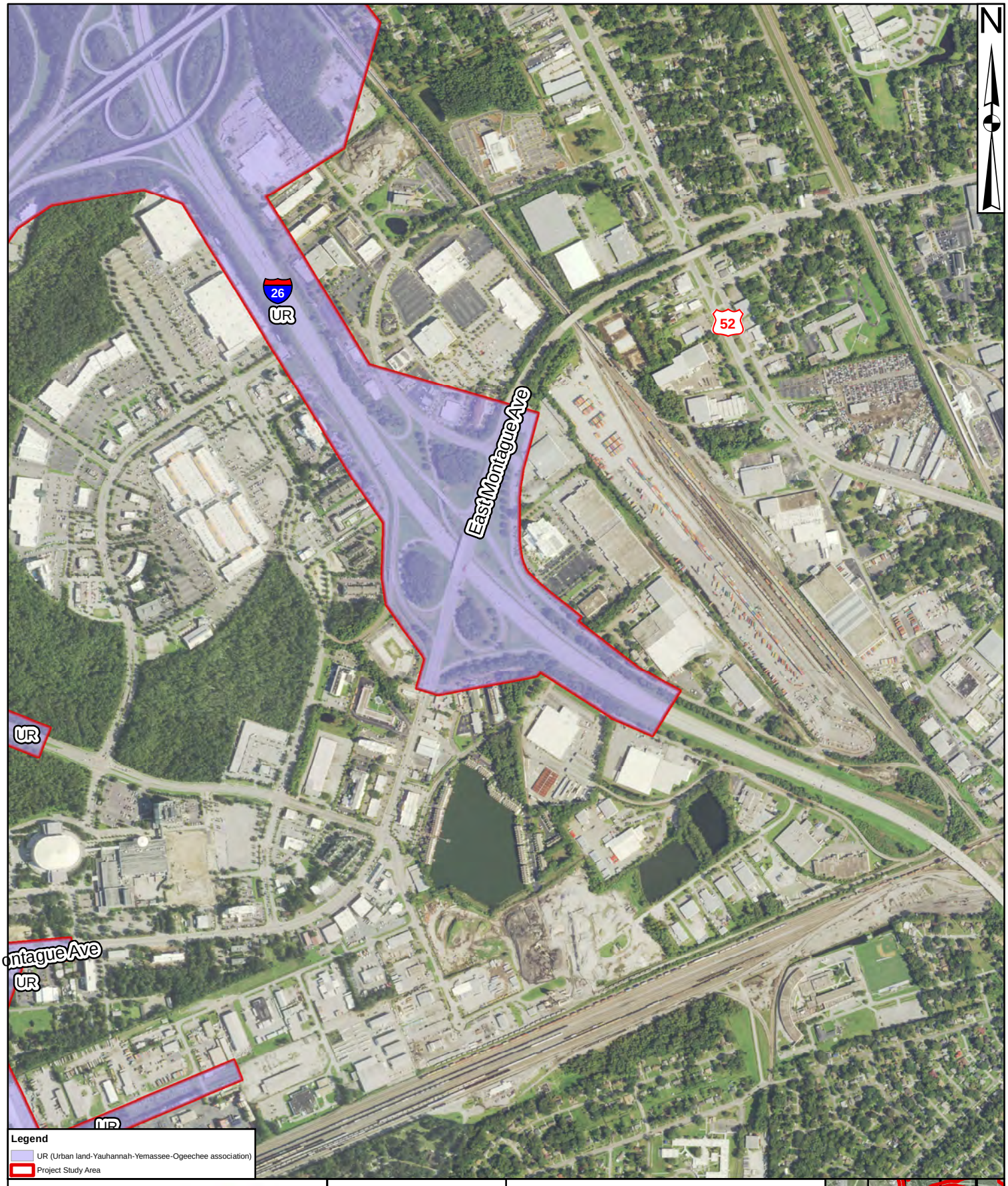
NRCS Soils Data

Figure 3
Sheet 5 of 11





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NRCS Charleston
County Soils

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

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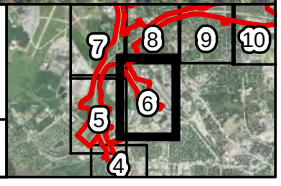
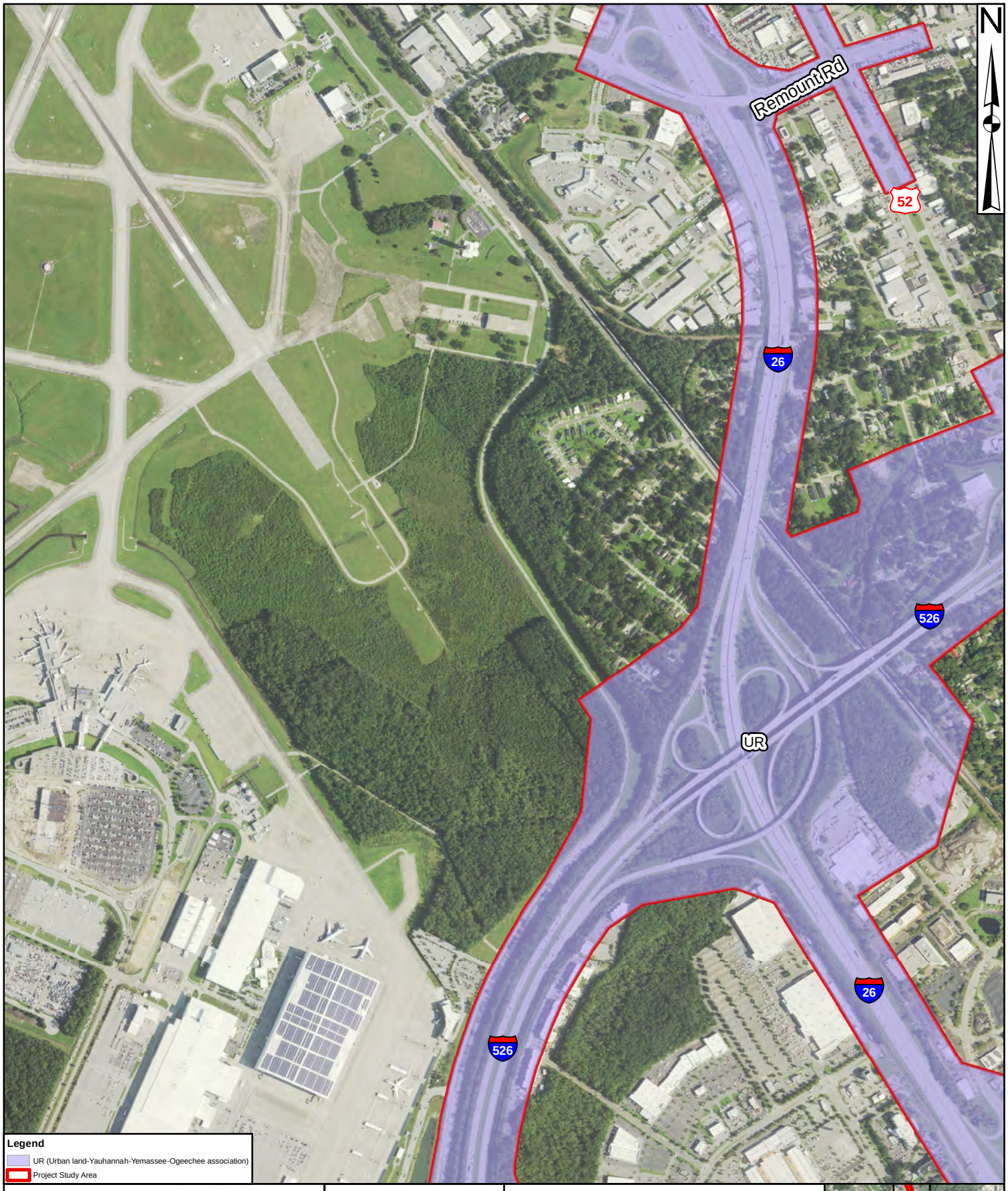
NRCS Soils Data

Figure 3
Sheet 6 of 11





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County Soils

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Charleston County
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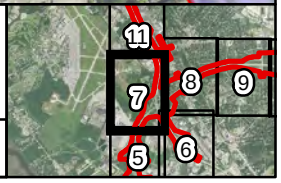
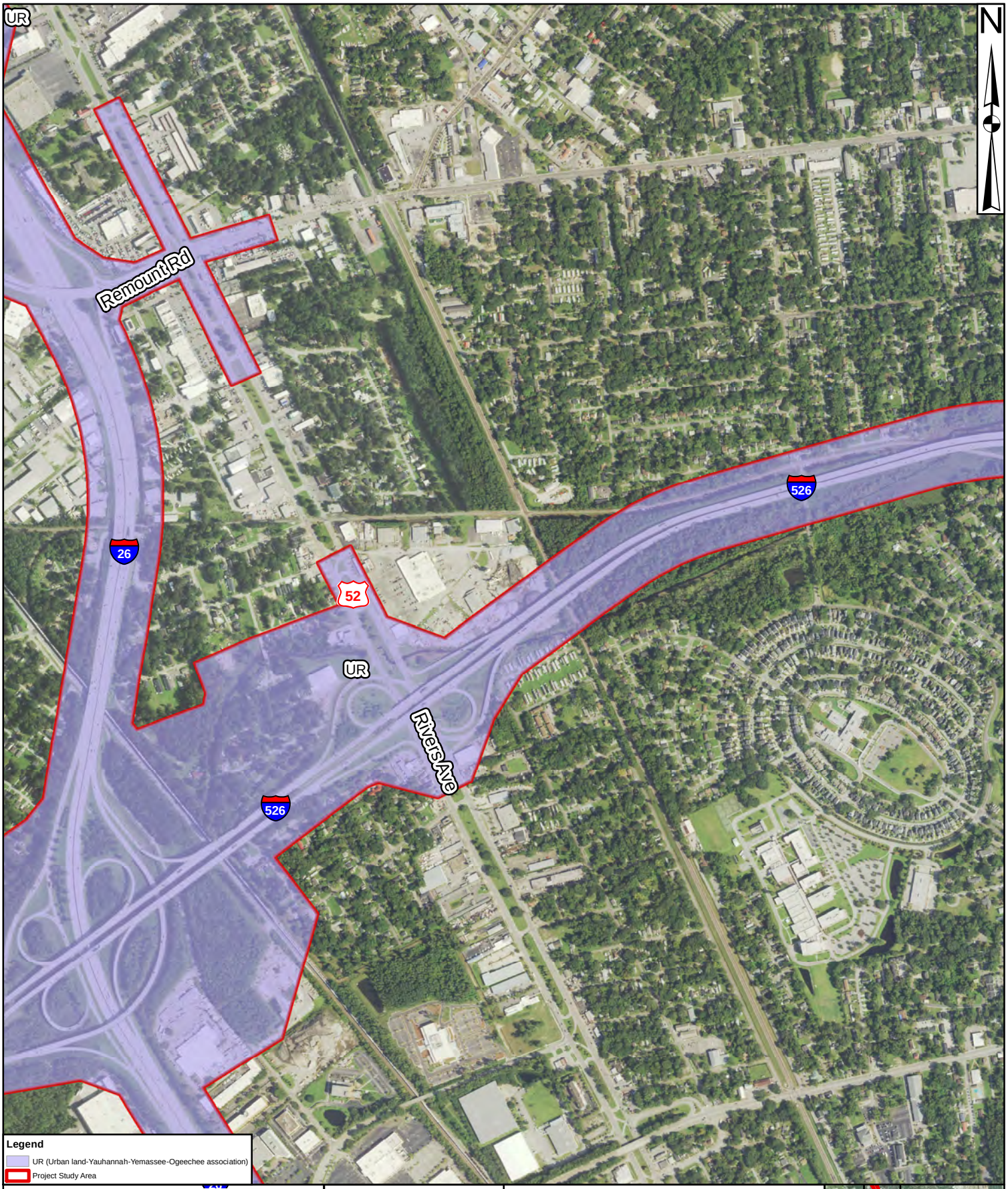
Sheet 7 of 11





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526 WEST LOWCOUNTRY CORRIDOR

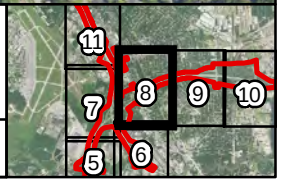
Source:
NRCS Charleston
County Soils

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

NRCS Soils Data

Figure 3
Sheet 8 of 11



SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

Source:
NRCS Charleston
County Soils

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

NRCS Soils Data

Figure 3
Sheet 9 of 11

SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

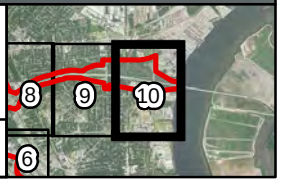
Source:
NRCS Charleston
County Soils

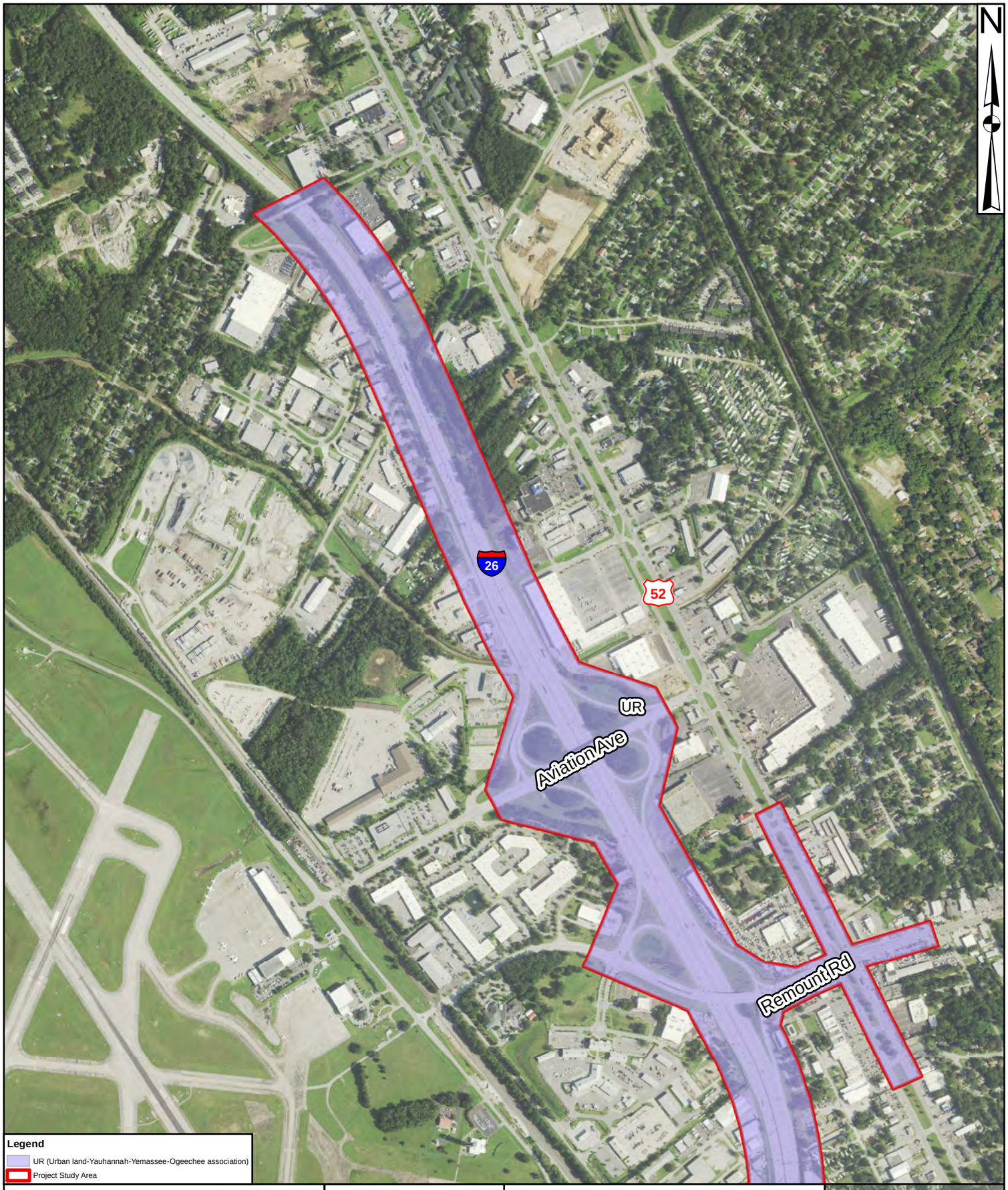
I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

NRCS Soils Data

Figure 3
Sheet 10 of 11





SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

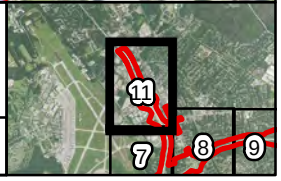
Source:
NRCS Charleston
County Soils

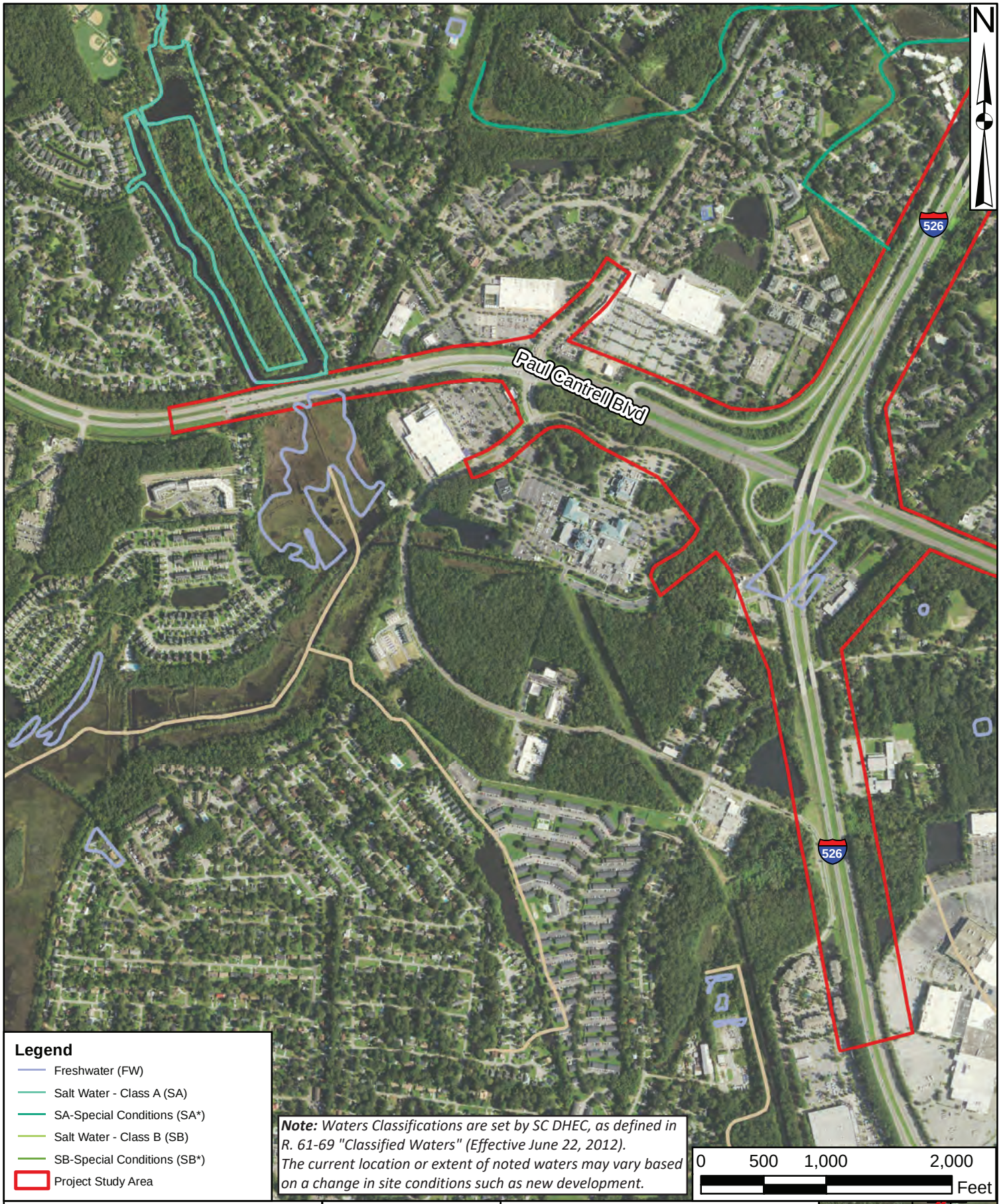
I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

NRCS Soils Data

Figure 3
Sheet 11 of 11





Legend

- Freshwater (FW)
- Salt Water - Class A (SA)
- SA-Special Conditions (SA*)
- Salt Water - Class B (SB)
- SB-Special Conditions (SB*)
- Project Study Area

Note: *Waters Classifications are set by SC DHEC, as defined in R. 61-69 "Classified Waters" (Effective June 22, 2012). The current location or extent of noted waters may vary based on a change in site conditions such as new development.*

0 500 1,000 2,000 Feet

SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

Drawn By: RHH
QA/QC: KLM

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Waters Classification

Figure 5
Sheet 1 of 11

SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

Waters Classification

Figure 5
Sheet 2 of 11

SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

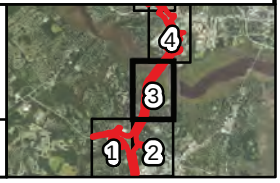
Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

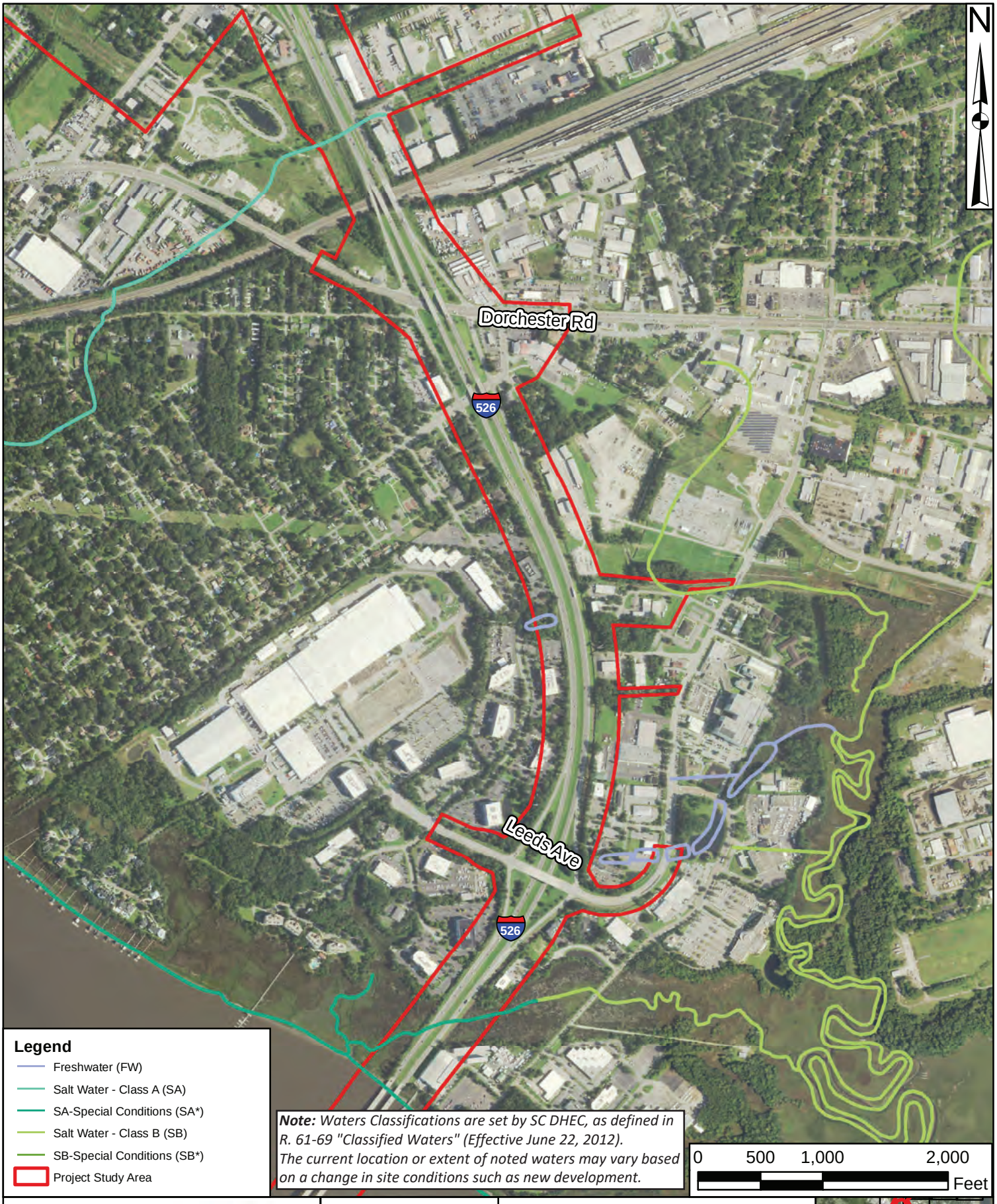
I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

Waters Classification

Figure 5
Sheet 3 of 11





SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

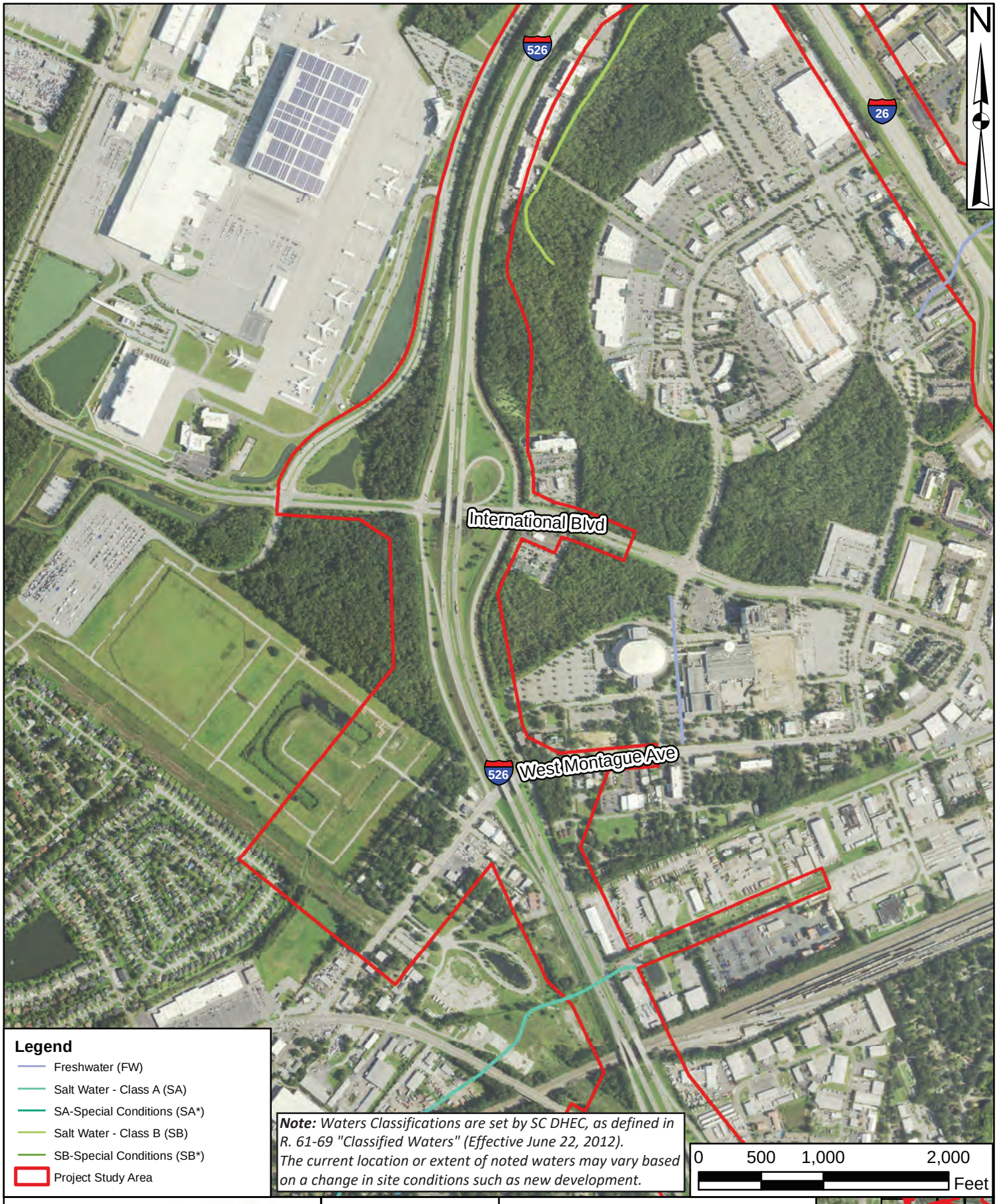
Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

Waters Classification

Figure 5
Sheet 4 of 11



SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

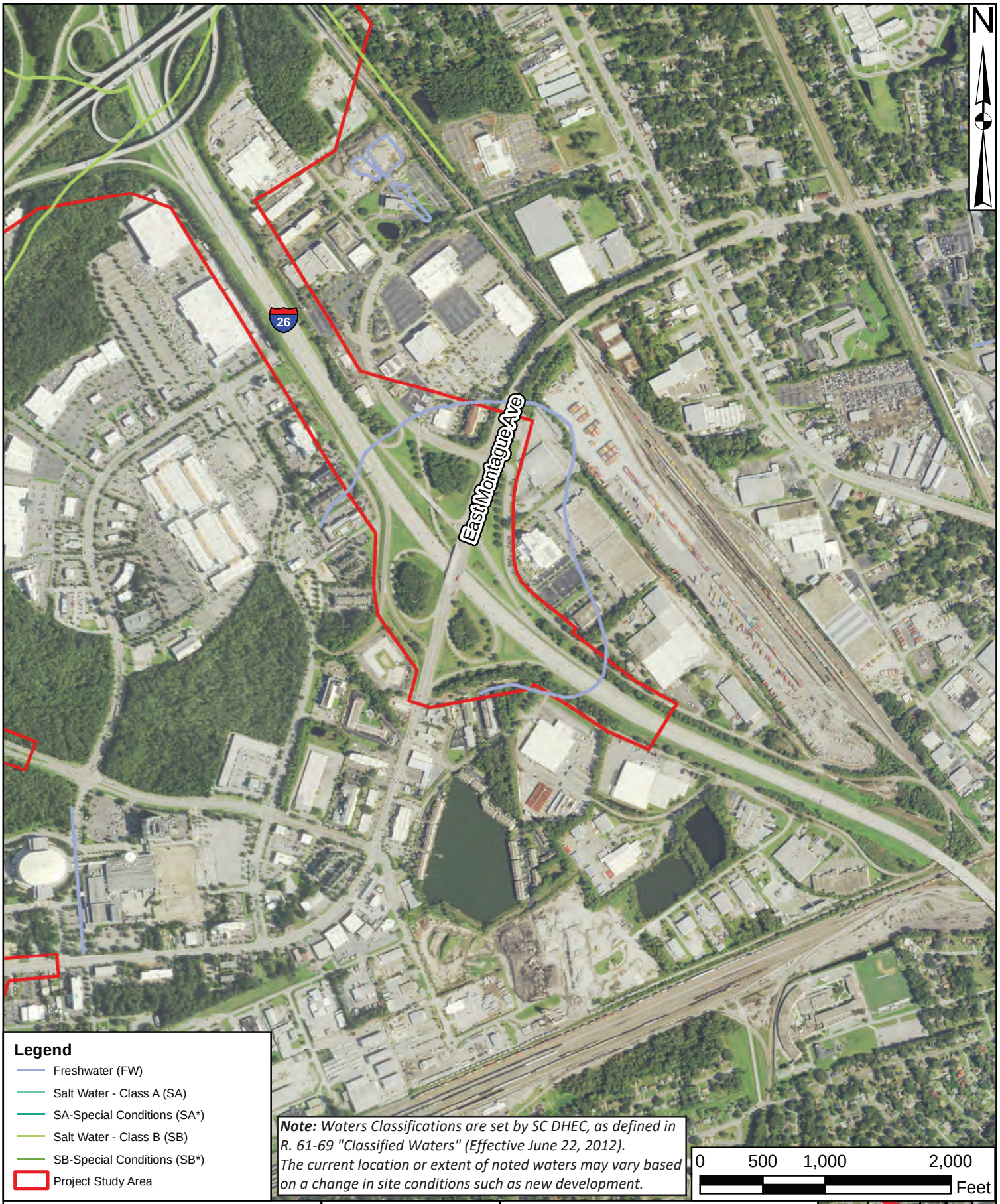
Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

Drawn By: RHH
QA/QC: KLM

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Waters Classification

Figure 5
Sheet 5 of 11



SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

Waters Classification

Figure 5
Sheet 6 of 11

Legend

- Freshwater (FW)
- Salt Water - Class A (SA)
- SA-Special Conditions (SA*)
- Salt Water - Class B (SB)
- SB-Special Conditions (SB*)
- Project Study Area

Note: *Waters Classifications are set by SC DHEC, as defined in R. 61-69 "Classified Waters" (Effective June 22, 2012). The current location or extent of noted waters may vary based on a change in site conditions such as new development.*

0 500 1,000 2,000 Feet

SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

Drawn By: RHH
QA/QC: KLM

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Waters Classification

Figure 5
Sheet 7 of 11

Legend

- Freshwater (FW)
- Salt Water - Class A (SA)
- SA-Special Conditions (SA*)
- Salt Water - Class B (SB)
- SB-Special Conditions (SB*)
- Project Study Area

Note: *Waters Classifications are set by SC DHEC, as defined in R. 61-69 "Classified Waters" (Effective June 22, 2012). The current location or extent of noted waters may vary based on a change in site conditions such as new development.*

0 500 1,000 2,000 Feet

SCDOT South Carolina Department of Transportation

I-526 LOWCOUNTRY CORRIDOR WEST

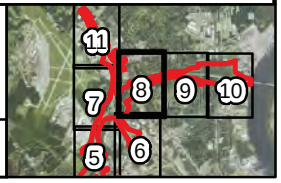
Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

Waters Classification

Figure 5
Sheet 8 of 11



Legend

- Freshwater (FW)
- Salt Water - Class A (SA)
- SA-Special Conditions (SA*)
- Salt Water - Class B (SB)
- SB-Special Conditions (SB*)
- Project Study Area

Note: *Waters Classifications are set by SC DHEC, as defined in R. 61-69 "Classified Waters" (Effective June 22, 2012). The current location or extent of noted waters may vary based on a change in site conditions such as new development.*

0 500 1,000 2,000 Feet

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

Waters Classification

Figure 5
Sheet 9 of 11

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

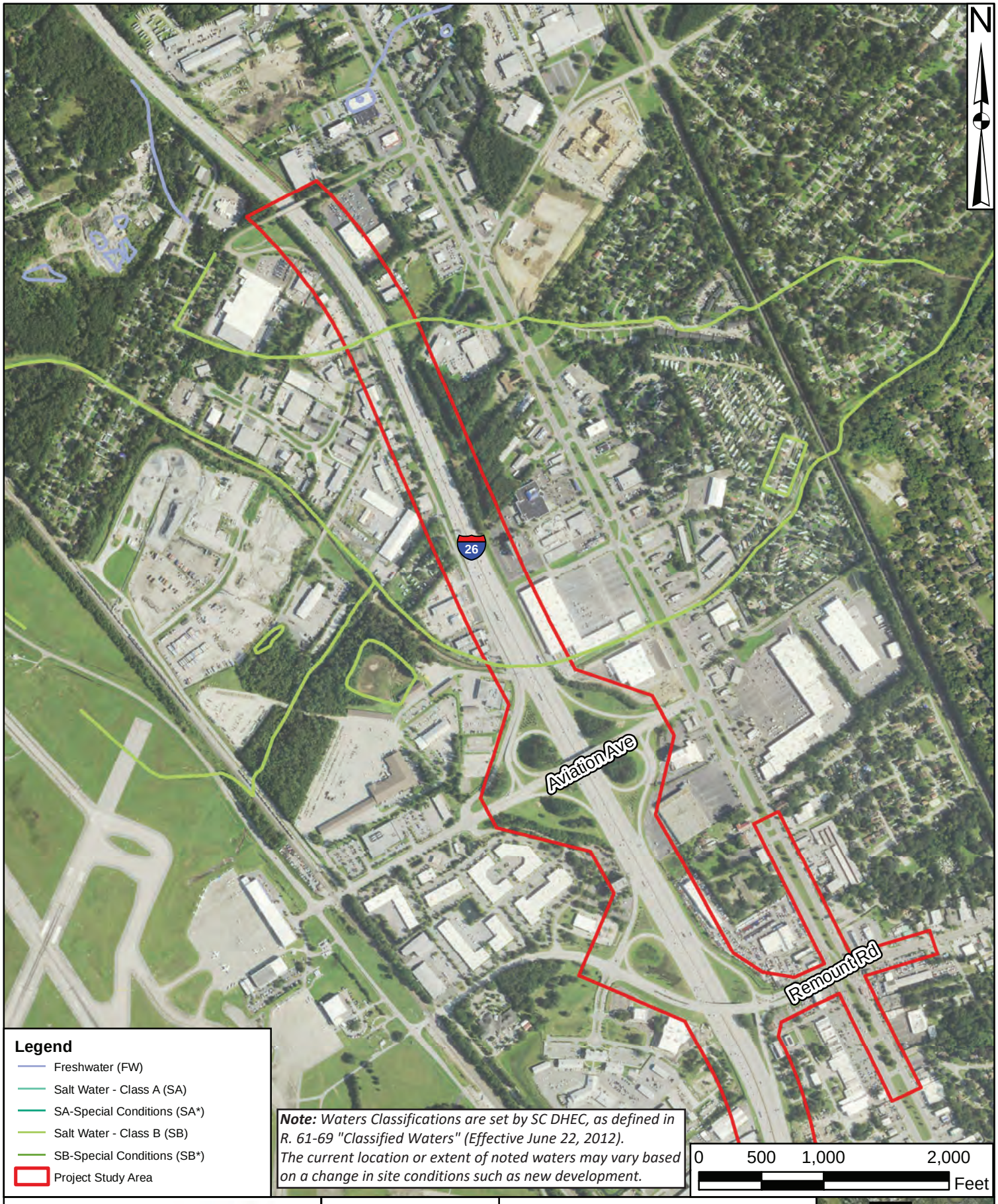
Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

Waters Classification

Figure 5
Sheet 10 of 11



SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

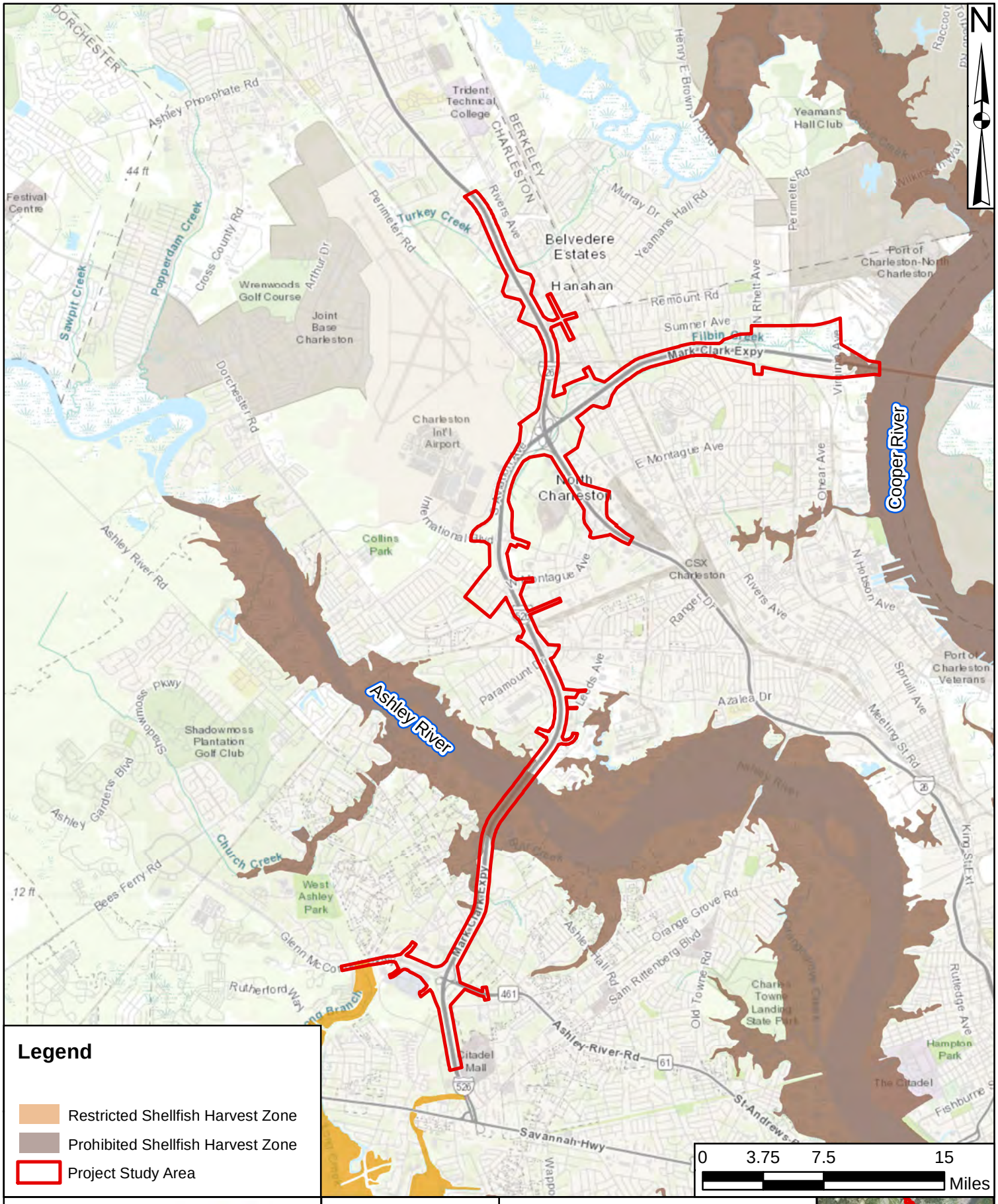
Source:
SCDHEC Water Quality Tool 2020
R.61-69 Effective 6/22/2012

Drawn By: RHH
QA/QC: KLM

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Waters Classification

Figure 5
Sheet 11 of 11



Legend

- Restricted Shellfish Harvest Zone
- Prohibited Shellfish Harvest Zone
- Project Study Area

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

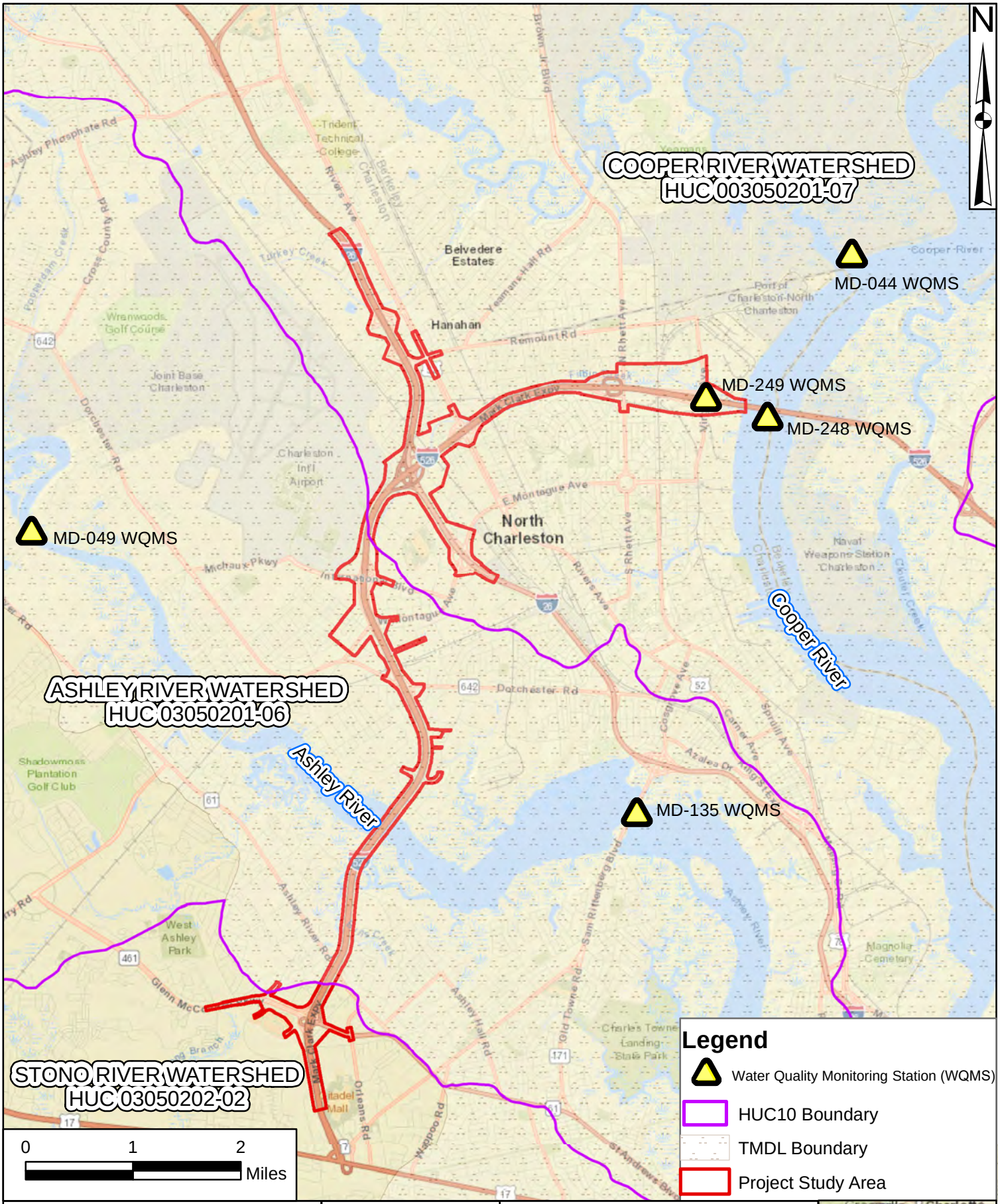
Source:
SCDHEC Water Quality Tool
2020

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

Shellfish Harvest Classification

Figure 5



Source:
USGS NHD
January 2020

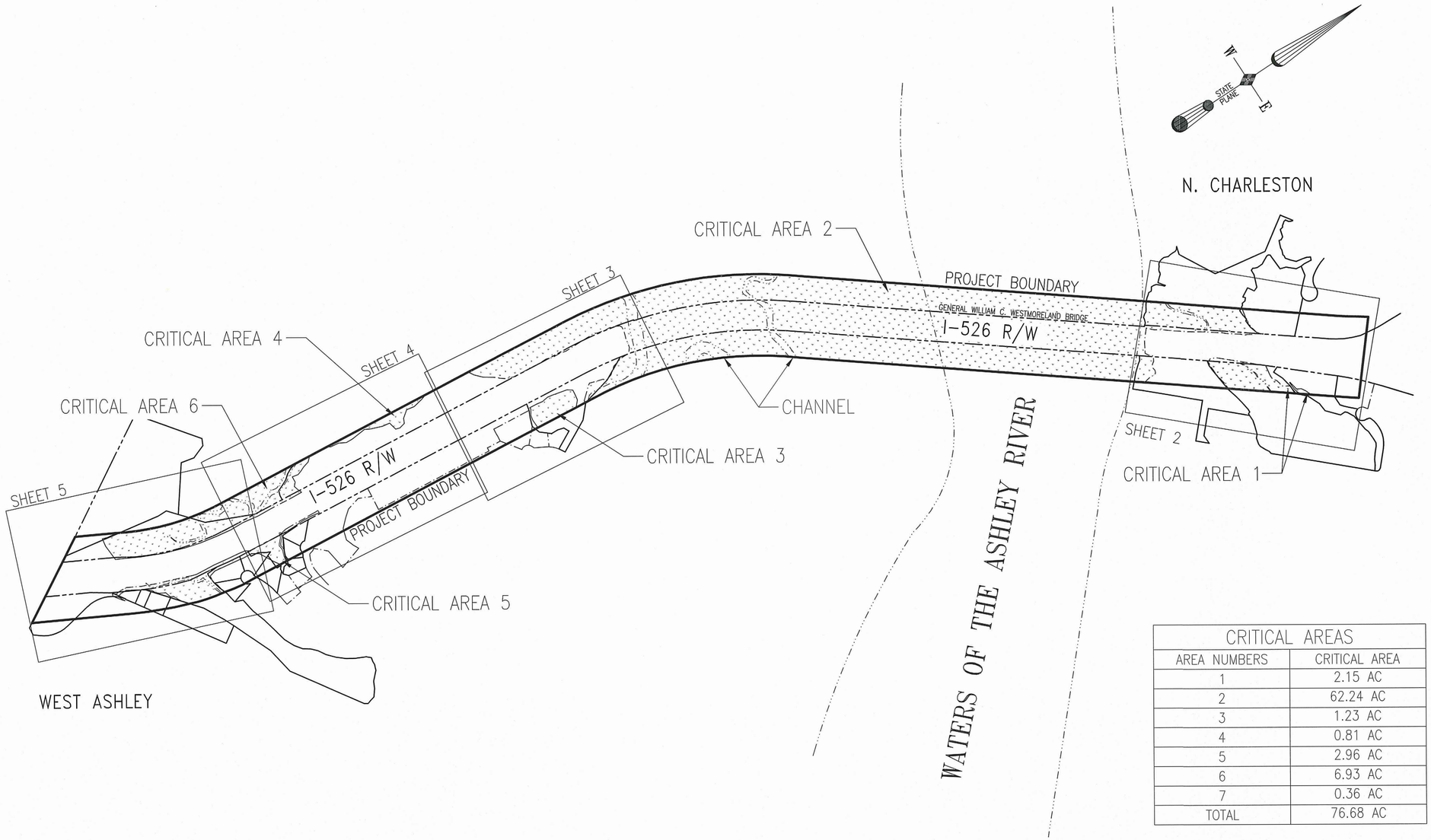
I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
April 2020

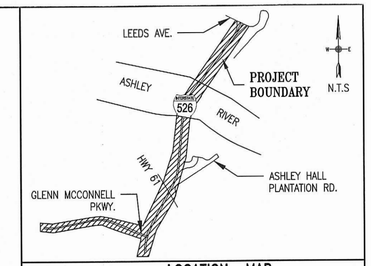
Drawn By: RHH
QA/QC: KLM

10-Digit HUC
TMDL Boundary

Figure 6

SCDOT South Carolina Department of Transportation / I-526 WEST LOWCOUNTRY CORRIDOR	Source: USGS NHD January 2020	**I-526 Lowcountry Corridor West Charleston County SCDOT P032102 April 2020**	Project Area (Santee River Basin)
	Drawn By: RHH QA/QC: KLM	NPDES Permits	Figure 6





LOCATION MAP

GENERAL NOTES:

1. STATE PLANE COORDINATES ARE FOR GIS PURPOSES ONLY.
2. POINT FLAG LABELS AND SOME LINE TAG LABELS HAVE BEEN TURNED OFF FOR CLARITY

REFERENCE PLAT BY:

			PLAT BOOK–PAGE
1.	GEORGE A.Z. JOHNSON	– APRIL 26, 1989	BX – 162
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12.	H. EXO HILTON	– DEC 31, 1986	BL – 132
13.	ANDREW G. GILLETTE	– OCT 15, 2009	L09 – 0517
14.	SCDOT ROAD PLANS #10.765 – 1983		

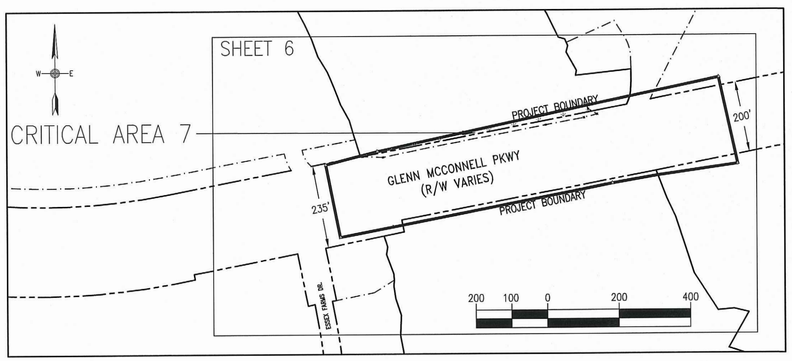
LEGEND

- PROPERTY LINE W/ CORNER (AS DESC.)
- RIGHT OF WAY LINE
- ADJACENT PROPERTY LINE
- CRITICAL LINE
- PROPERTY LINE TIE
- CRITICAL STREAM LINE
- MATCH LINE
- PROJECT BOUNDARY (AS LABELED)
- PROPERTY CORNER FOUND (AS DESC.)
- CONCRETE MONUMENT FOUND (SIZE DESC.)
- PROJECT BOUNDARY VERTEX
- CRITICAL AREA HATCH

CRITICAL AREAS	
AREA NUMBERS	CRITICAL AREA
1	2.15 AC
2	62.24 AC
3	1.23 AC
4	0.81 AC
5	2.96 AC
6	6.93 AC
7	0.36 AC
TOTAL	76.68 AC

ABBREVIATION LEGEND

RBF	REBAR FOUND (SIZE DESC.)
CMF	CONCRETE MONUMENT FOUND (SIZE DESC.)
IPF	IRON PIPE FOUND (SIZE DESC.)



I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SPECIFIED THEREIN. THE AREA WAS DETERMINED BY THE COORDINATE METHOD OF AREA DETERMINATION. THE PRECISION OF THE UNADJUSTED FIELD SURVEY WAS GREATER THAN 1:10,000.

SOUTH CAROLINA PROFESSIONAL LAND SURVEYOR — TIER A — No. 21627 — KEVIN N. THEWES

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION — DAVIS & FLOYD, INC. — No. C00538

KEVIN THEWES – S.C.R.L.S. No. 21627 DATE: 10 Oct 19

THE AREA SHOWN ON THIS PLAT IS A REPRESENTATION OF DEPARTMENT(SCDHEC–OCRM) PERMIT AUTHORITY ON THE SUBJECT PROPERTY. CRITICAL AREAS BY THEIR NATURE ARE DYNAMIC AND SUBJECT TO CHANGE OVER TIME. BY DELINEATING THE PERMIT AUTHORITY OF SCDHEC–OCRM, SCDHEC–OCRM IN NO WAY WAIVES ITS RIGHT TO ASSERT PERMIT JURISDICTION AT ANY TIME IN ANY CRITICAL AREA ON THE SUBJECT PROPERTY WHETHER SHOWN OR NOT.

SIGNATURE — DATE 10-3-19

The critical line shown on this plat is valid for five years from the date of this signature, subject to the cautionary language above.

CRITICAL LINE PLAT

SHOWING

CRITICAL AREAS ALONG I–526 CORRIDOR

INCLUDING

CRITICAL AREAS 1 (2.15 AC), 2 (62.24 AC), 3 (1.23 AC), 4 (0.81 AC), 5 (2.96 AC), 6 (6.93 AC), AND 7 (0.36 AC)

LOCATED

CITY OF NORTH CHARLESTON

AND

CITY OF CHARLESTON

CHARLESTON COUNTY, SOUTH CAROLINA

D&F JOB #: 31667.00

SCALE: 1" = 400' DATE: 05/23/2019

400 200 0 400 800

SHEET 01 of 06

DAVIS & FLOYD, INC

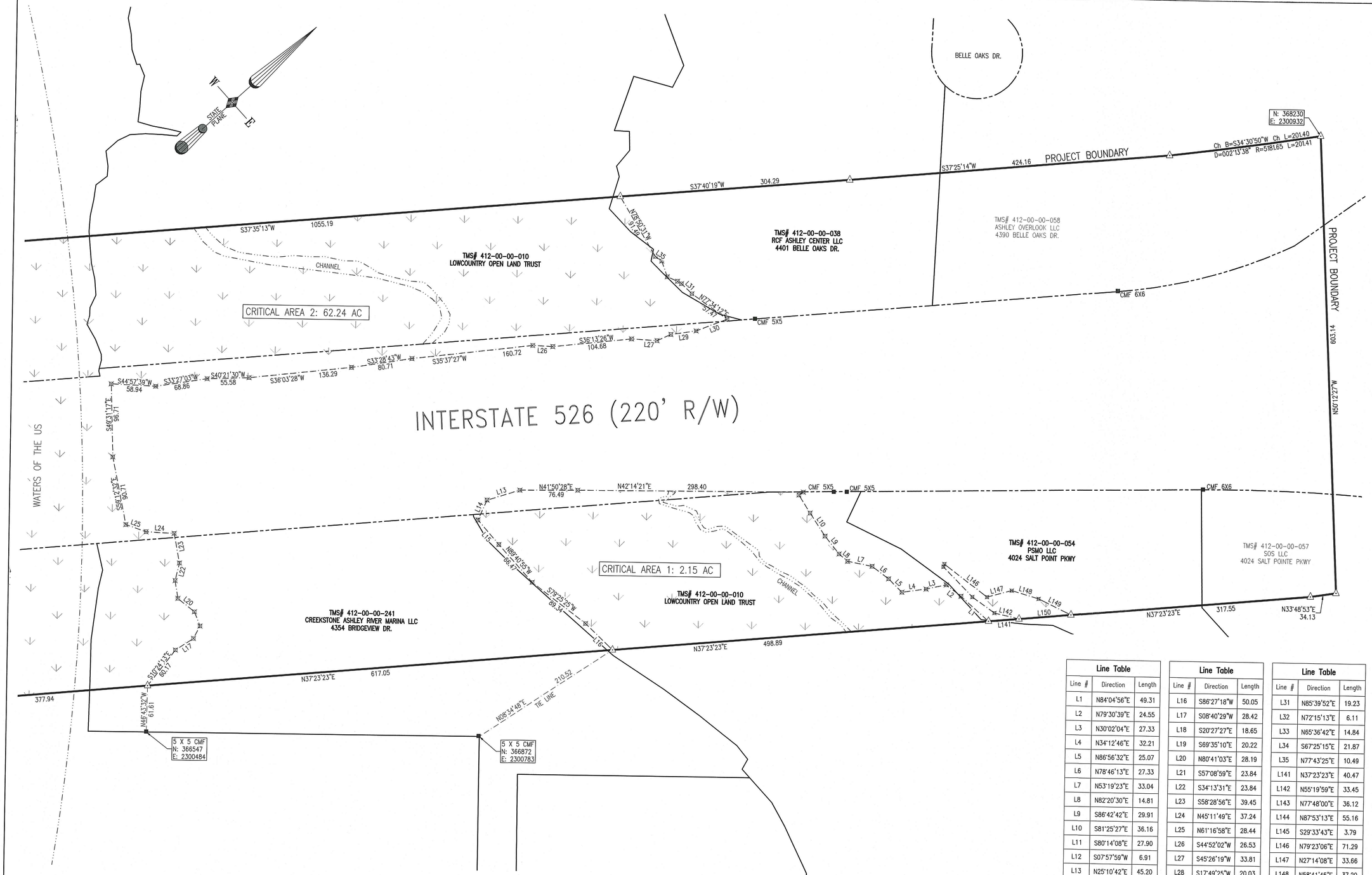
POST OFFICE BOX 61599

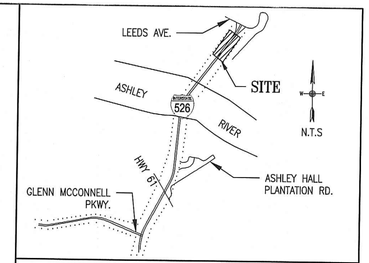
CHARLESTON, SC 29419

PHONE (843) 554–8602

KTHEWES@DAVISFLOYD.COM

ACAD DWG – G:\JOBSODD\31667–00\PRODUCTION\SURVEY\31667 DWG\2019 DWG\31667 CRITICAL LINE PLAT ASHLEY RIVER.DWG, PLOTTED BY: LANE SMITH, PLOTTED: 19 SEPTEMBER 2019 – 10:57:09





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LEGEND

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- CRITICAL AREA HATCH

ABBREVIATION LEGEND

RBF	REBAR FOUND (SIZE DESC.)
CMF	CONCRETE MONUMENT FOUND (SIZE DESC.)
IPF	IRON PIPE FOUND (SIZE DESC.)

Line Table		
Line #	Direction	Length
L1	N84°04'56"E	49.31
L2	N79°30'39"E	24.55
L3	N30°02'04"E	27.33
L4	N34°12'46"E	32.21
L5	N86°56'32"E	25.07
L6	N78°46'13"E	27.33
L7	N53°19'23"E	33.04
L8	N82°20'30"E	14.81
L9	S86°42'42"E	29.91
L10	S81°25'27"E	36.16
L11	S80°14'08"E	27.90
L12	S07°57'59"W	6.91
L13	N25°10'42"E	45.20
L14	N23°21'31"W	28.62
L15	N88°48'44"W	42.46

Line Table		
Line #	Direction	Length
L16	S86°27'18"W	50.05
L17	S08°40'29"W	28.42
L18	S20°27'27"E	18.65
L19	S69°35'10"E	20.22
L20	N80°41'03"E	28.19
L21	S57°08'59"E	23.84
L22	S34°13'31"E	23.84
L23	S58°28'56"E	39.45
L24	N45°11'49"E	37.24
L25	N61°16'58"E	28.44
L26	S44°52'02"W	26.53
L27	S45°26'19"W	33.81
L28	S17°49'25"W	20.03
L29	S33°56'58"W	33.74
L30	S20°52'54"W	43.84

Line Table		
Line #	Direction	Length
L31	N85°39'52"E	19.23
L32	N72°15'13"E	6.11
L33	N65°36'42"E	14.84
L34	S67°25'15"E	21.87
L35	N77°43'25"E	10.49
L141	N37°23'23"E	40.47
L142	N55°19'59"E	33.45
L143	N77°48'00"E	36.12
L144	N87°53'13"E	55.16
L145	S29°33'43"E	3.79
L146	N79°23'06"E	71.29
L147	N27°14'08"E	33.66
L148	N58°41'45"E	37.29
L149	N68°14'18"E	47.69
L150	N37°23'23"E	68.87

I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SPECIFIED THEREIN. THE AREA WAS DETERMINED BY THE COORDINATE METHOD OF AREA DETERMINATION. THE PRECISION OF THE UNADJUSTED FIELD SURVEY WAS GREATER THAN 1:10,000.

SOUTH CAROLINA PROFESSIONAL LAND SURVEYOR KEVIN THEWES TIER A No. 21627

DAVIS & FLOYD, INC. SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION No. C00538

KEVIN THEWES – S.C.R.L.S. No. 21627 DATE: 10-3-19

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Josh Rohe 10-3-19
SIGNATURE DATE

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INCLUDING
CRITICAL AREAS 1 (2.15 AC), 2 (62.24 AC), 3 (1.23 AC), 4 (0.81 AC), 5 (2.96 AC), 6 (6.93 AC), AND 7 (0.36 AC)
LOCATED
CITY OF NORTH CHARLESTON
AND
CITY OF CHARLESTON
CHARLESTON COUNTY, SOUTH CAROLINA
D&F JOB #: 31667.00

SCALE: 1" = 60' DATE: 05/23/2019

60 30 0 60 120

SHEET 02 of 06

DAVIS & FLOYD, INC
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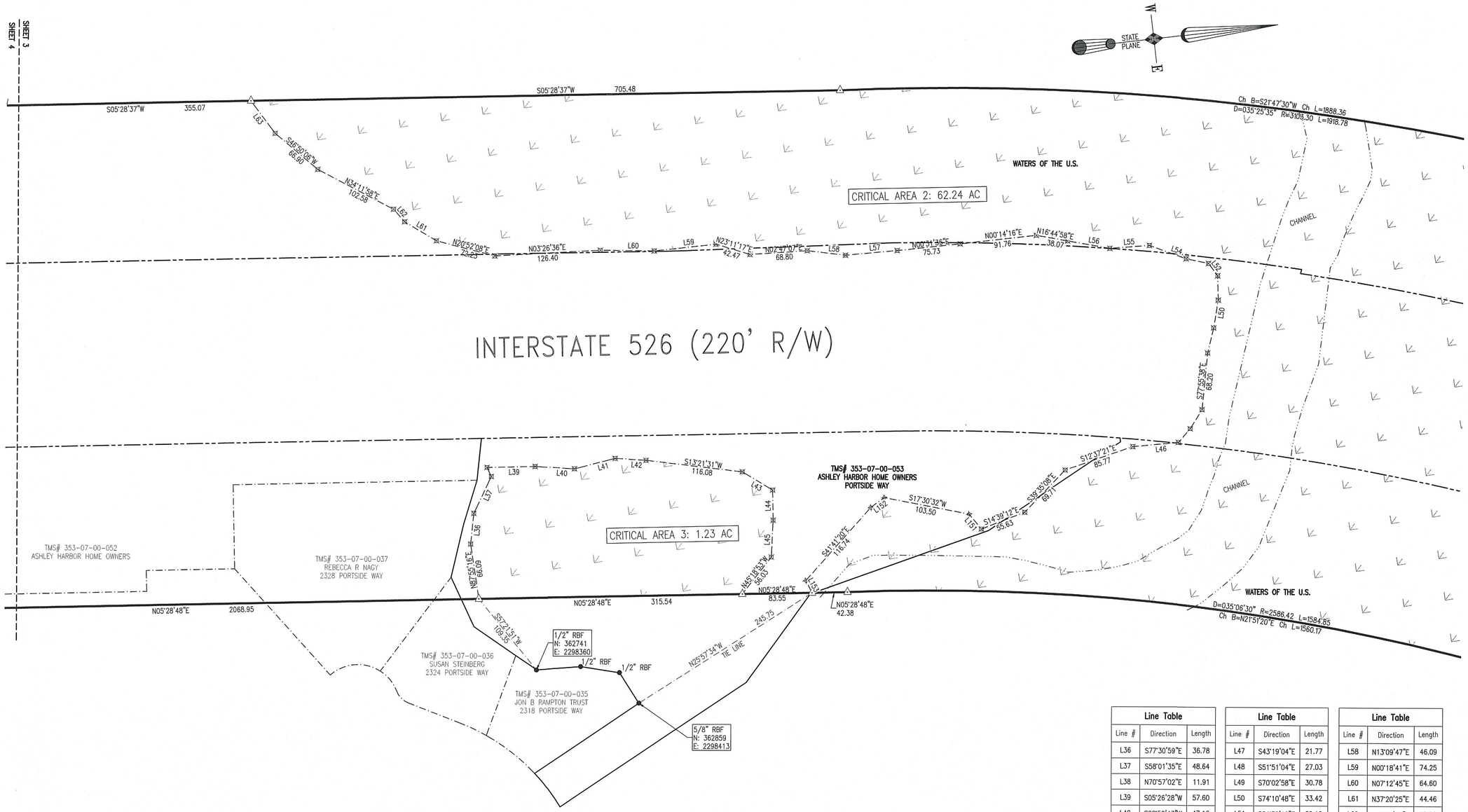
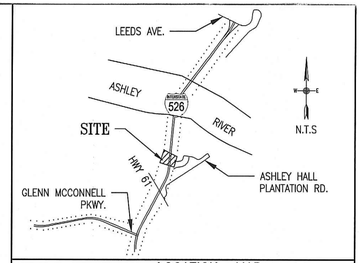
CHARLESTON, SC 29419
PHONE (843) 554–8602
KTHEWES@DAVISFLOYD.COM

ACAD DWG – G:\JOBSODD\31667–00\PRODUCTION\SURVEY\31667 DWG\2019 DWG\31667 CRITICAL LINE PLAT ASHLEY RIVER.DWG, PLOTTED BY: LANE SMITH, PLOTTED: 19 SEPTEMBER 2019 – 10:58:35





LOCATION MAP

GENERAL NOTES:

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2. POINT FLAG LABELS AND SOME LINE TAG LABELS HAVE BEEN TURNED OFF FOR CLARITY

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4.	GEORGE A.Z. JOHNSON	– SEPT 12, 1990	CA – 103
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6.	JOHN O. PLEXICO	– SEPT. 25, 1986	BL – 063
7.	GEORGE A.Z. JOHNSON	– APRIL 28, 1990	BZ – 152
8.	F. LEE HOWELL	– SEPT 21, 2011	L11 – 255
9.	JULIUS E. CROMWELL	– DEC 11, 1941	F – 104
10.	GEORGE A.Z. JOHNSON	– FEB 20, 2008	EJ – 911
11.	THOMAS BV. BESSETT	– MAY 18, 1989	BW – M 67
12.	H. EXO HILTON	– DEC 31, 1986	BL – 132
13.	ANDREW G. GILLETTE	– OCT 15, 2009	L09 – 0517
14.	SCDOT ROAD PLANS #10.765	– 1983	

LEGEND

- PROPERTY LINE W/ CORNER (AS DESC.)
- RIGHT OF WAY LINE
- ADJACENT PROPERTY LINE
- CRITICAL LINE
- PROPERTY LINE TIE
- CRITICAL STREAM LINE
- MATCH LINE
- PROJECT BOUNDARY (AS LABELED)
- PROPERTY CORNER FOUND (AS DESC.)
- CONCRETE MONUMENT FOUND (SIZE DESC.)
- PROJECT BOUNDARY VERTEX
- CRITICAL AREA HATCH

Line Table		
Line #	Direction	Length
L36	S77°30'59"E	36.78
L37	S58°01'35"E	48.64
L38	N70°57'02"E	11.91
L39	S05°26'28"W	57.60
L40	S09°59'43"W	47.16
L41	S07°59'10"E	50.21
L42	S10°03'33"W	37.13
L43	S37°17'04"W	42.40
L44	N84°23'46"W	36.04
L45	N80°35'59"W	43.84

Line Table		
Line #	Direction	Length
L47	S43°19'04"E	21.77
L48	S51°51'04"E	27.03
L49	S70°02'58"E	30.78
L50	S74°10'48"E	33.42
L51	S84°39'10"E	29.12
L52	N59°22'45"E	18.31
L53	N18°02'49"E	27.38
L54	N26°23'00"E	46.51
L55	N02°26'17"E	47.54
L56	N16°22'49"E	51.34

Line Table		
Line #	Direction	Length
L58	N13°09'47"E	46.09
L59	N00°18'41"E	74.25
L60	N07°12'45"E	64.60
L61	N37°20'25"E	44.46
L62	N54°58'08"E	19.99
L63	S59°45'54"W	48.48
L151	S57°06'43"W	23.03
L152	S29°36'40"E	19.99
L153	N69°04'01"E	16.36

ABBREVIATION LEGEND

RBF	REBAR FOUND (SIZE DESC.)
CMF	CONCRETE MONUMENT FOUND (SIZE DESC.)
IPF	IRON PIPE FOUND (SIZE DESC.)

CRITICAL LINE PLAT

SHOWING
CRITICAL AREAS ALONG I–526 CORRIDOR
INCLUDING
CRITICAL AREAS 1 (2.15 AC), 2 (62.24 AC), 3 (1.23 AC), 4 (0.81 AC), 5 (2.96 AC), 6 (6.93 AC), AND 7 (0.36 AC)
LOCATED
CITY OF NORTH CHARLESTON
AND
CITY OF CHARLESTON
CHARLESTON COUNTY, SOUTH CAROLINA
D&F JOB #: 31667.00

SCALE: 1" = 60' DATE: 05/23/2019

60 30 0 60 120

SHEET 03 of 06

DAVIS & FLOYD, INC
POST OFFICE BOX 61599
CHARLESTON, SC 29419
PHONE (843) 554–8602
KTHEWES@DAVISFLOYD.COM

I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SPECIFIED THEREIN. THE AREA WAS DETERMINED BY THE COORDINATE METHOD OF AREA DETERMINATION. THE PRECISION OF THE UNADJUSTED FIELD SURVEY WAS GREATER THAN 1:10,000.

SOUTH CAROLINA PROFESSIONAL LAND SURVEYOR KEVIN L. THEWES TIER A No. 21627

SOUTH CAROLINA DAVIS & FLOYD, INC. CERTIFICATE OF AUTHORIZATION No. C00538

KEVIN THEWES – S.C.R.L.S. No. 21627 DATE: 10-3-19

THE AREA SHOWN ON THIS PLAT IS A REPRESENTATION OF DEPARTMENT(SCDHEC–OCRM) PERMIT AUTHORITY ON THE SUBJECT PROPERTY. CRITICAL AREAS BY THEIR NATURE ARE DYNAMIC AND SUBJECT TO CHANGE OVER TIME. BY DELINEATING THE PERMIT AUTHORITY OF SCDHEC–OCRM, SCDHEC–OCRM IN NO WAY WAIVES ITS RIGHT TO ASSERT PERMIT JURISDICTION AT ANY TIME IN ANY CRITICAL AREA ON THE SUBJECT PROPERTY WHETHER SHOWN OR NOT.

SIGNATURE 10-3-19 DATE

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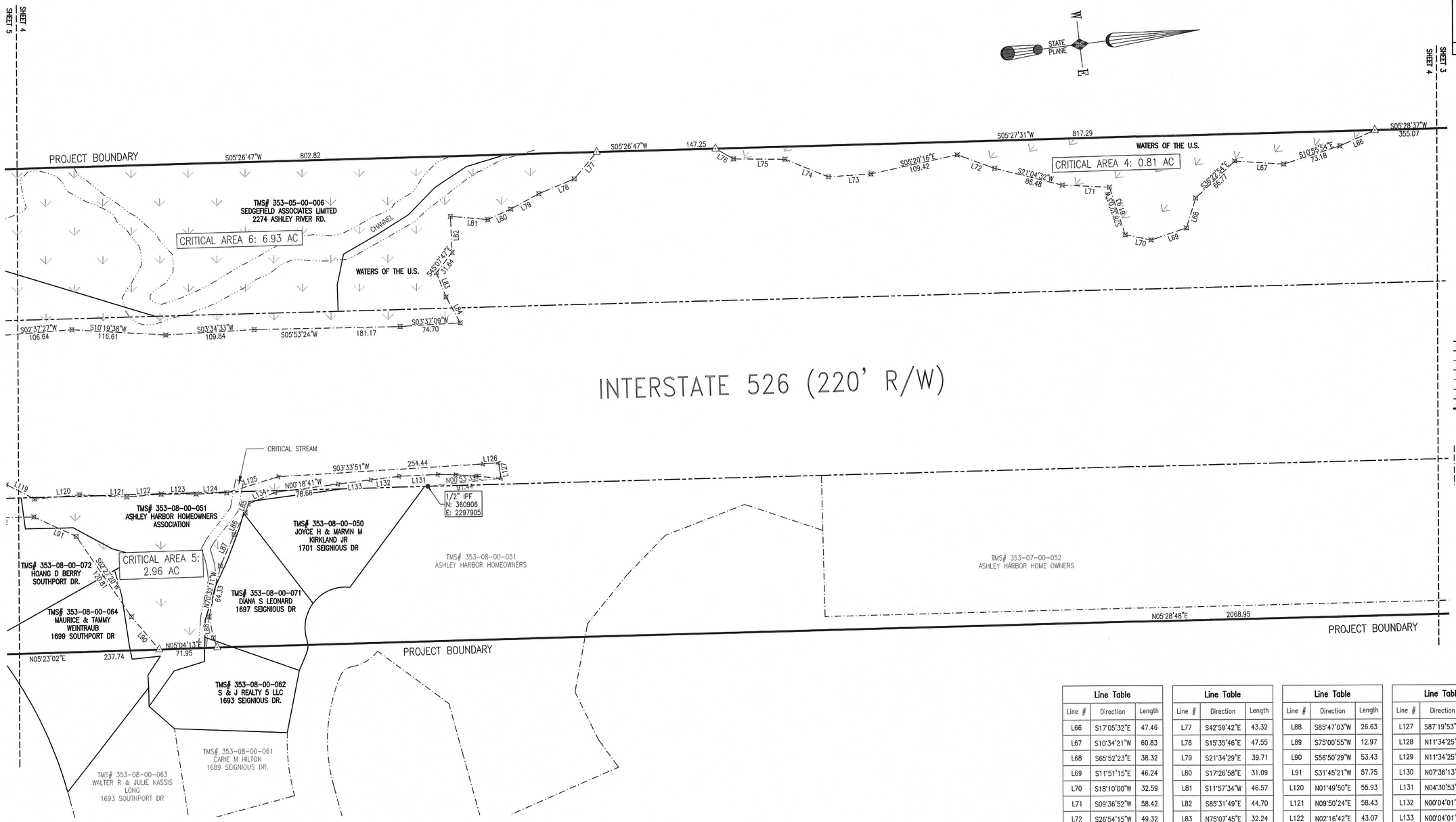
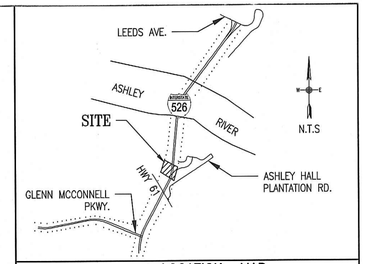
ACAD DWG – G:\JOBSODD\31667–00\PRODUCTION\SURVEY\31667 DWG\2019 DWG\31667 CRITICAL LINE PLAT ASHLEY RIVER.DWG, PLOTTED BY: LANE SMITH, PLOTTED: 19 SEPTEMBER 2019 – 11:02:27





LOCATION MAP

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10.	GEORGE A.Z. JOHNSON	– FEB 20, 2008	EJ – 911
11.	THOMAS BV. BESSETT	– MAY 18, 1989	BW – M 67
12.	H. EXO HILTON	– DEC 31, 1986	BL – 132
13.	ANDREW G. GILLETTE	– OCT 15, 2009	L09 – 0517
14.	SCDOT ROAD PLANS #10.765 – 1983		

LEGEND

- PROPERTY LINE W/ CORNER (AS DESC.)
- RIGHT OF WAY LINE
- ADJACENT PROPERTY LINE
- CRITICAL LINE
- PROPERTY LINE TIE
- CRITICAL STREAM LINE
- MATCH LINE
- PROJECT BOUNDARY (AS LABELED)
- PROPERTY CORNER FOUND (AS DESC.)
- CONCRETE MONUMENT FOUND (SIZE DESC.)
- PROJECT BOUNDARY VERTEX
- CRITICAL AREA HATCH

ABBREVIATION LEGEND

RBF	REBAR FOUND (SIZE DESC.)
CMF	CONCRETE MONUMENT FOUND (SIZE DESC.)
IPF	IRON PIPE FOUND (SIZE DESC.)

Line Table		
Line #	Direction	Length
L66	S17°05'32"E	47.46
L67	S10°34'21"W	60.83
L68	S65°52'23"E	38.32
L69	S11°51'15"E	46.24
L70	S18°10'00"W	32.59
L71	S09°36'52"W	58.42
L72	S26°54'15"W	49.32
L73	S03°05'03"W	52.76
L74	S29°03'30"W	58.21
L75	S07°23'11"W	63.71
L76	S36°35'27"W	25.72

Line Table		
Line #	Direction	Length
L77	S42°59'42"E	43.32
L78	S15°35'46"E	47.55
L79	S21°34'29"E	39.71
L80	S17°26'58"E	31.09
L81	S11°57'34"W	46.57
L82	S85°31'49"E	44.70
L83	N75°07'45"E	32.24
L84	N68°09'07"E	36.64
L85	N60°57'56"W	11.53
L86	N56°25'25"W	30.59
L87	N59°00'35"W	42.36

Line Table		
Line #	Direction	Length
L88	S85°47'03"W	26.63
L89	S75°00'55"W	12.97
L90	S56°50'29"W	53.43
L91	S31°45'21"W	57.75
L120	N01°49'50"E	55.93
L121	N09°50'24"E	58.43
L122	N02°16'42"E	43.07
L123	N06°59'02"E	43.23
L124	N05°00'44"E	37.86
L125	S10°08'45"E	67.07
L126	S02°36'09"W	19.12

Line Table		
Line #	Direction	Length
L127	S87°19'53"W	19.37
L128	N11°34'25"E	30.89
L129	N11°34'25"E	25.71
L130	N07°36'13"E	21.96
L131	N04°30'53"E	48.19
L132	N00°04'01"W	35.37
L133	N00°04'01"W	40.79
L134	N16°16'55"W	35.79

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SOUTH CAROLINA PROFESSIONAL LAND SURVEYOR KEVIN T. HEWES TIER A No. 21627

SOUTH CAROLINA DAVIS & FLOYD, INC. No. C00538 CERTIFICATE OF AUTHORIZATION

10-4-19

KEVIN THEWES – S.C.R.L.S. No. 21627 DATE:

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SIGNATURE

10-3-19
DATE

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CRITICAL LINE PLAT

SHOWING
CRITICAL AREAS ALONG I–526 CORRIDOR
INCLUDING
CRITICAL AREAS 1 (2.15 AC), 2 (62.24 AC), 3 (1.23 AC), 4 (0.81 AC), 5 (2.96 AC), 6 (6.93 AC), AND 7 (0.36 AC)
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D&F JOB #: 31667.00

SCALE: 1" = 60' DATE: 05/23/2019

60 30 0 60 120

SHEET 04 of 06

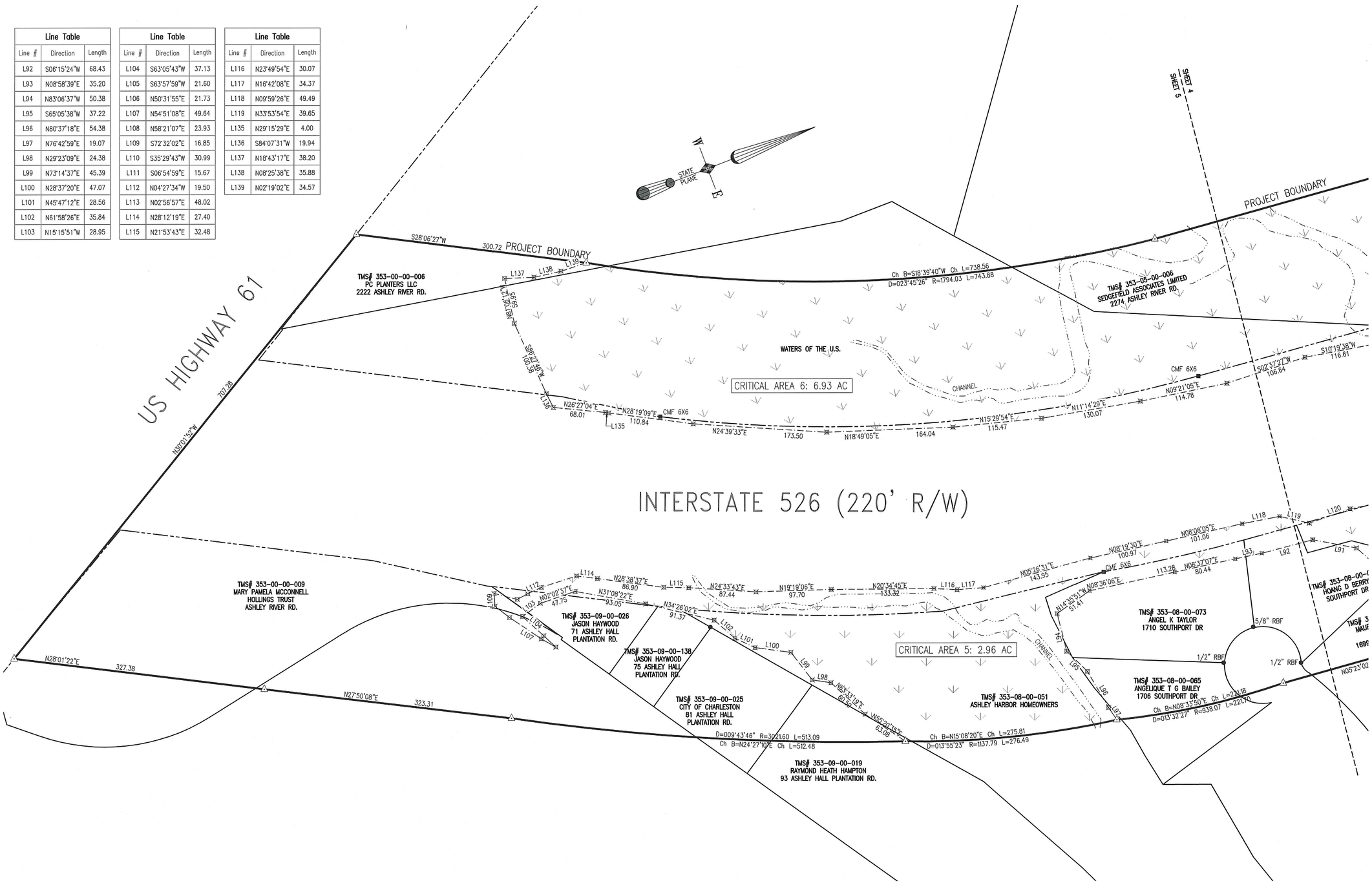
DAVIS & FLOYD, INC
POST OFFICE BOX 61599
CHARLESTON, SC 29419
PHONE (843) 554–8602
KTHEWES@DAVISFLOYD.COM

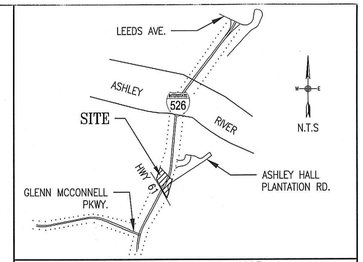
ACAD DWG – G:\JOBSODD\31667–00\PRODUCTION\SURVEY\31667 DWG\2019 DWG\31667 CRITICAL LINE PLAT ASHLEY RIVER.DWG, PLOTTED BY: LANE SMITH, PLOTTED: 19 SEPTEMBER 2019 – 11:03:53

Line Table		
Line #	Direction	Length
L92	S06°15'24"W	68.43
L93	N08°58'39"E	35.20
L94	N83°06'37"W	50.38
L95	S65°05'38"W	37.22
L96	N80°37'18"E	54.38
L97	N76°42'59"E	19.07
L98	N29°23'09"E	24.38
L99	N73°14'37"E	45.39
L100	N28°37'20"E	47.07
L101	N45°47'12"E	28.56
L102	N61°58'26"E	35.84
L103	N15°15'51"W	28.95

Line Table		
Line #	Direction	Length
L104	S63°05'43"W	37.13
L105	S63°57'59"W	21.60
L106	N50°31'55"E	21.73
L107	N54°51'08"E	49.64
L108	N58°21'07"E	23.93
L109	S72°32'02"E	16.85
L110	S35°29'43"W	30.99
L111	S06°54'59"E	15.67
L112	N04°27'34"W	19.50
L113	N02°56'57"E	48.02
L114	N28°12'19"E	27.40
L115	N21°53'43"E	32.48

Line Table		
Line #	Direction	Length
L116	N23°49'54"E	30.07
L117	N16°42'08"E	34.37
L118	N09°59'26"E	49.49
L119	N33°53'54"E	39.65
L135	N29°15'29"E	4.00
L136	S84°07'31"W	19.94
L137	N18°43'17"E	38.20
L138	N08°25'38"E	35.88
L139	N02°19'02"E	34.57





LOCATION MAP

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LEGEND

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ABBREVIATION LEGEND

RBF	REBAR FOUND (SIZE DESC.)
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SOUTH CAROLINA PROFESSIONAL LAND SURVEYOR
KEVIN M. THEWES
TIER A
No. 21627

SOUTH CAROLINA
DAVIS & FLOYD, INC.
No. C00538
CERTIFICATE OF AUTHORIZATION

KEVIN THEWES – S.C.R.L.S. No. 21627 DATE: 10-3-19

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CRITICAL LINE PLAT

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CRITICAL AREAS ALONG I–526 CORRIDOR
INCLUDING
CRITICAL AREAS 1 (2.15 AC), 2 (62.24 AC), 3 (1.23 AC), 4 (0.81 AC), 5 (2.96 AC), 6 (6.93 AC), AND 7 (0.36 AC)
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SHEET 05 of 06

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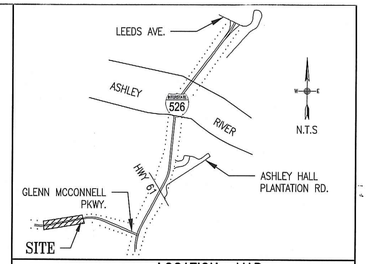
Line Table		
Line #	Direction	Length
L140	S75°24'25"W	49.15
L155	N68°58'42"W	6.10
L156	N87°42'06"W	57.10
L157	S75°50'43"W	37.96
L158	S60°21'11"E	28.62
L159	S25°55'08"E	11.79



LOCATION MAP

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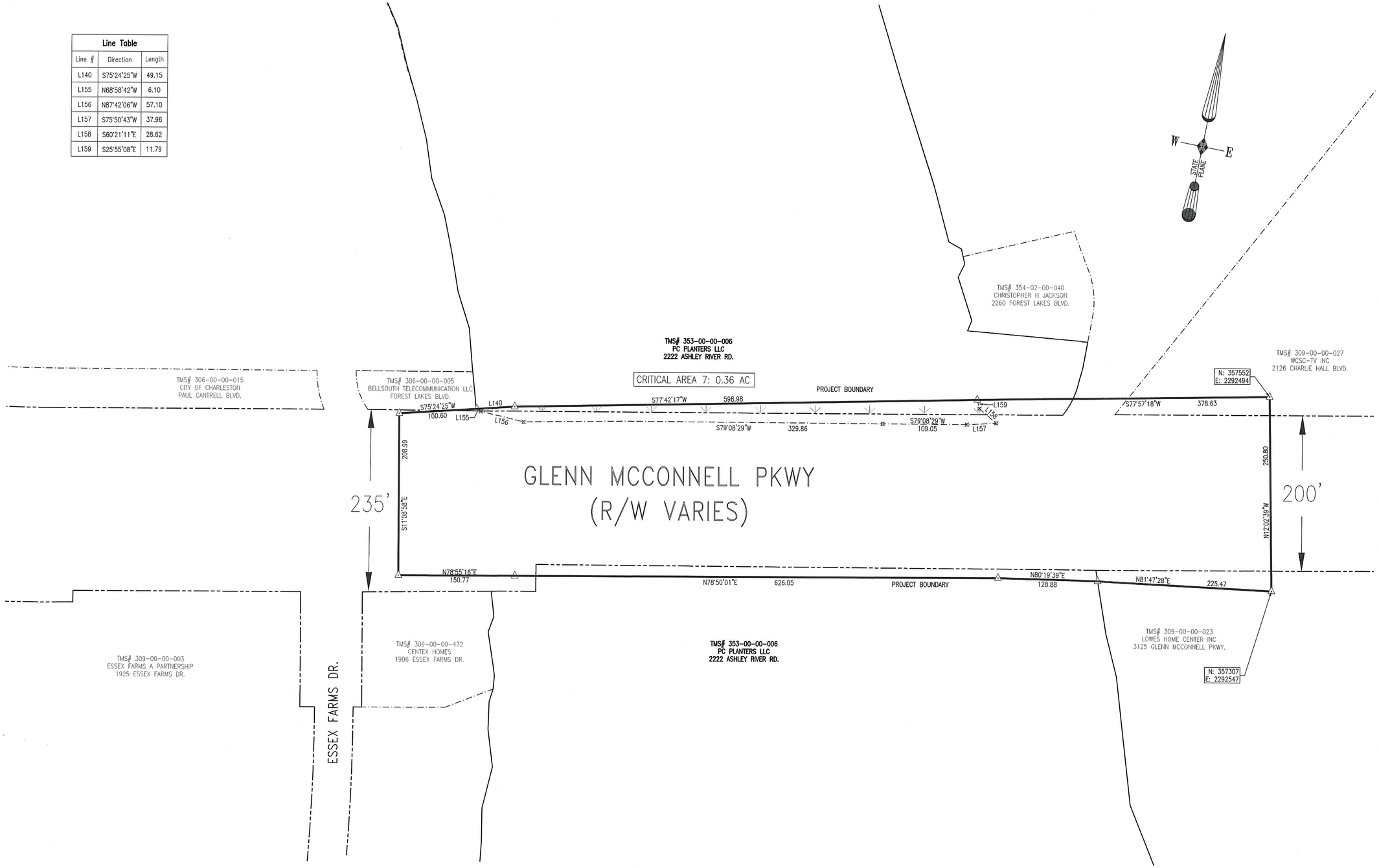

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IPF	IRON PIPE FOUND (SIZE DESC.)

I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SPECIFIED THEREIN. THE AREA WAS DETERMINED BY THE COORDINATE METHOD OF AREA DETERMINATION. THE PRECISION OF THE UNADJUSTED FIELD SURVEY WAS GREATER THAN 1:10,000.

SOUTH CAROLINA PROFESSIONAL LAND SURVEYOR — TIER A — No. 21627 — KEVIN L. THEWES

SOUTH CAROLINA — DAVIS & FLOYD, INC. — No. C00538 — CERTIFICATE OF AUTHORIZATION

KEVIN THEWES – S.C.R.L.S. No. 21627 DATE: 10-2-19

THE AREA SHOWN ON THIS PLAT IS A REPRESENTATION OF DEPARTMENT(SCDHEC–OCRM) PERMIT AUTHORITY ON THE SUBJECT PROPERTY. CRITICAL AREAS BY THEIR NATURE ARE DYNAMIC AND SUBJECT TO CHANGE OVER TIME. BY DELINEATING THE PERMIT AUTHORITY OF SCDHEC–OCRM, SCDHEC–OCRM IN NO WAY WAIVES ITS RIGHT TO ASSERT PERMIT JURISDICTION AT ANY TIME IN ANY CRITICAL AREA ON THE SUBJECT PROPERTY WHETHER SHOWN OR NOT.

SIGNATURE 10-3-19 DATE

The critical line shown on this plat is valid for five years from the date of this signature, subject to the cautionary language above.

CRITICAL LINE PLAT

SHOWING

CRITICAL AREAS ALONG I–526 CORRIDOR

INCLUDING

CRITICAL AREAS 1 (2.15 AC), 2 (62.24 AC), 3 (1.23 AC), 4 (0.81 AC), 5 (2.96 AC), 6 (6.93 AC), AND 7 (0.36 AC)

LOCATED

CITY OF NORTH CHARLESTON

AND

CITY OF CHARLESTON

CHARLESTON COUNTY, SOUTH CAROLINA

D&F JOB #: 31667.00

SCALE: 1" = 60' DATE: 05/23/2019

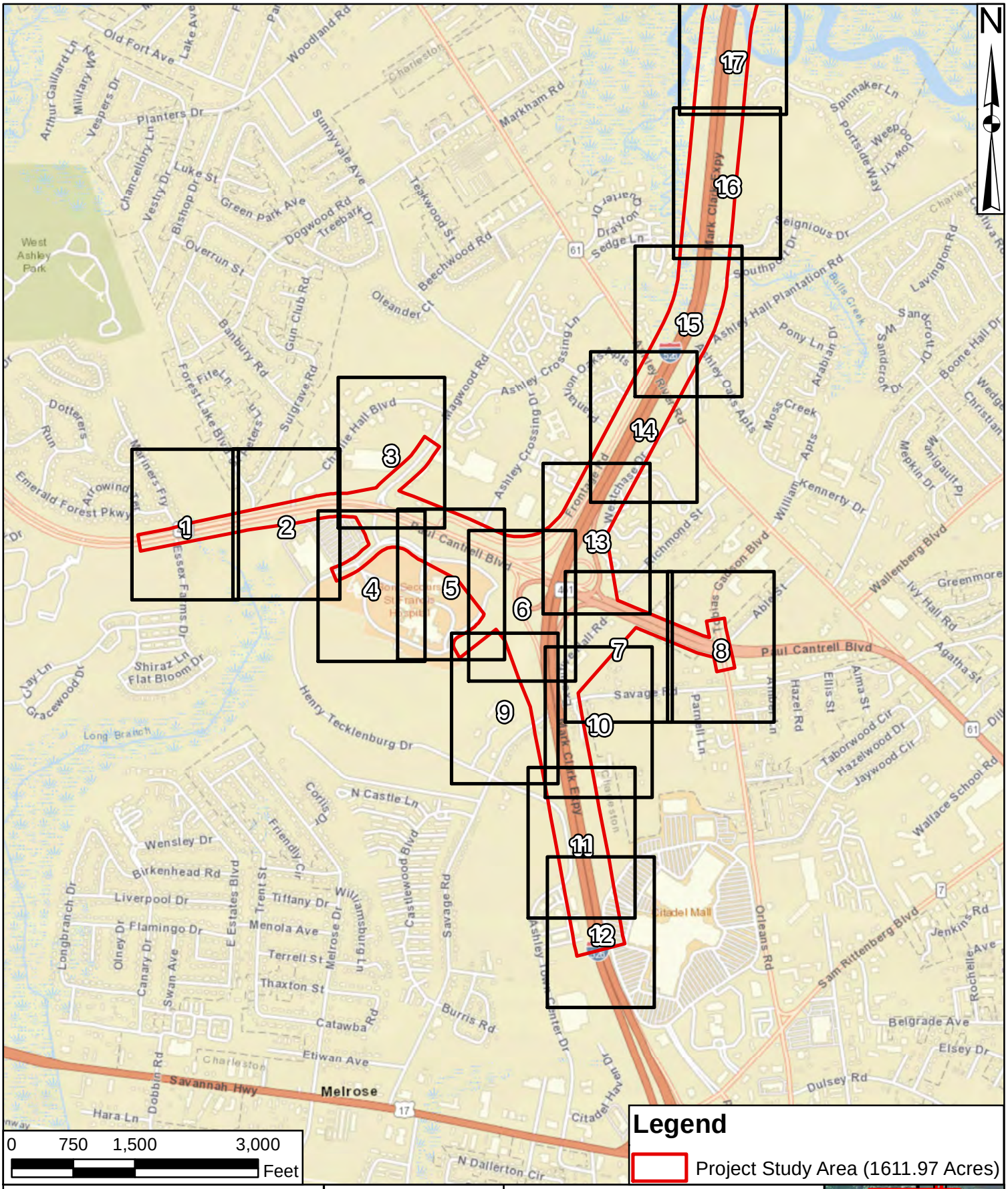
60 30 0 60 120

SHEET 06 of 06

DAVIS & FLOYD, INC

POST OFFICE BOX 61599
CHARLESTON, SC 29419
PHONE (843) 554–8602
KTHEWES@DAVISFLOYD.COM

ACAD DWG – G:\JOBSODD\31667-00\PRODUCTION\SURVEY\31667 DWG\2019 DWG\31667 CRITICAL LINE PLAT ASHLEY RIVER.DWG, PLOTTED BY: LANE SMITH, PLOTTED: 01 OCTOBER 2019 – 11:44:18



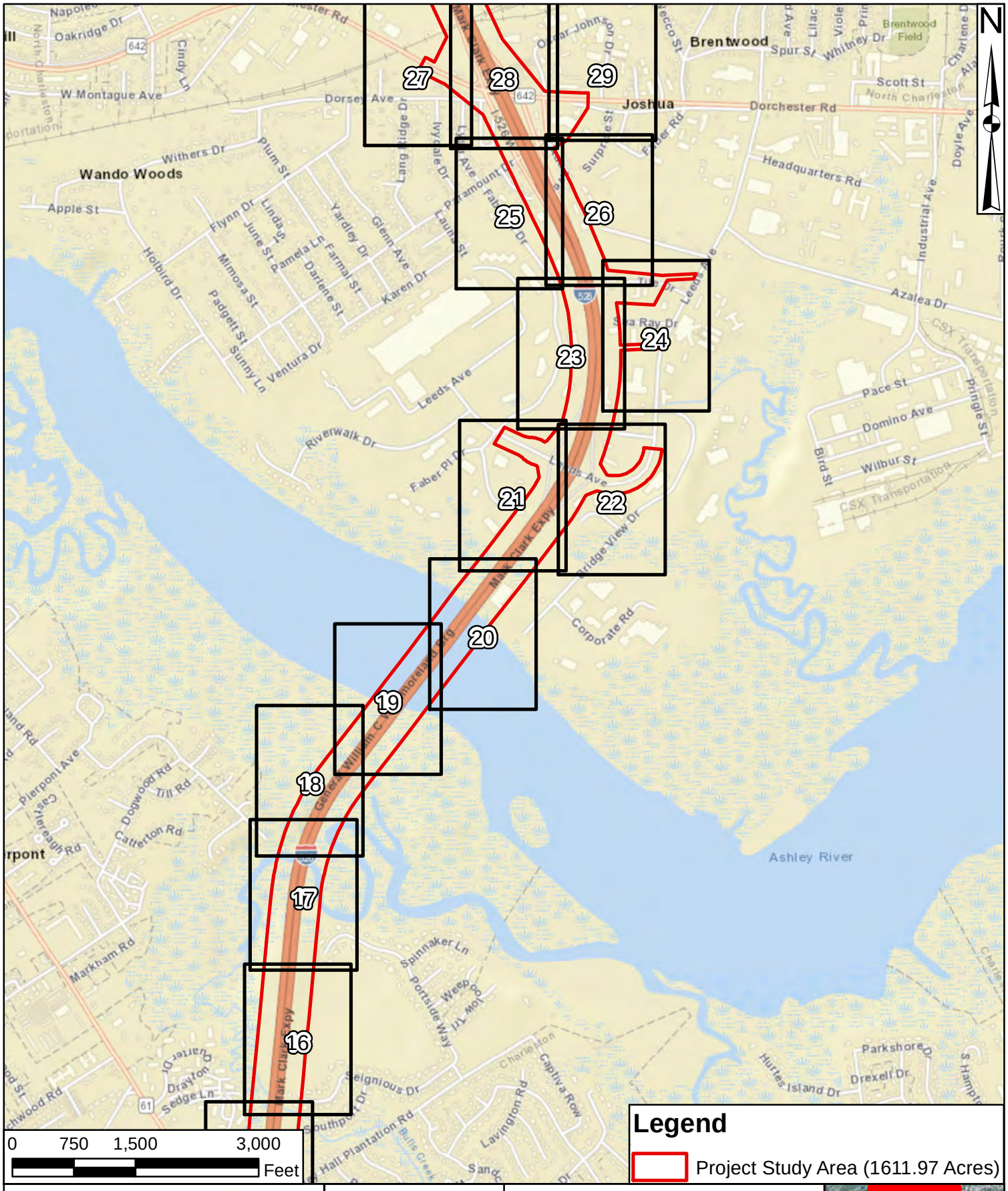
Source:
NRCS NAIP Aerial
2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Grid Index Layout

Figure 8
Sheet 1 of 6



SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

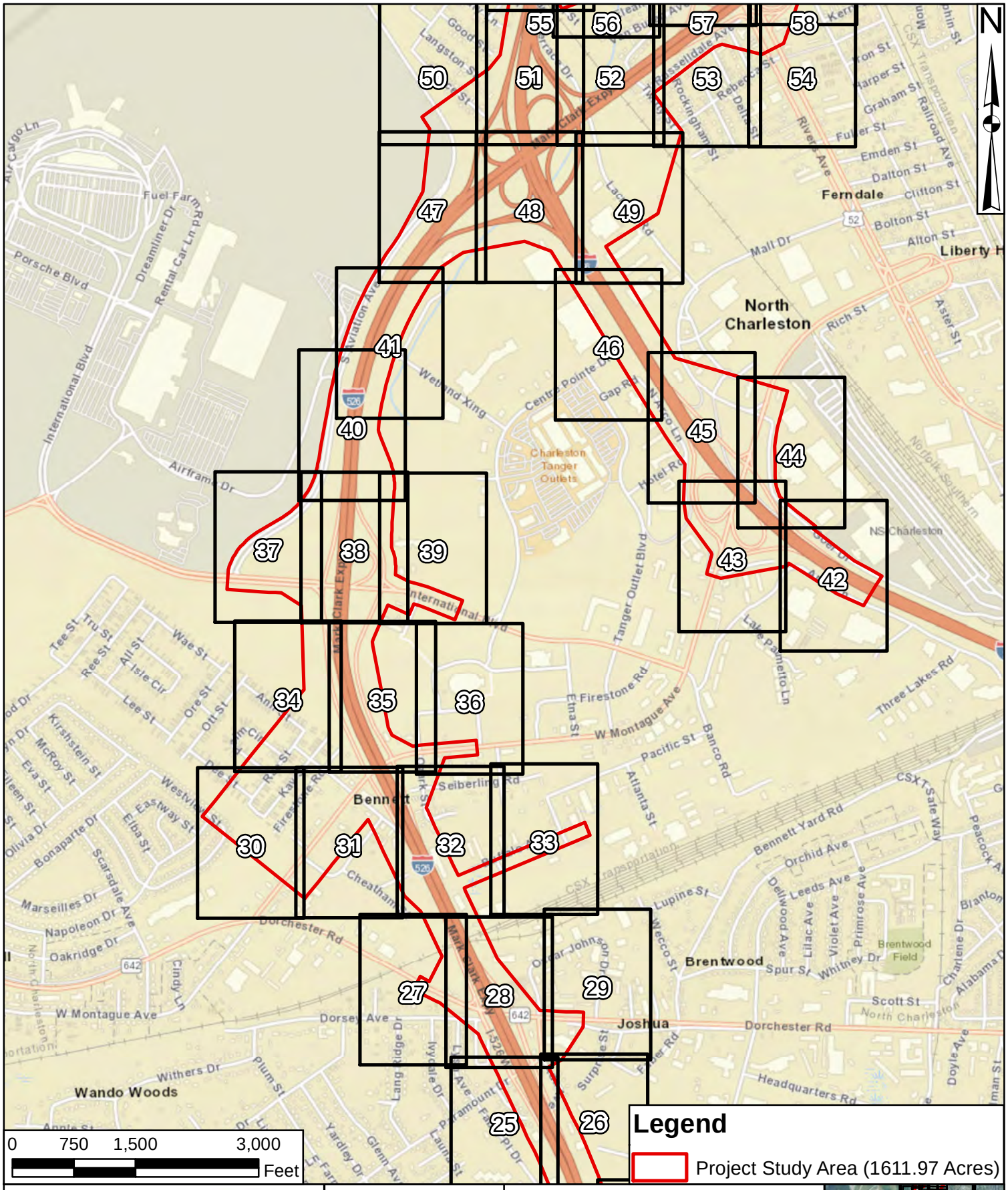
Source:
NRCS NAIP Aerial
2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Grid Index Layout

Sheet 2 of 6



SCDOT South Carolina Department of Transportation

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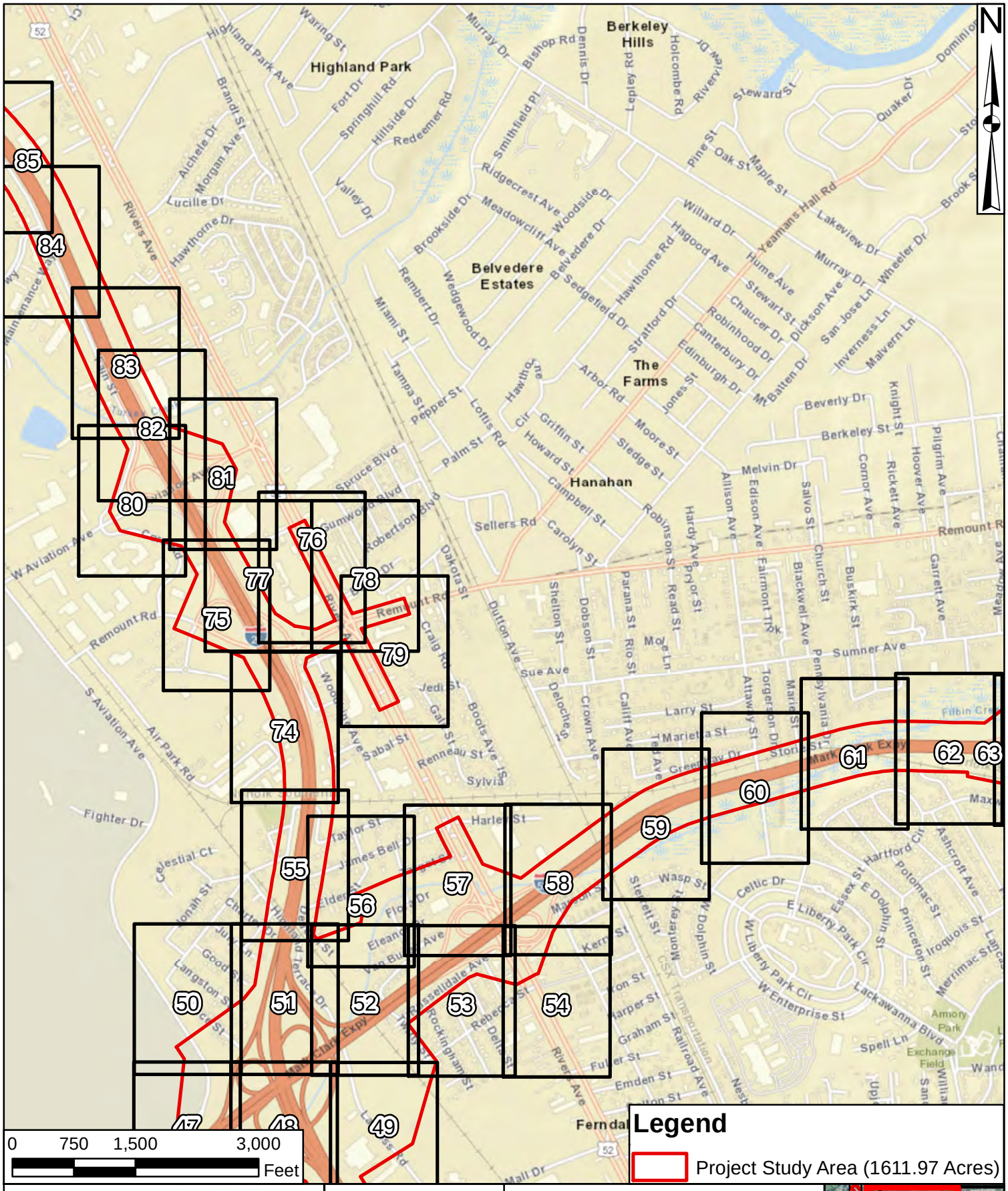
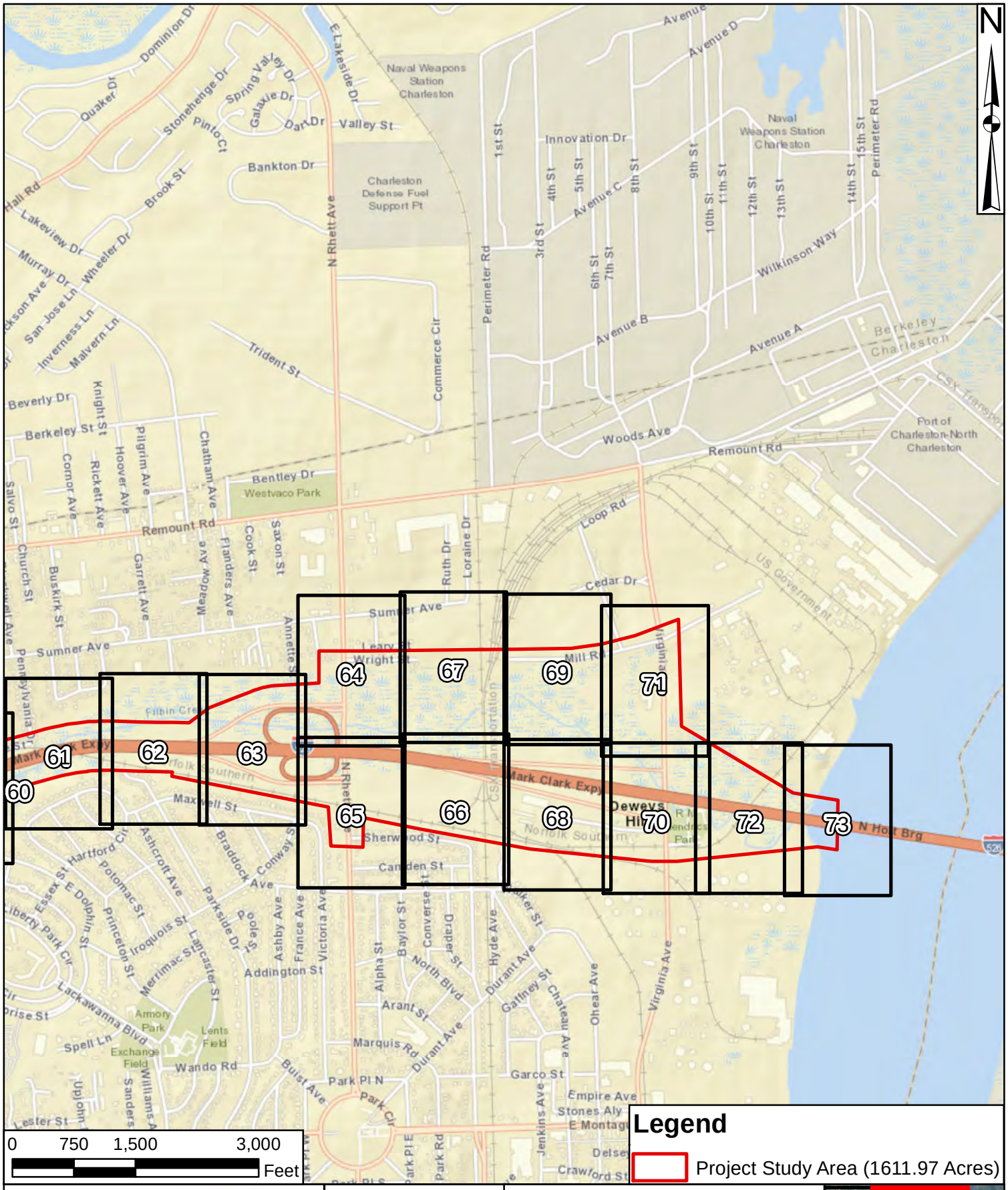
Grid Index Layout

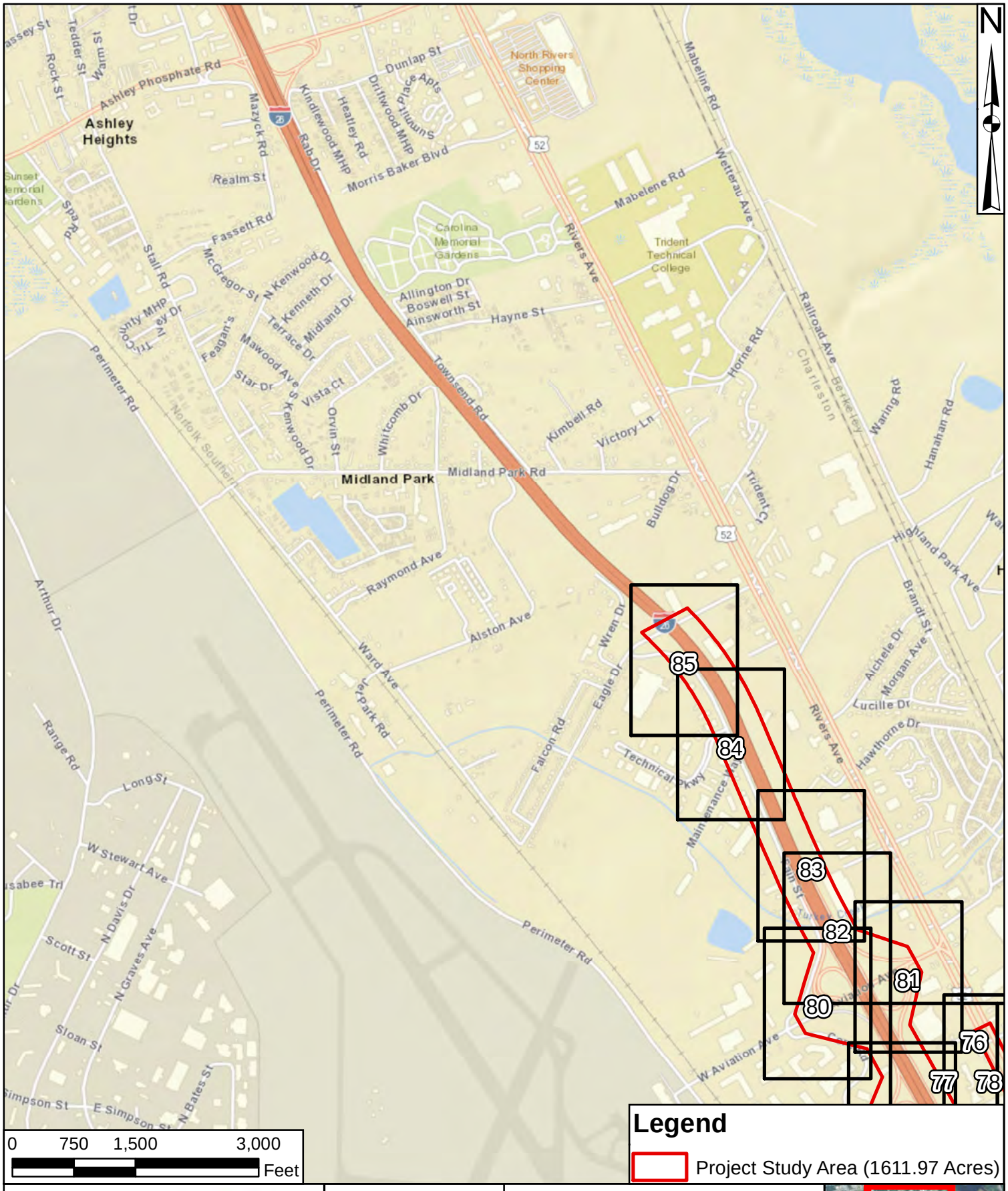
Sheet 3 of 6



SCDOT South Carolina Department of Transportation; I-526 WEST LOWCOUNTRY CORRIDOR	Source: NRCS NAIP Aerial 2017	**I-526 Lowcountry Corridor West** **Charleston County** **SCDOT P032102** **October 31 2019**	
	Drawn By: RHH QA/QC: KLM	Grid Index Layout	Sheet 4 of 6



SCDOT South Carolina Department of Transportation; WEST 526 LOWCOUNTRY CORRIDOR	Source: NRCS NAIP Aerial 2017	**I-526 Lowcountry Corridor West** **Charleston County** **SCDOT P032102** **October 31 2019**	
	Drawn By: RHH QA/QC: KLM	Grid Index Layout	Sheet 5 of 6



SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

Source:
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2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Grid Index Layout

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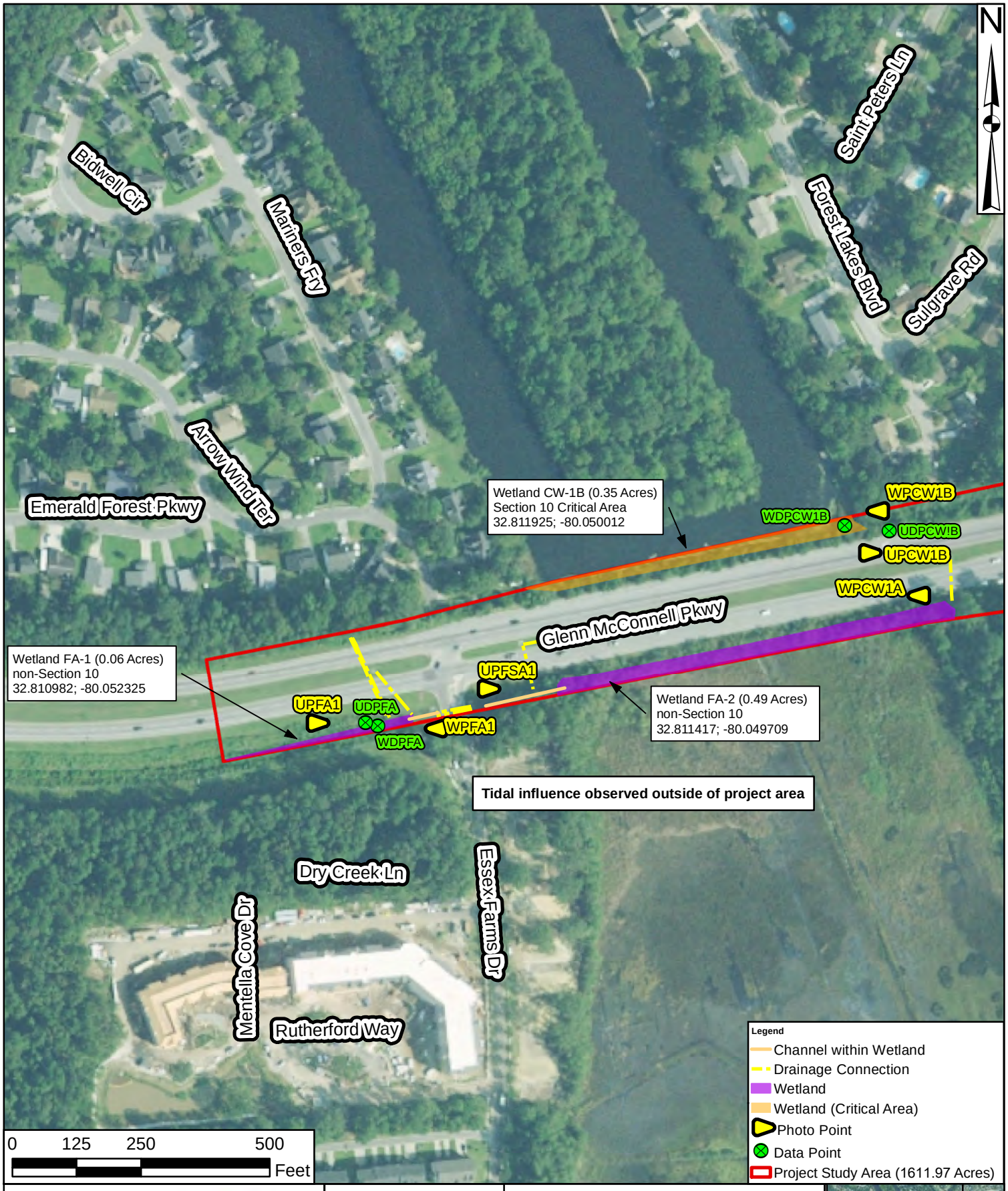

SCDOT South Carolina Department of Transportation

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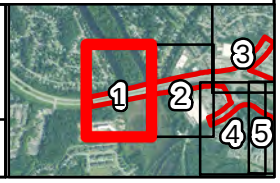
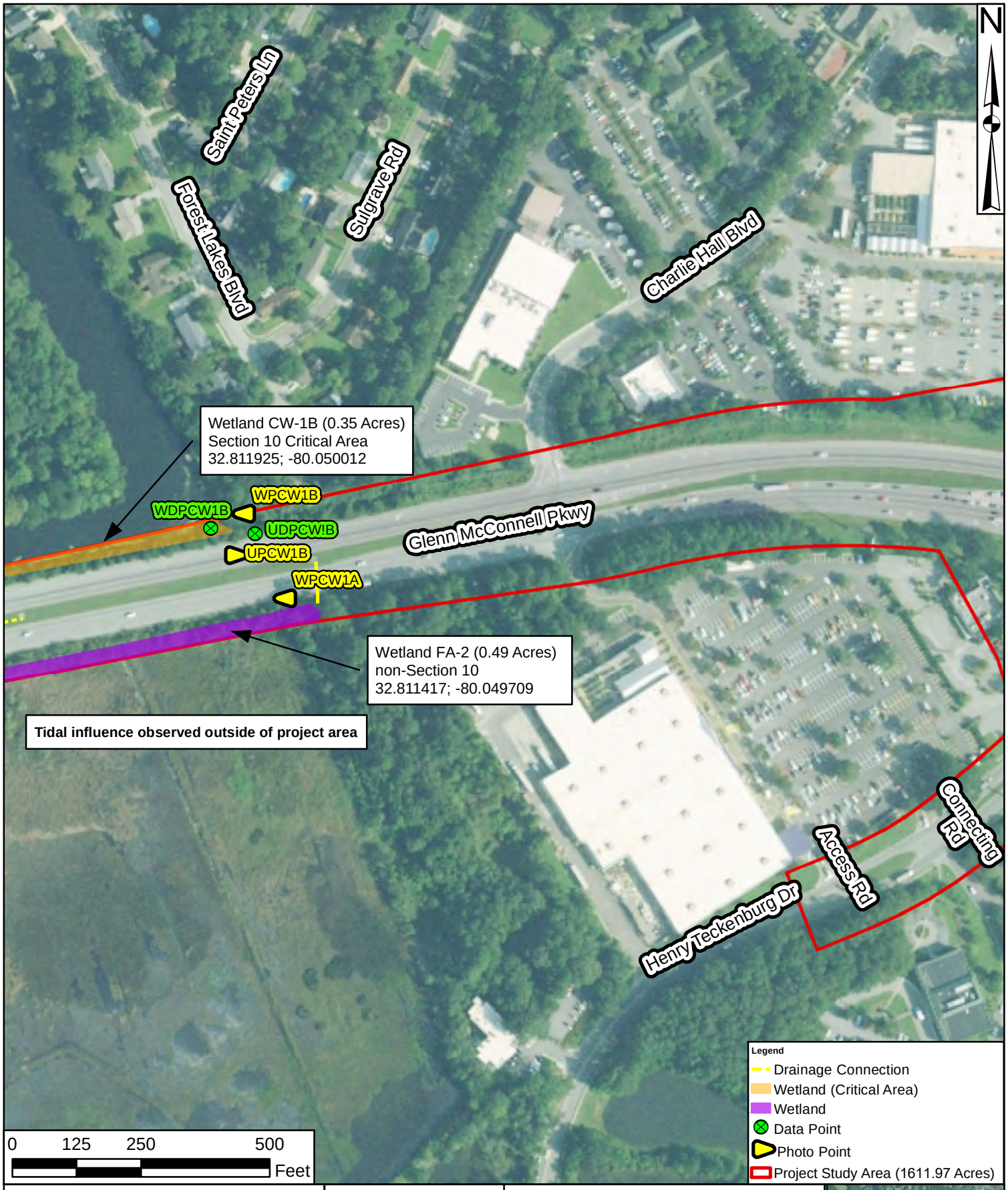
I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Aquatic Resources

Figure 8
Sheet 1 of 85





SCDOT South Carolina Department of Transportation

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I-526 Lowcountry Corridor West
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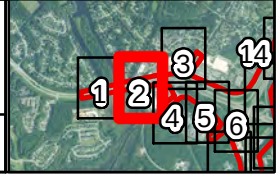
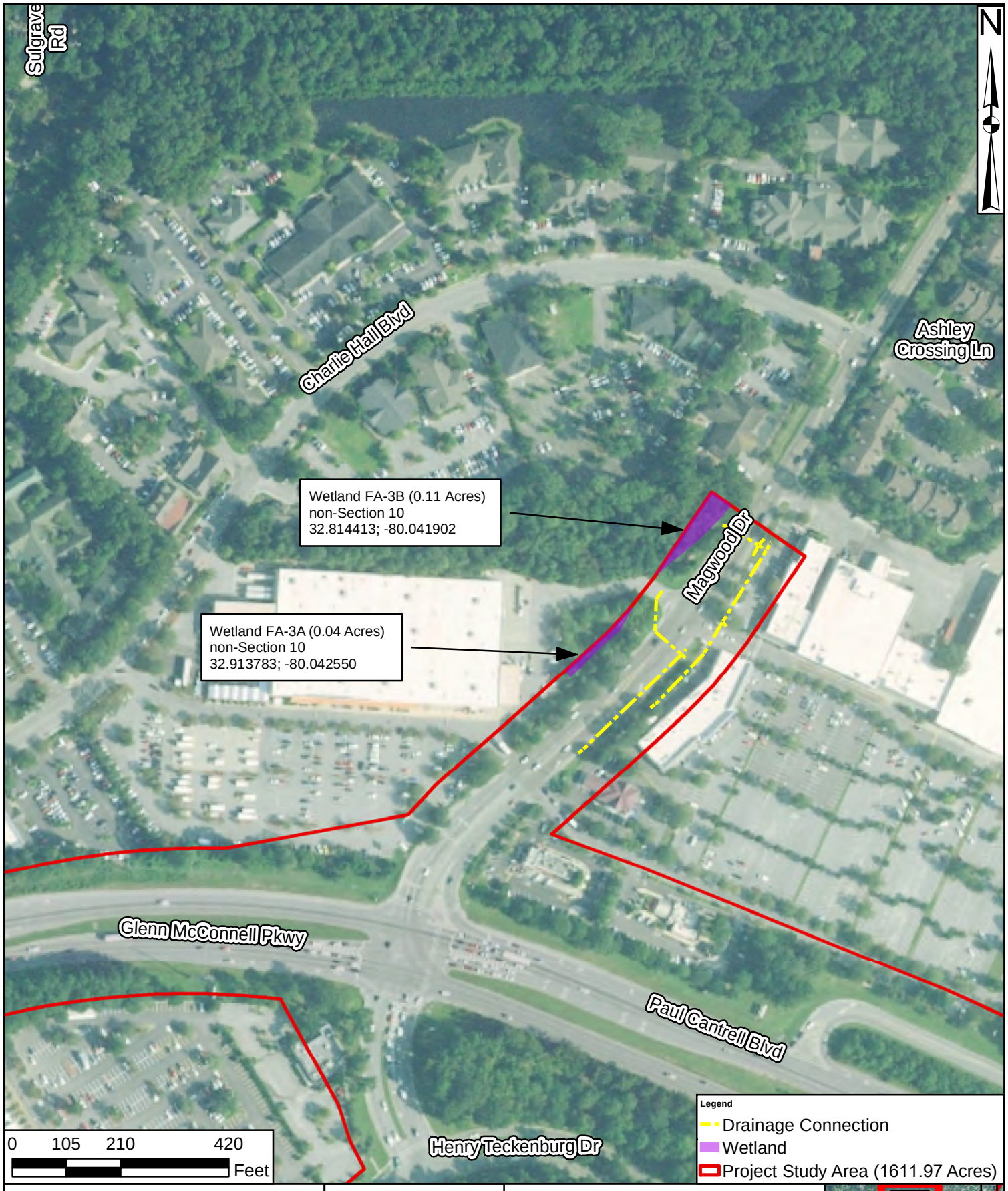
Aquatic Resources





SCDOT South Carolina Department of Transportation

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Aquatic Resources

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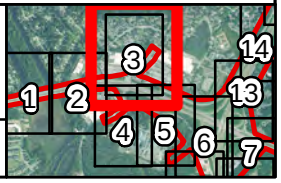

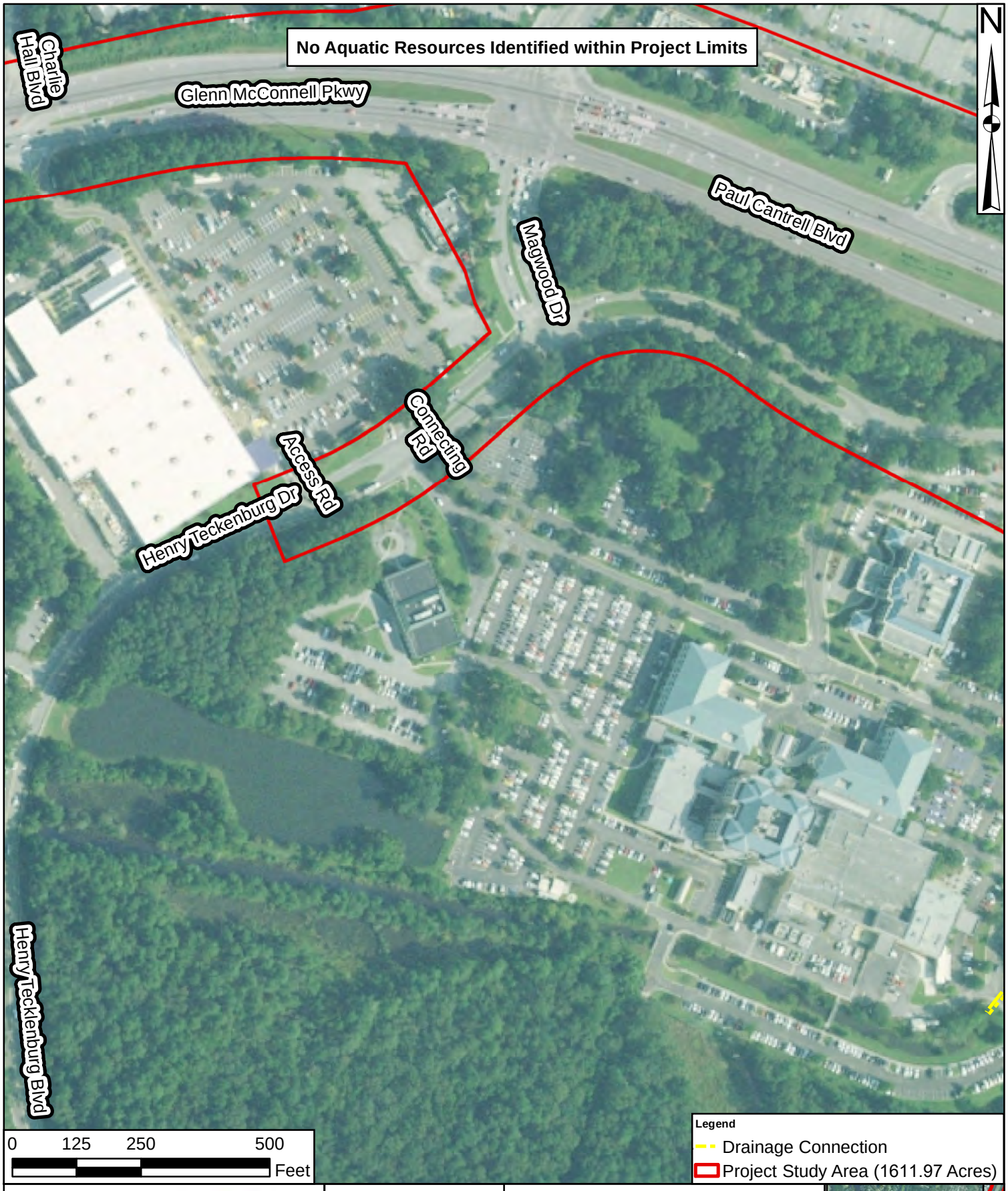

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October 31 2019

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Aquatic Resources

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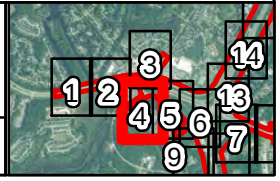

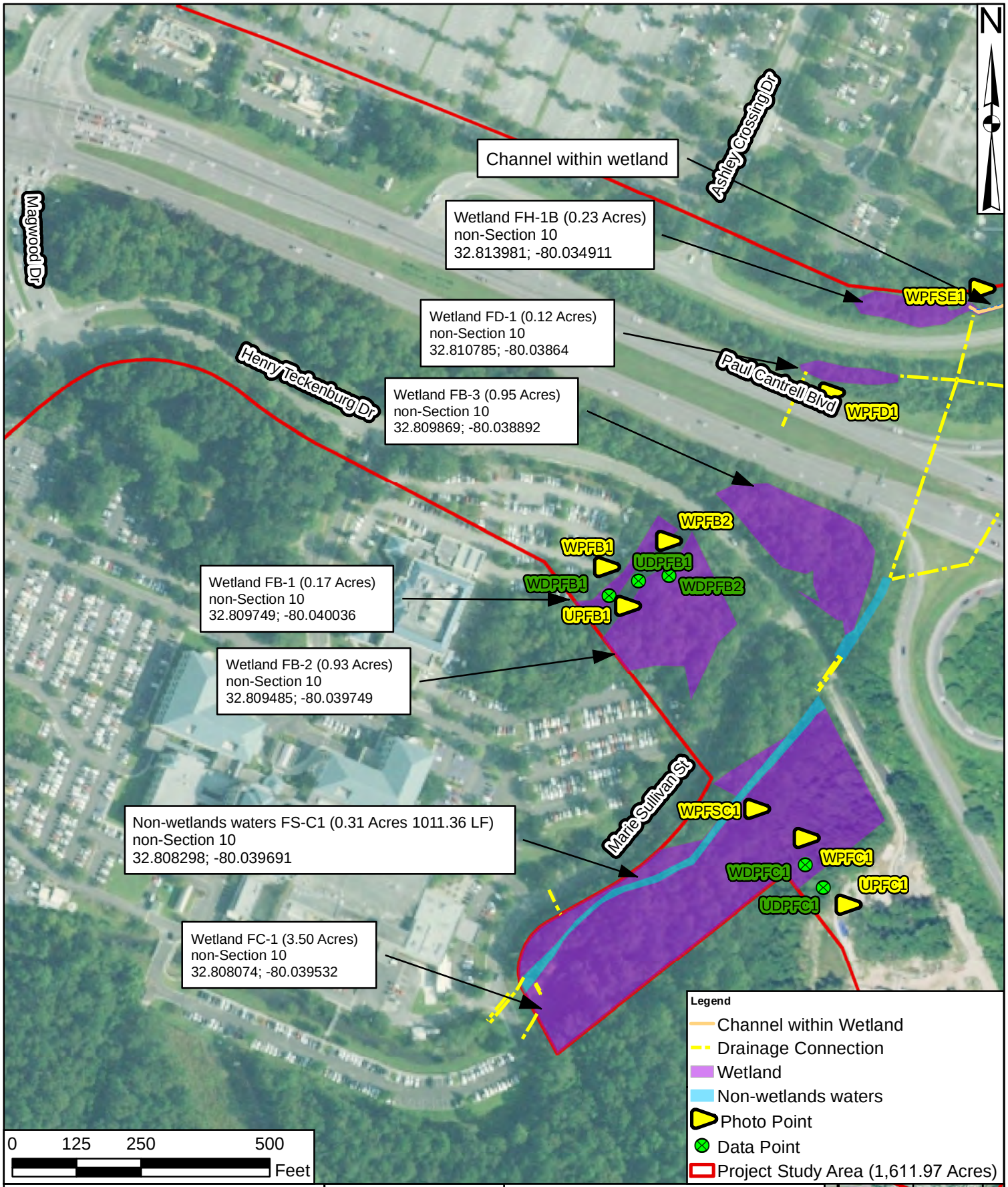

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Charleston County
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October 31 2019

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Aquatic Resources

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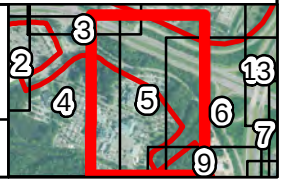

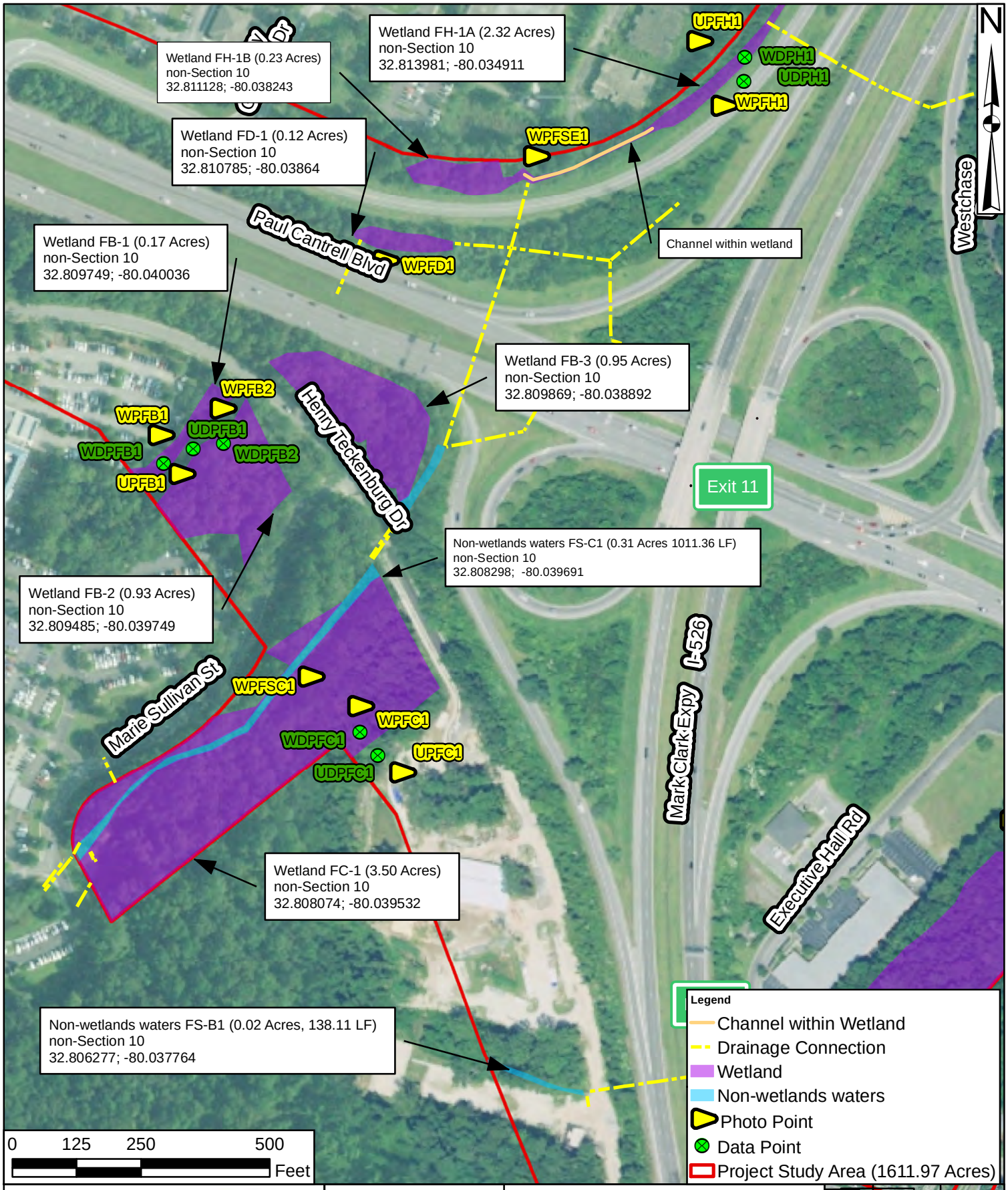

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2017

I-526 Lowcountry Corridor West
Charleston County
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October 31 2019

Drawn By: RHH
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Aquatic Resources

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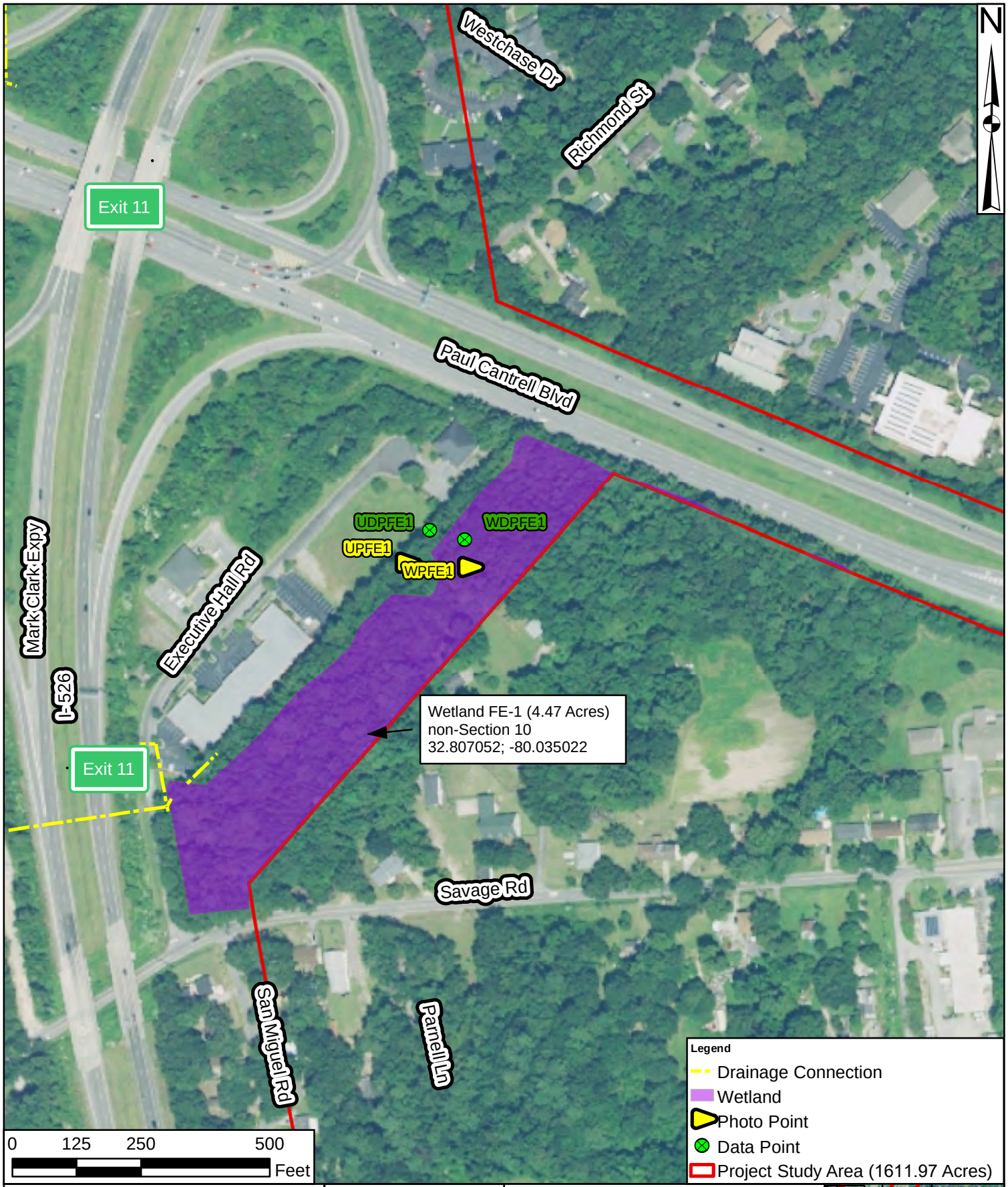

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Charleston County
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Aquatic Resources

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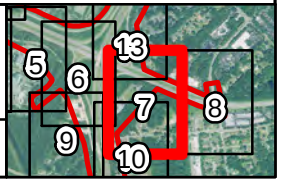

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Aquatic Resources

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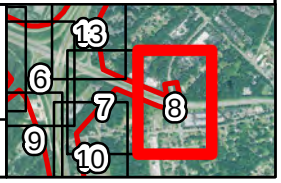

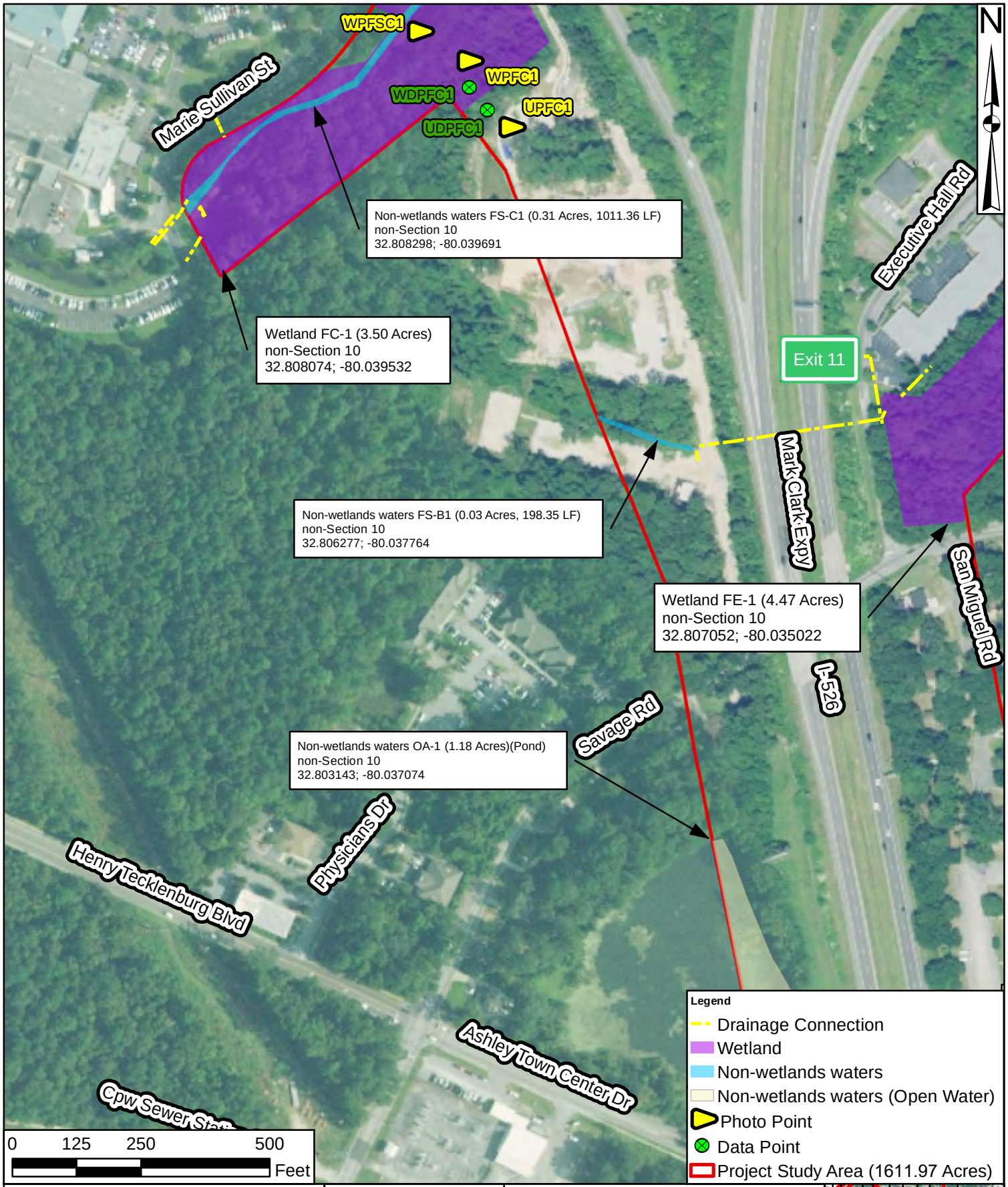

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Aquatic Resources

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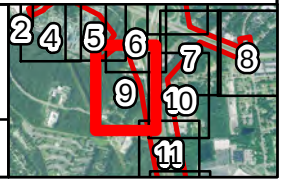

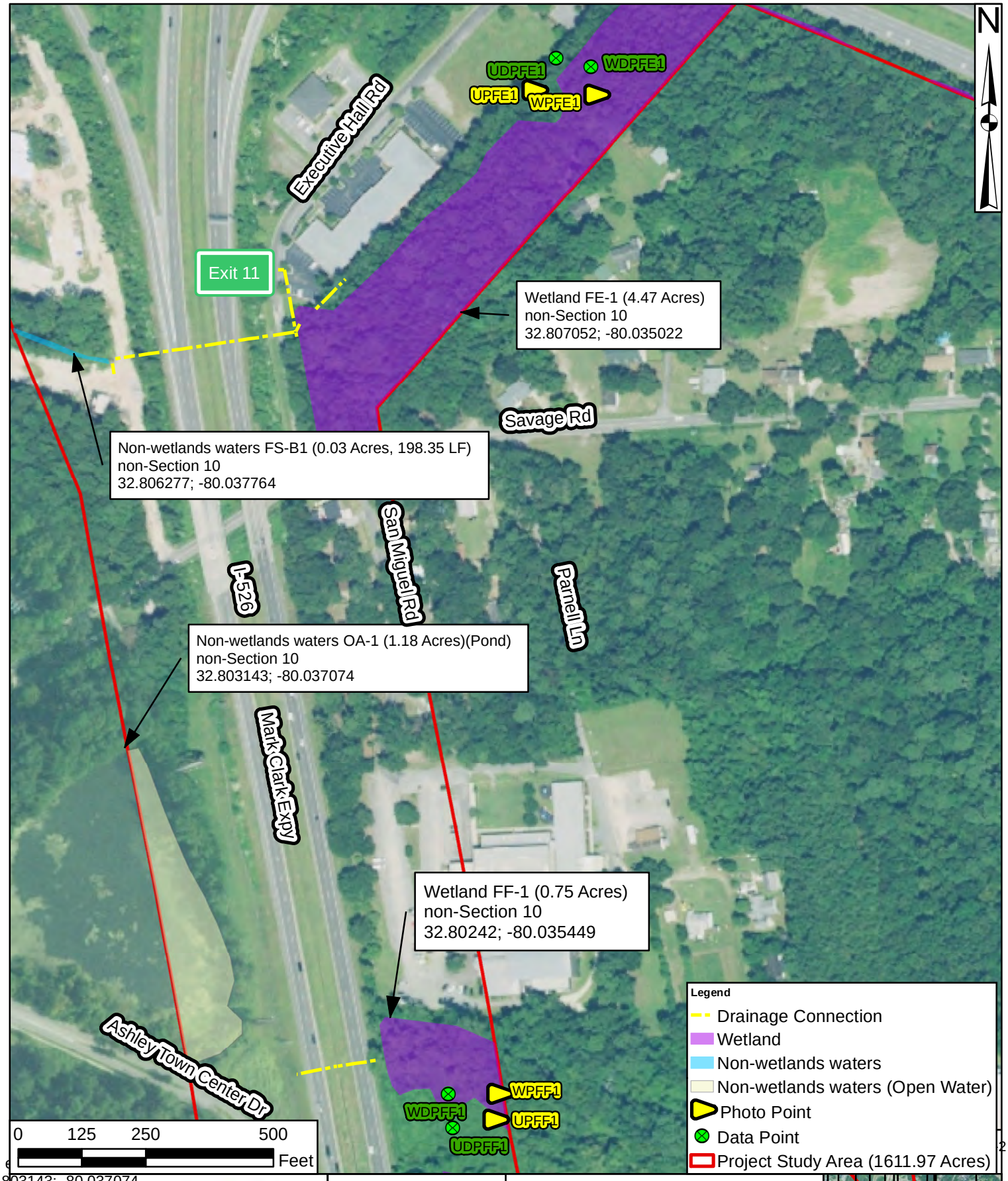

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Charleston County
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October 31 2019

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Aquatic Resources

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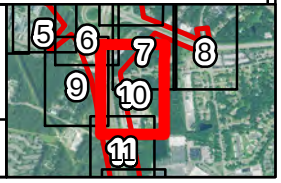

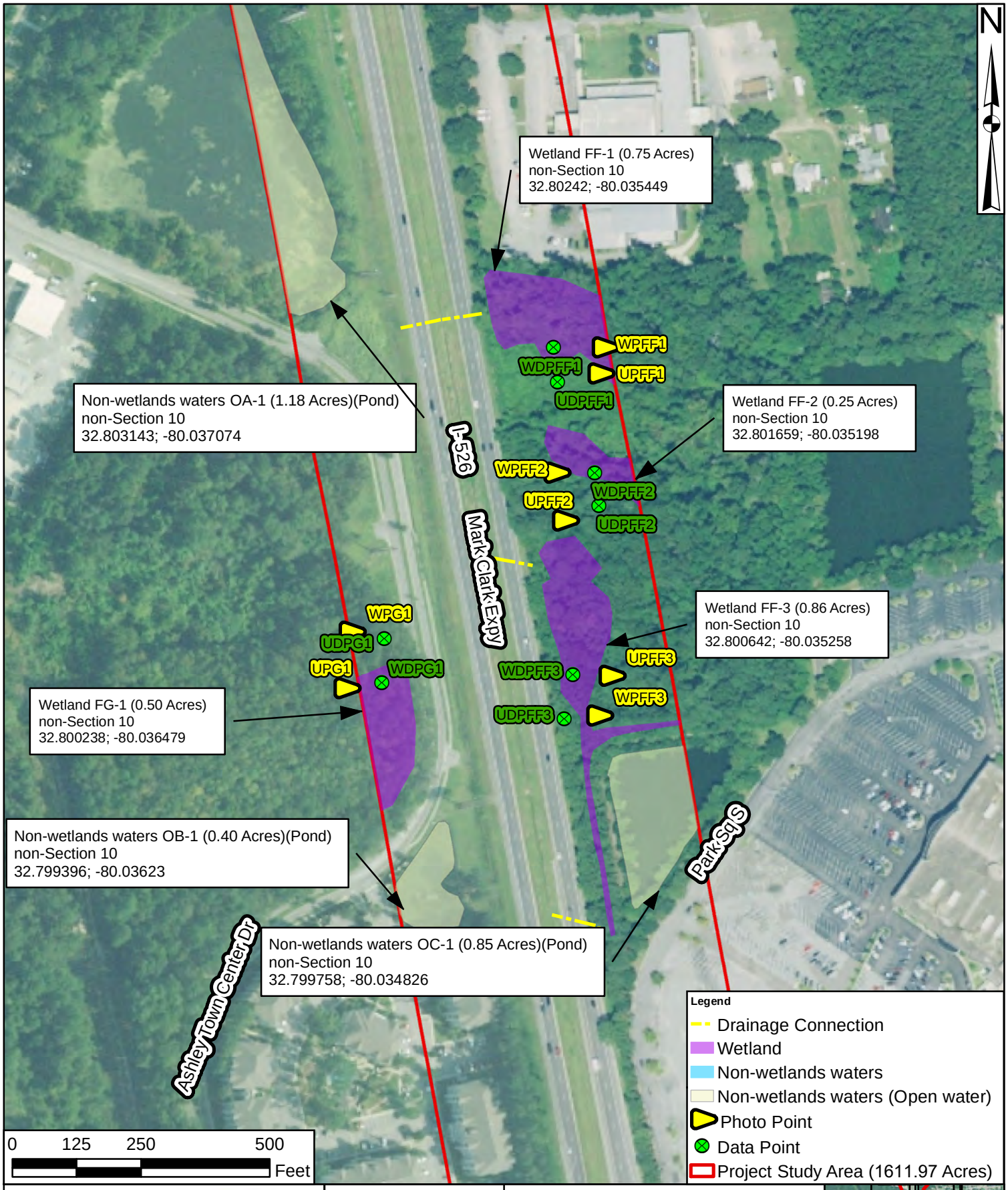

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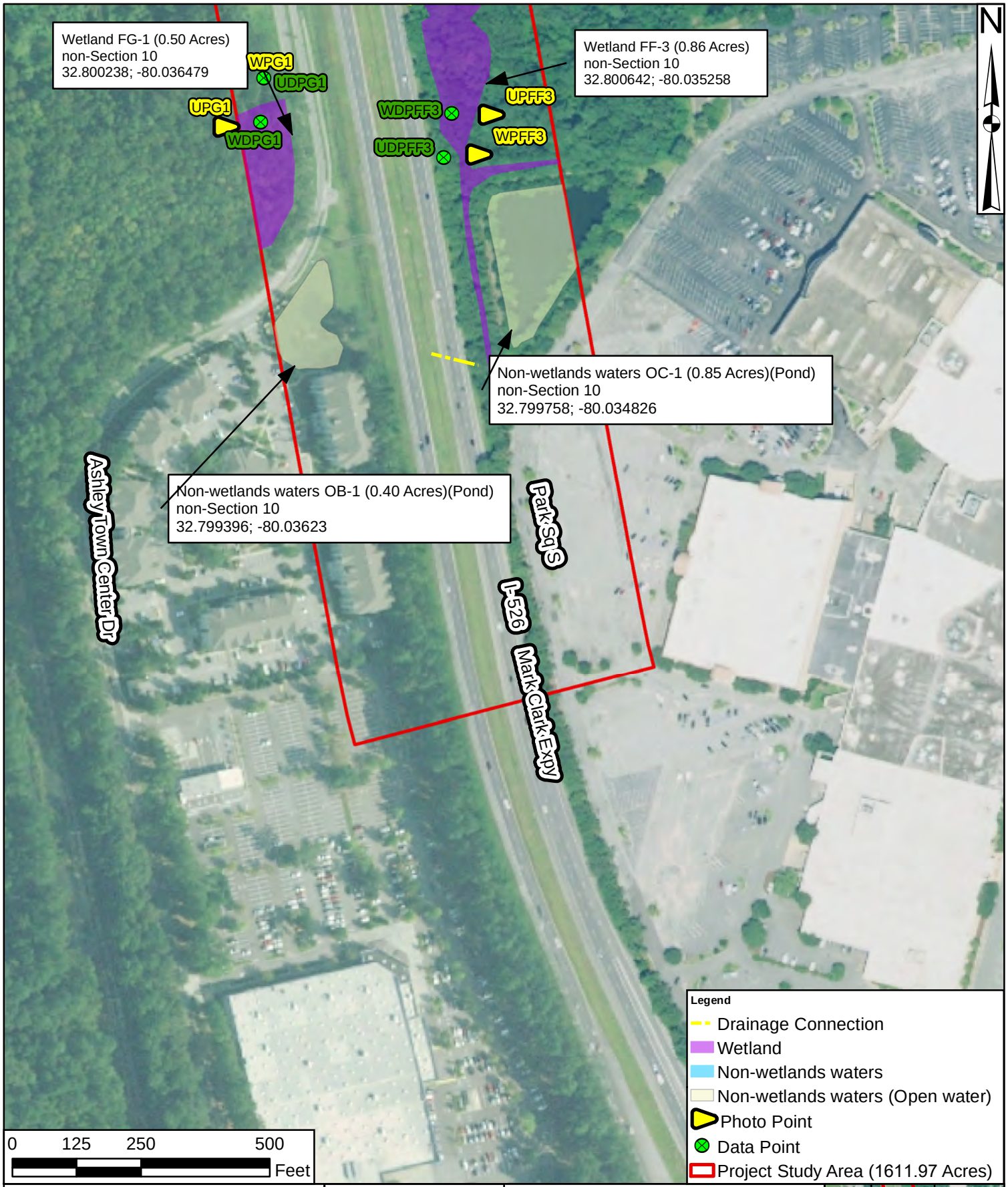

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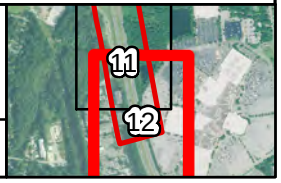

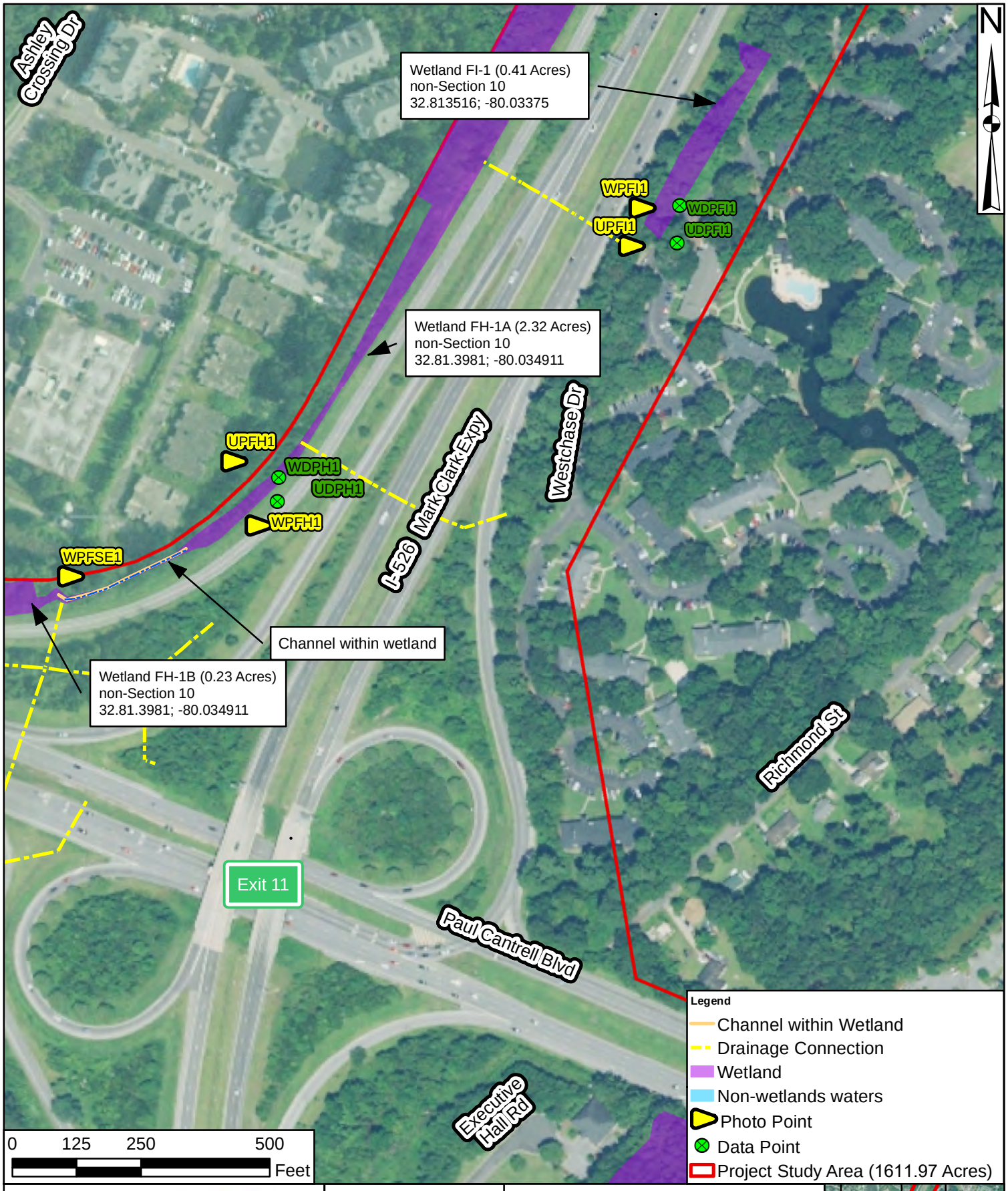

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Aquatic Resources

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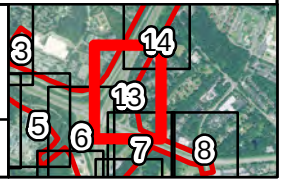

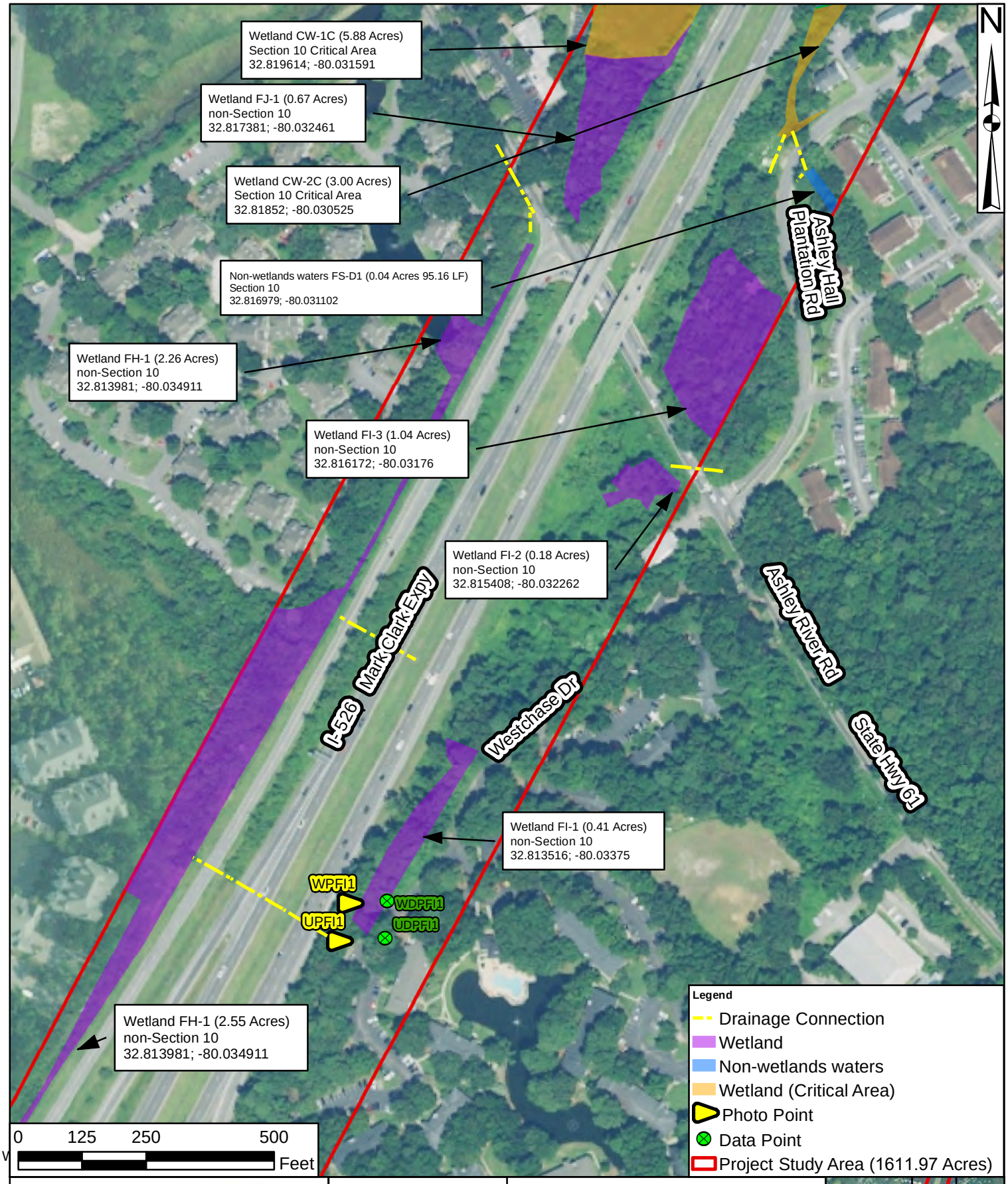

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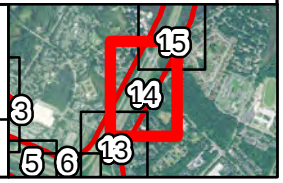

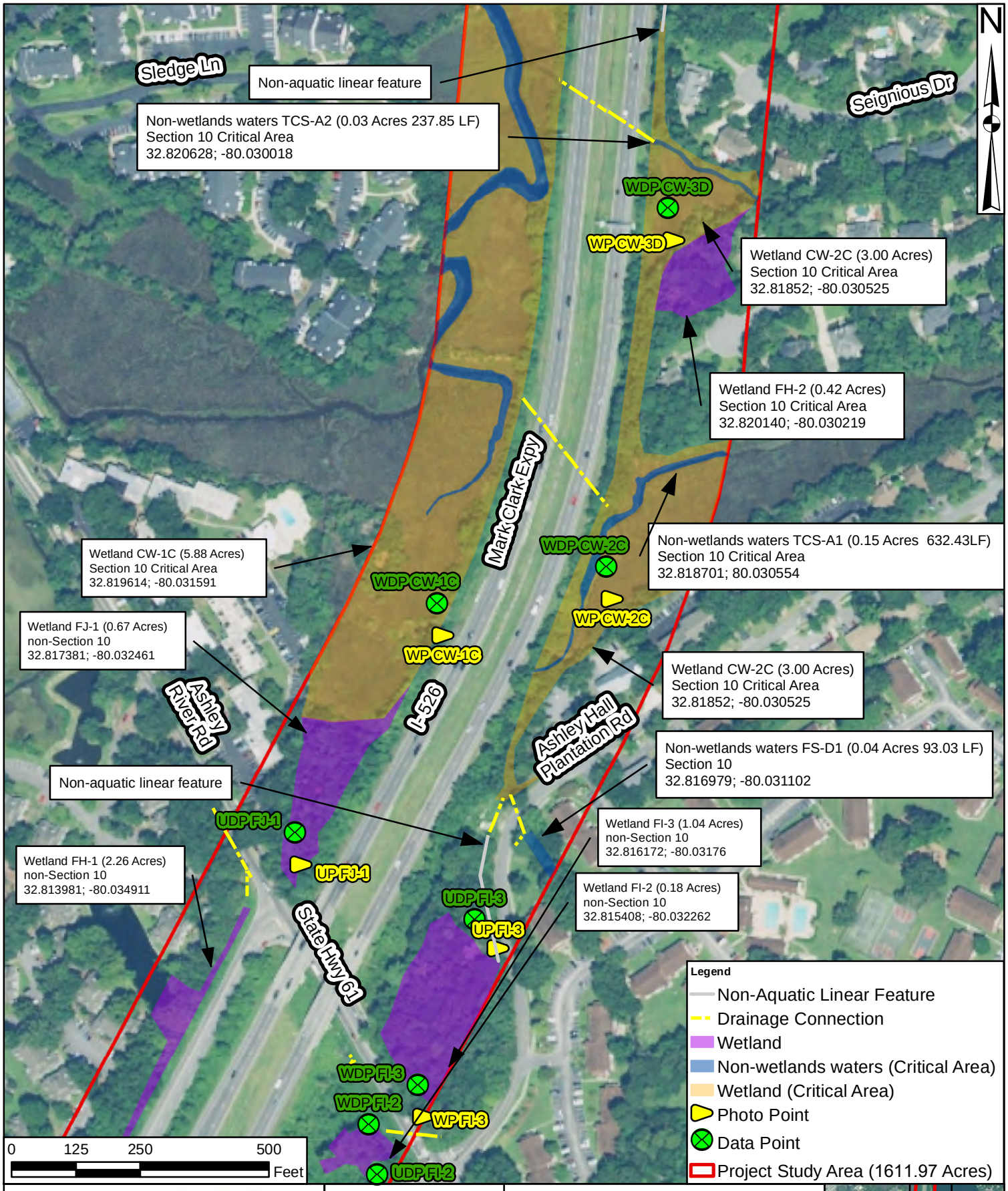

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Aquatic Resources

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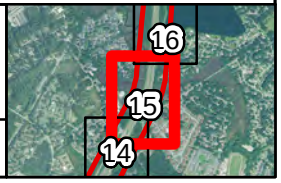

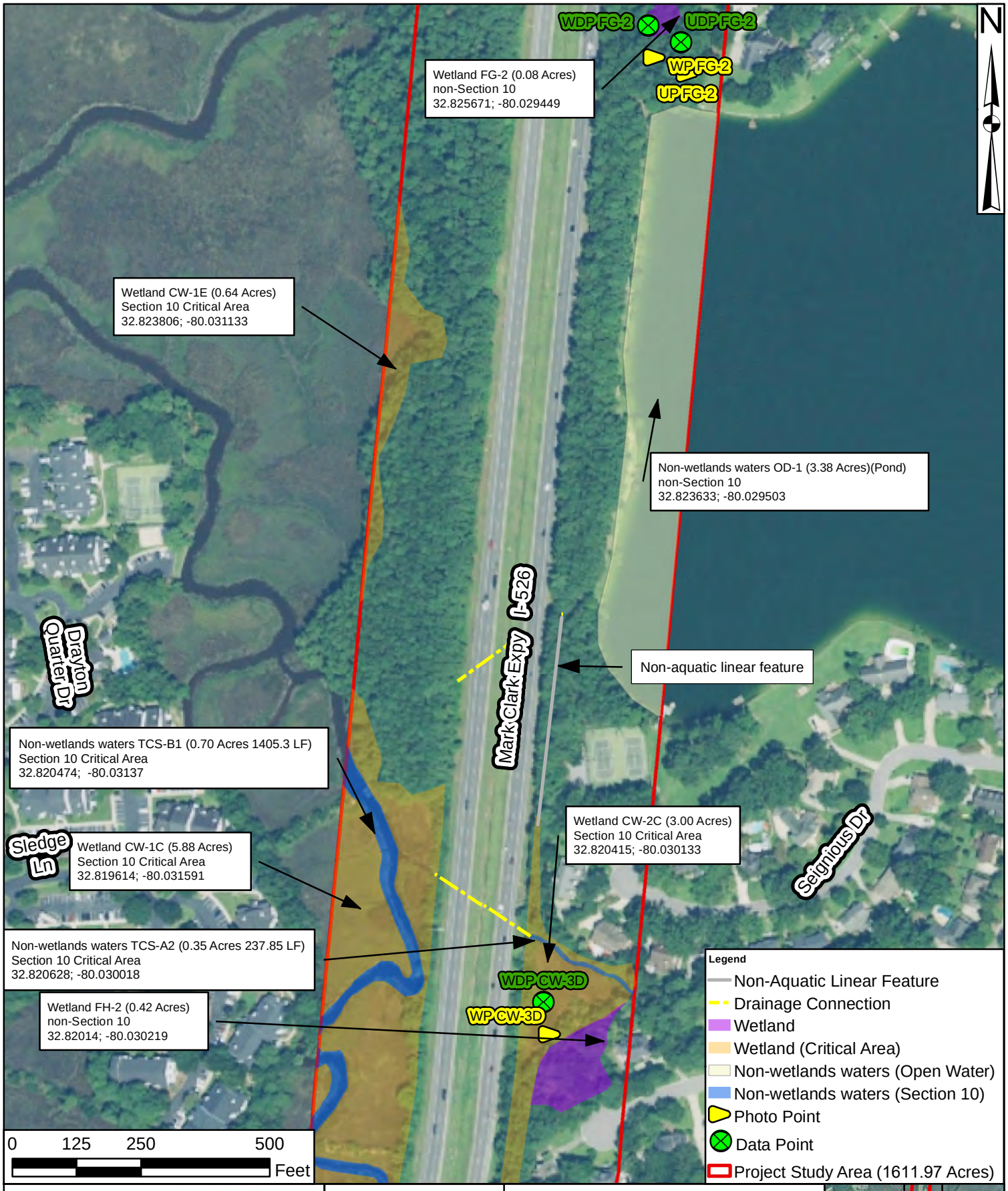

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Aquatic Resources

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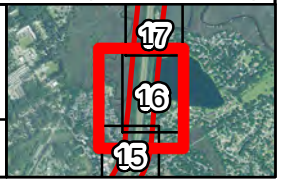

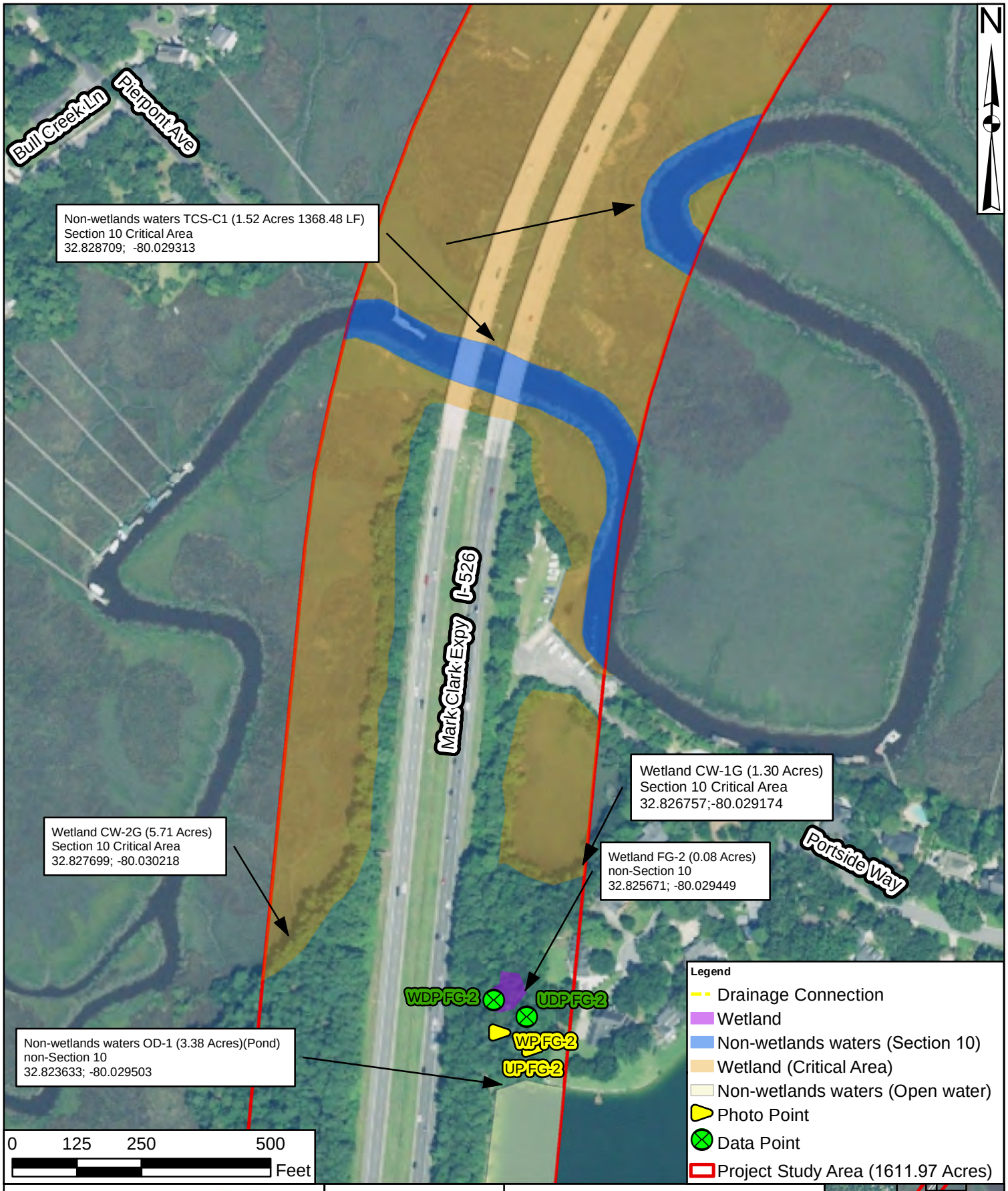

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Aquatic Resources

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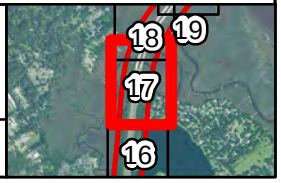

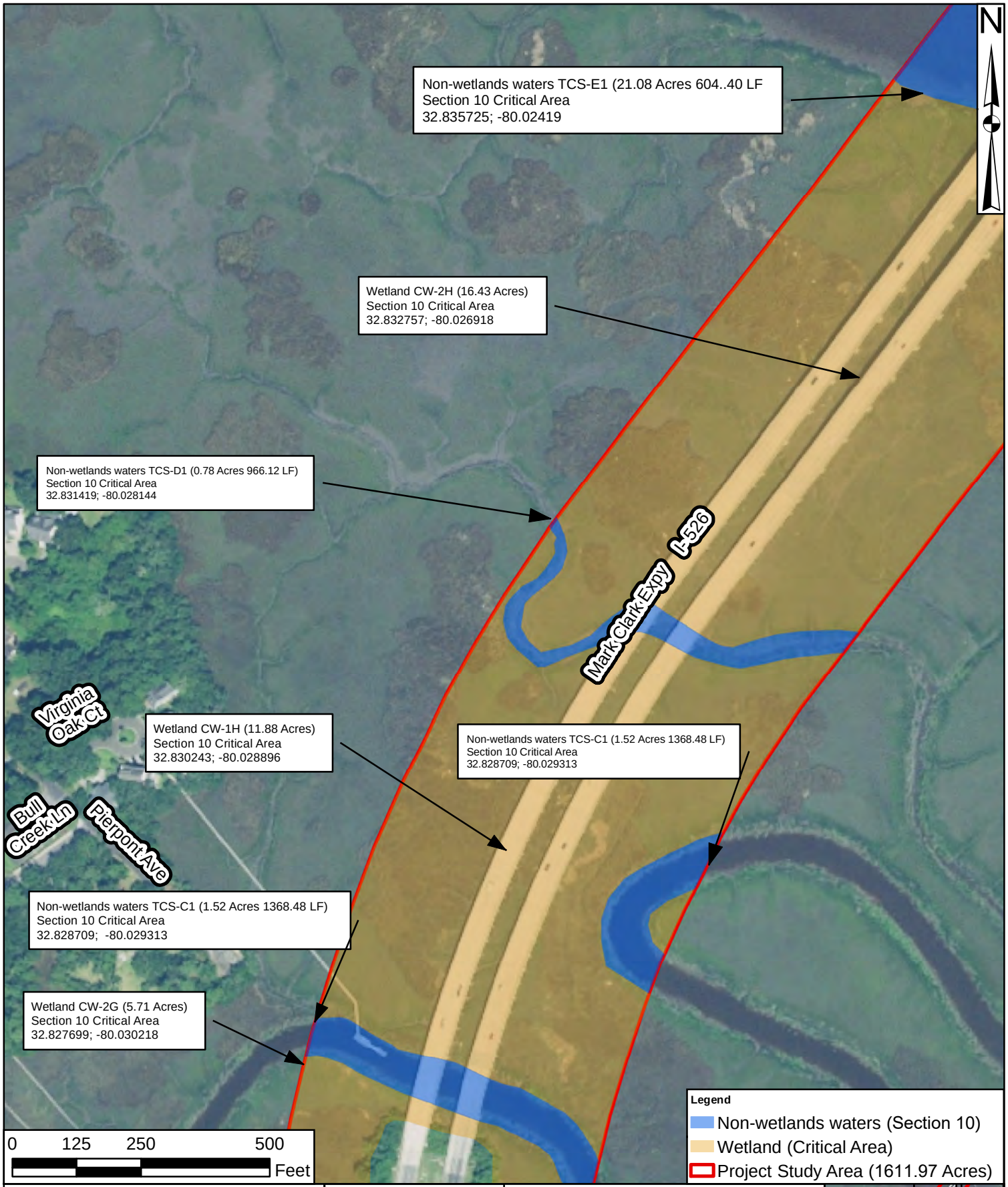

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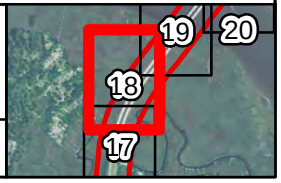

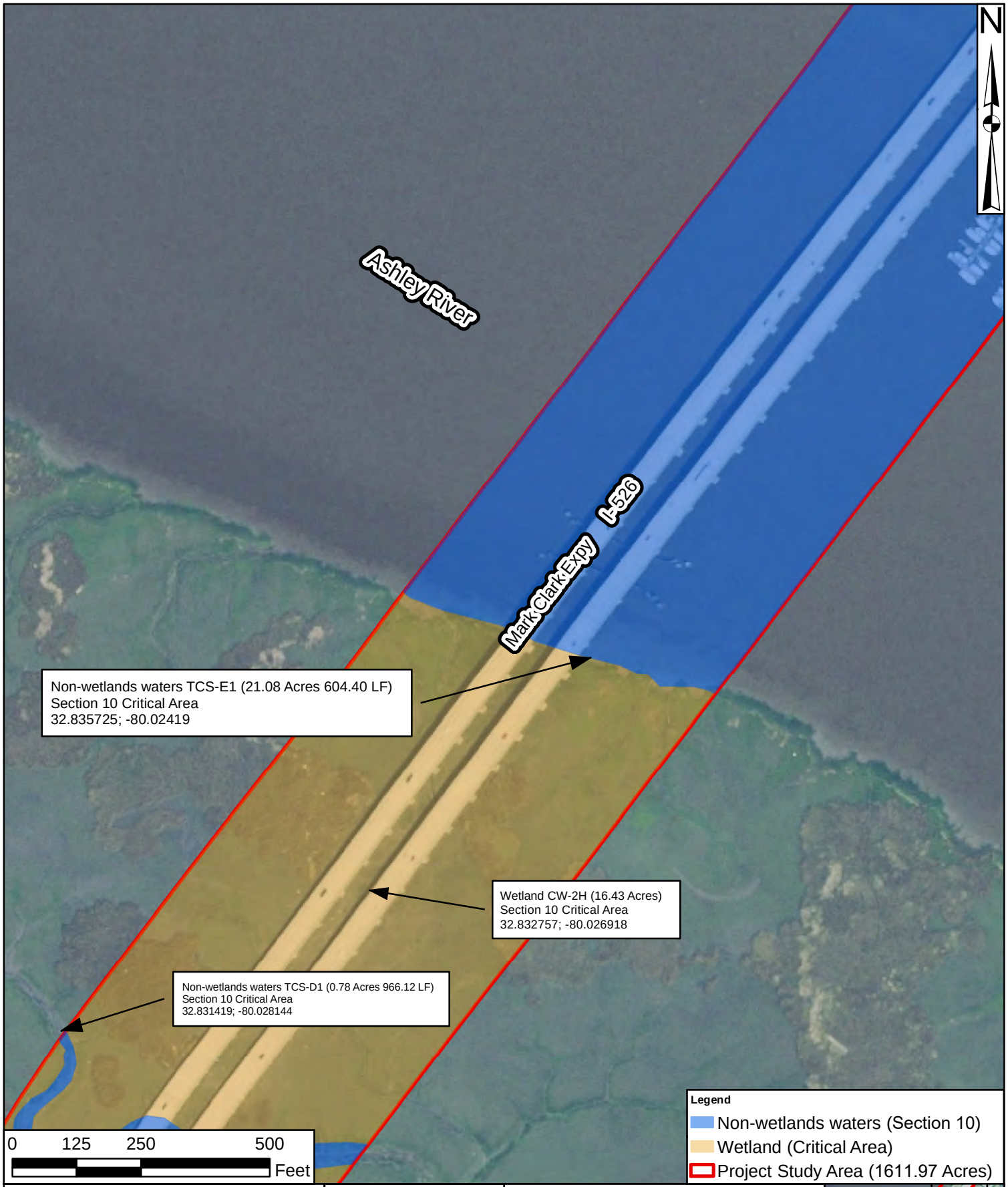

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

Source:
NRCS NAIP Aerial
2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

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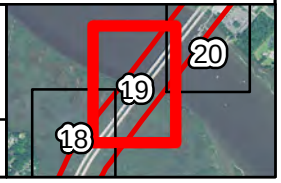

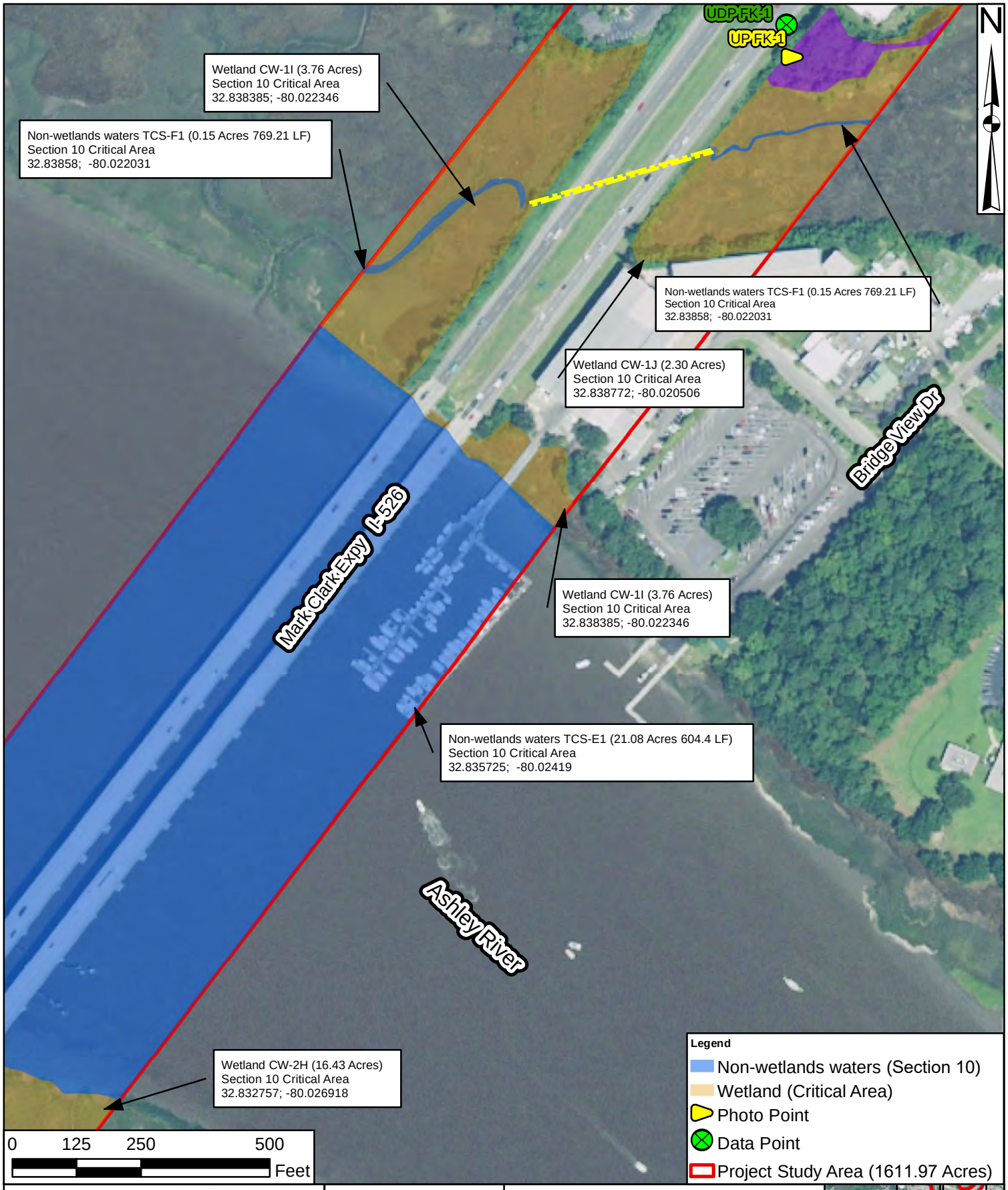

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I-526 Lowcountry Corridor West
Charleston County
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October 31 2019

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QA/QC: KLM

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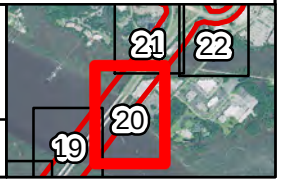

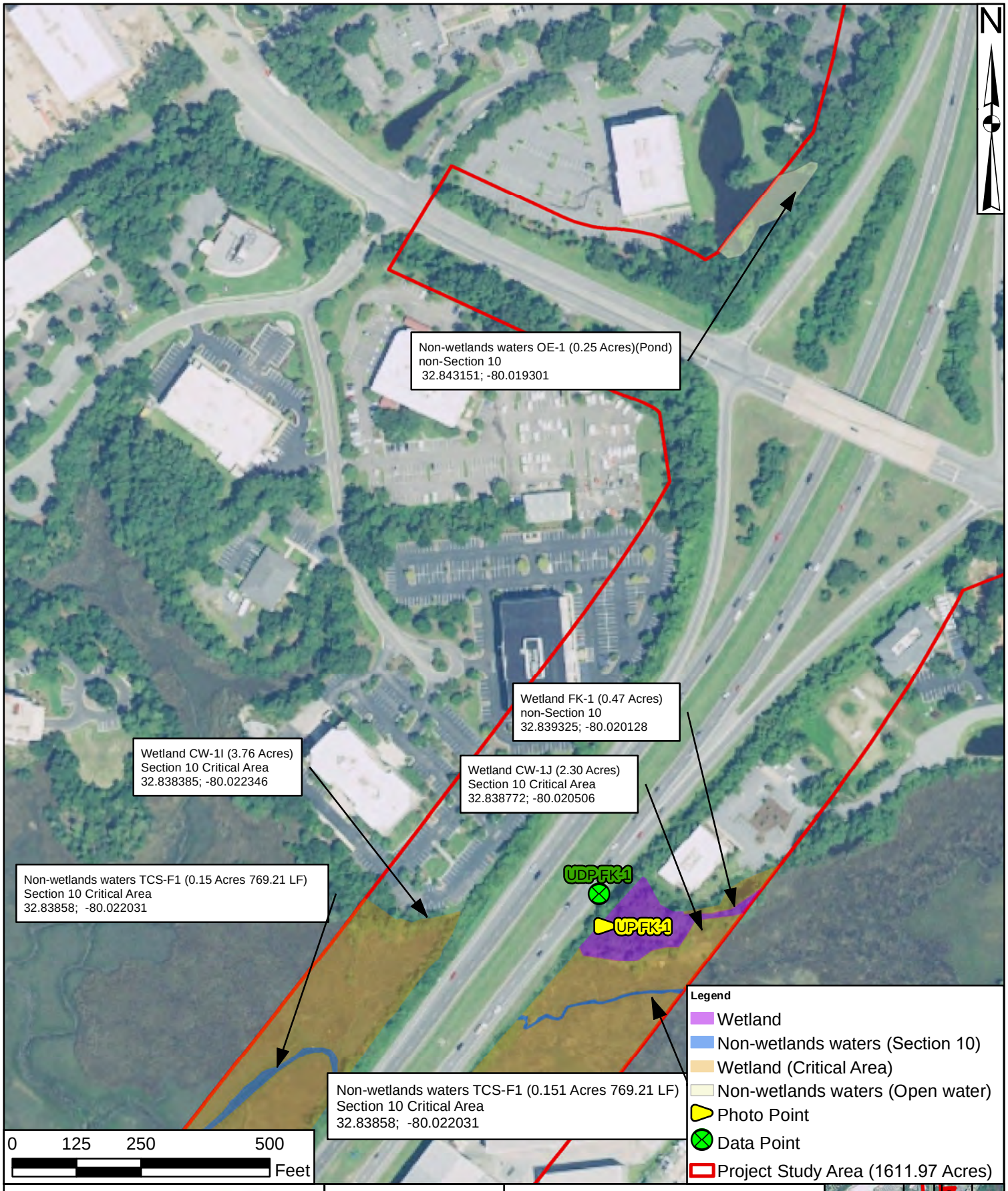

SCDOT South Carolina Department of Transportation

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Charleston County
SCDOT P032102
October 31 2019

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QA/QC: KLM

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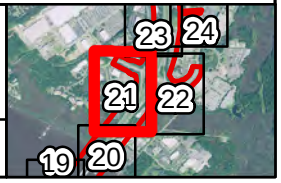

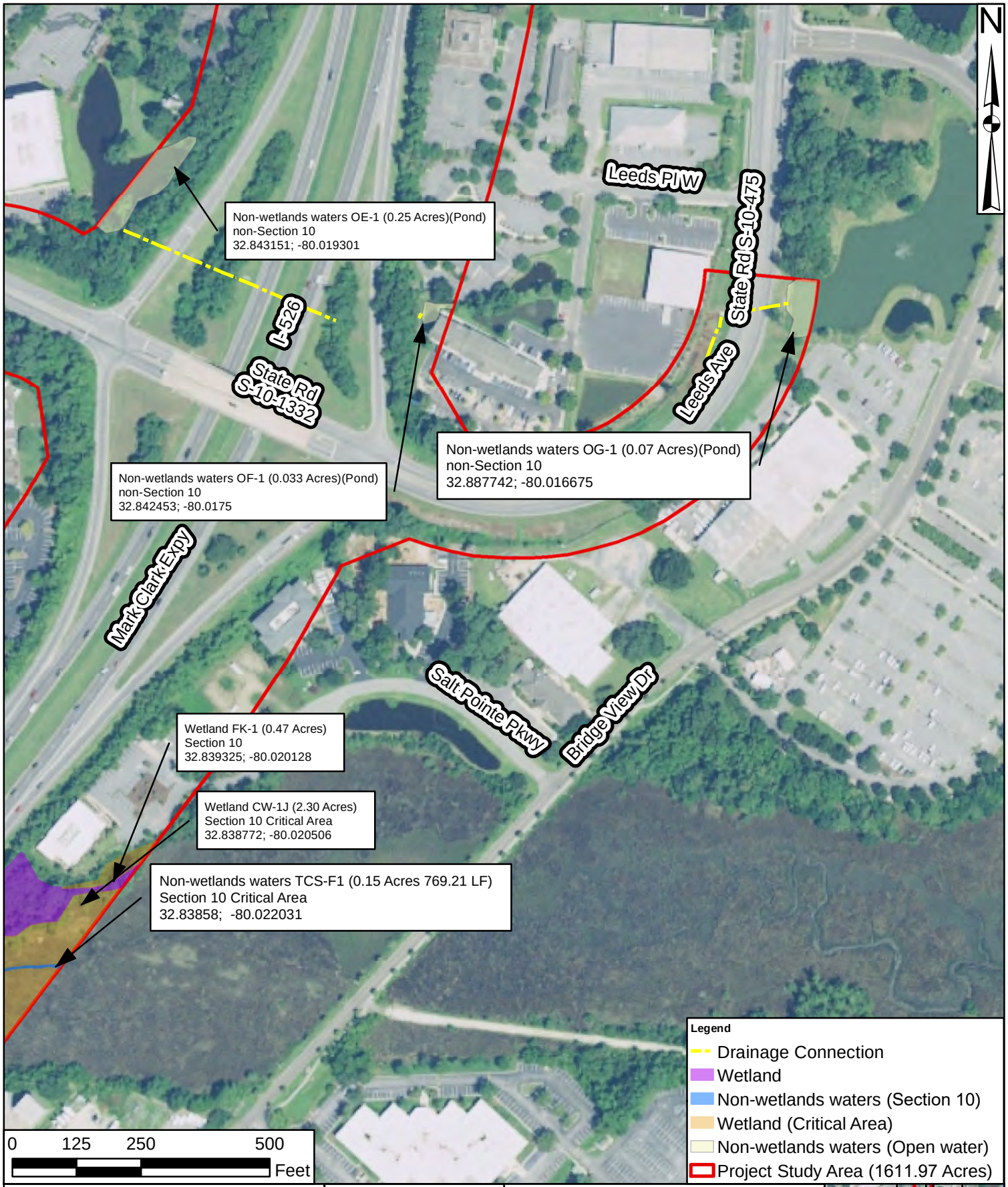

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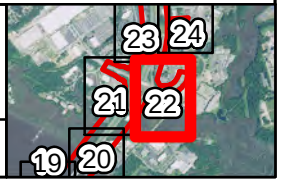

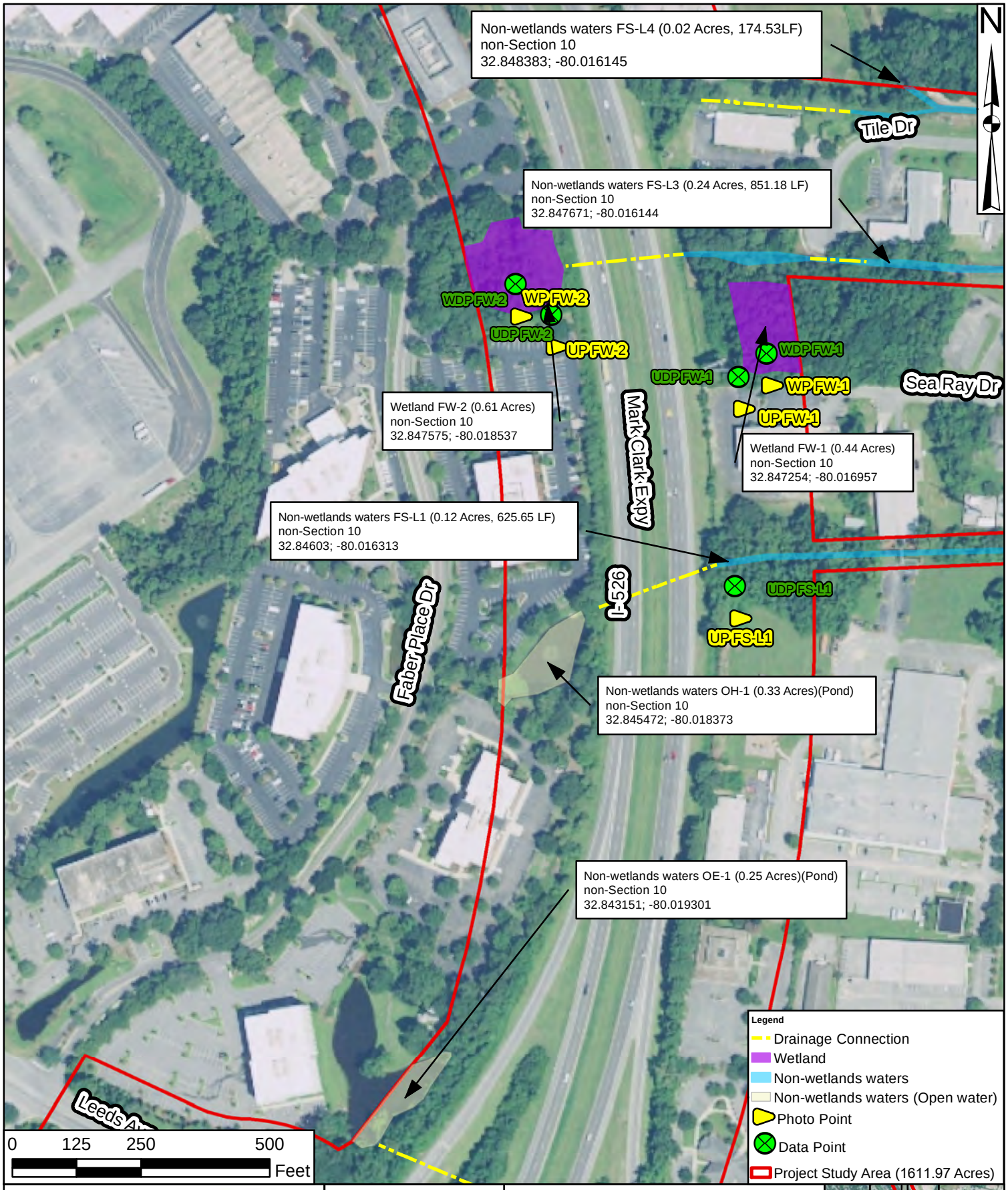

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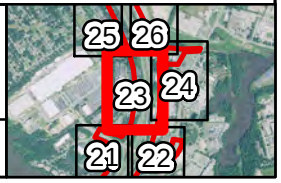

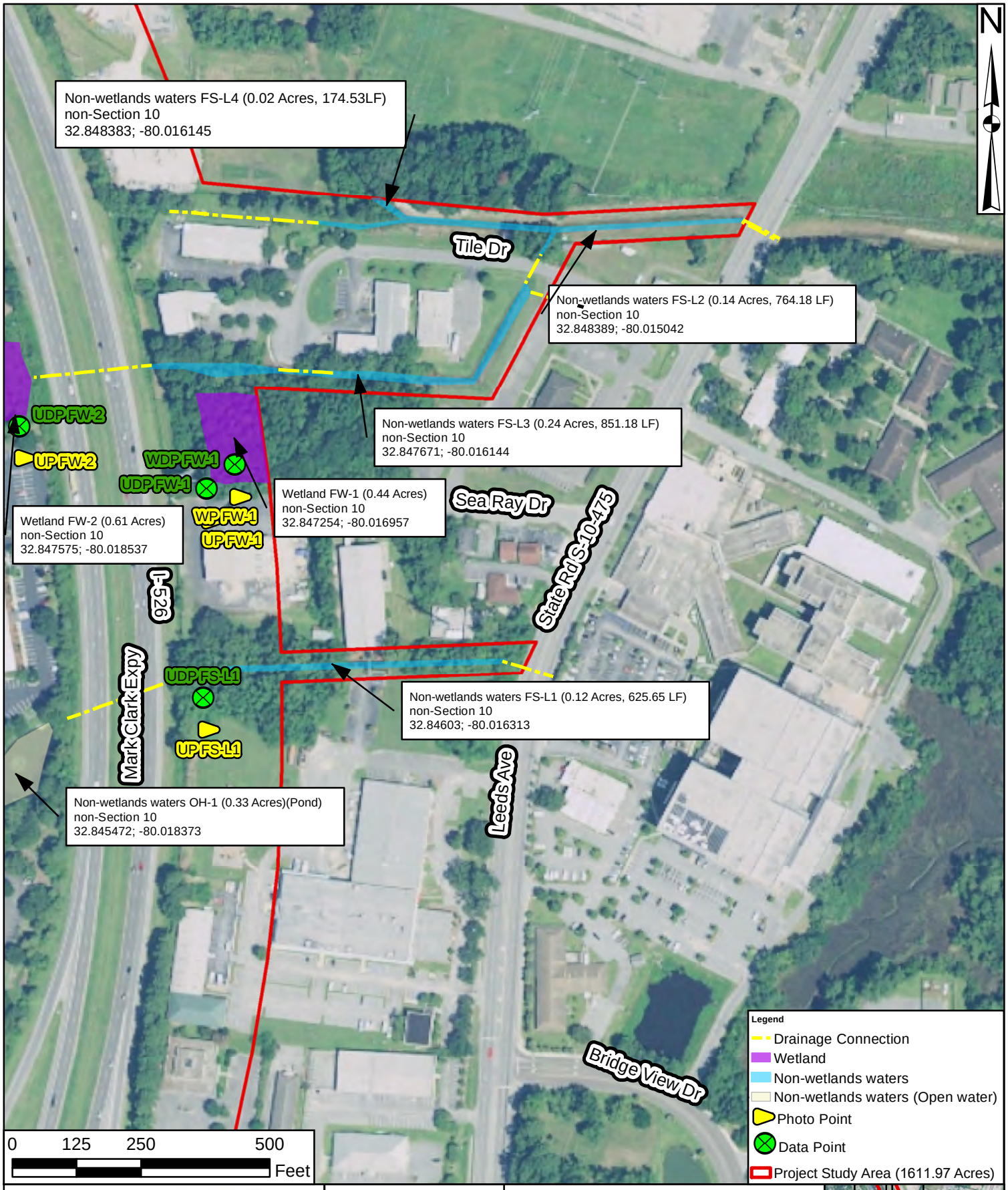

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Charleston County
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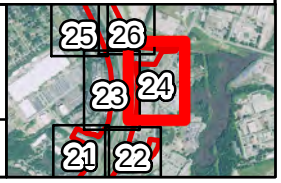

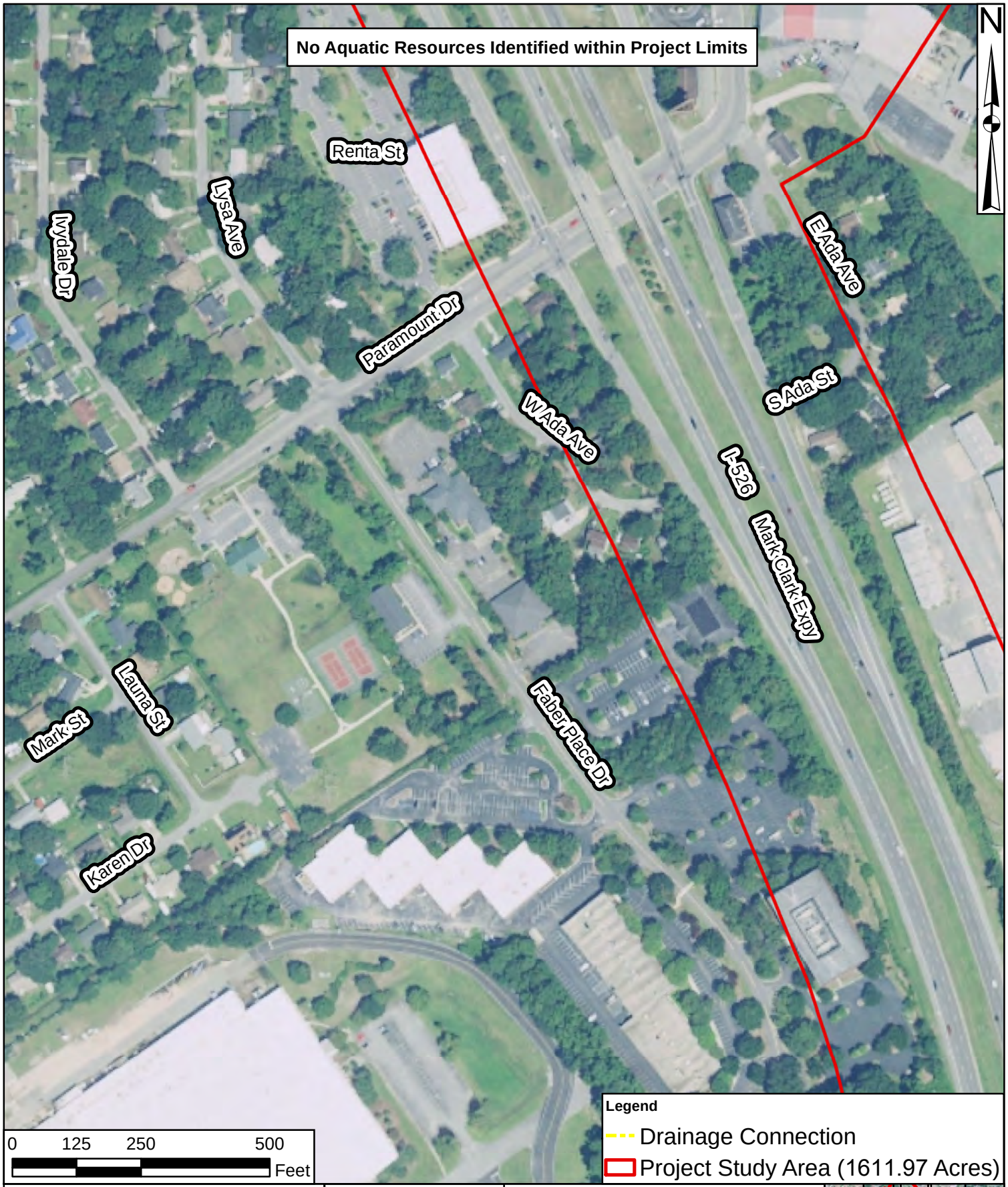

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WEST 526 LOWCOUNTRY CORRIDOR

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Charleston County
SCDOT P032102
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Drawn By: RHH
QA/QC: KLM

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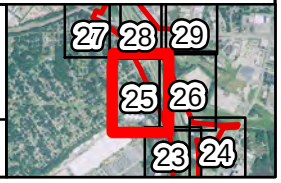

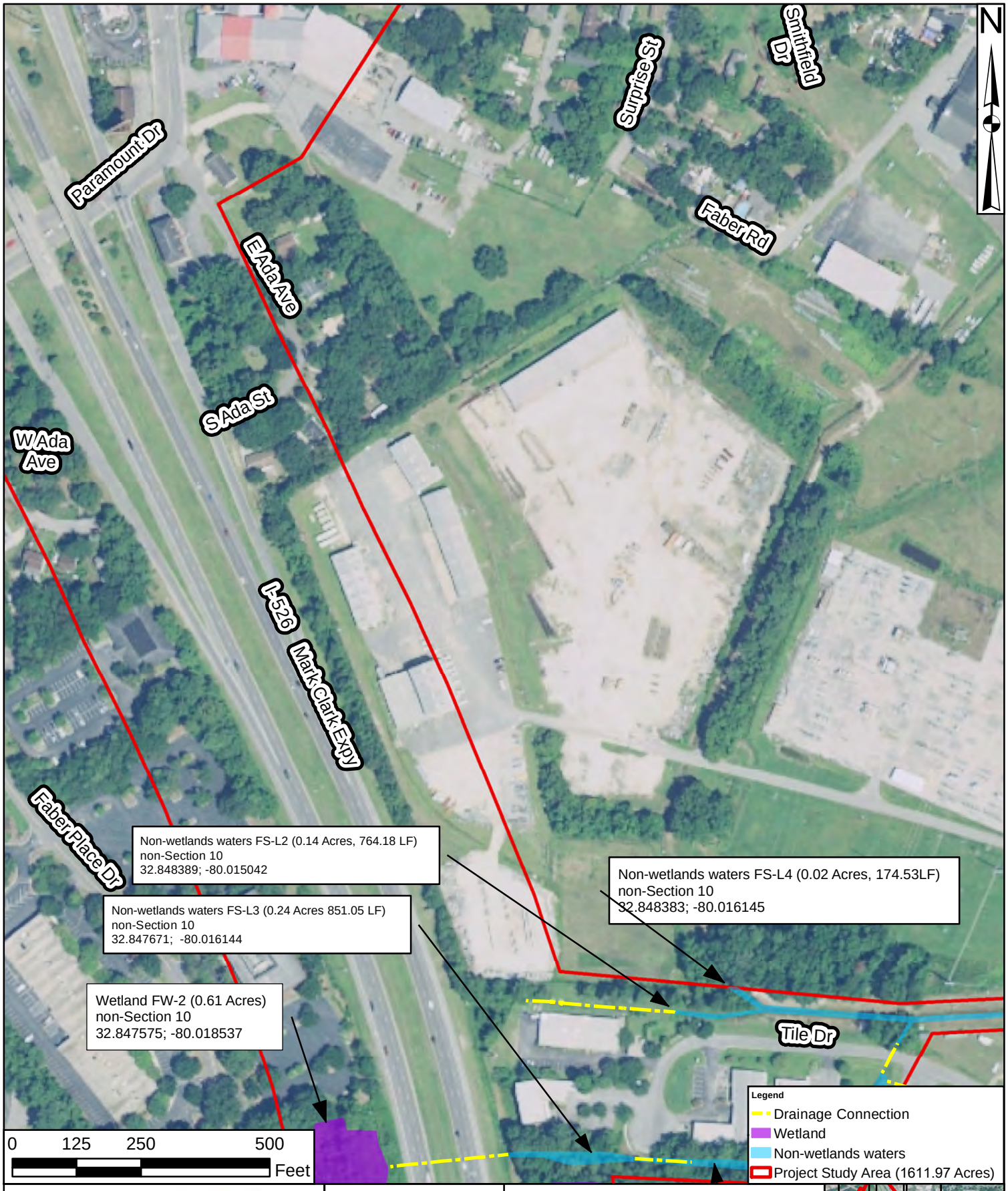

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Charleston County
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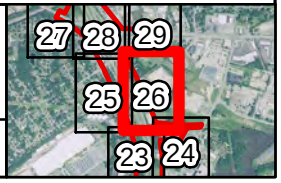

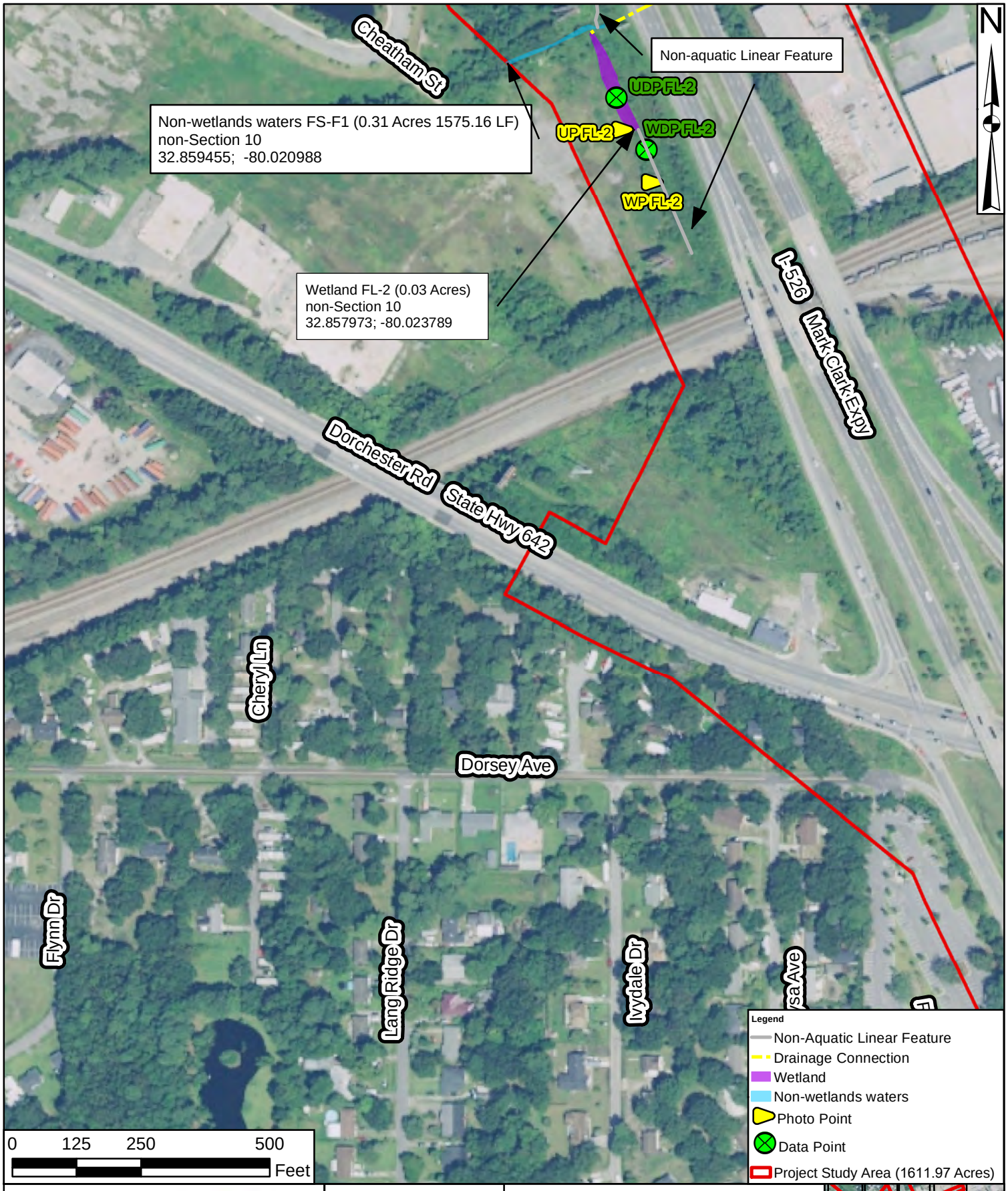

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Charleston County
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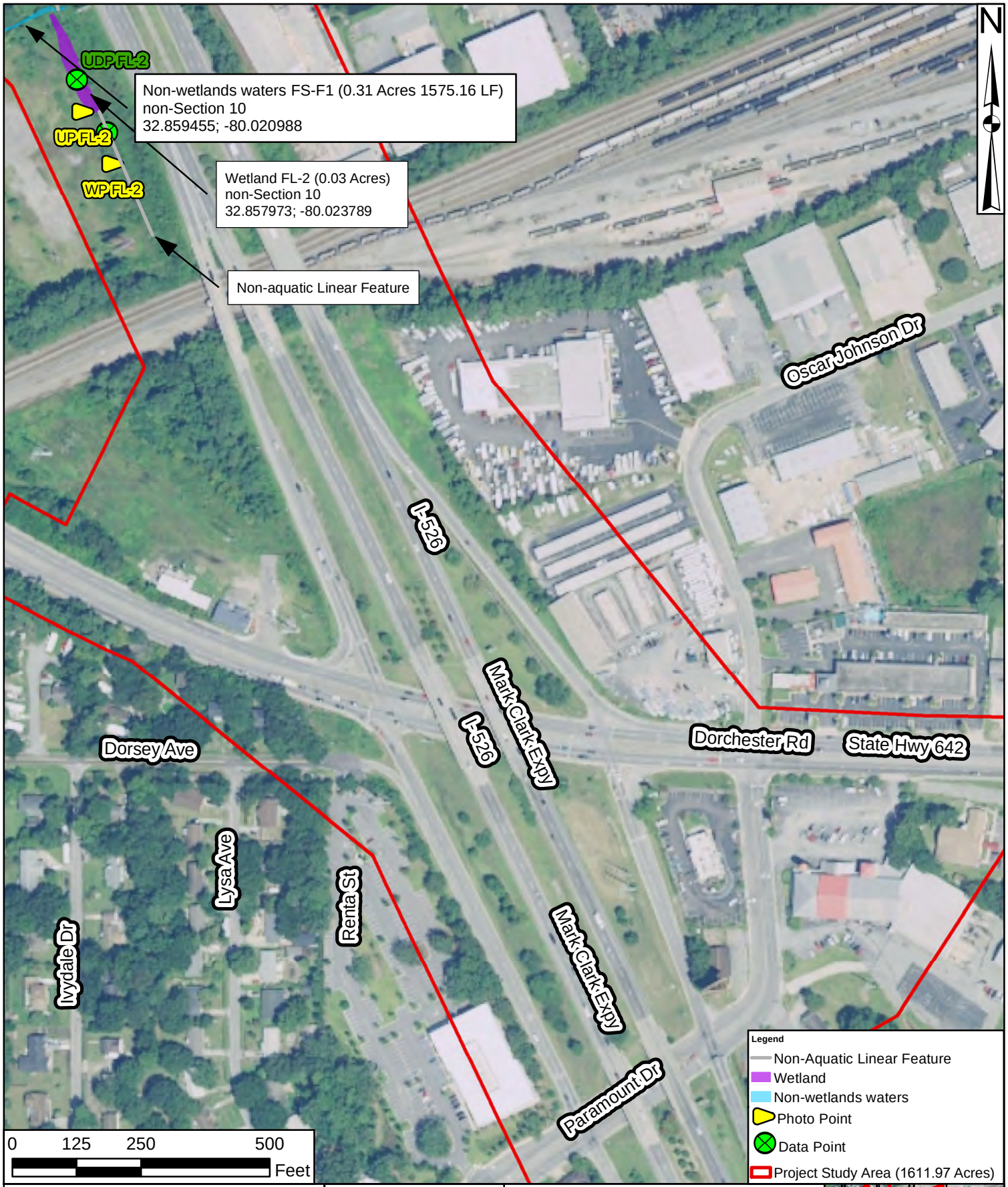

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Charleston County
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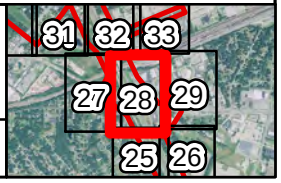

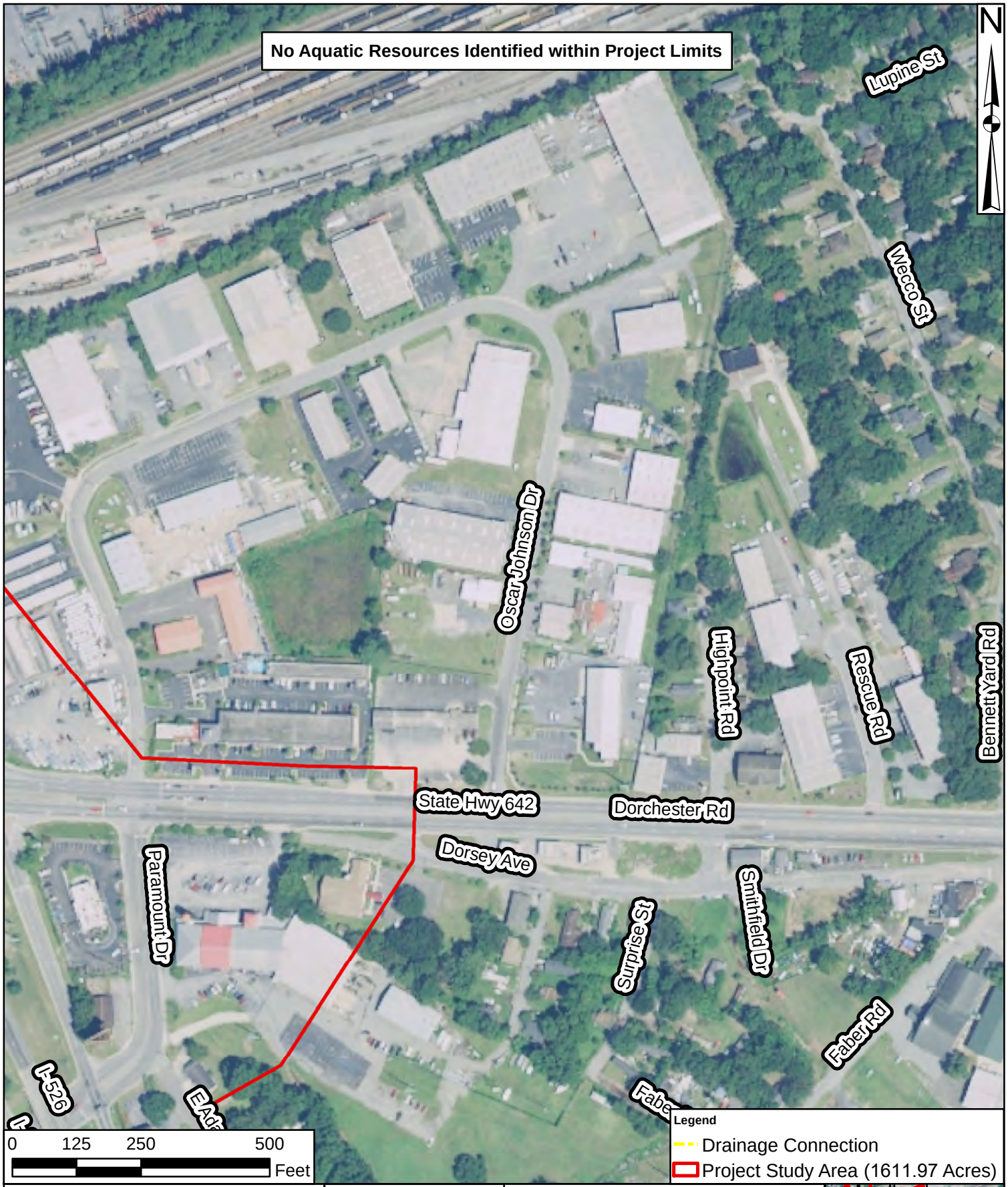

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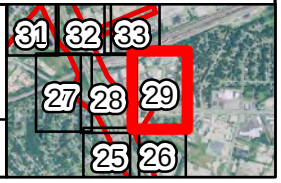

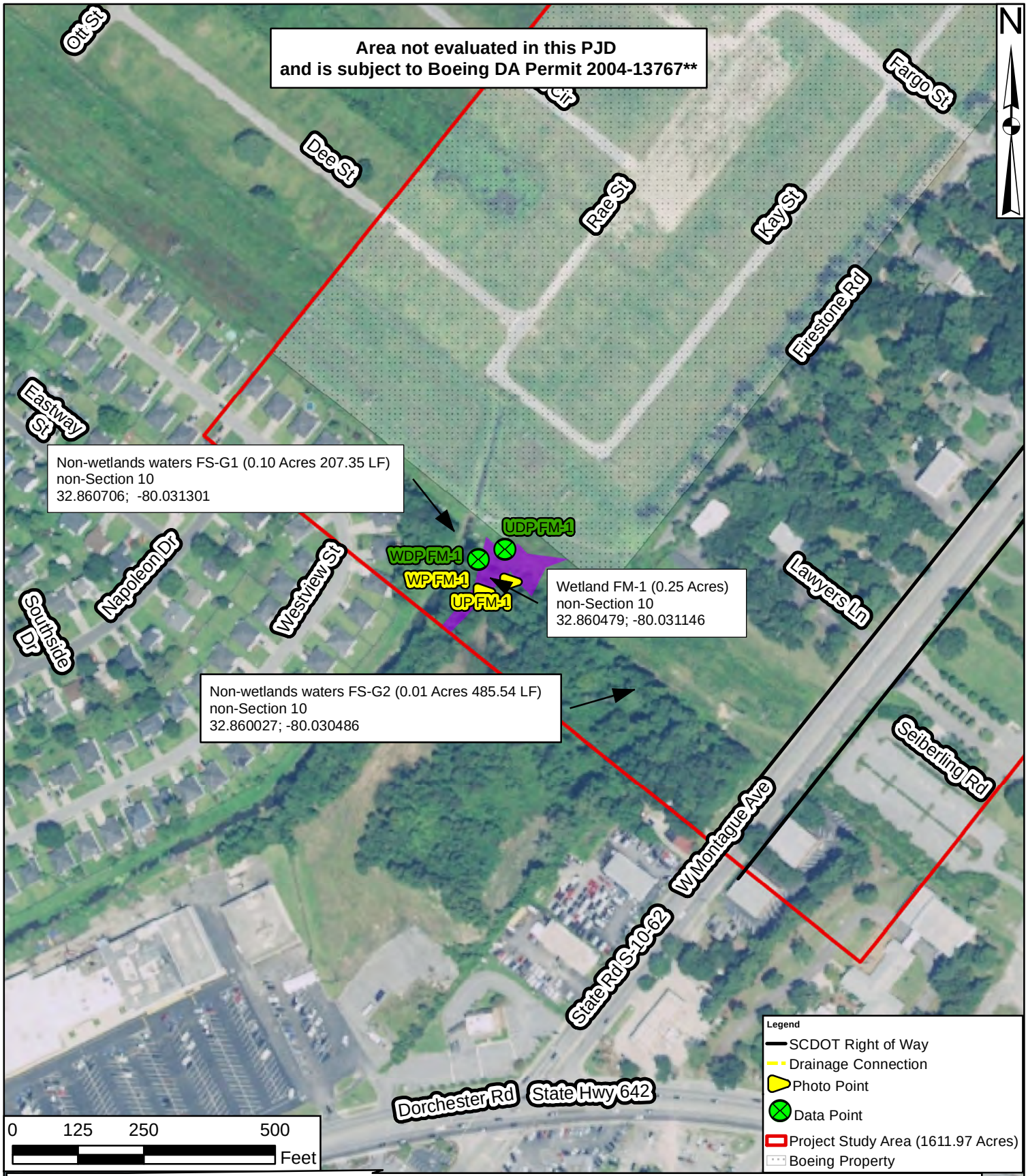

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SCDOT South Carolina Department of Transportation

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Charleston County
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October 31 2019

Drawn By: RHH
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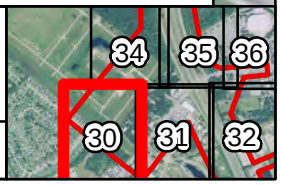

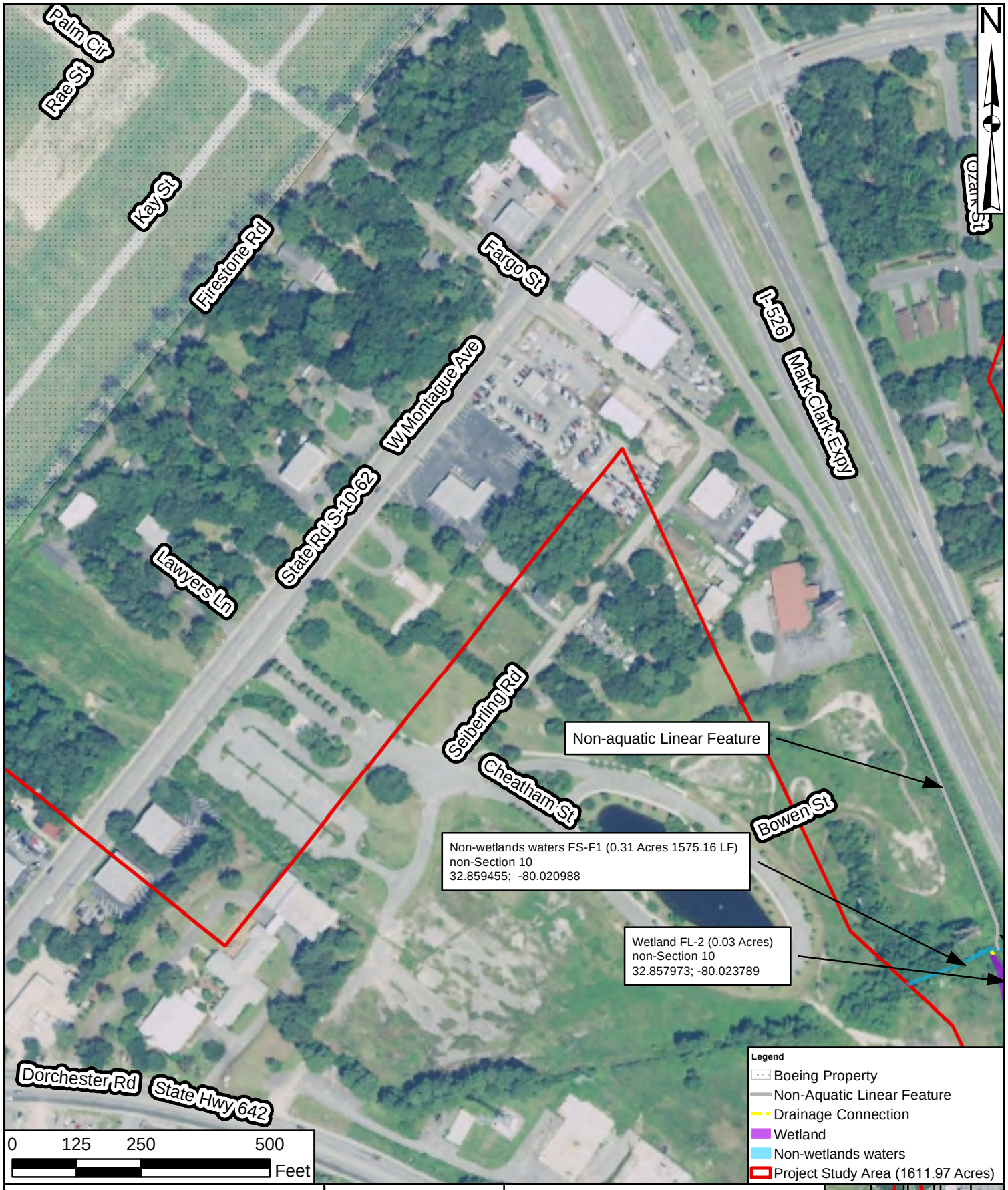

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Charleston County
SCDOT P032102
October 31 2019

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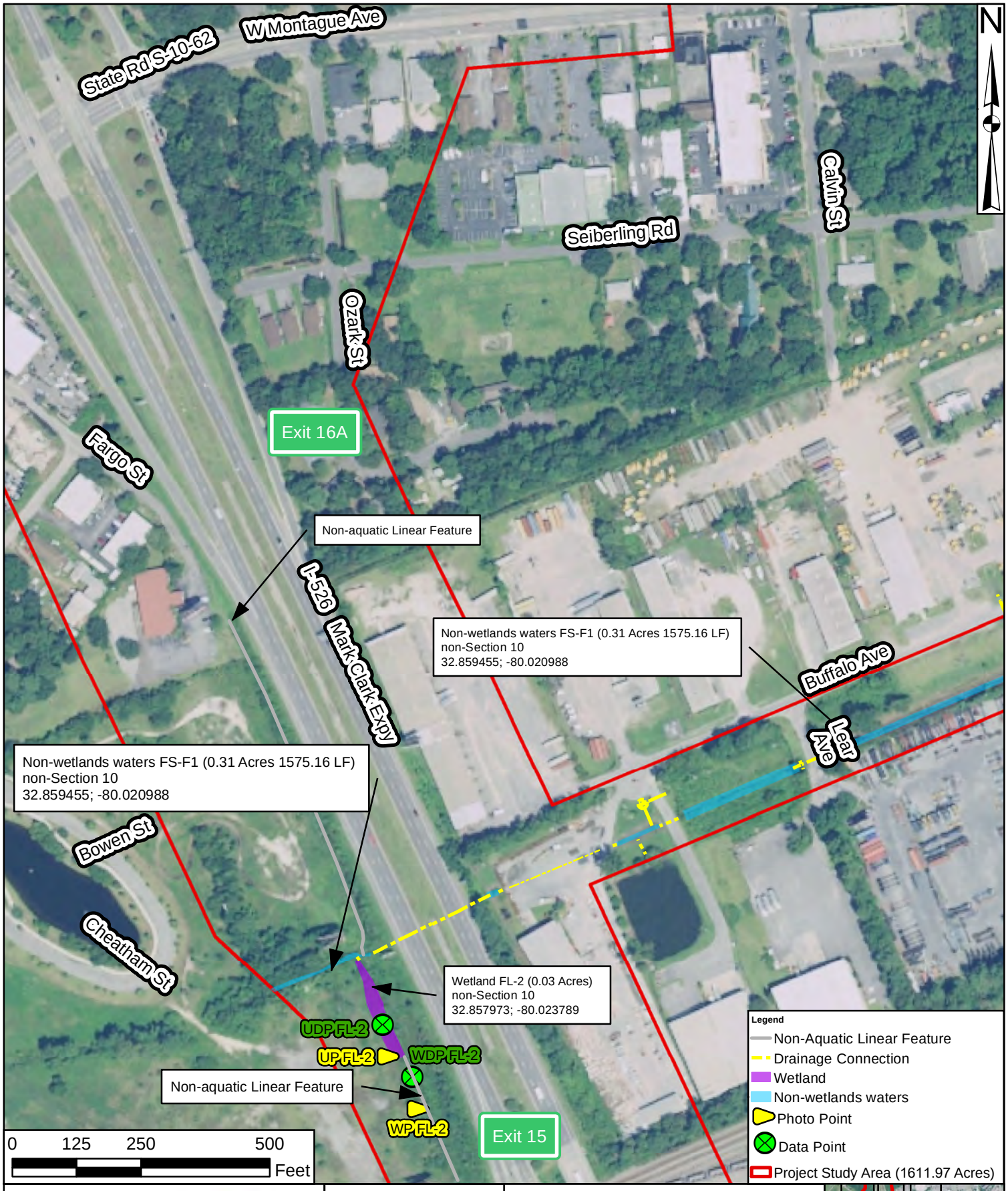

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I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

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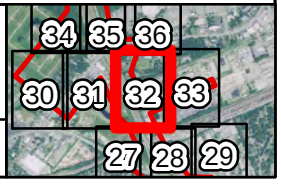

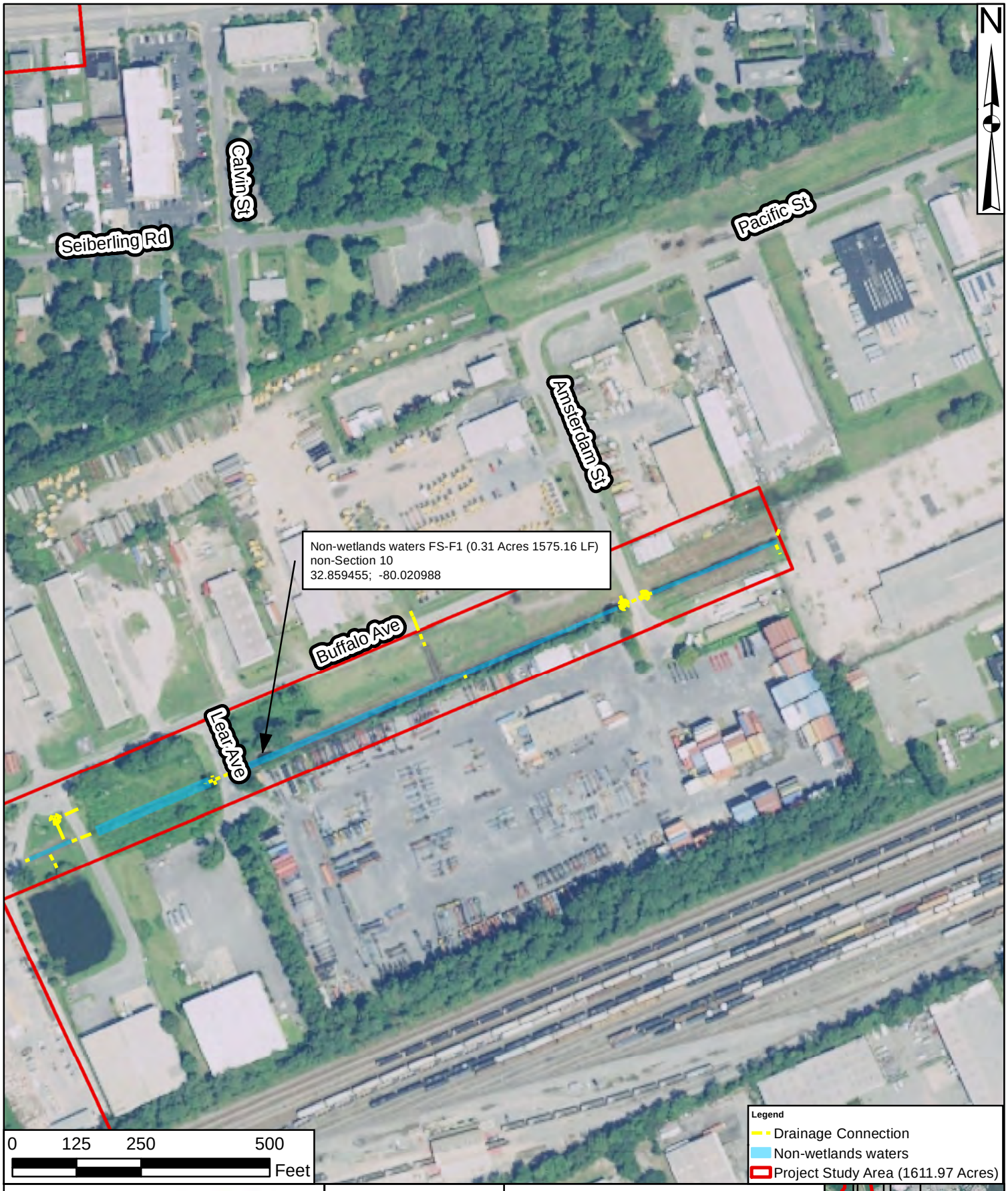

SCDOT South Carolina Department of Transportation

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Charleston County
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October 31 2019

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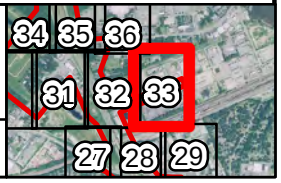

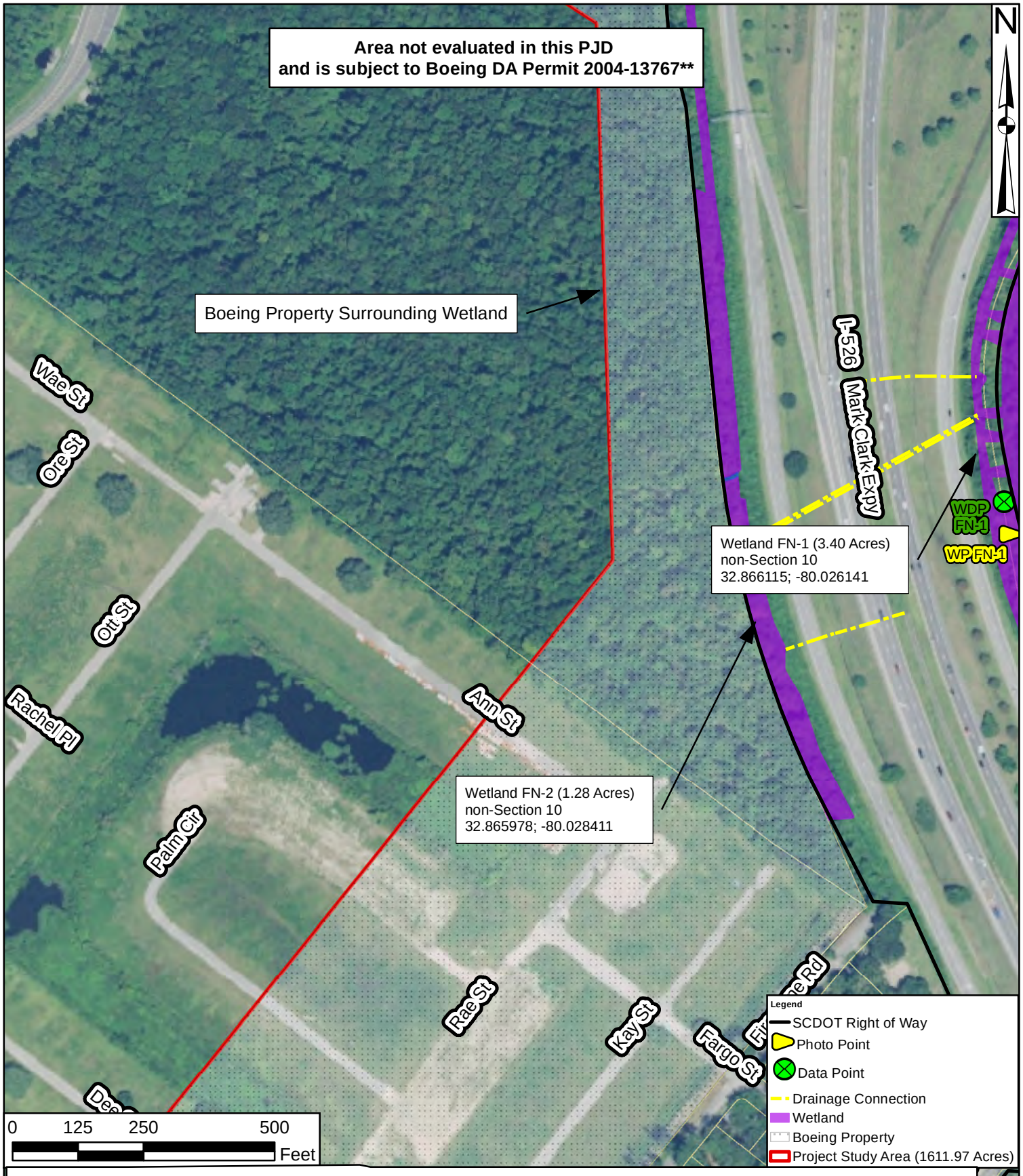

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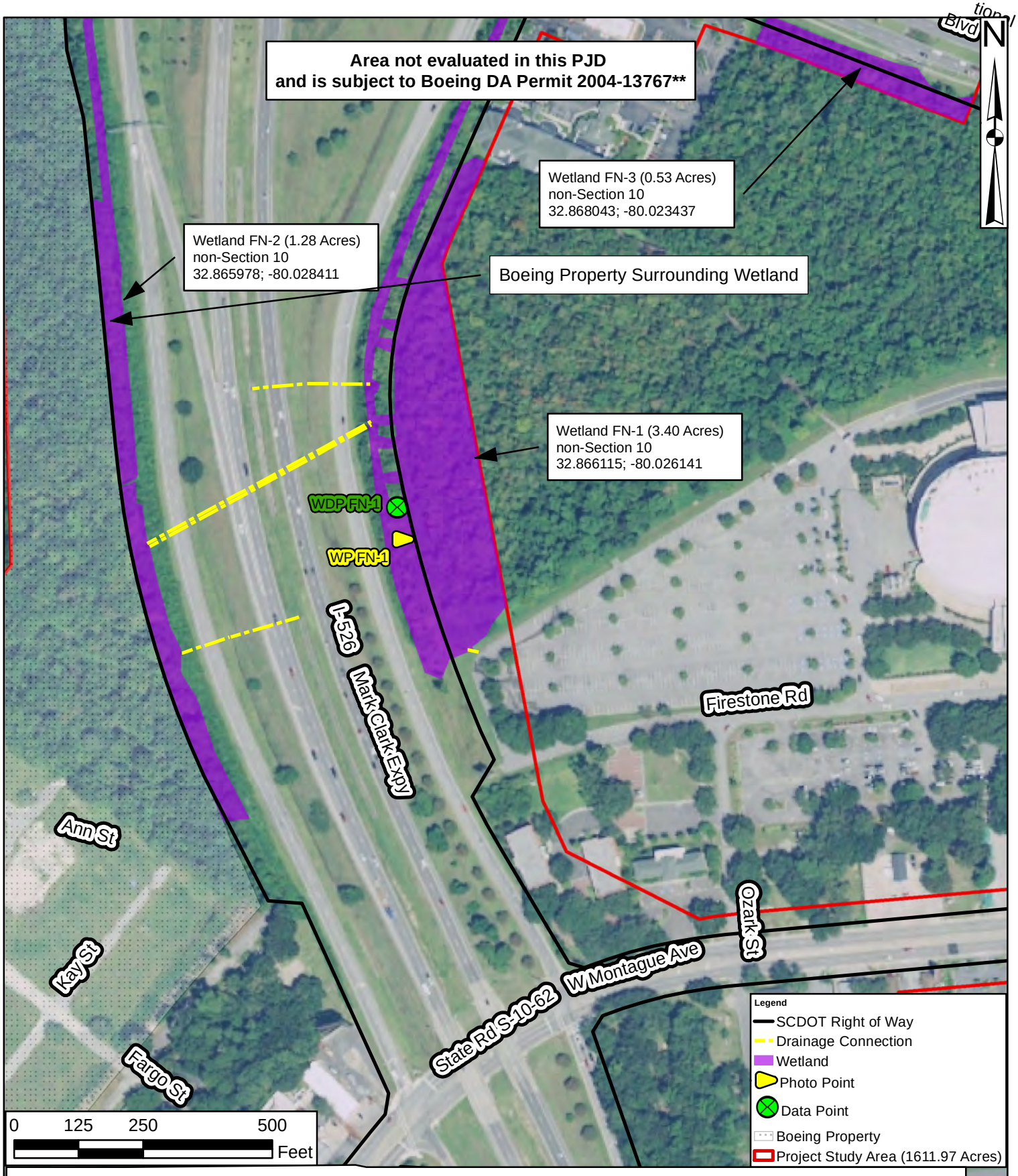

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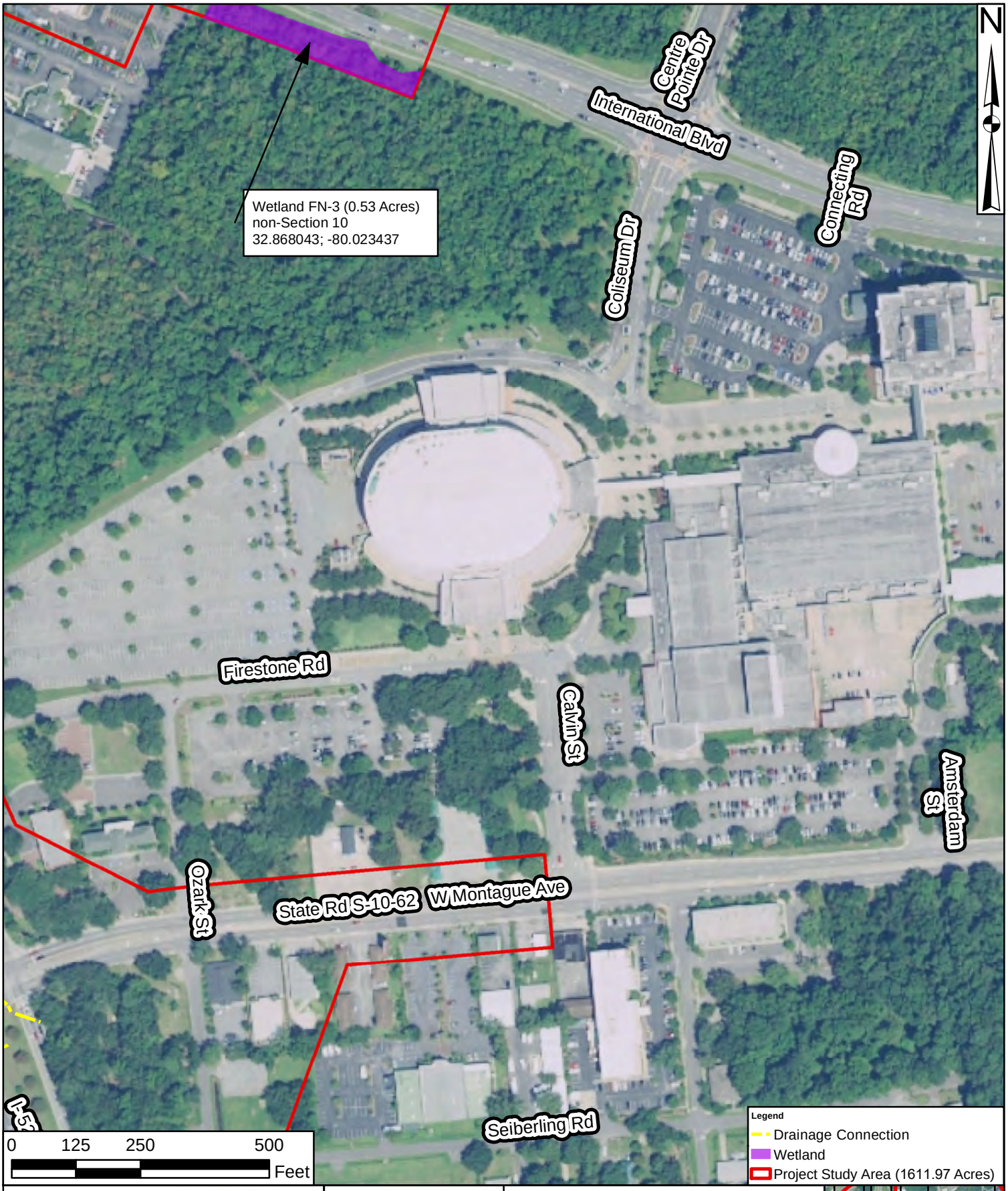

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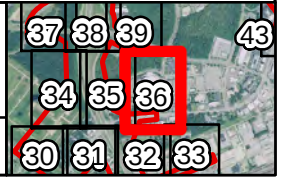

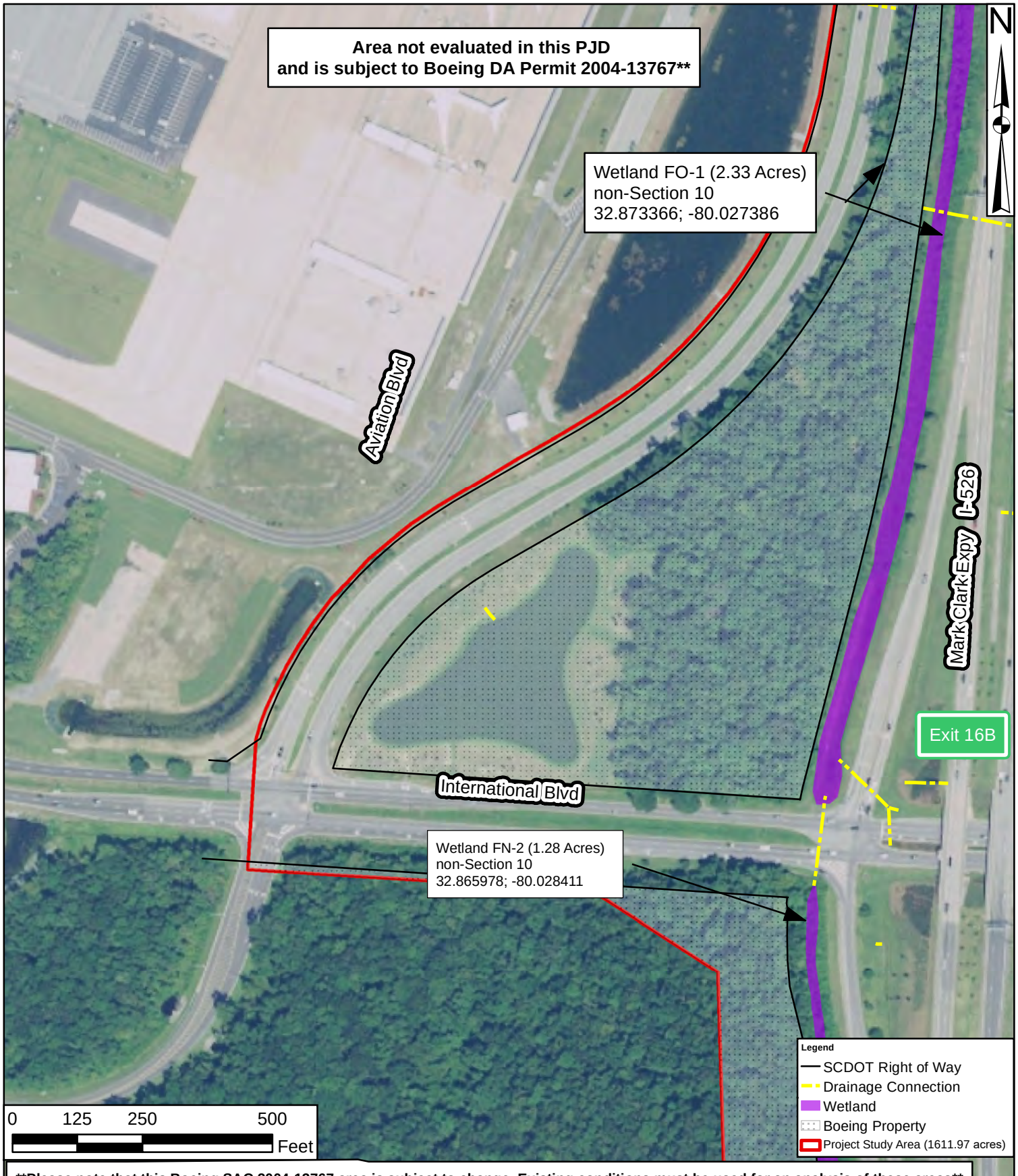

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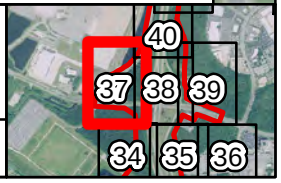

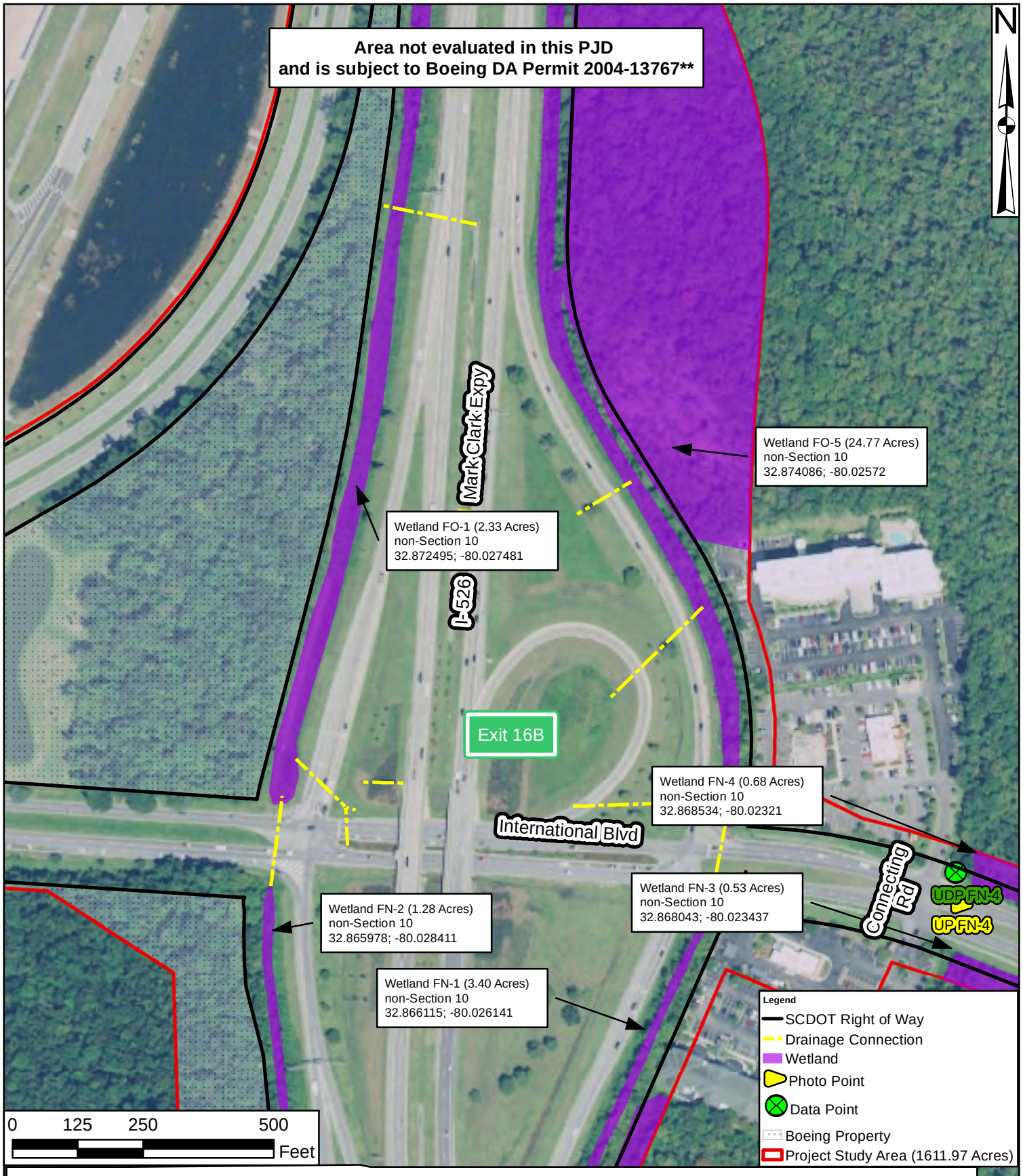

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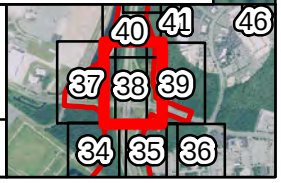

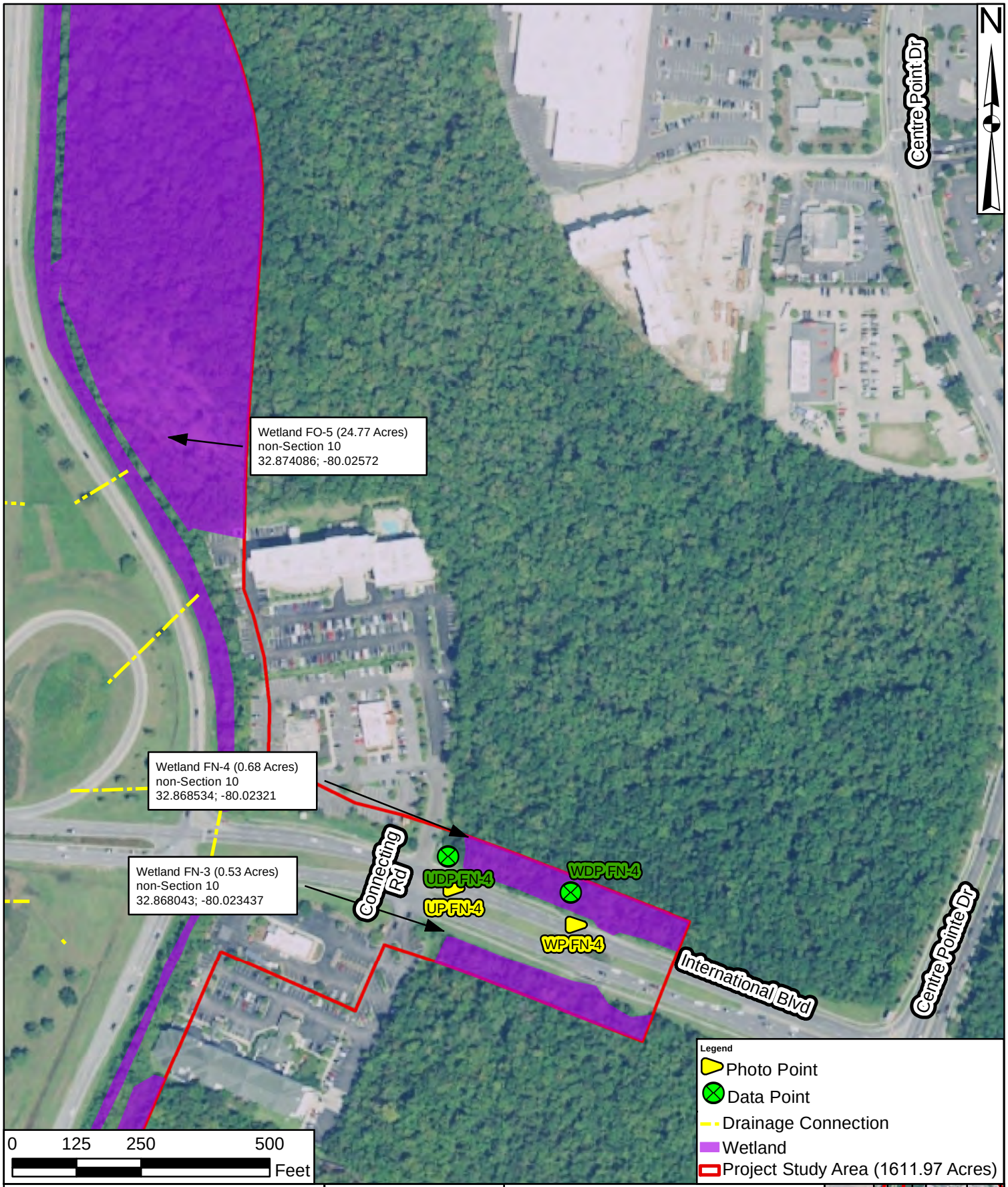

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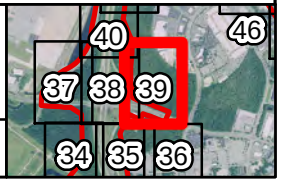

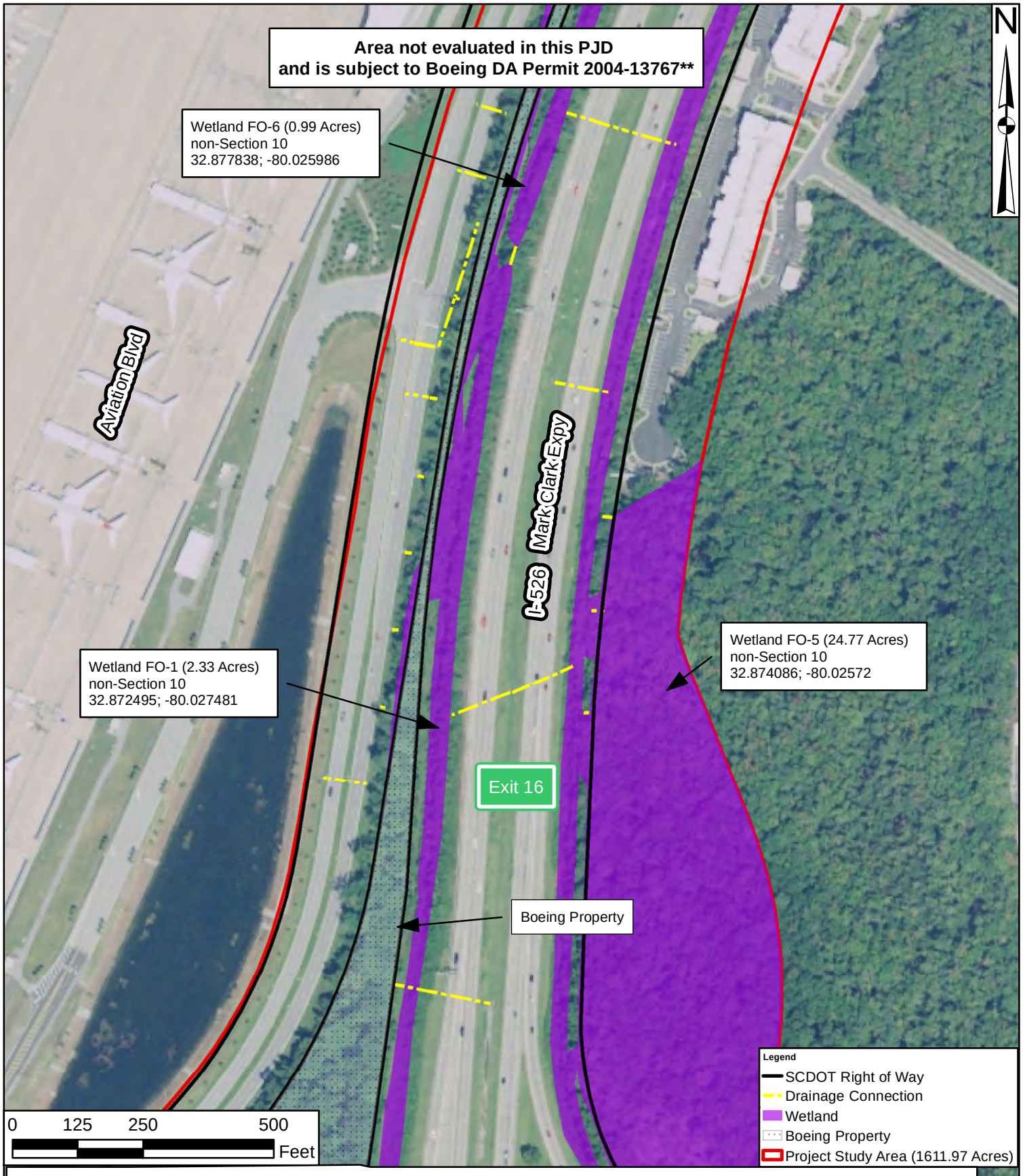

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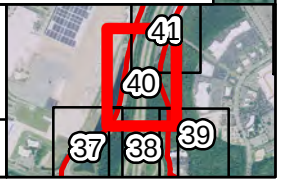

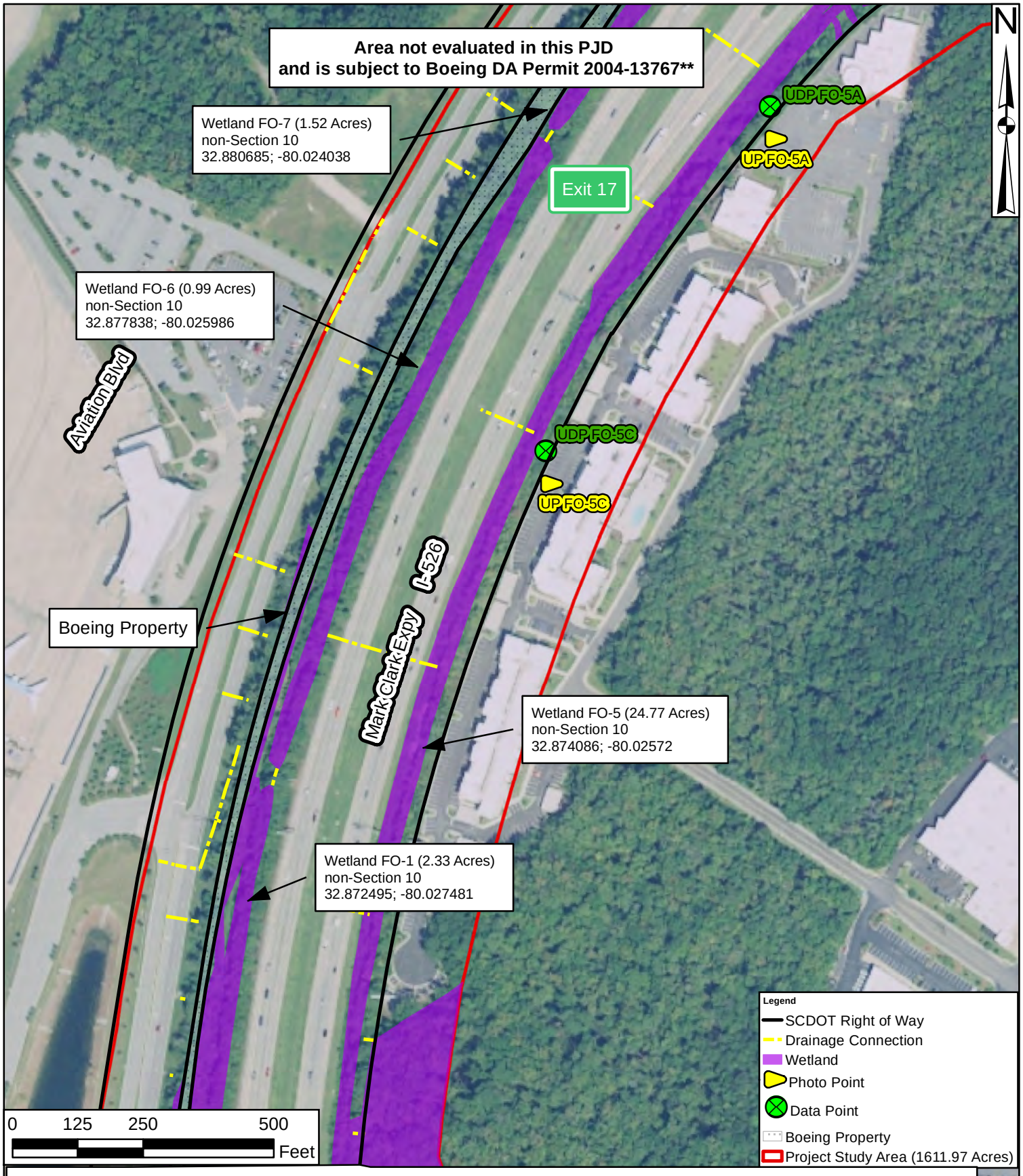

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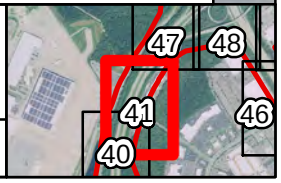

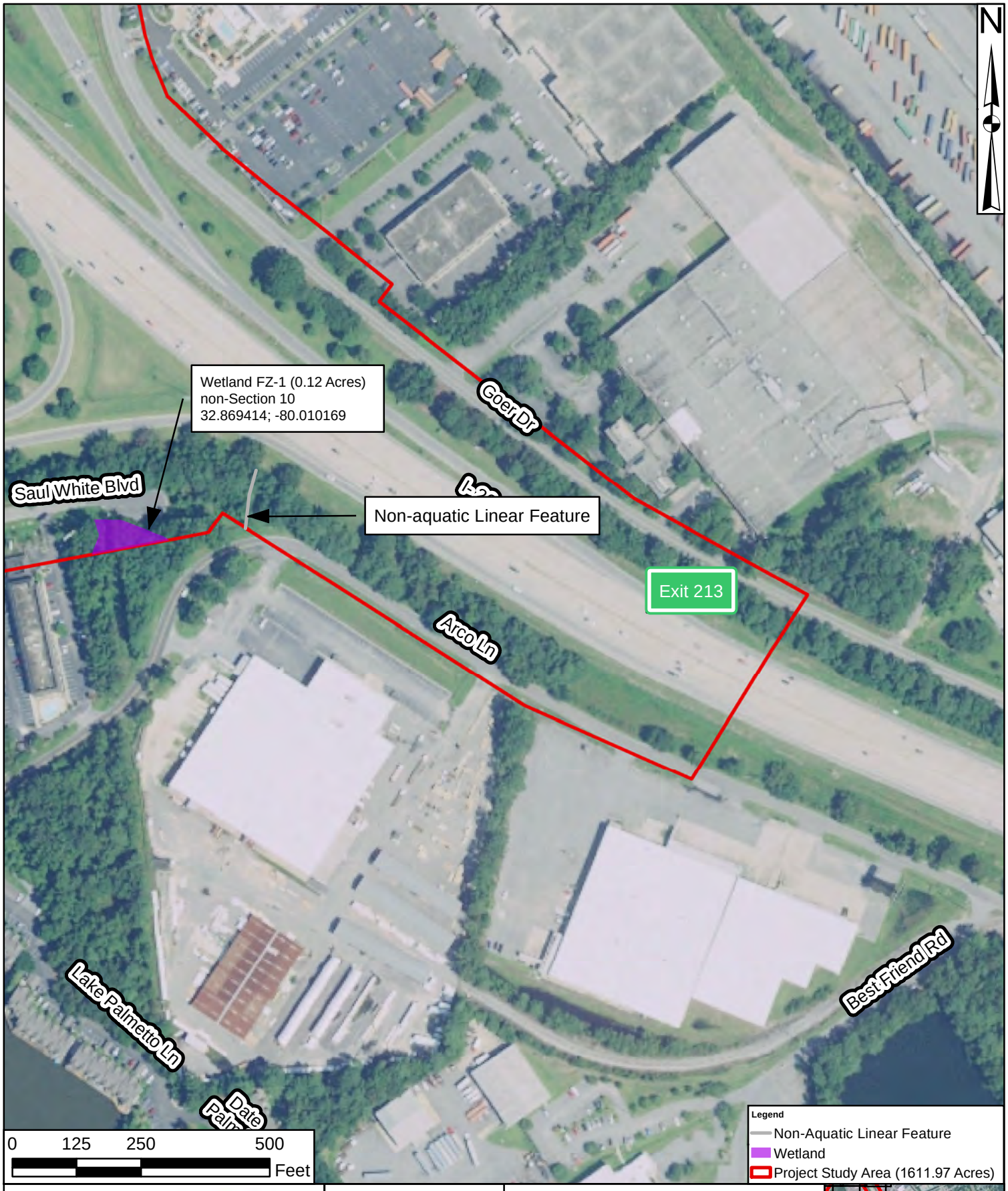

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

Source:
NRCS NAIP Aerial
2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

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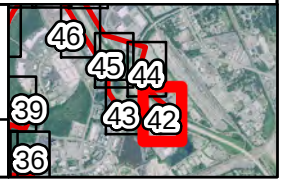

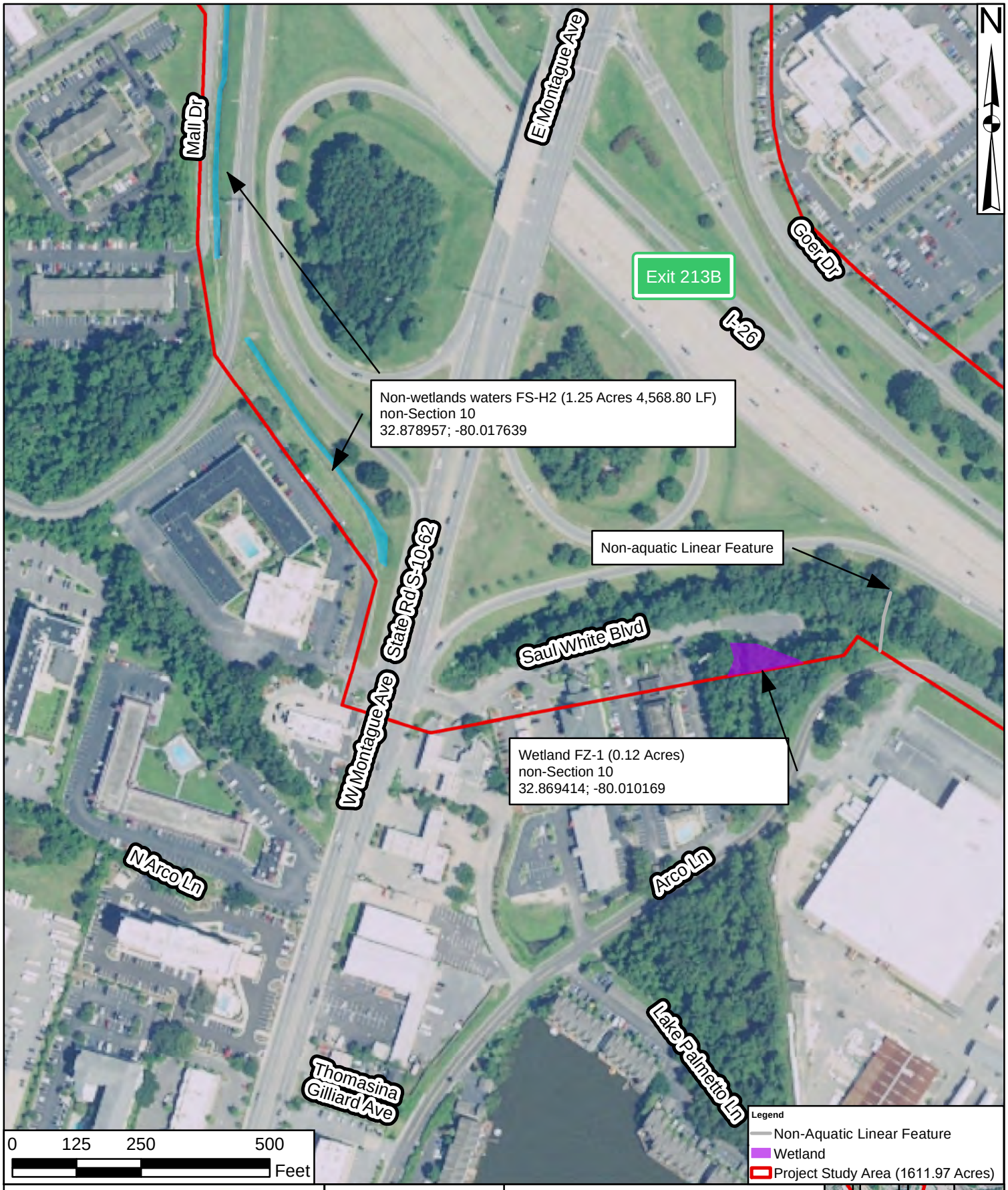

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I-526 WEST LOWCOUNTRY CORRIDOR

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2017

I-526 Lowcountry Corridor West
Charleston County
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QA/QC: KLM

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I-526 WEST LOWCOUNTRY CORRIDOR

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I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

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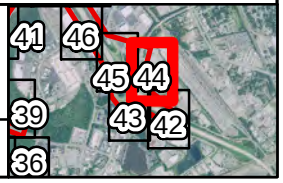

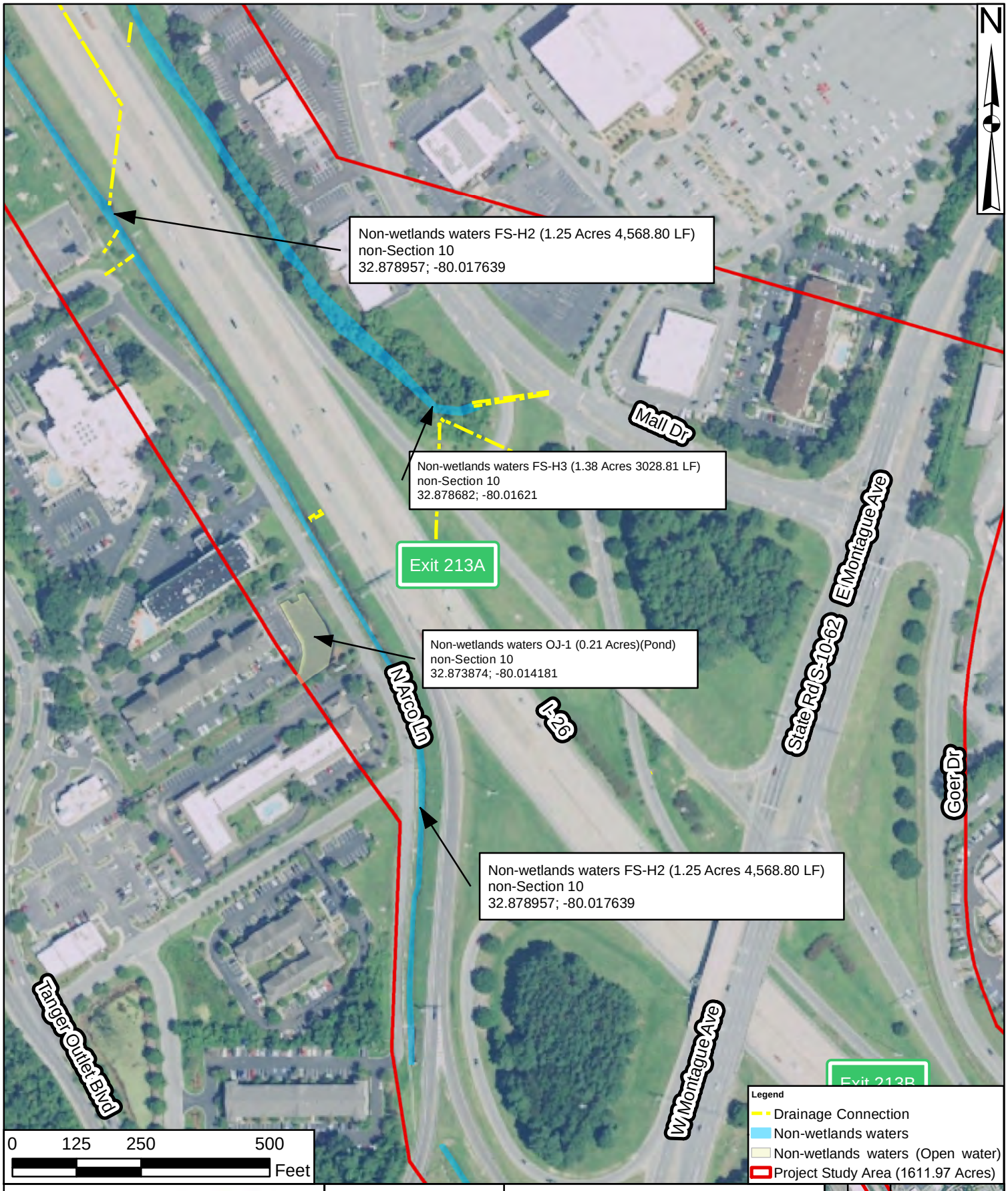

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Charleston County
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October 31 2019

Drawn By: RHH
QA/QC: KLM

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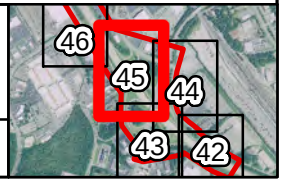

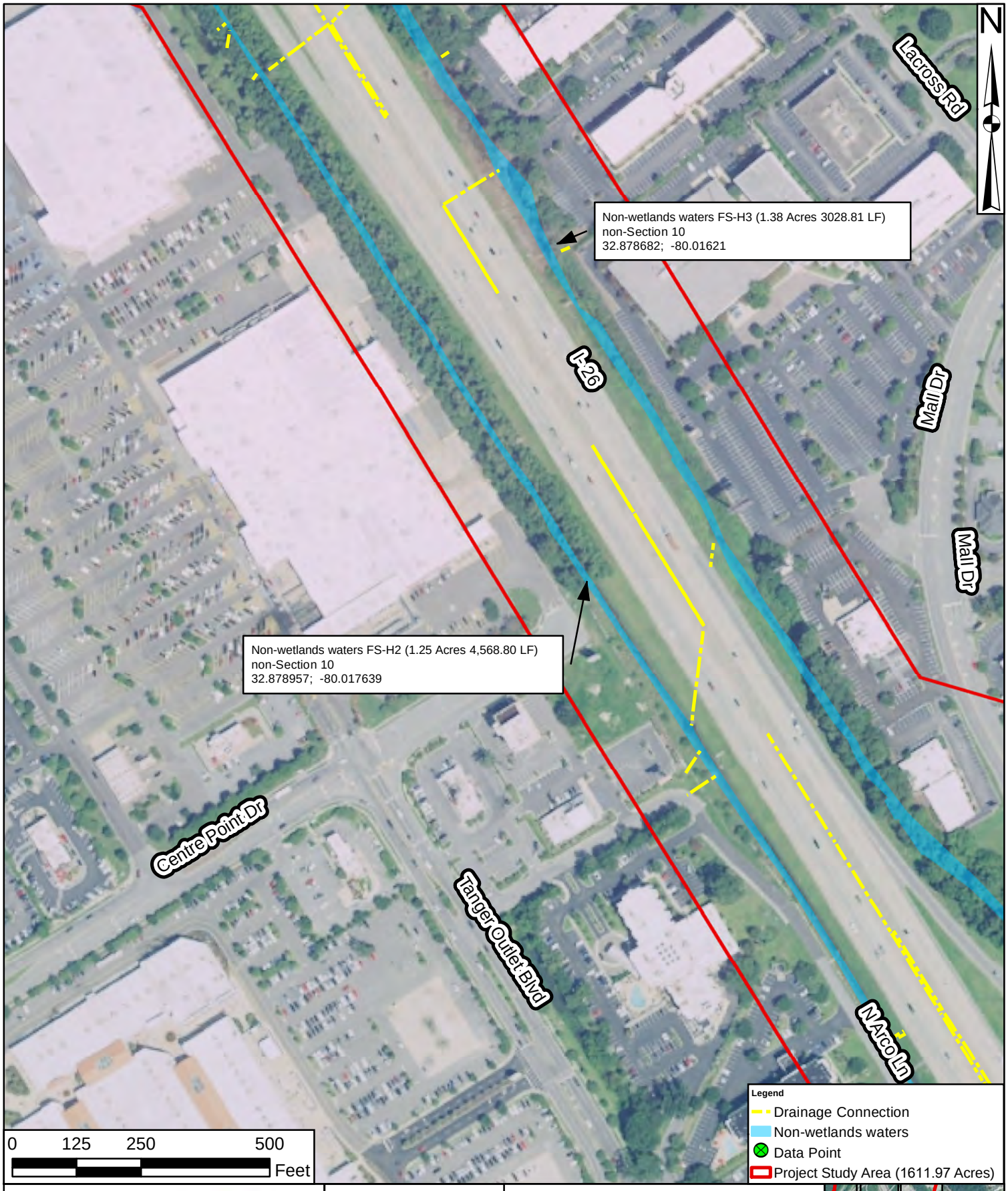

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Charleston County
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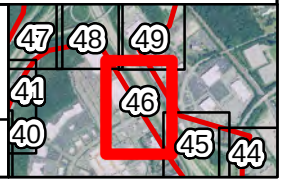

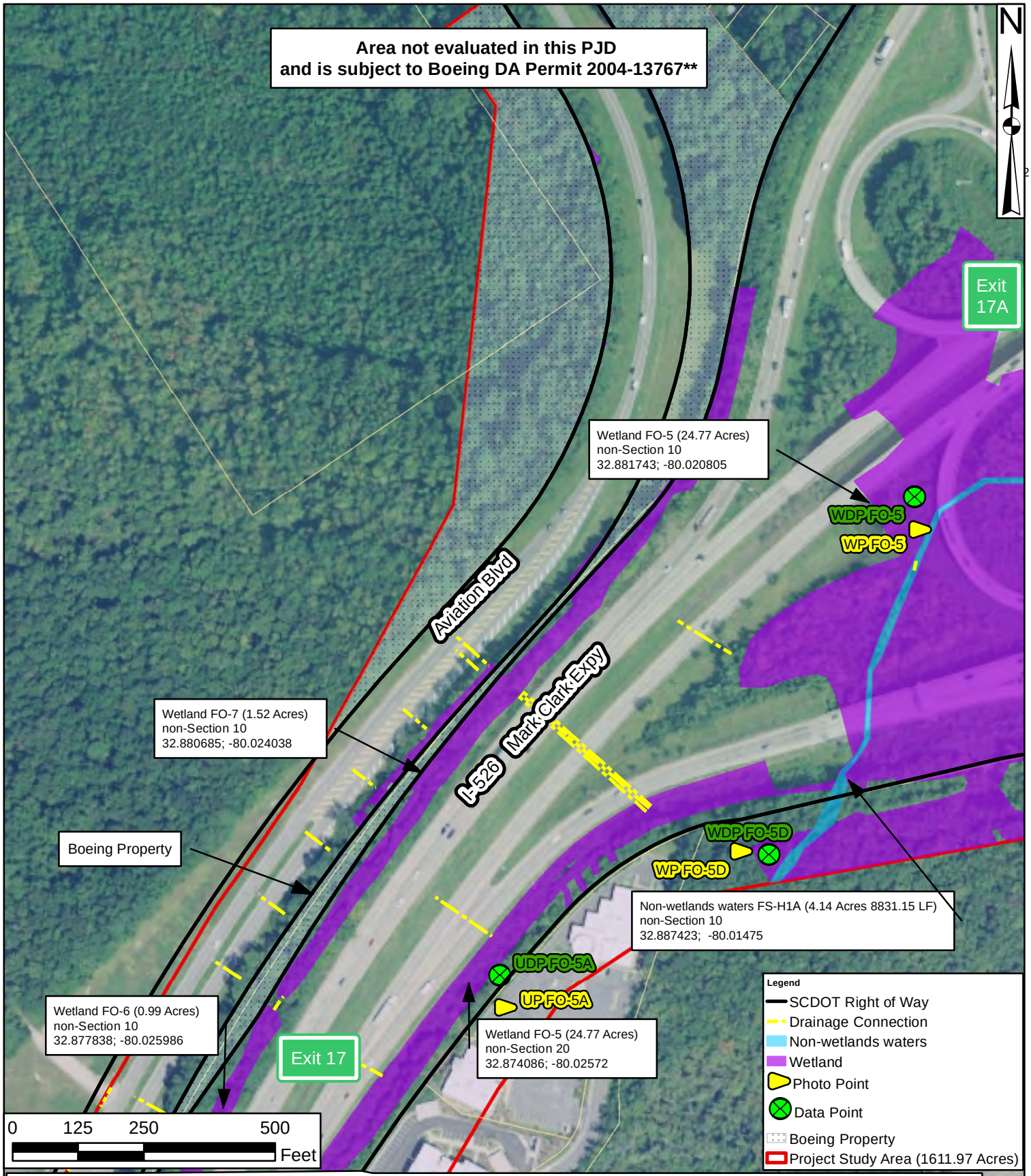

Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas

SCDOT South Carolina Department of Transportation

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QA/QC: KLM

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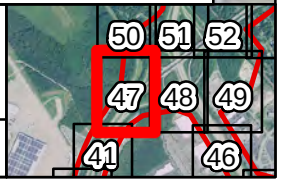

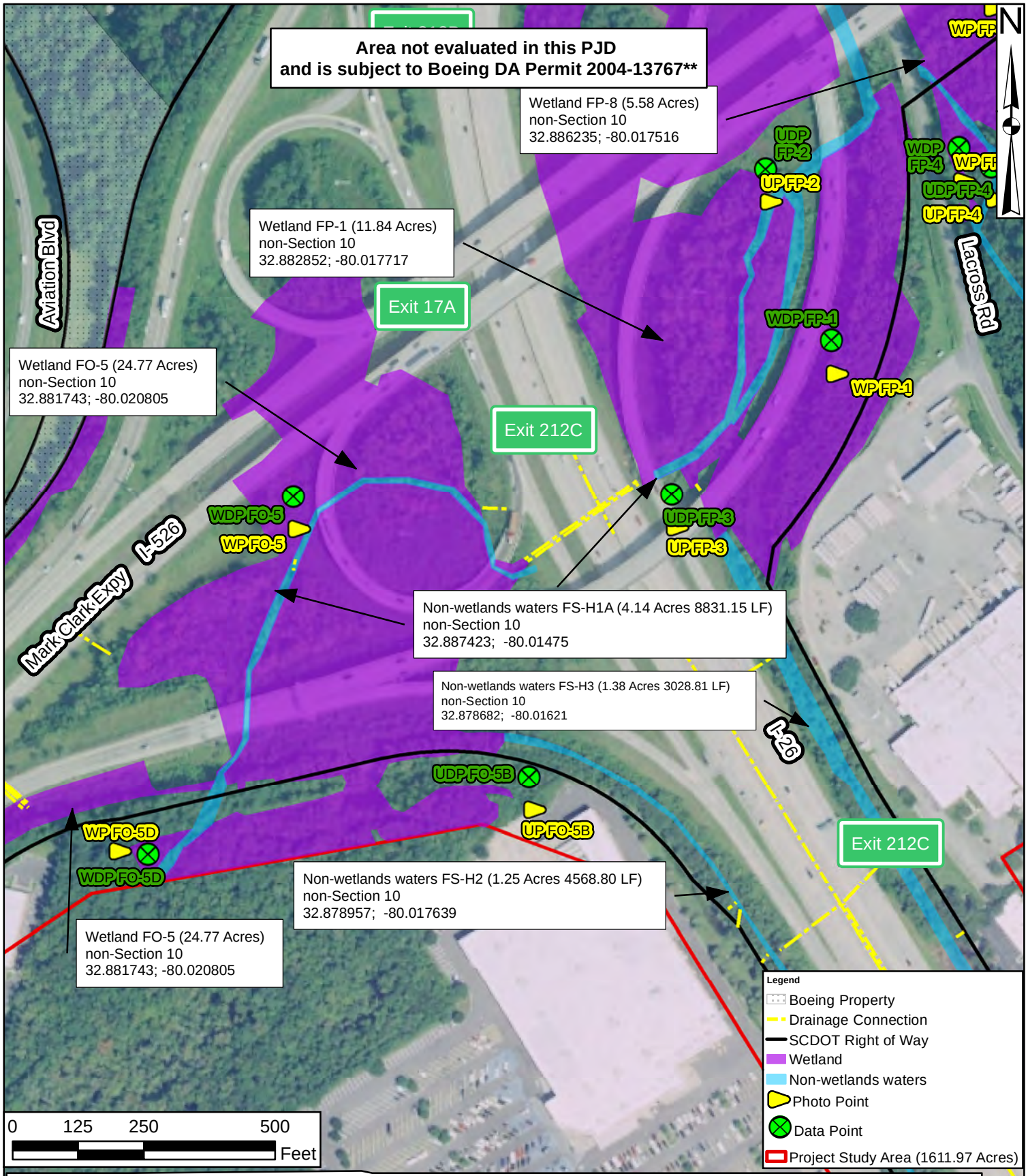

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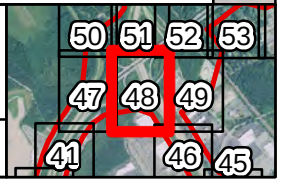

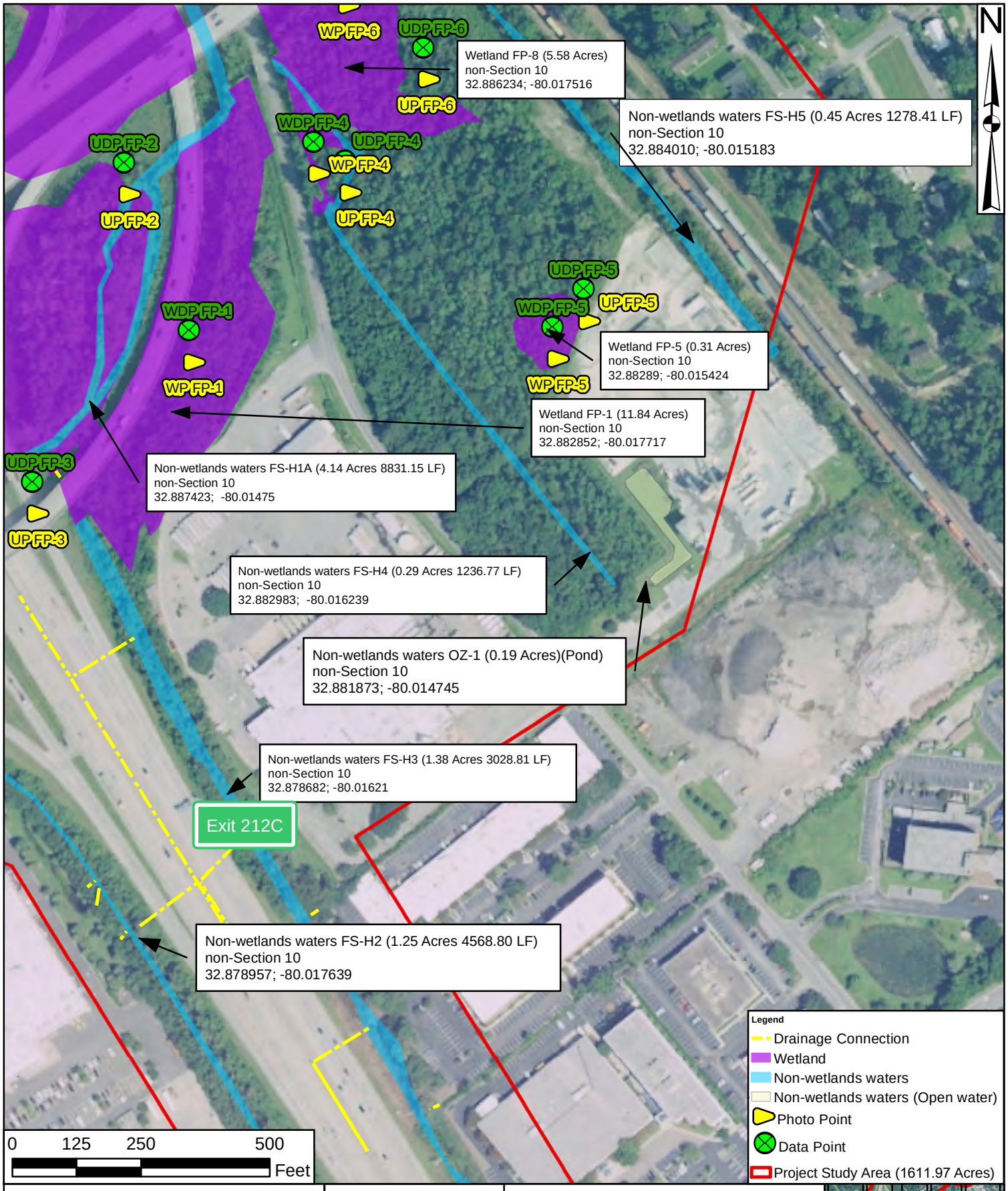

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Charleston County
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Drawn By: RHH
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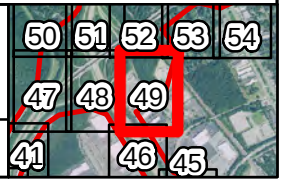

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Charleston County
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Drawn By: RHH
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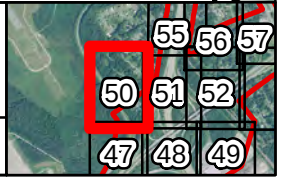

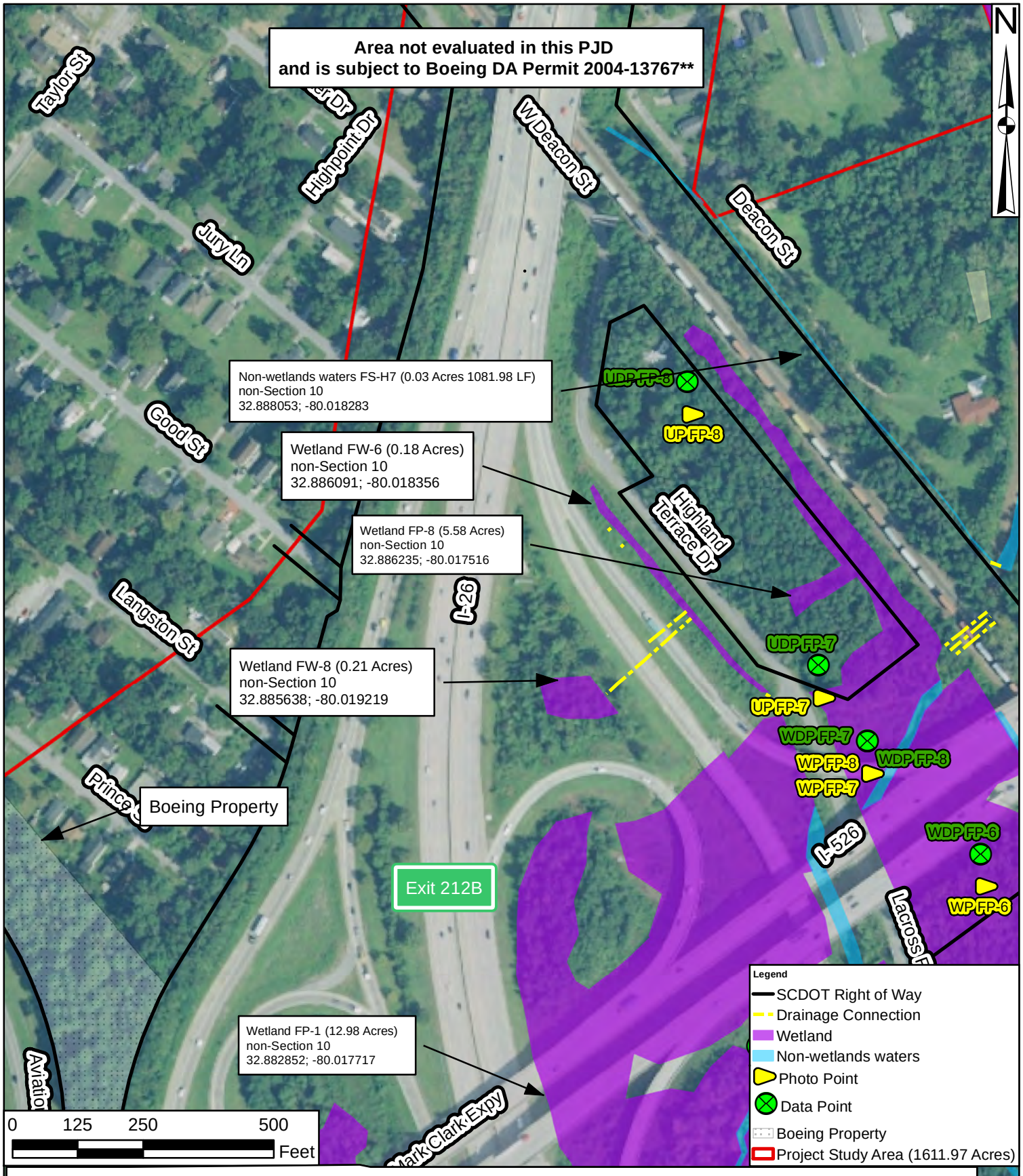

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SCDOT South Carolina Department of Transportation

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I-526 Lowcountry Corridor West
Charleston County
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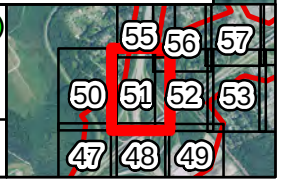

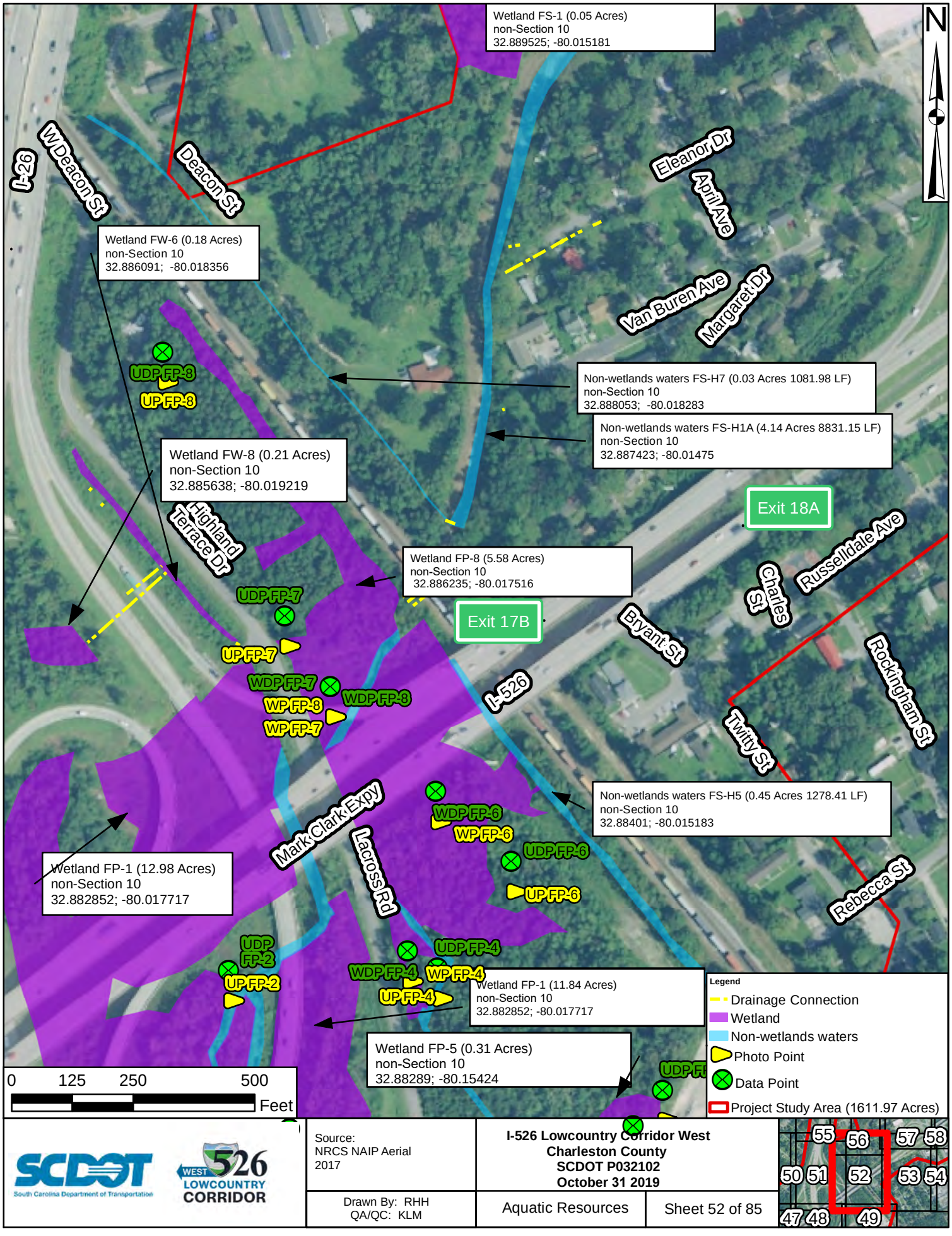

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Charleston County
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October 31 2019

Drawn By: RHH
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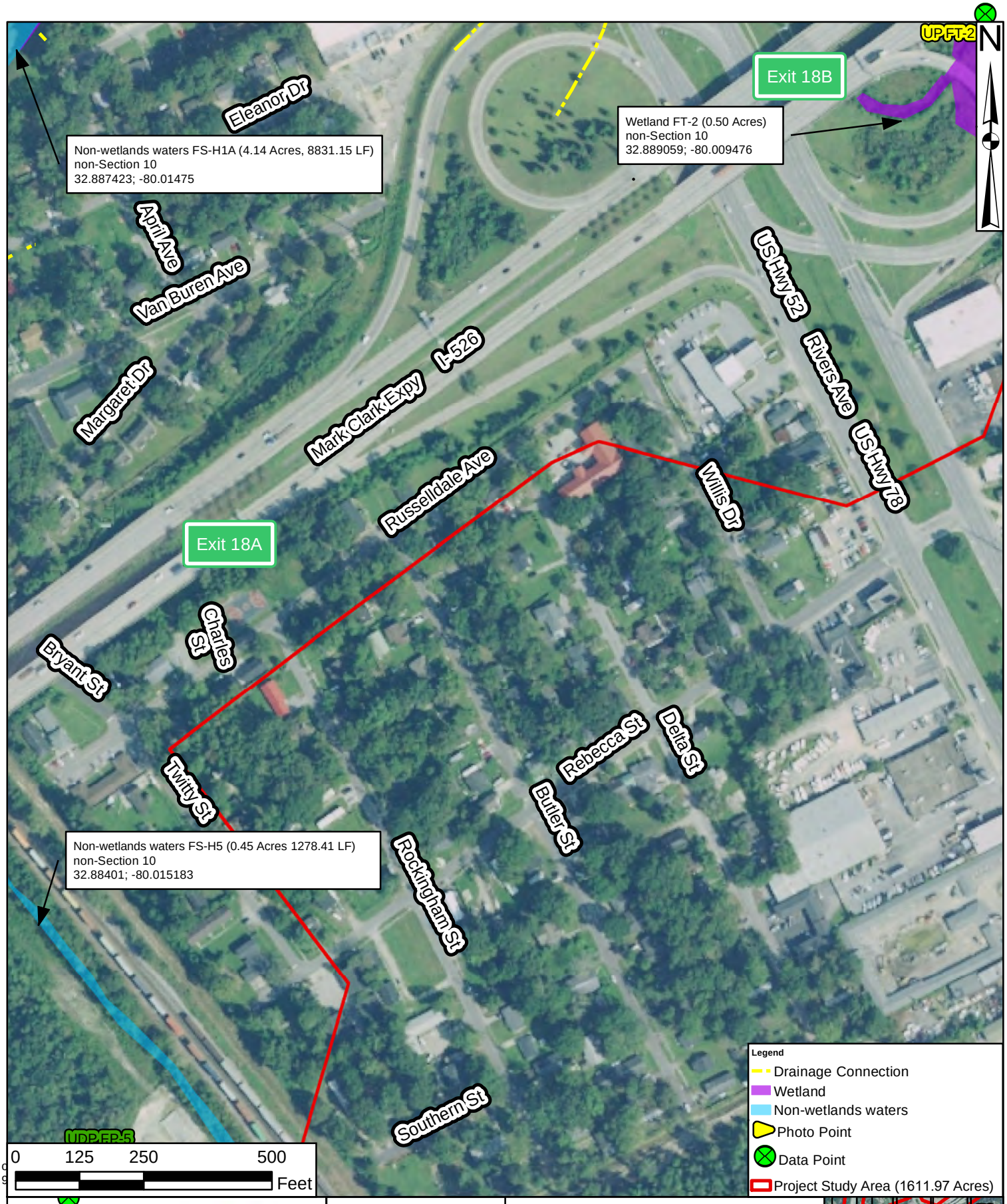

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Charleston County
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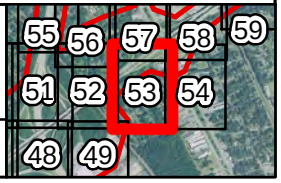

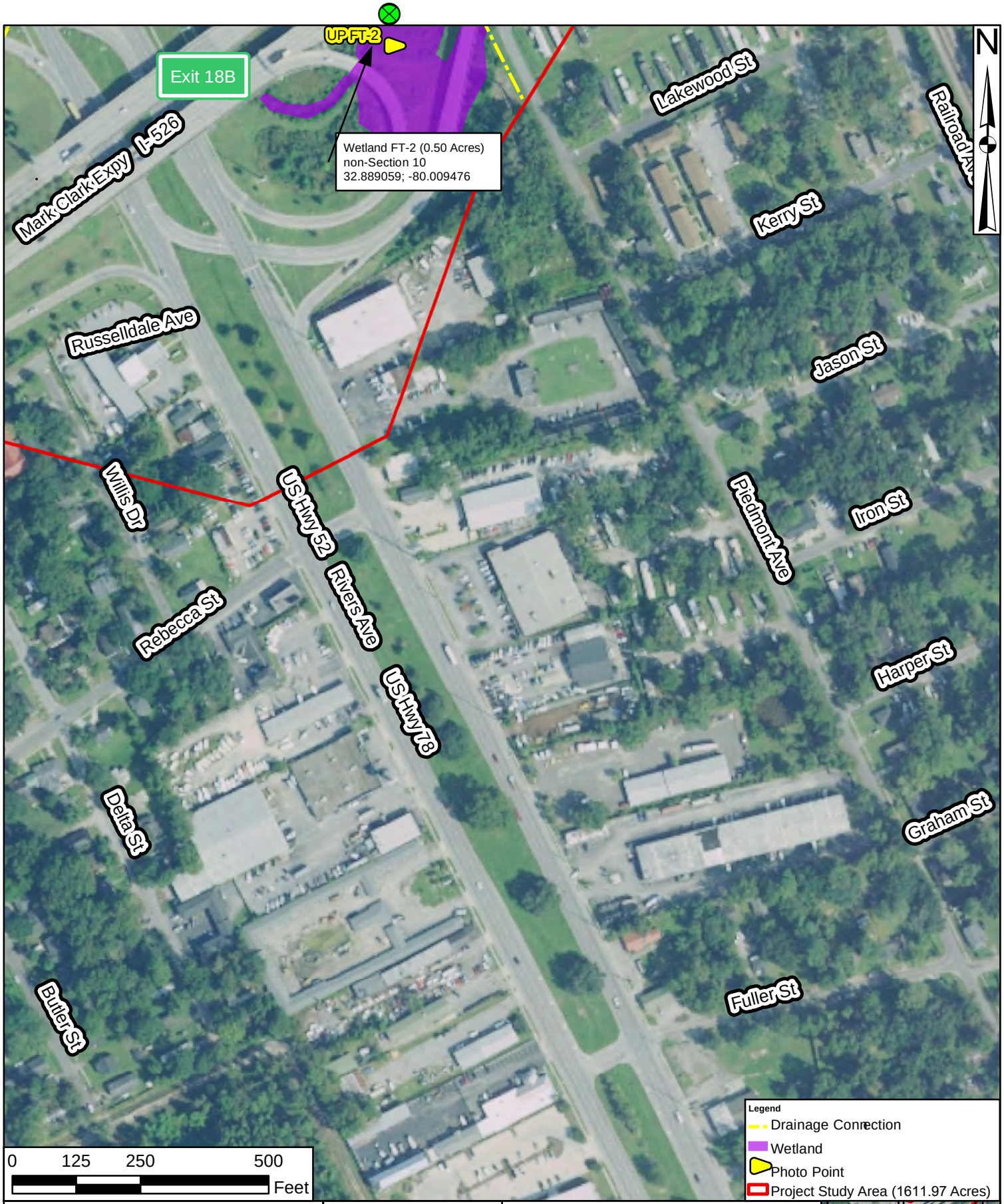

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I-526 Lowcountry Corridor West
Charleston County
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October 31 2019

Drawn By: RHH
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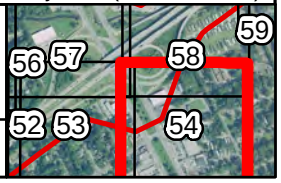

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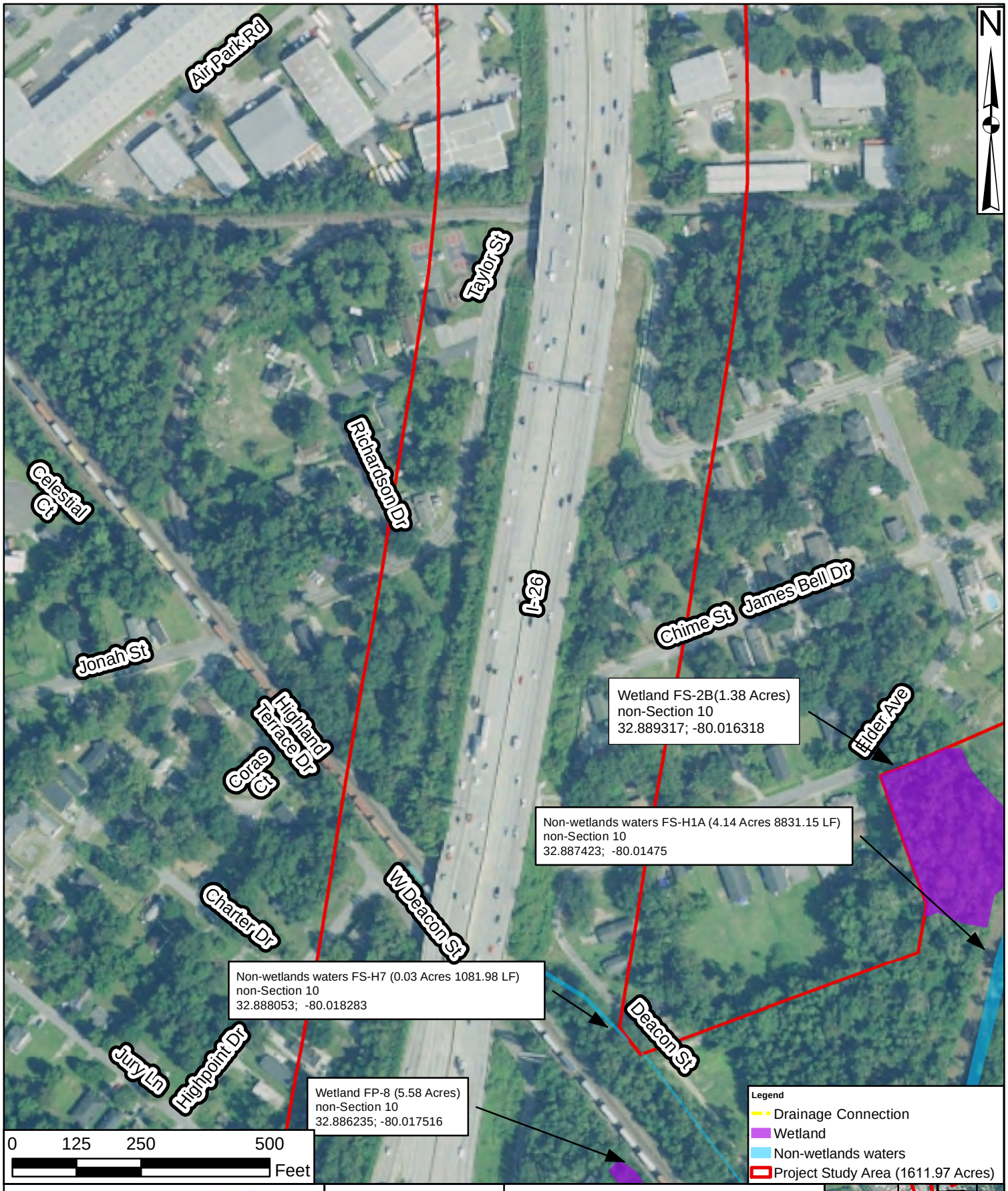

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I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

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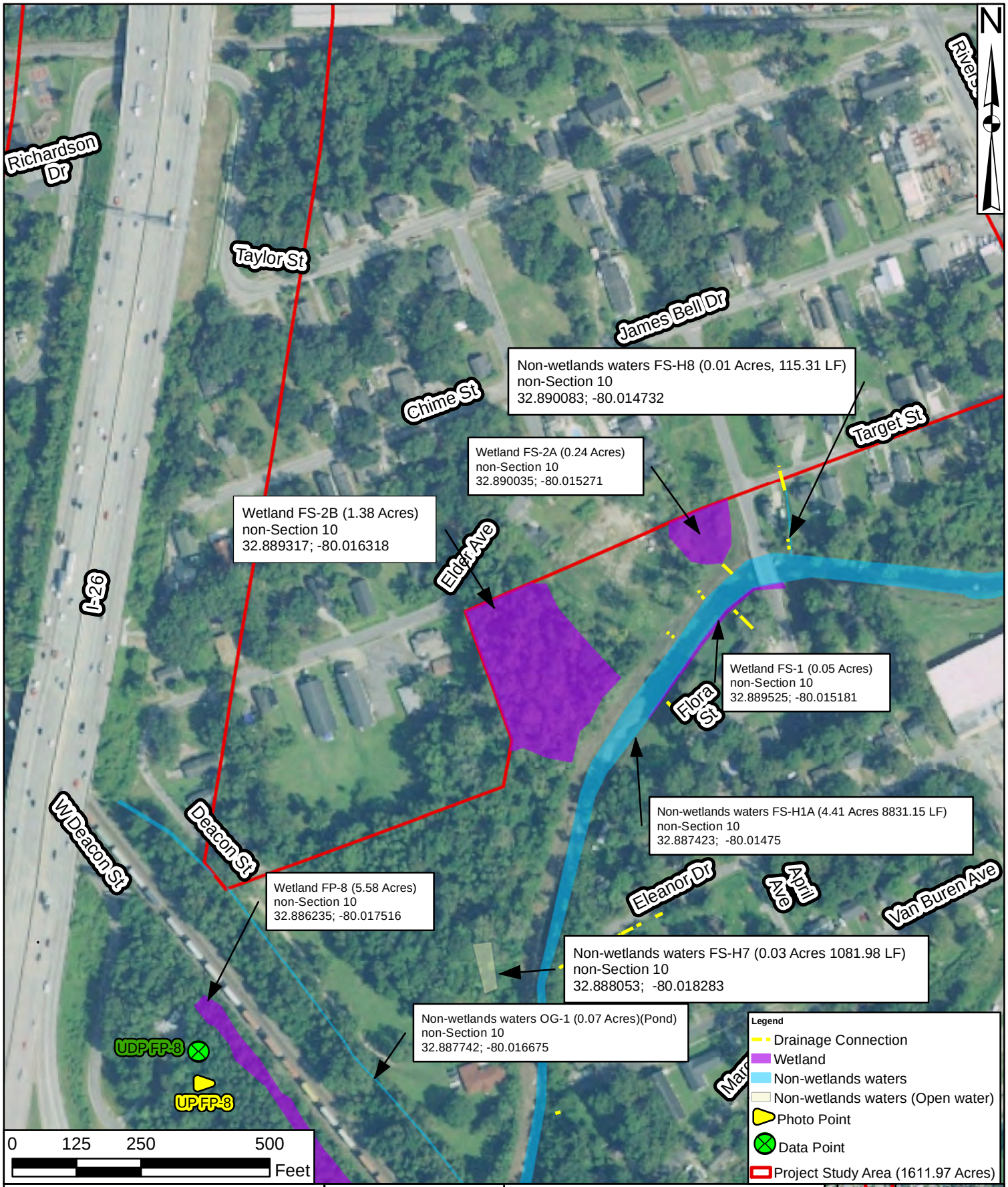

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

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I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

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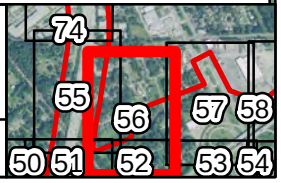

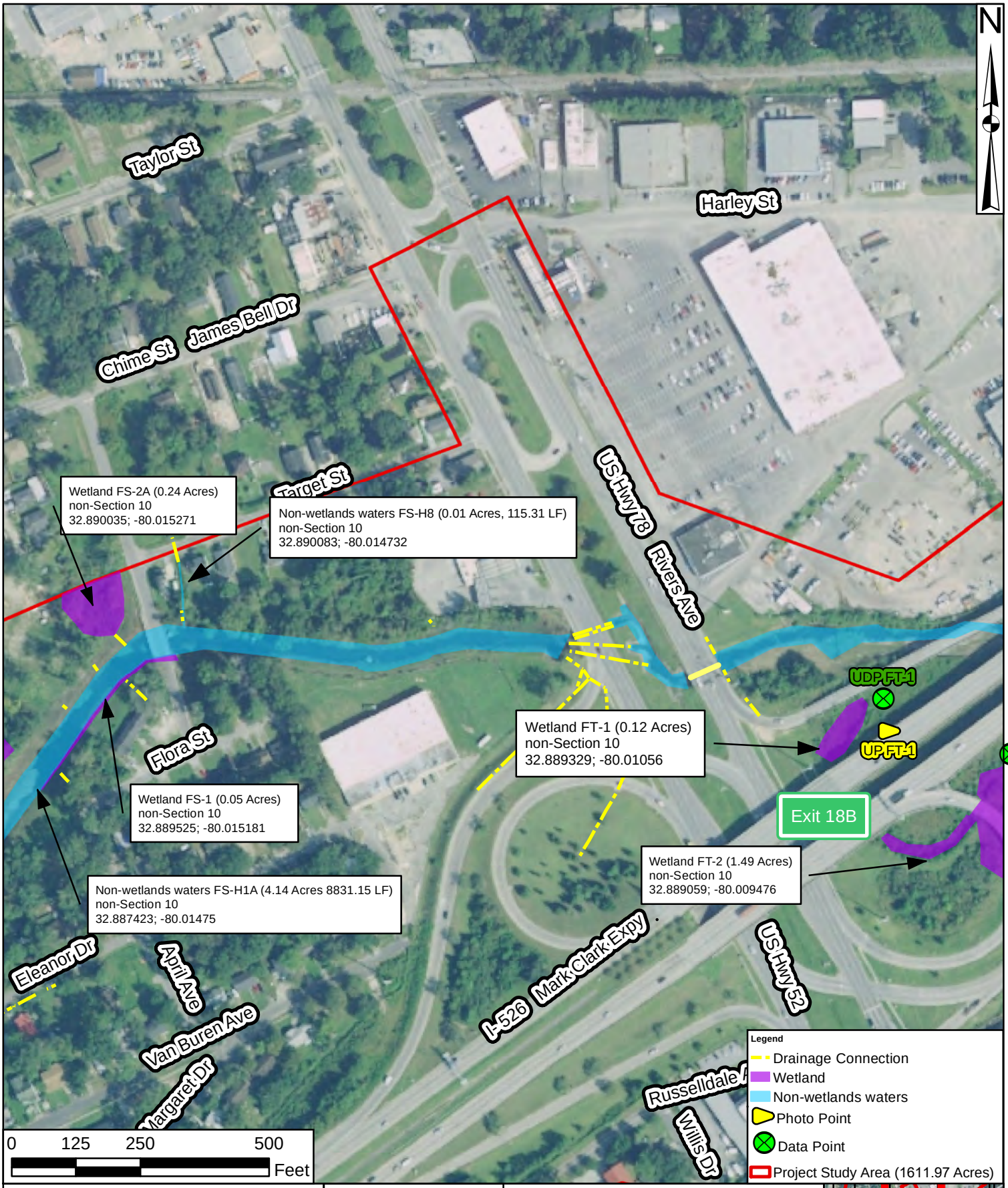

SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

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I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

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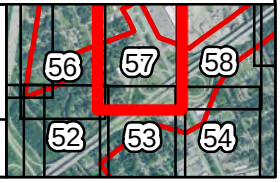

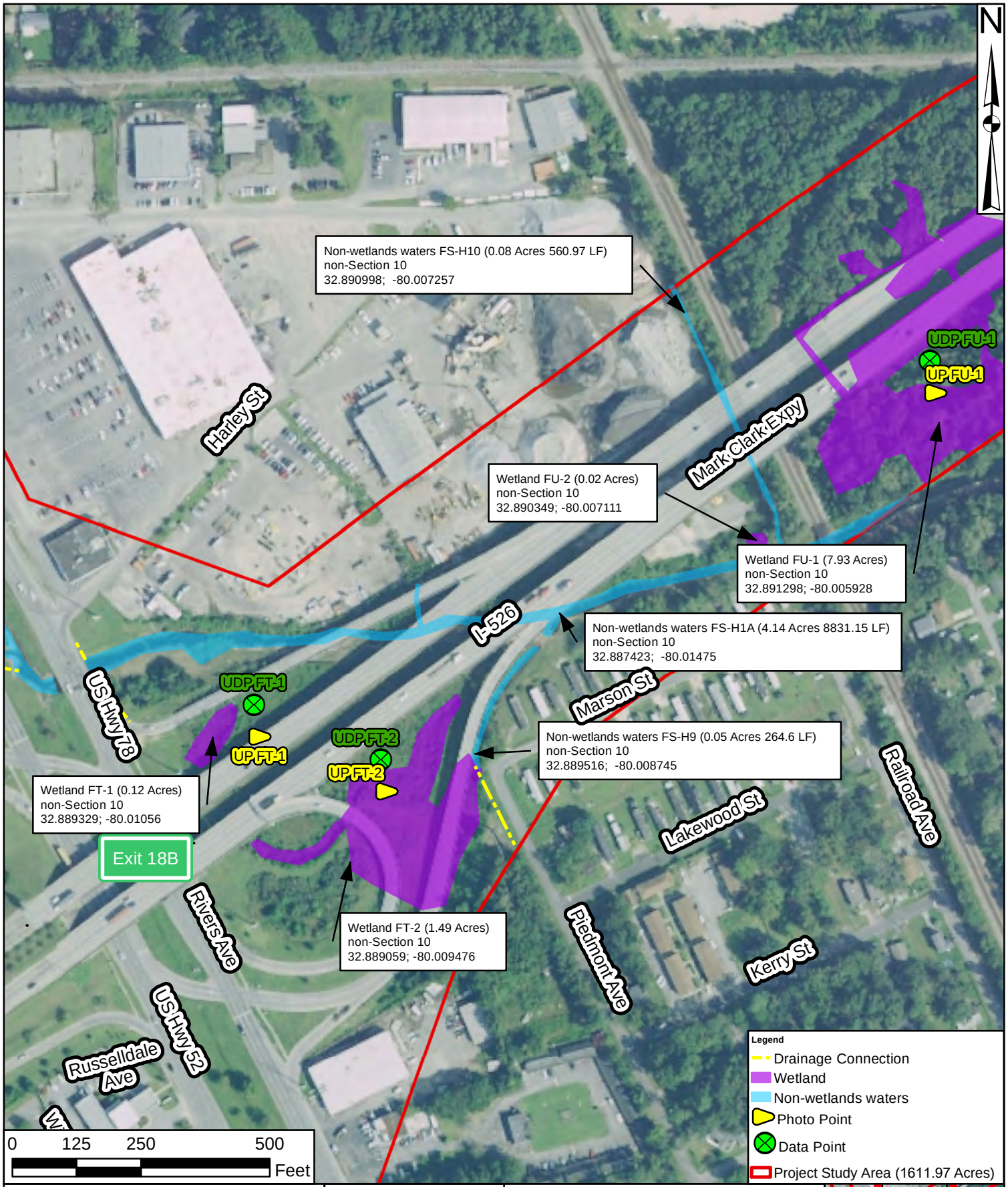

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Charleston County
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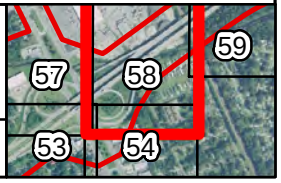

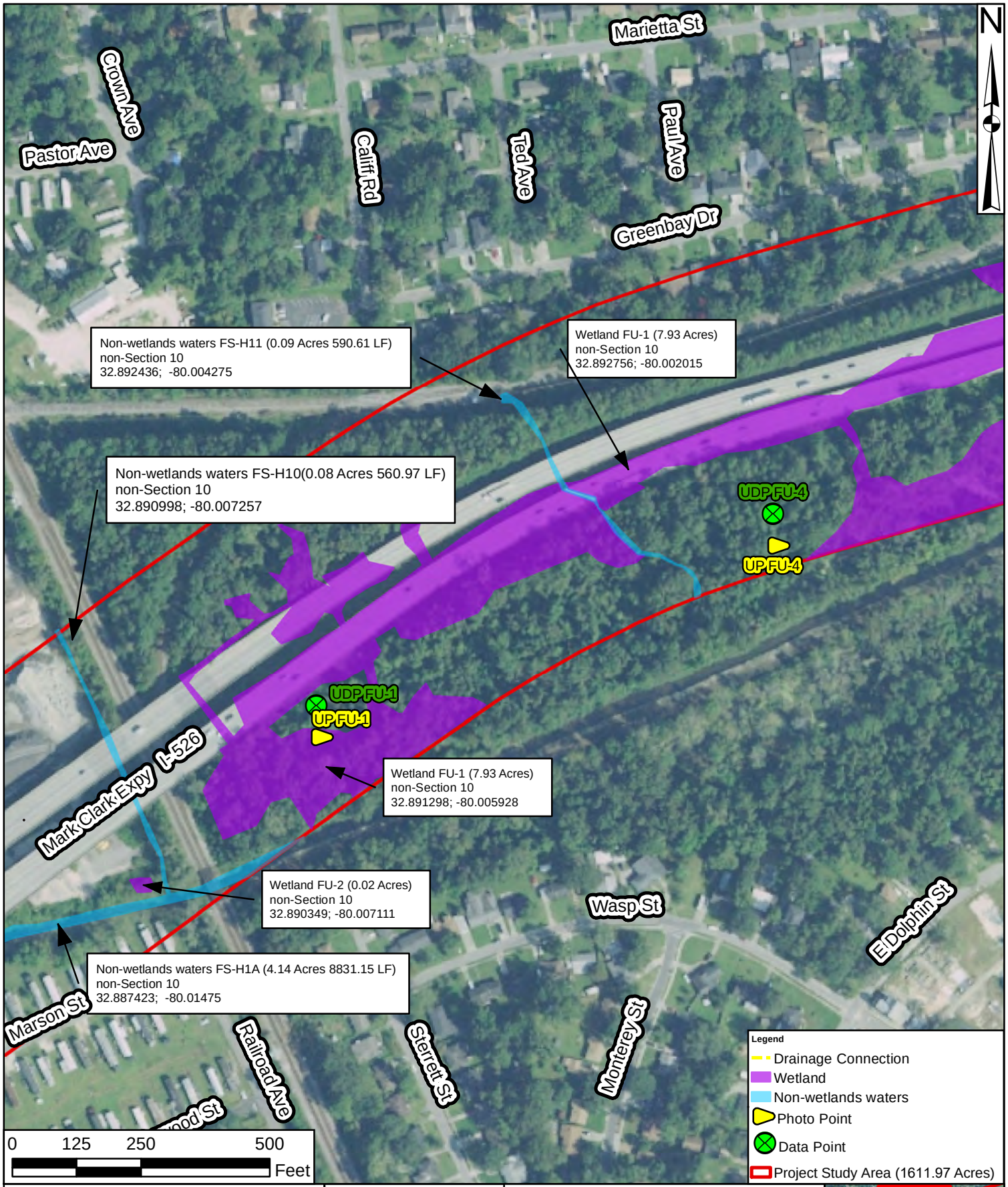

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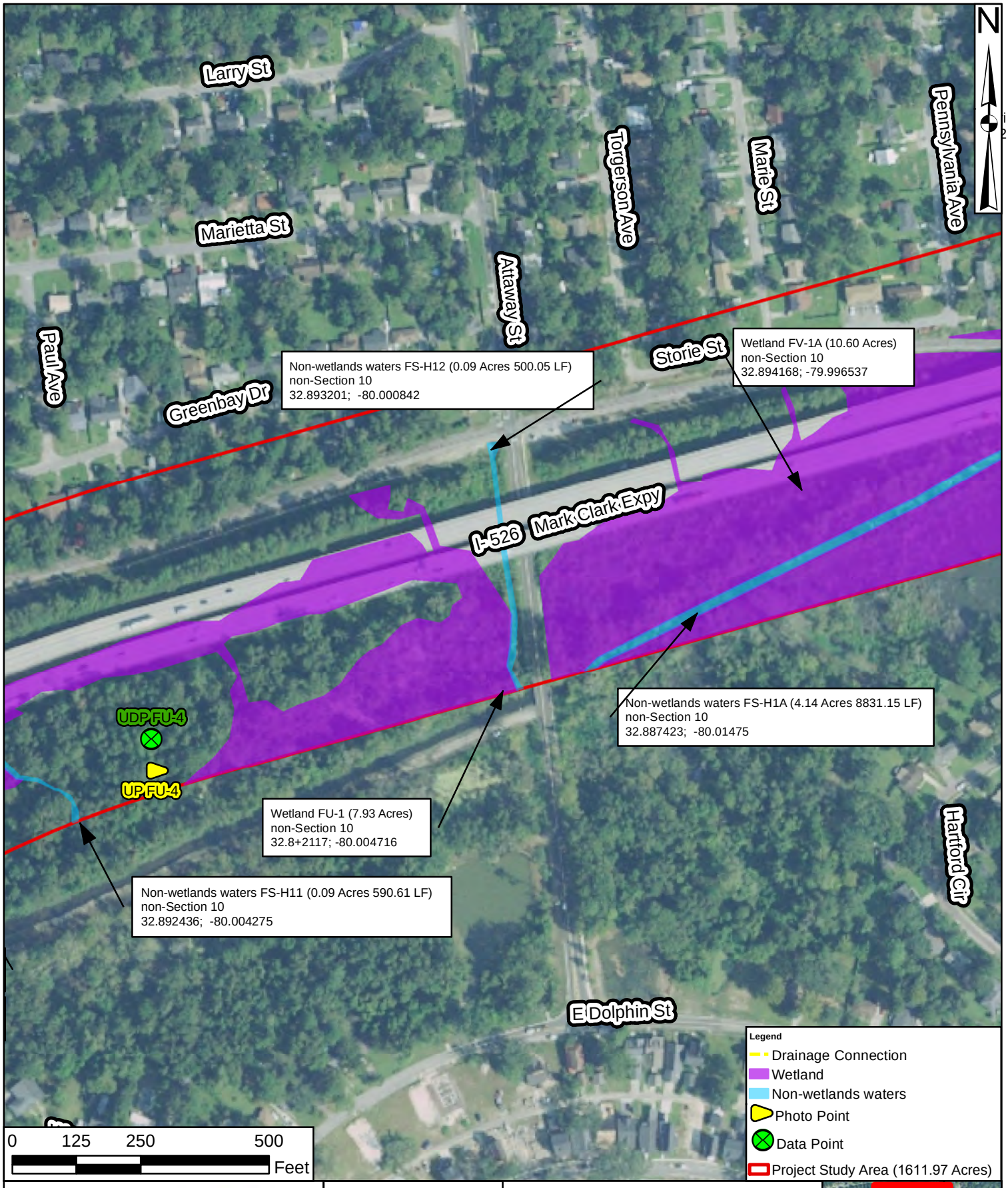

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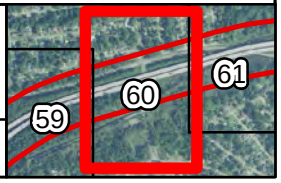

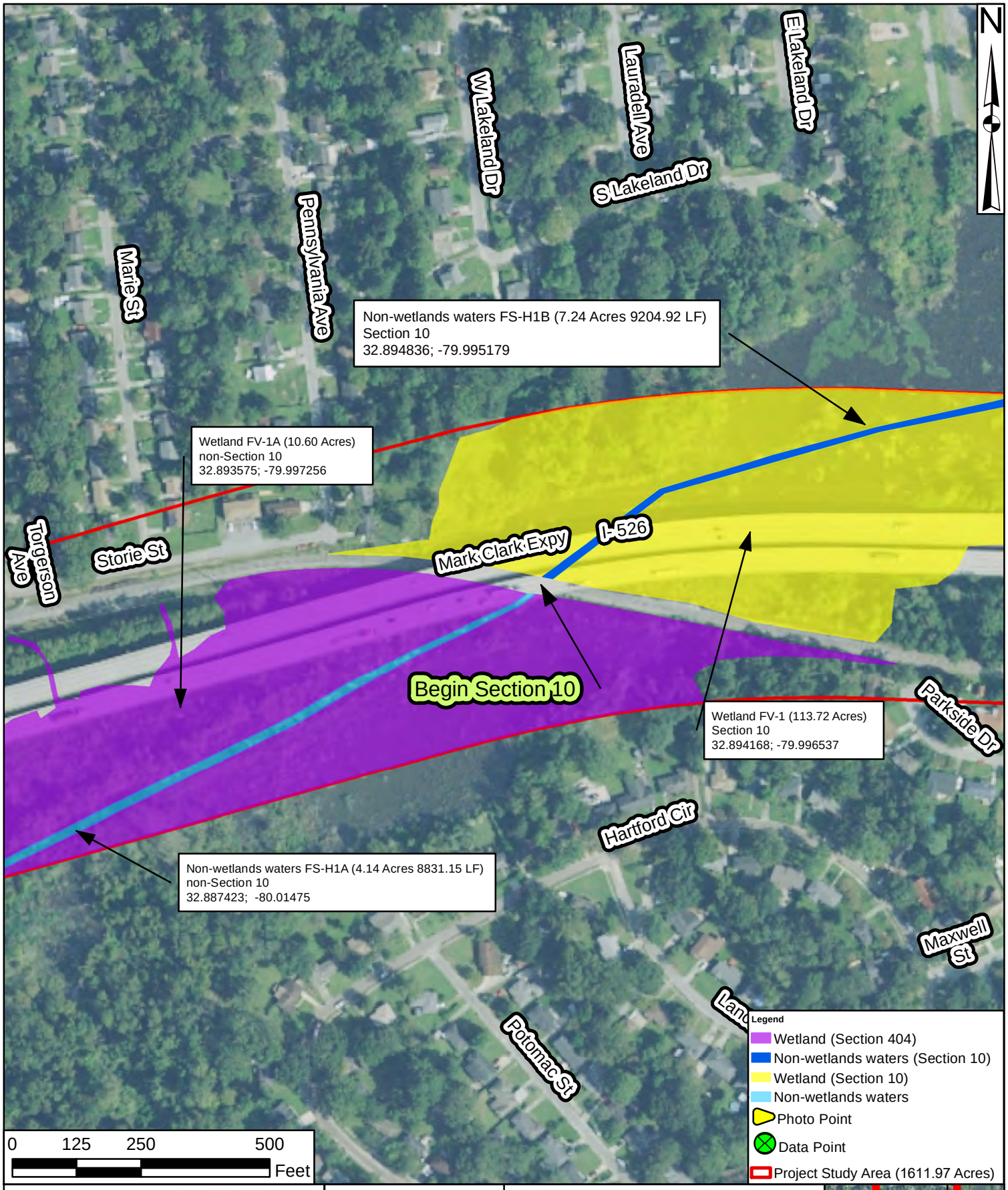

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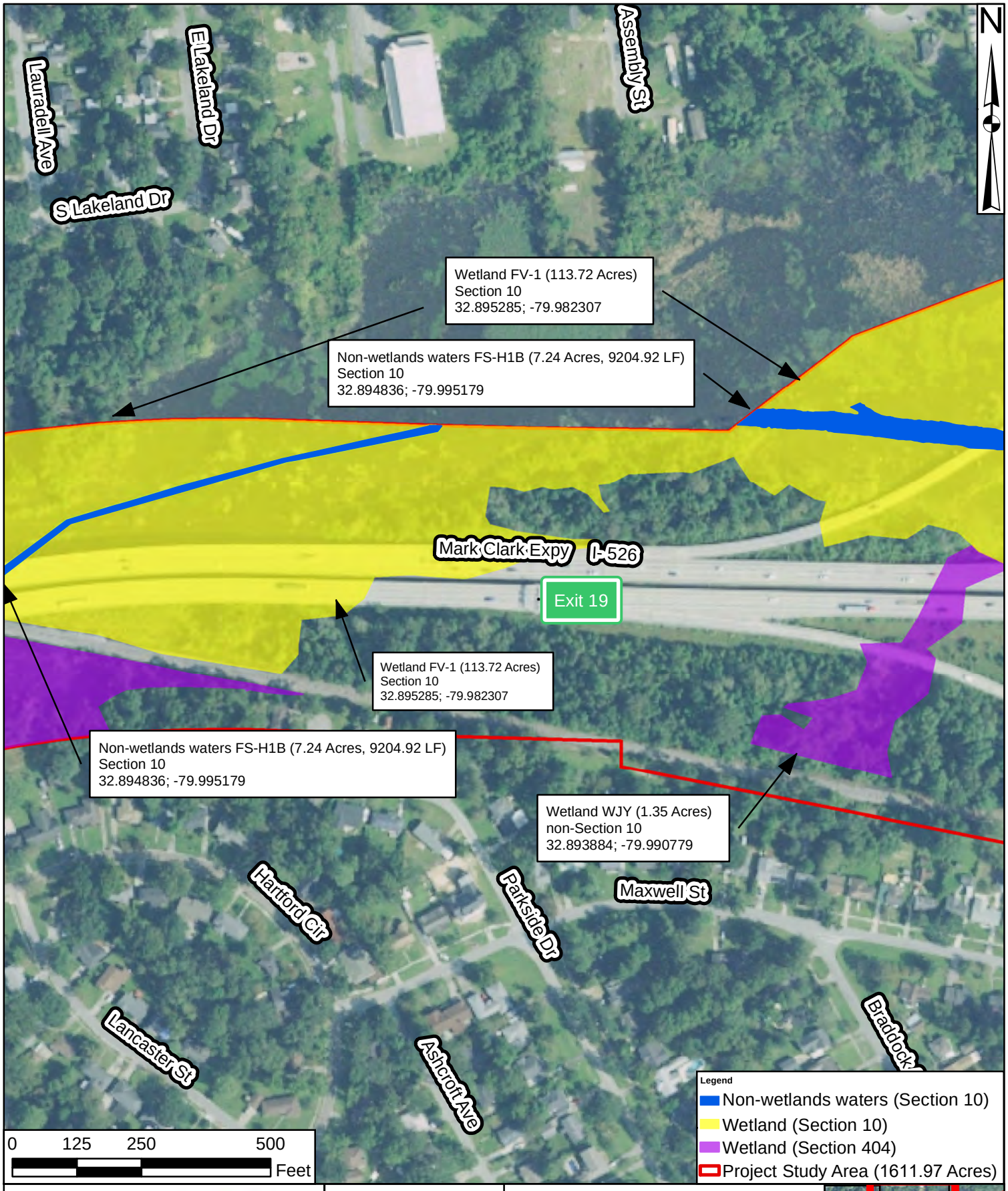

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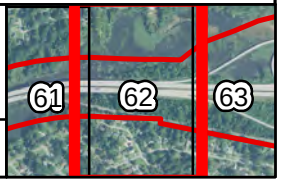

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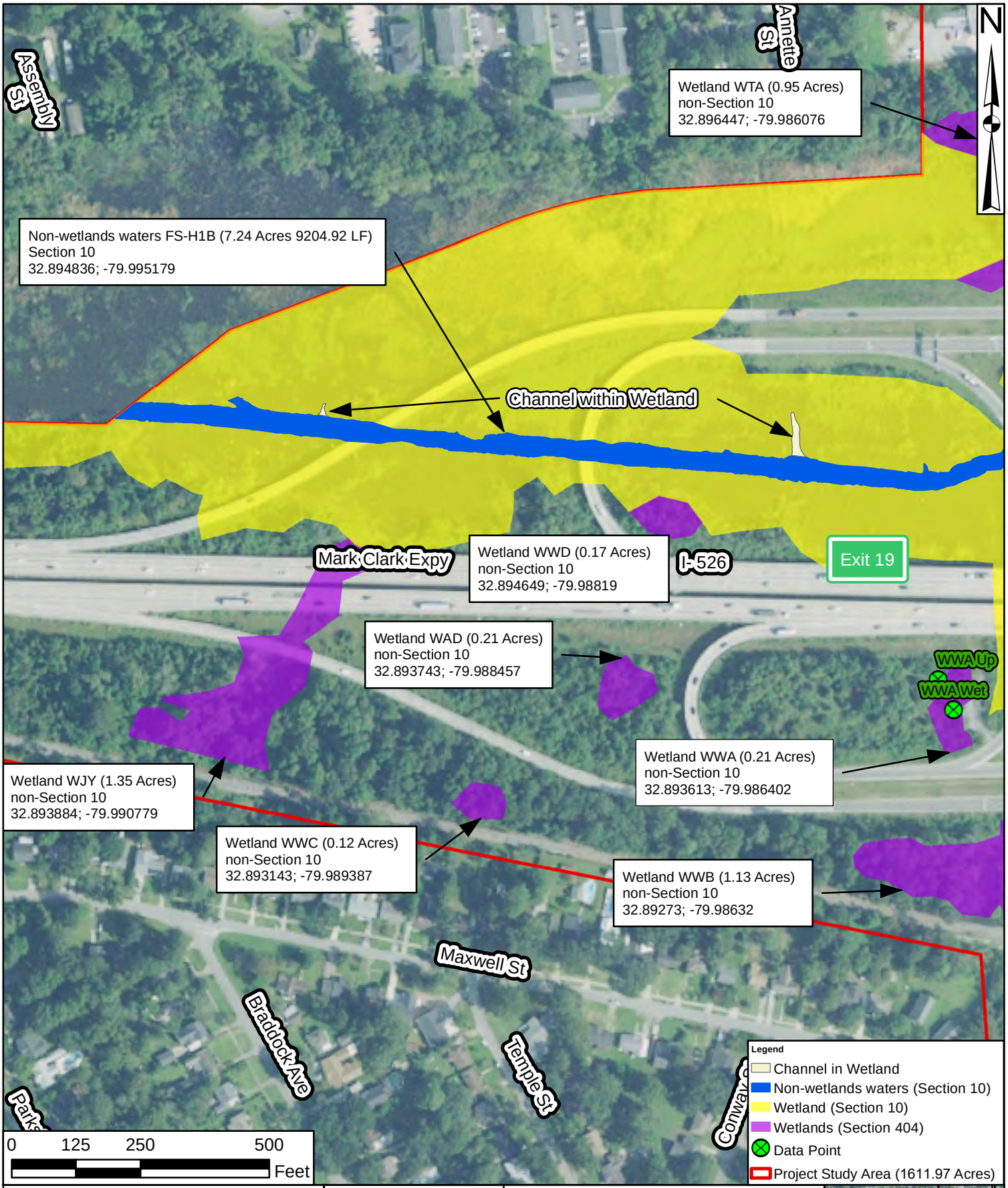

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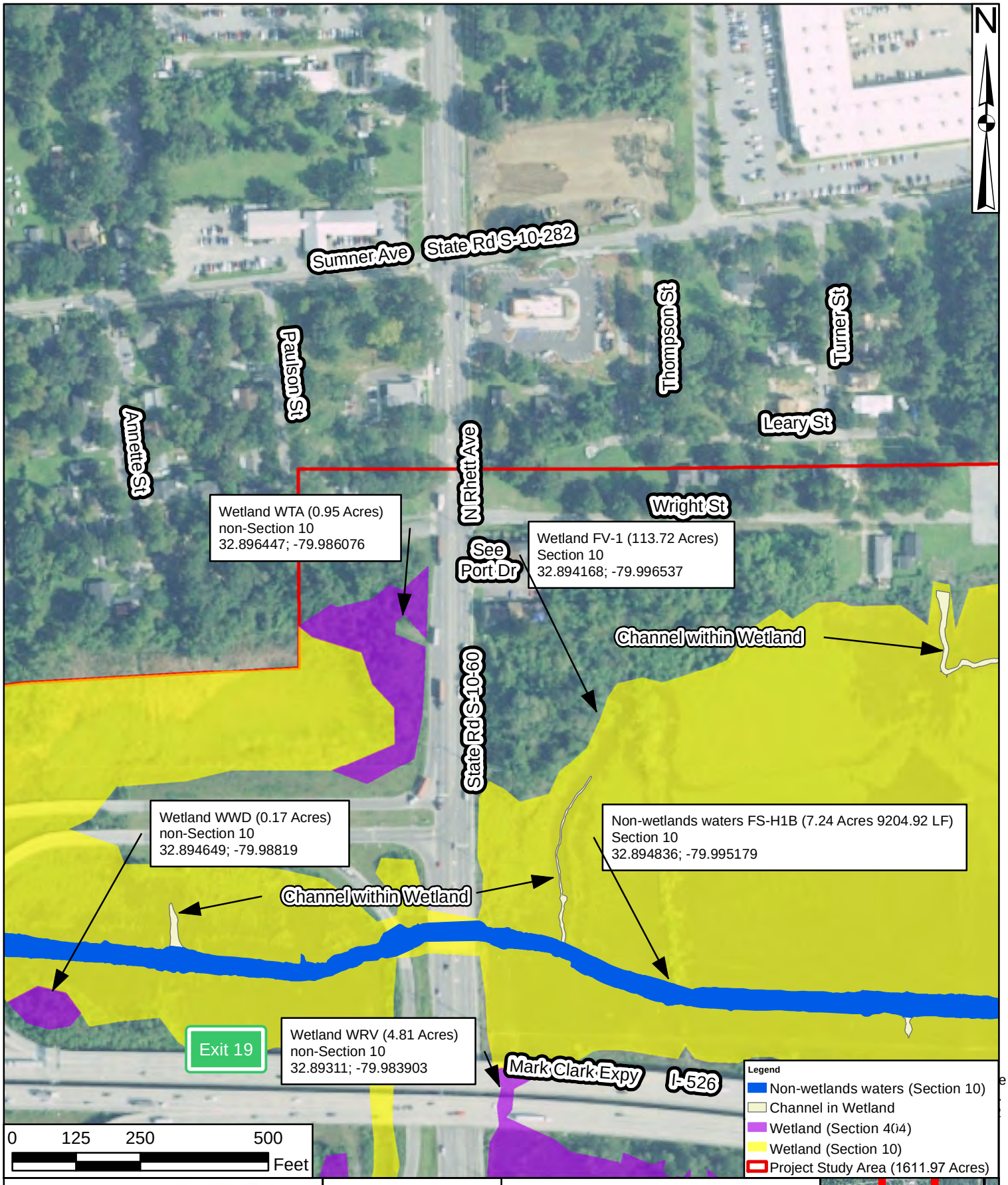

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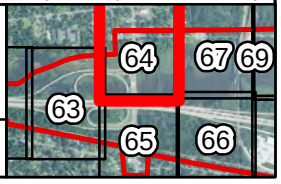

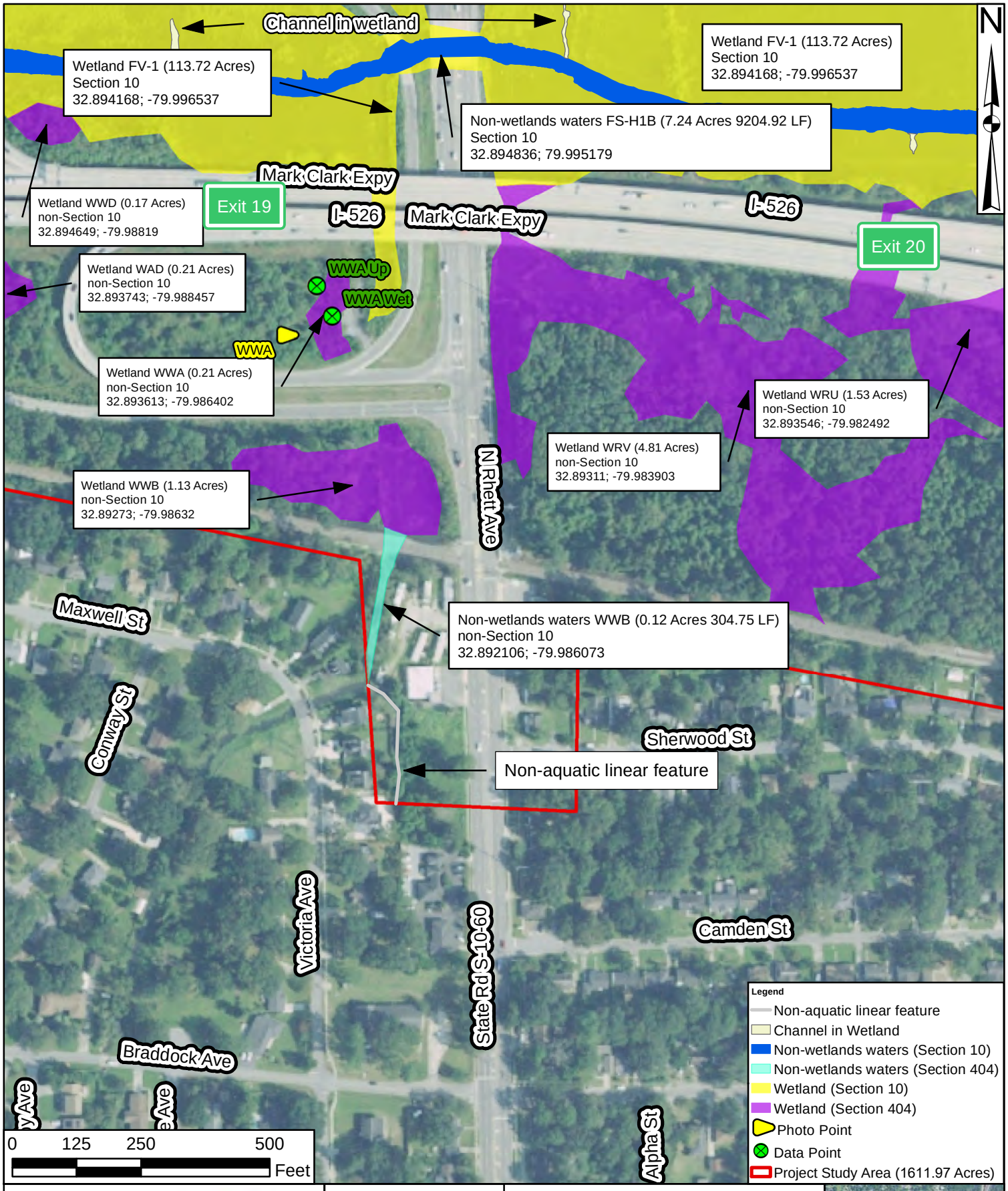

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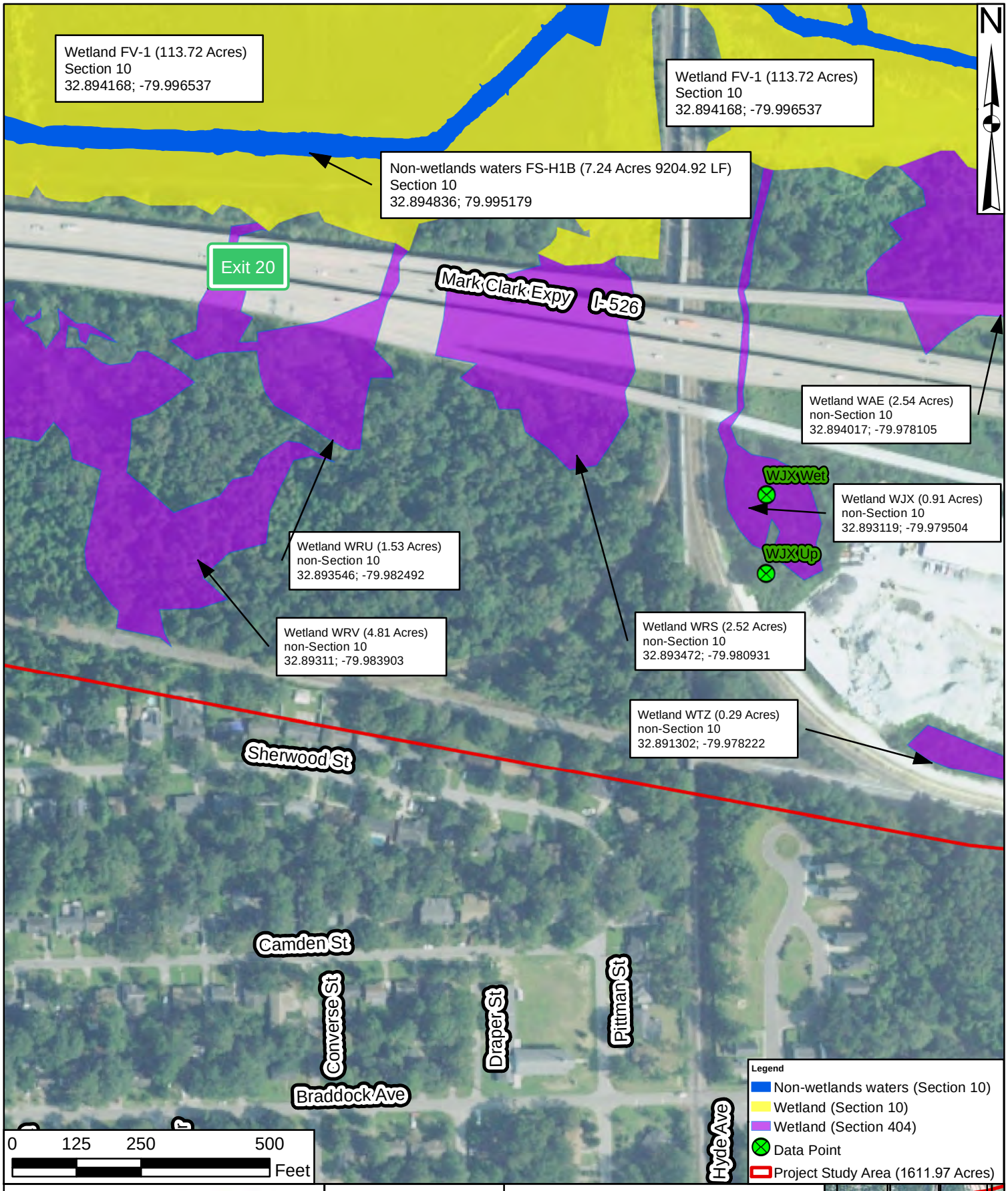

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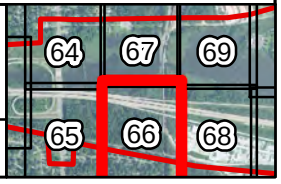

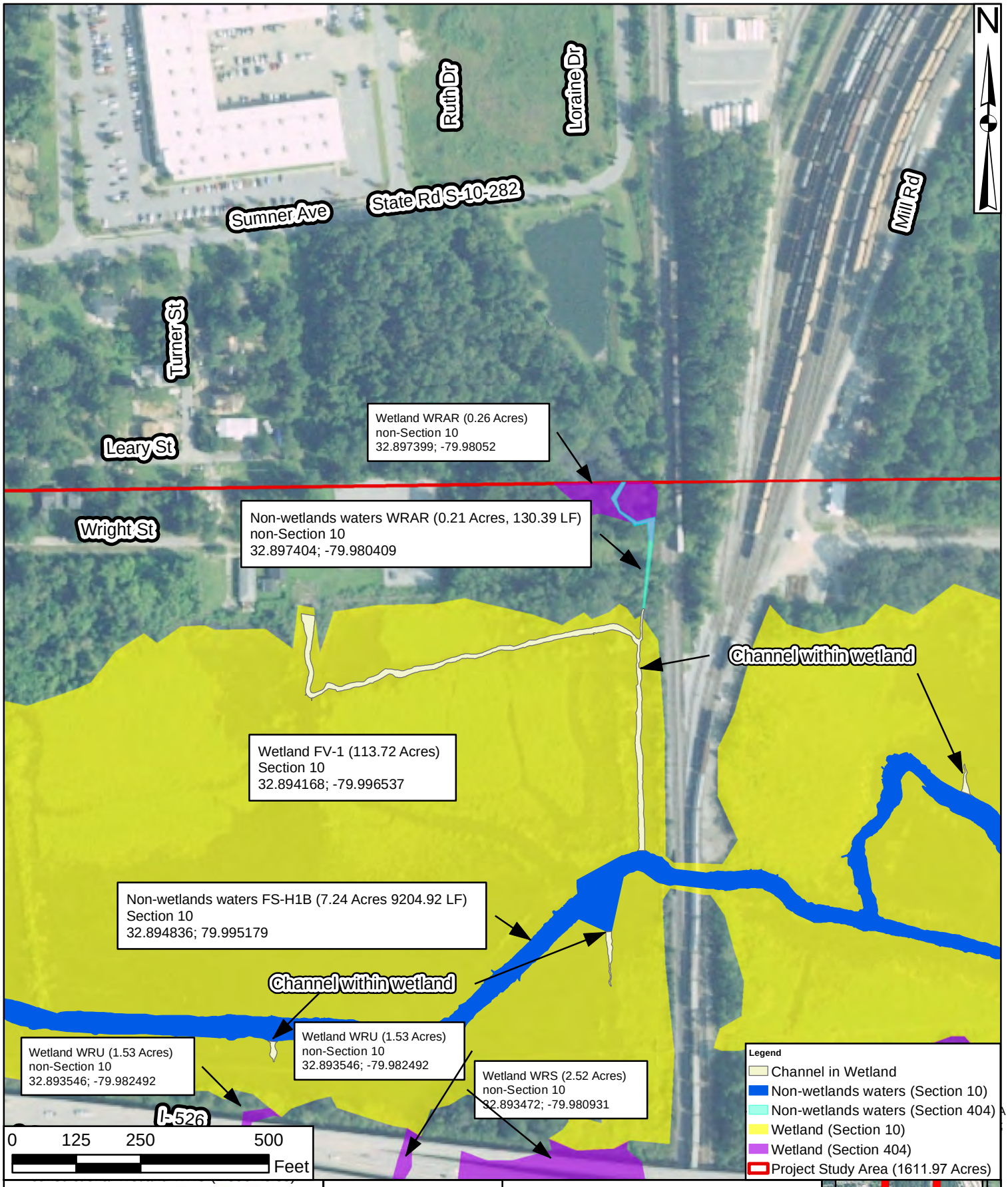

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

Source:
NRCS NAIP Aerial
2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Aquatic Resources

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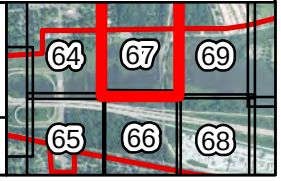

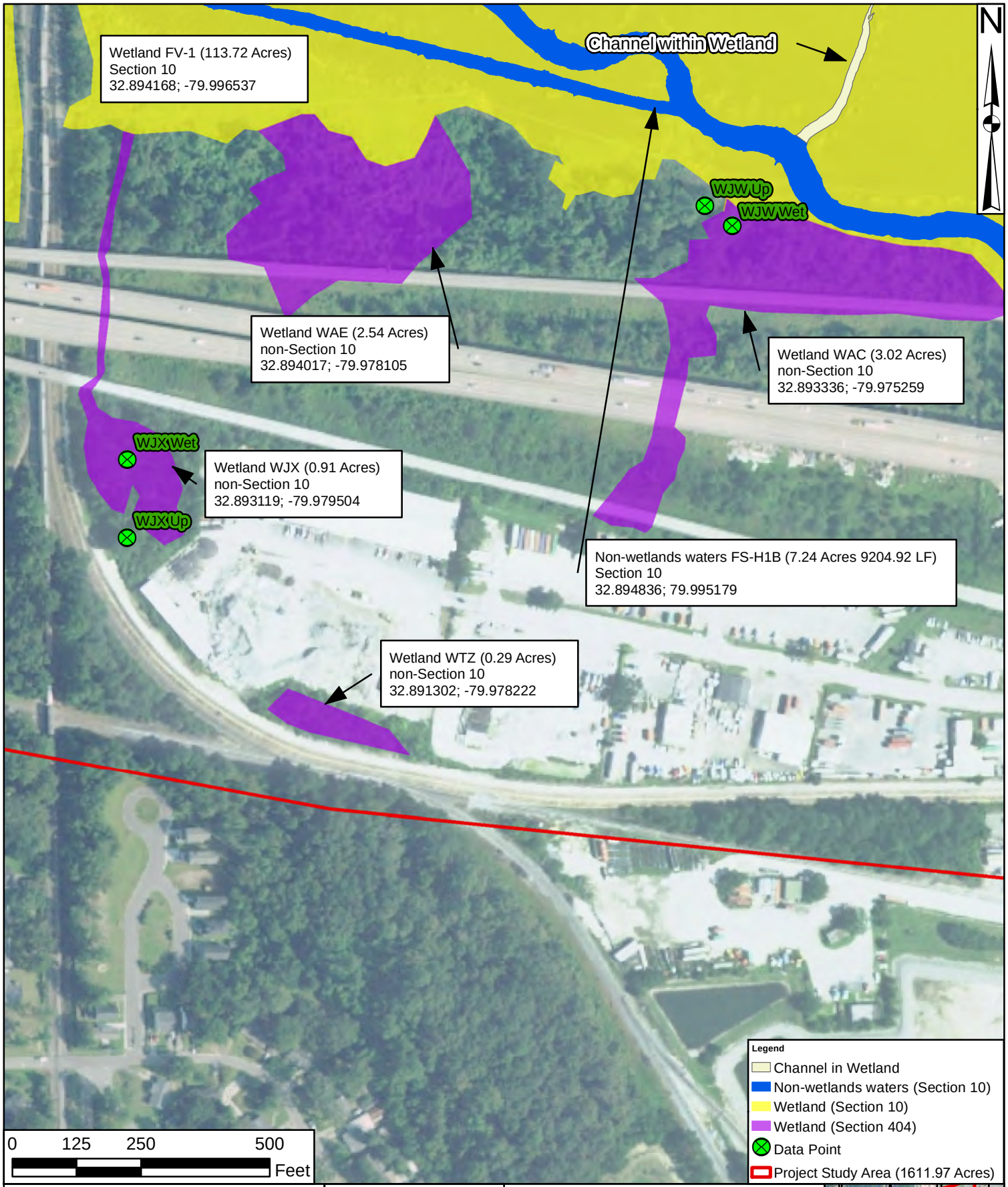

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

Source:
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I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Aquatic Resources

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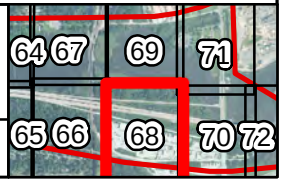

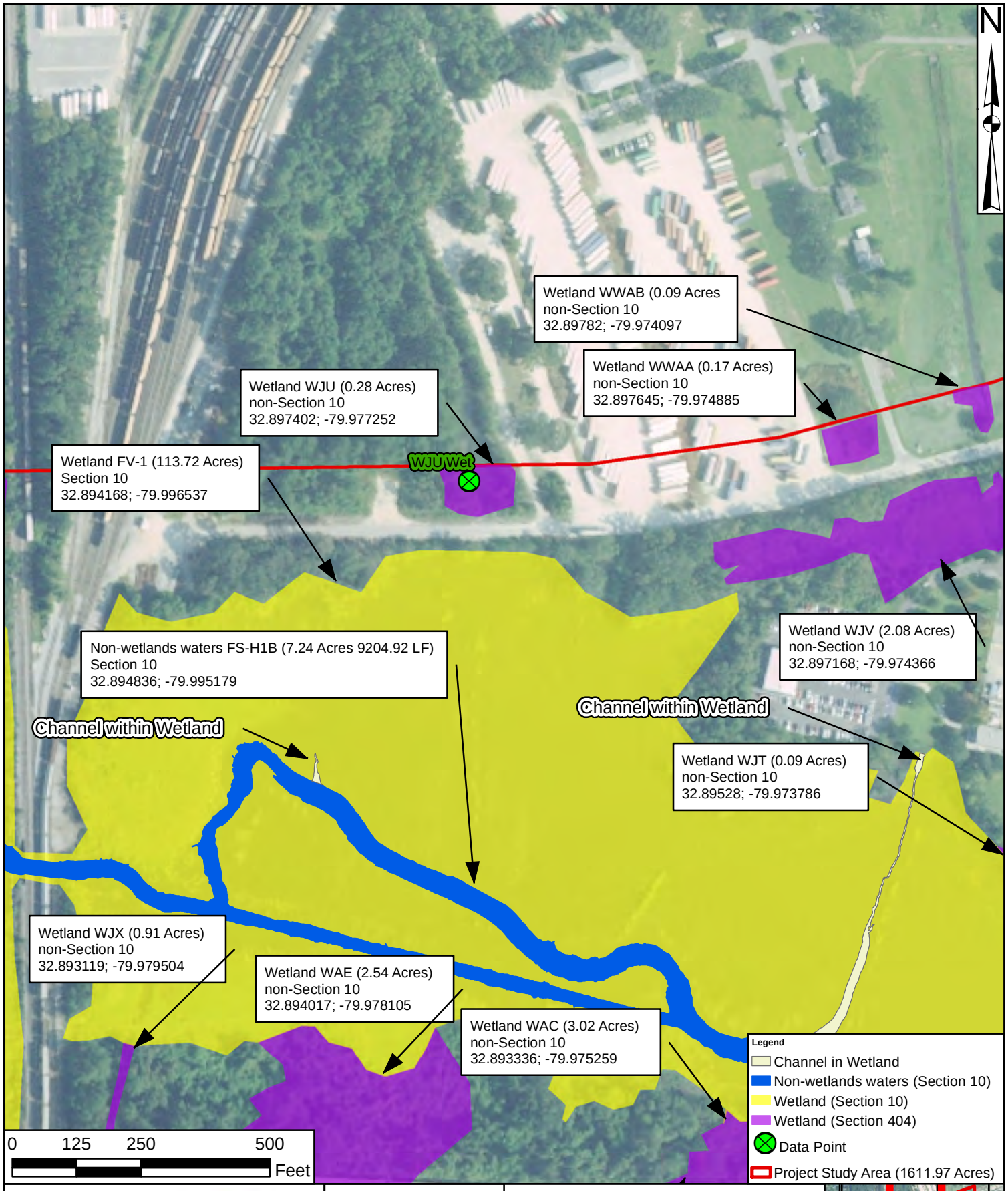

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

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2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

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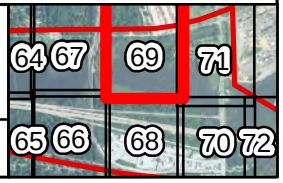

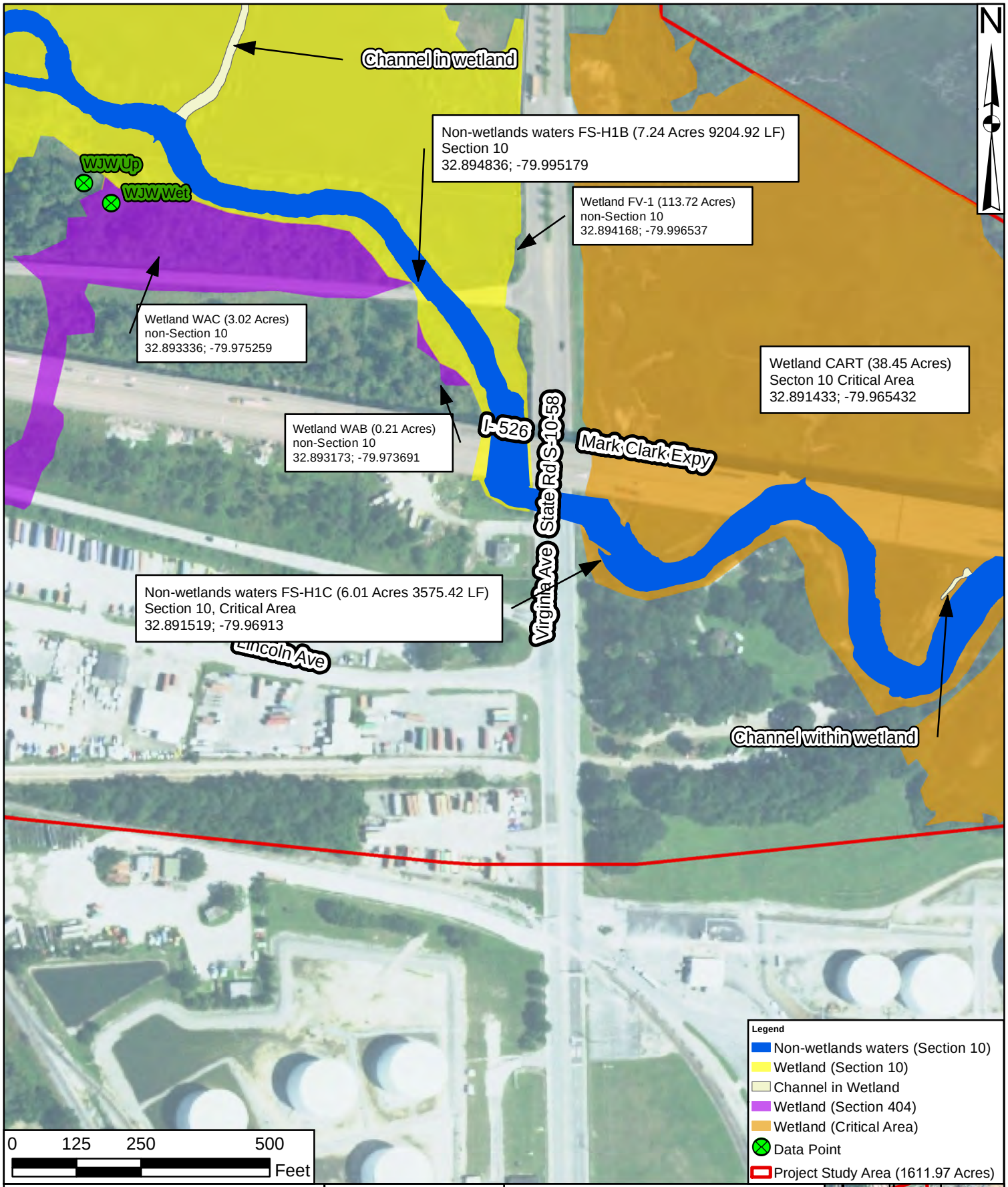

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I-526 Lowcountry Corridor West
Charleston County
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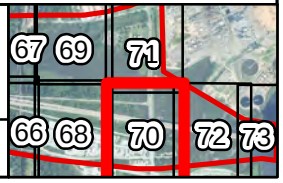

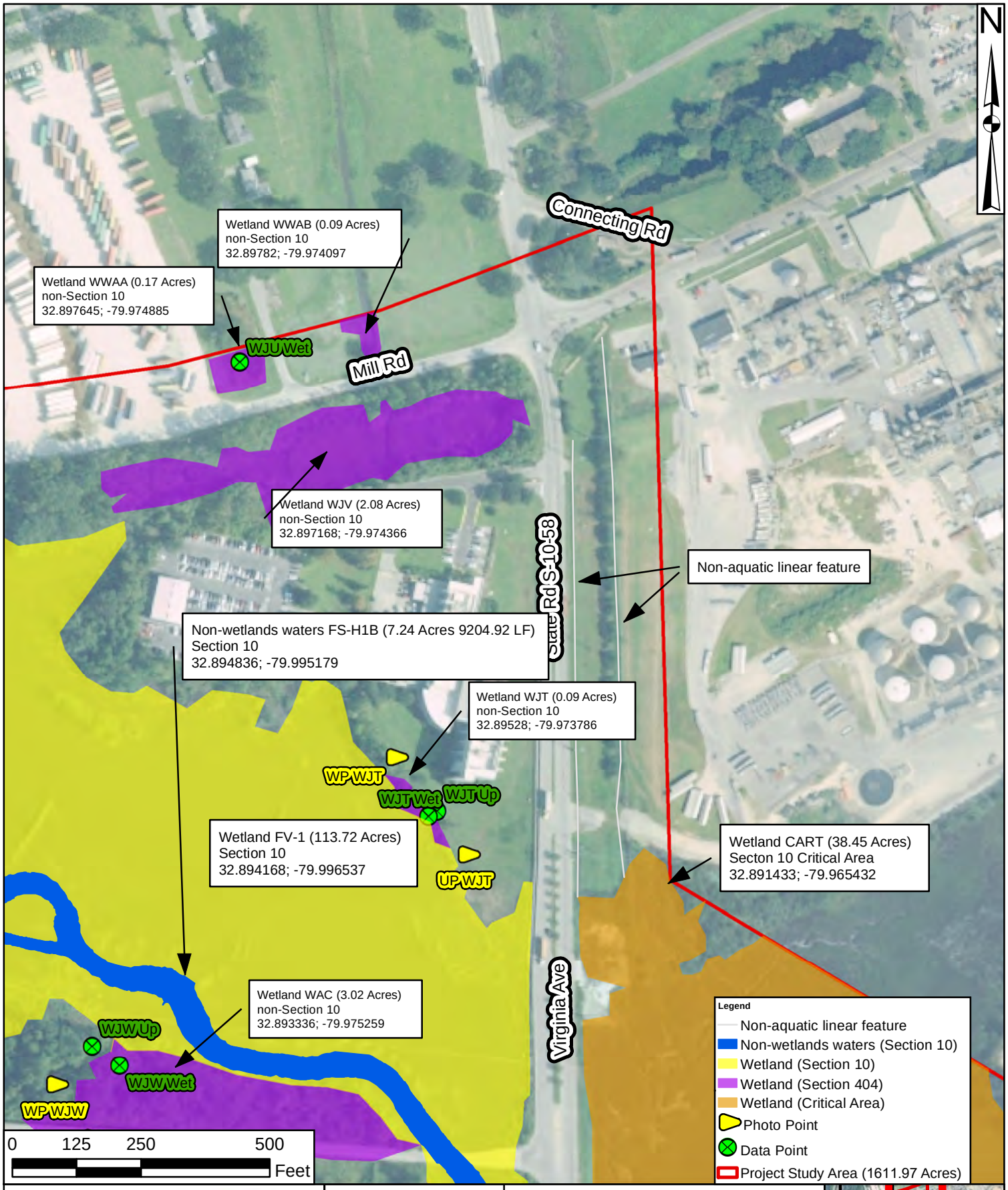

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I-526 Lowcountry Corridor West
Charleston County
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Drawn By: RHH
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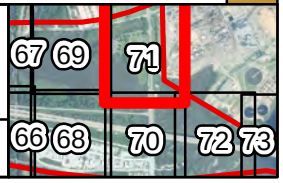

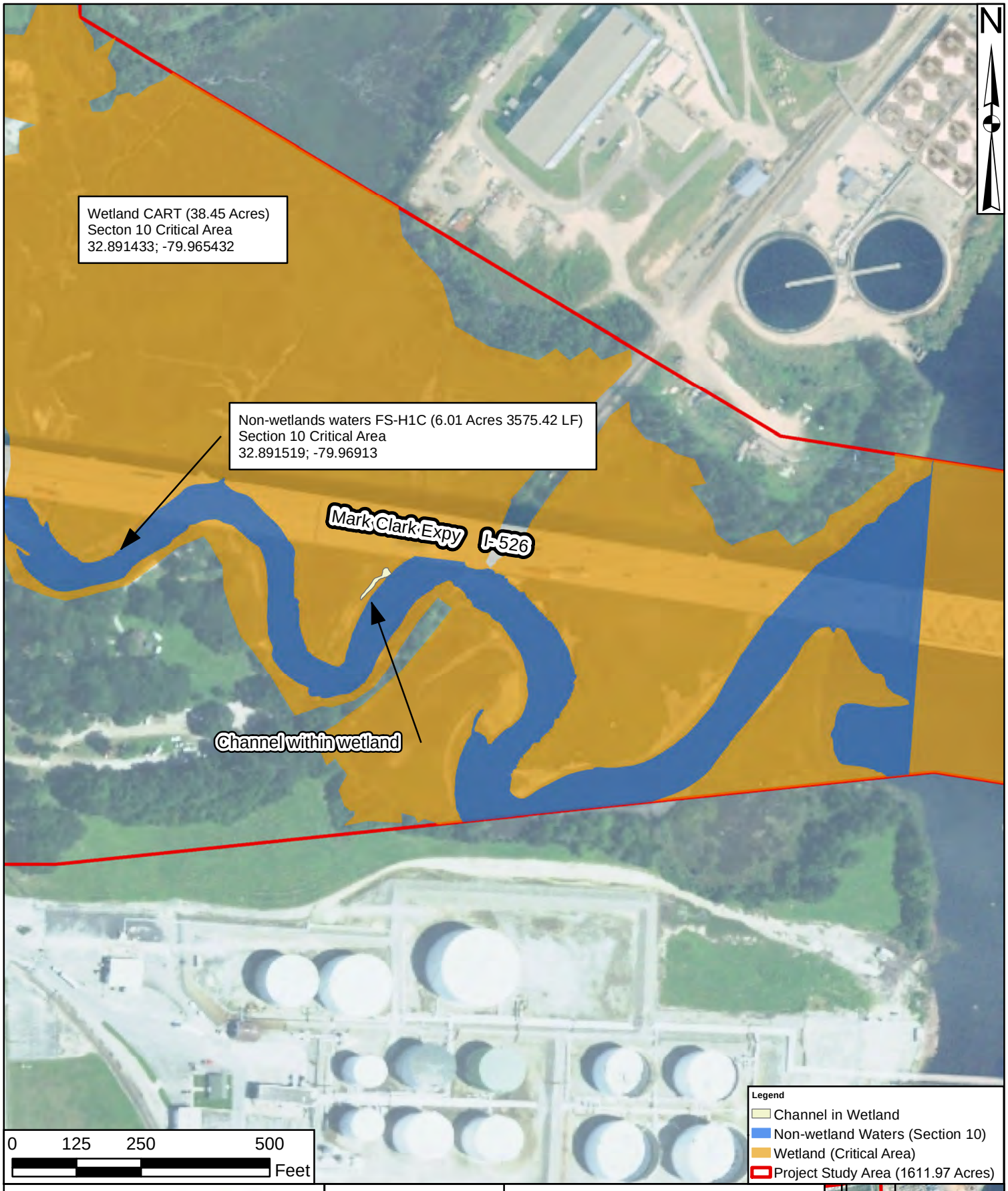

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WEST 526 LOWCOUNTRY CORRIDOR

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2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
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Drawn By: RHH
QA/QC: KLM

Aquatic Resources

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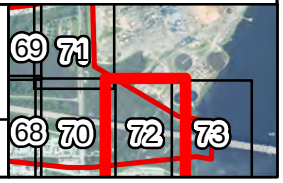

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

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I-526 Lowcountry Corridor West
Charleston County
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Drawn By: RHH
QA/QC: KLM

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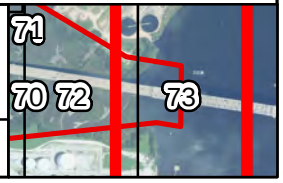

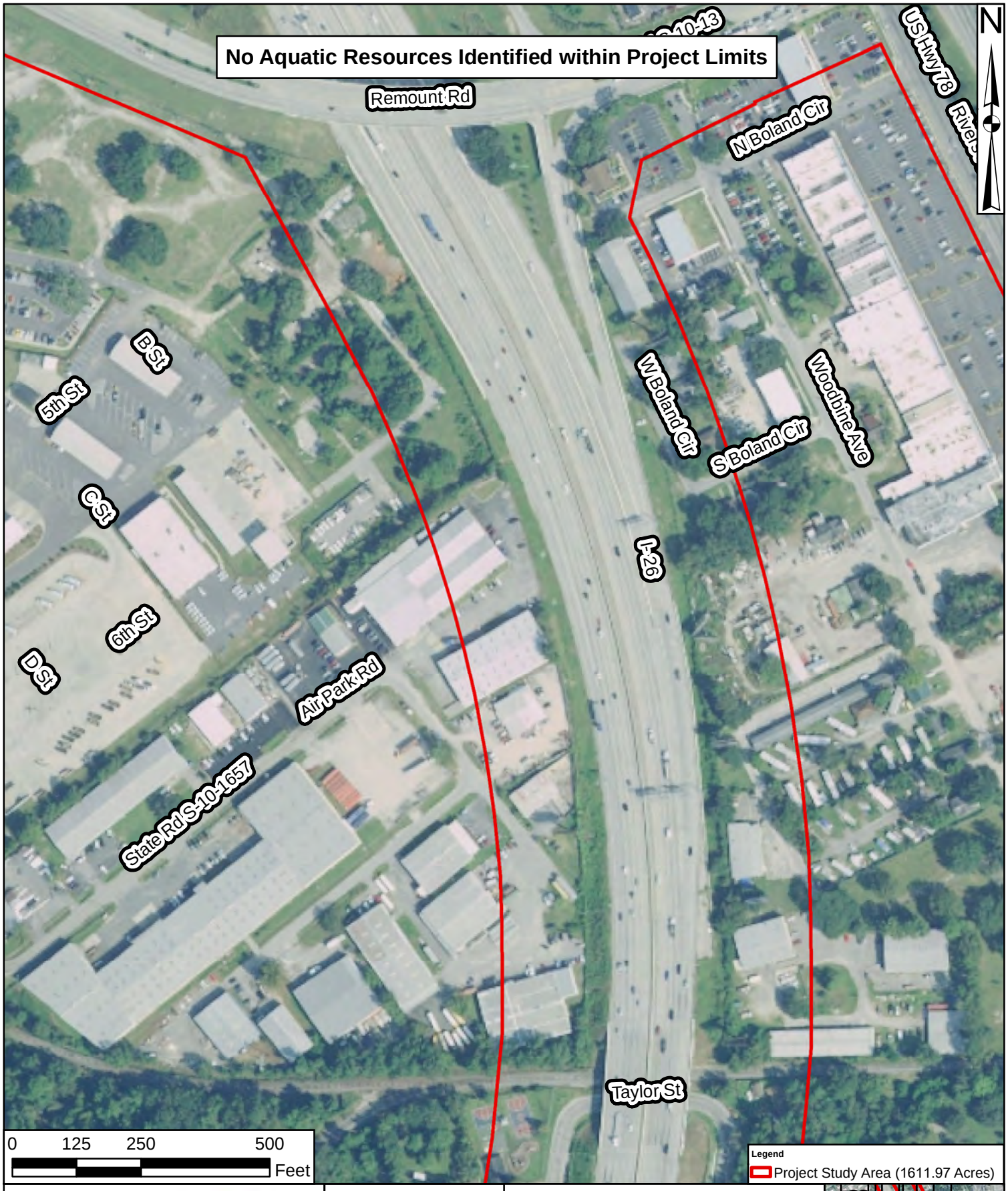

SCDOT South Carolina Department of Transportation

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Charleston County
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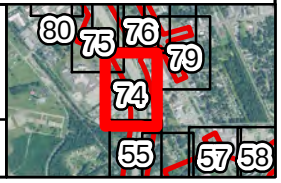

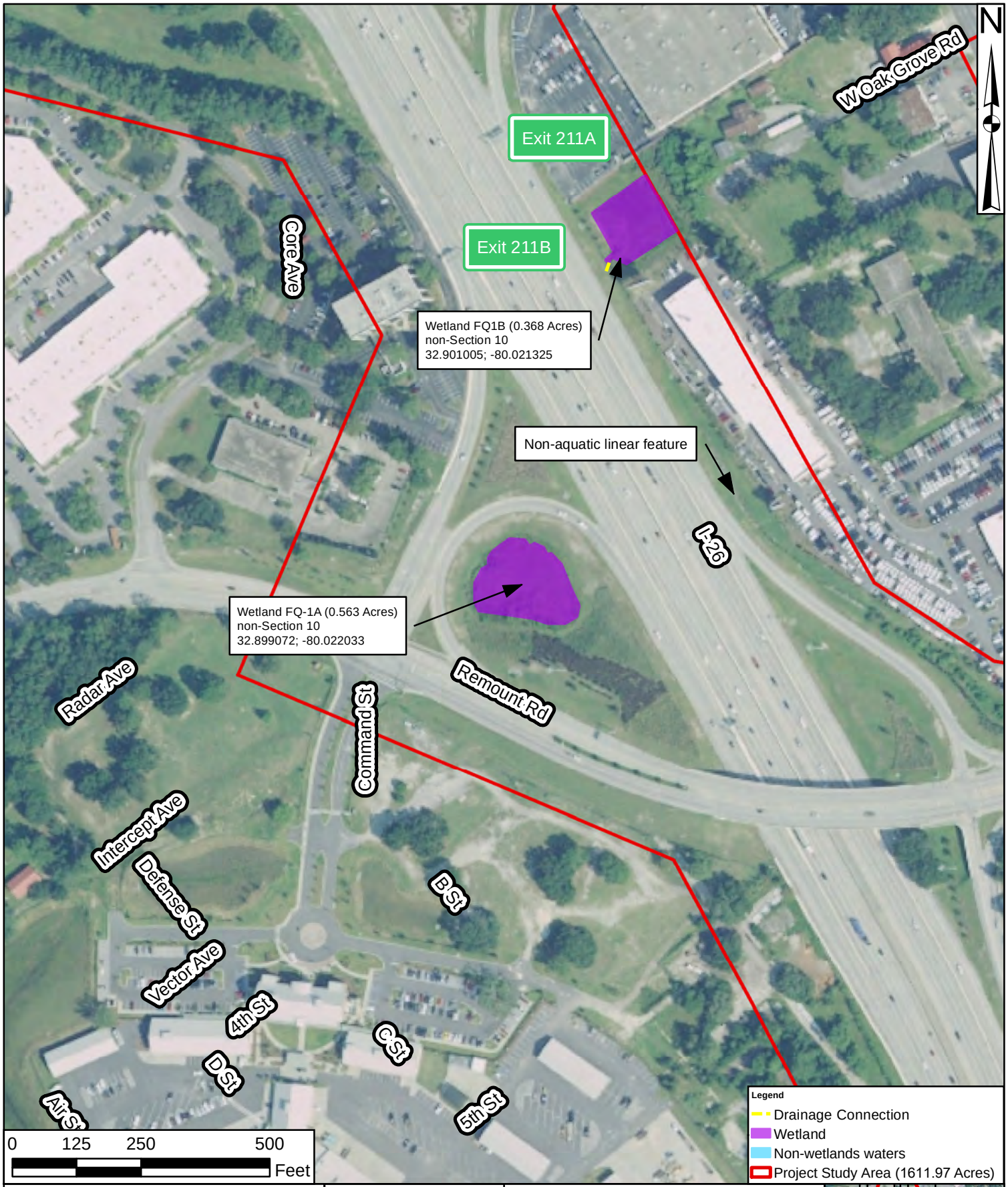

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

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Charleston County
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October 31 2019

Drawn By: RHH
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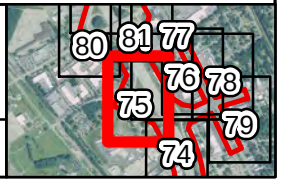

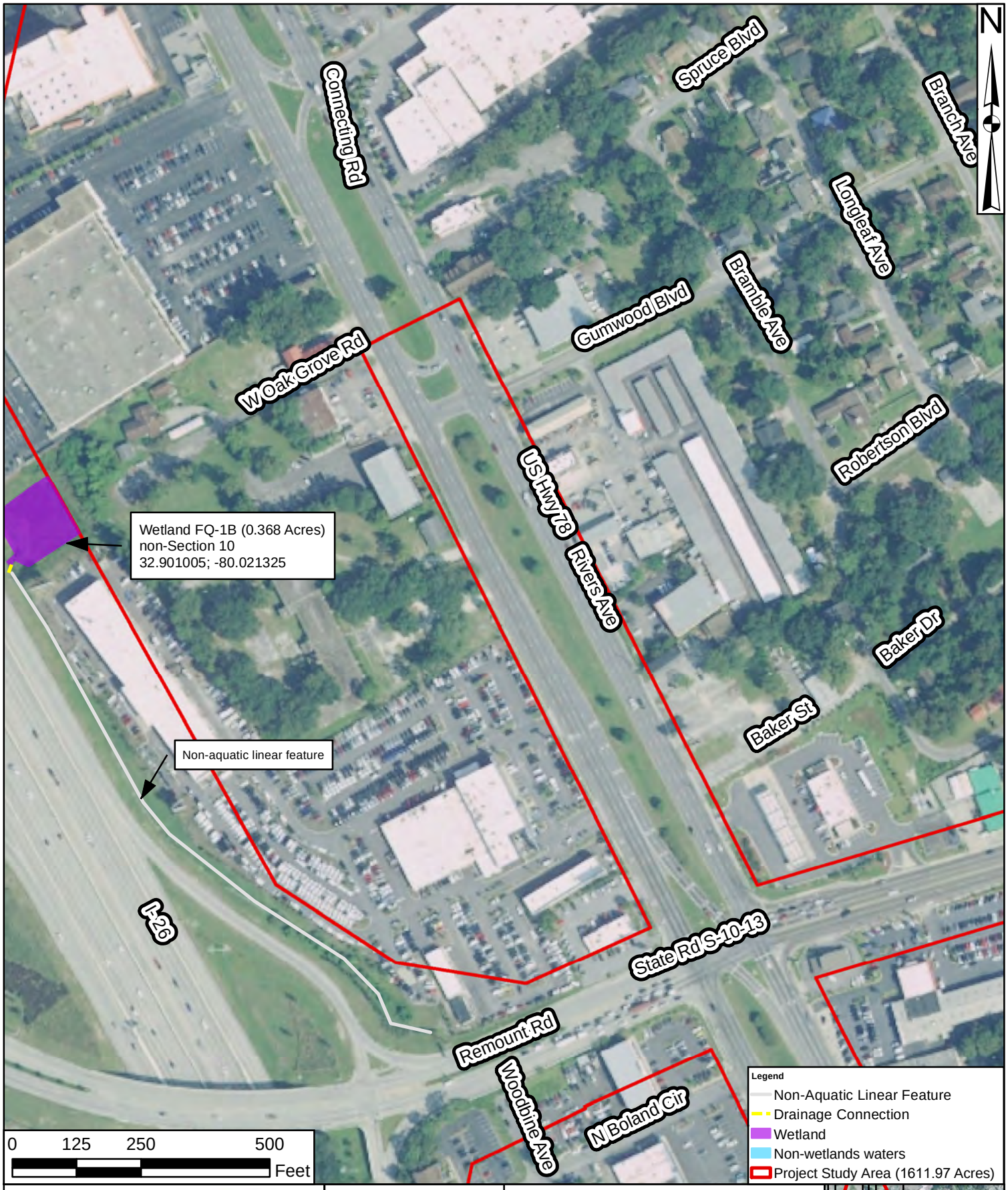

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I-526 WEST LOWCOUNTRY CORRIDOR

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Charleston County
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October 31 2019

Drawn By: RHH
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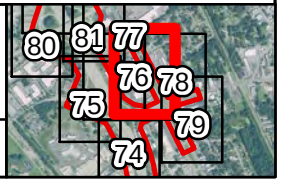

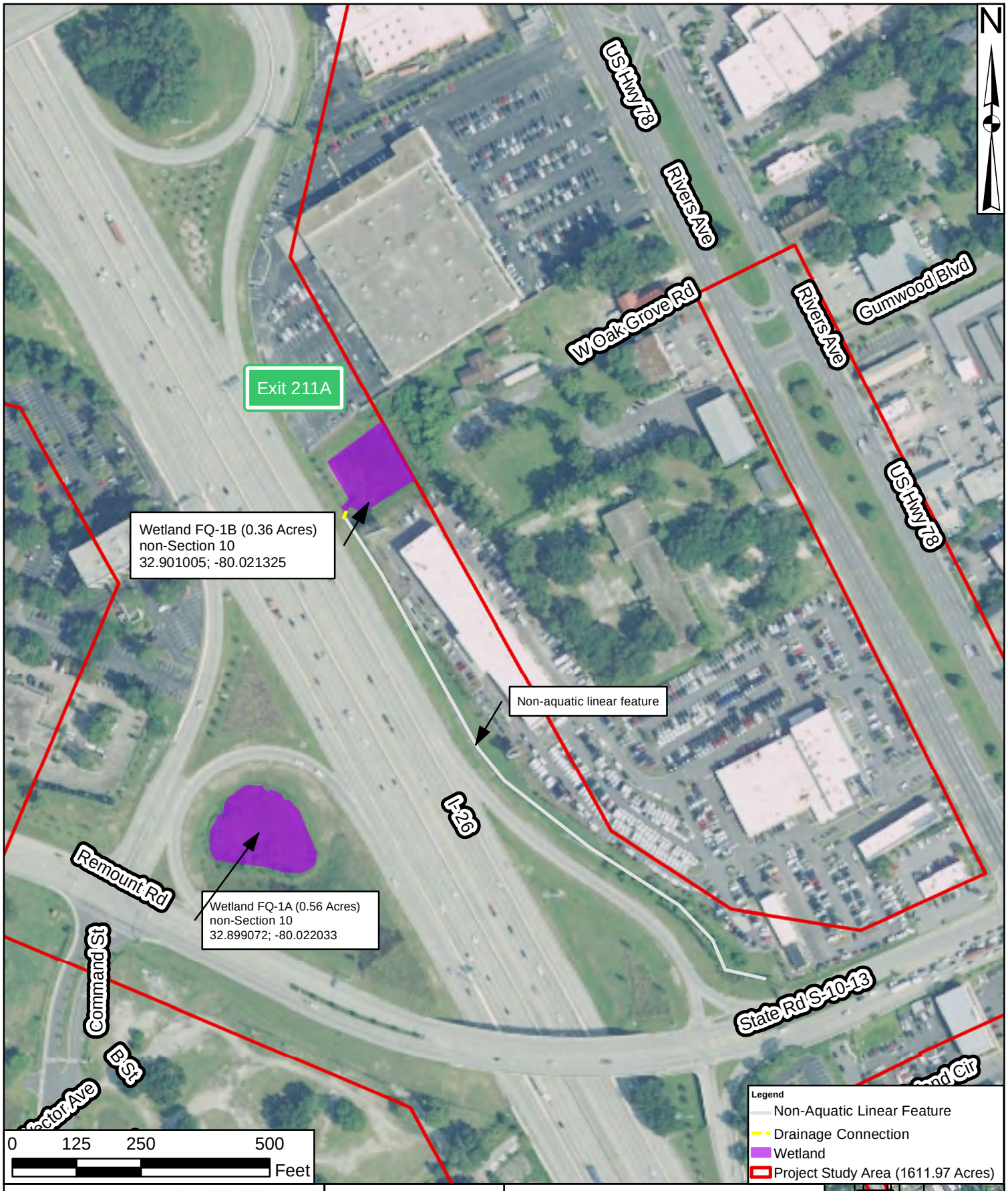

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I-526 Lowcountry Corridor West
Charleston County
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October 31 2019

Drawn By: RHH
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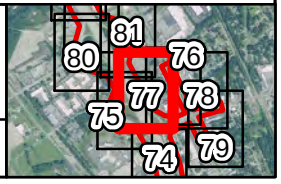

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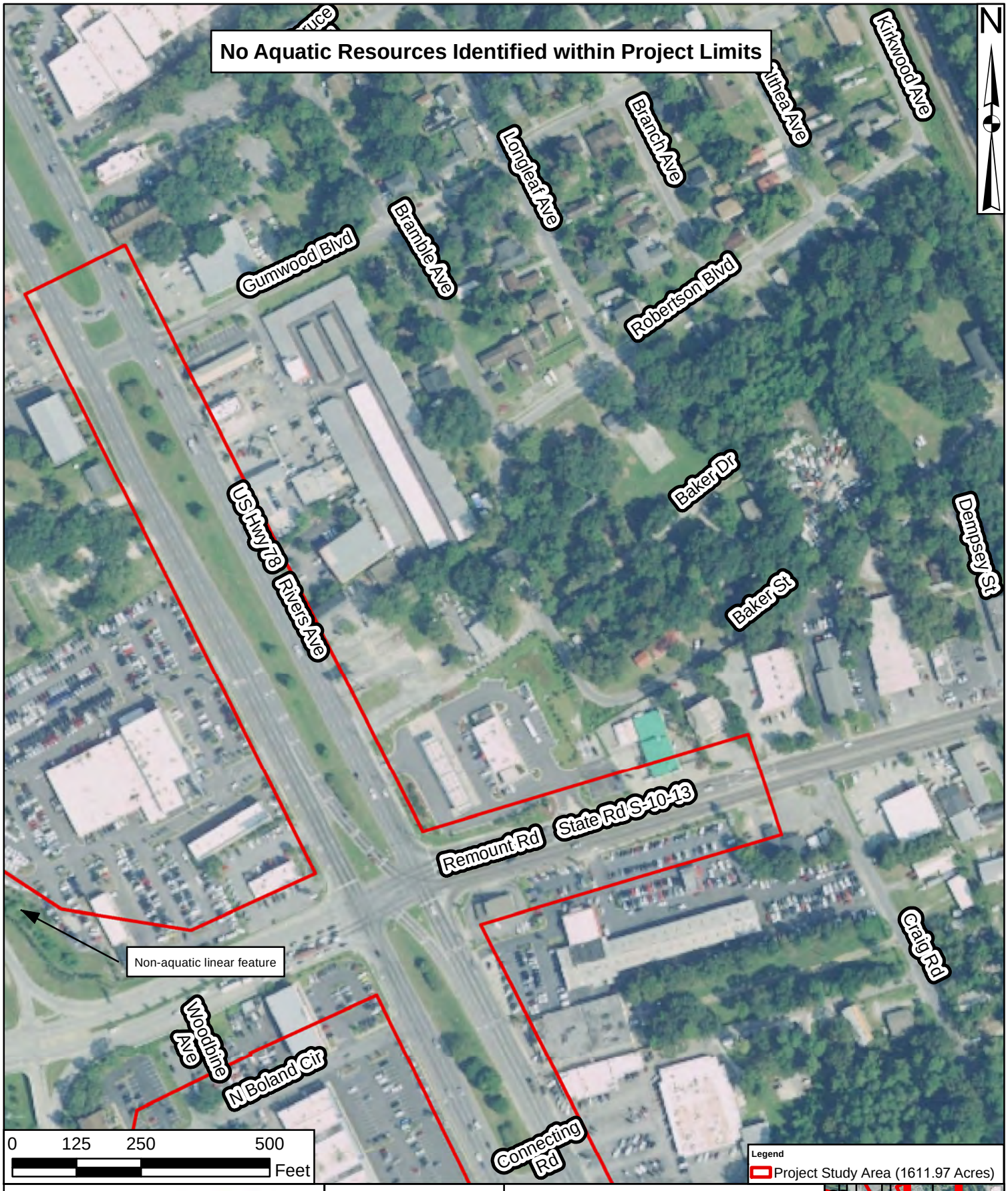

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2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

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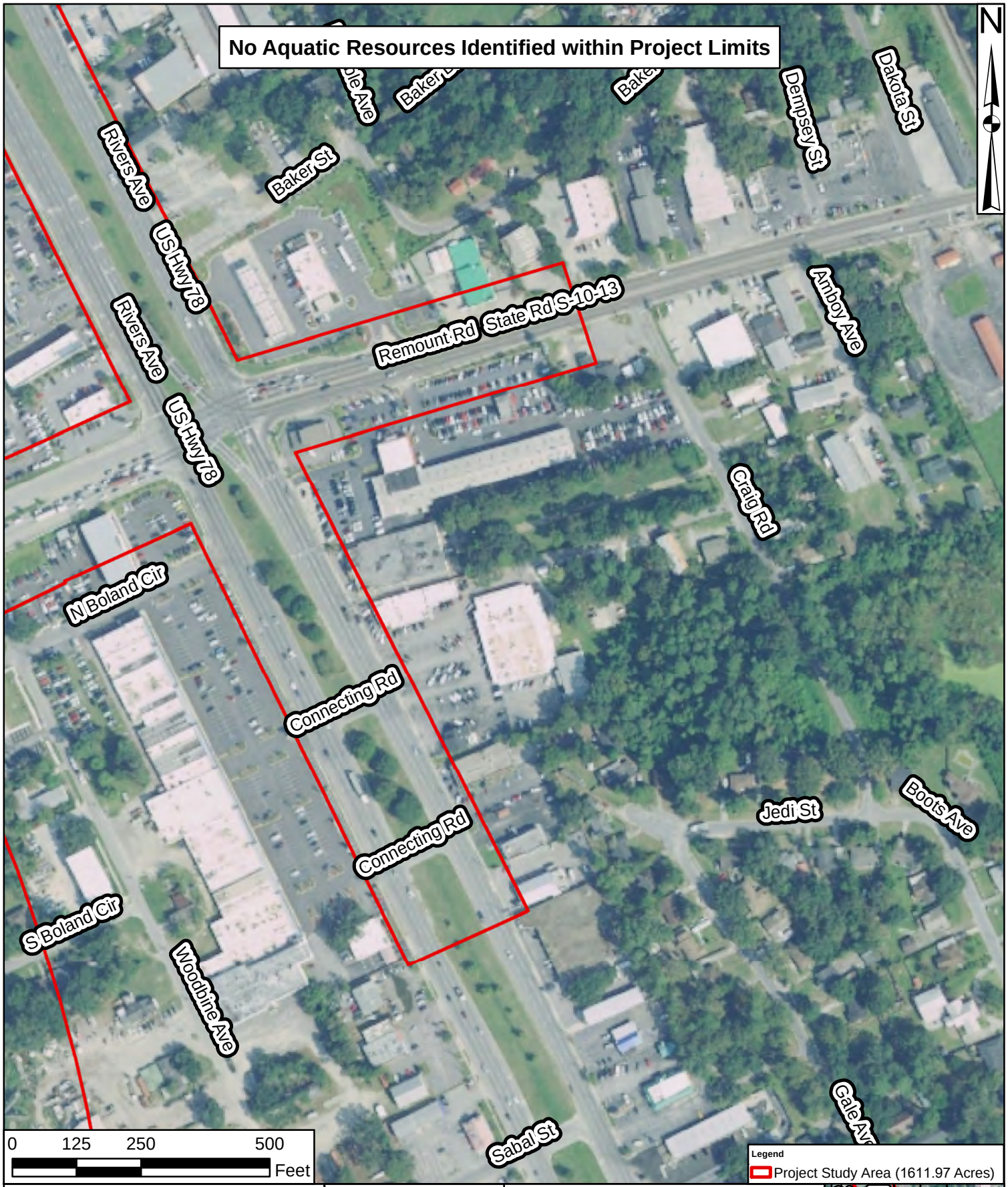

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

Source:
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2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

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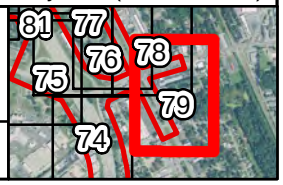

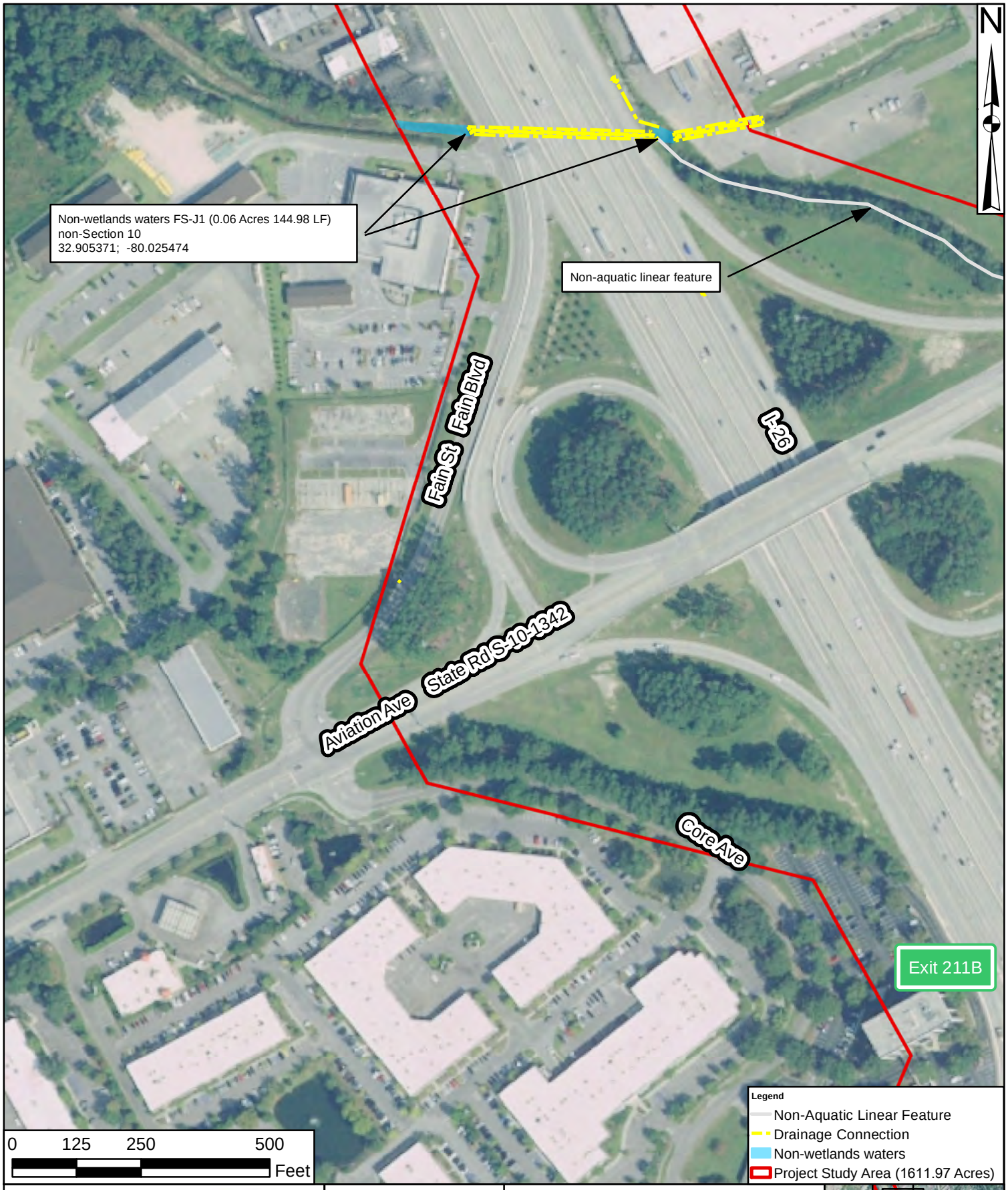

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

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2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Aquatic Resources

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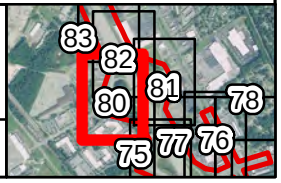

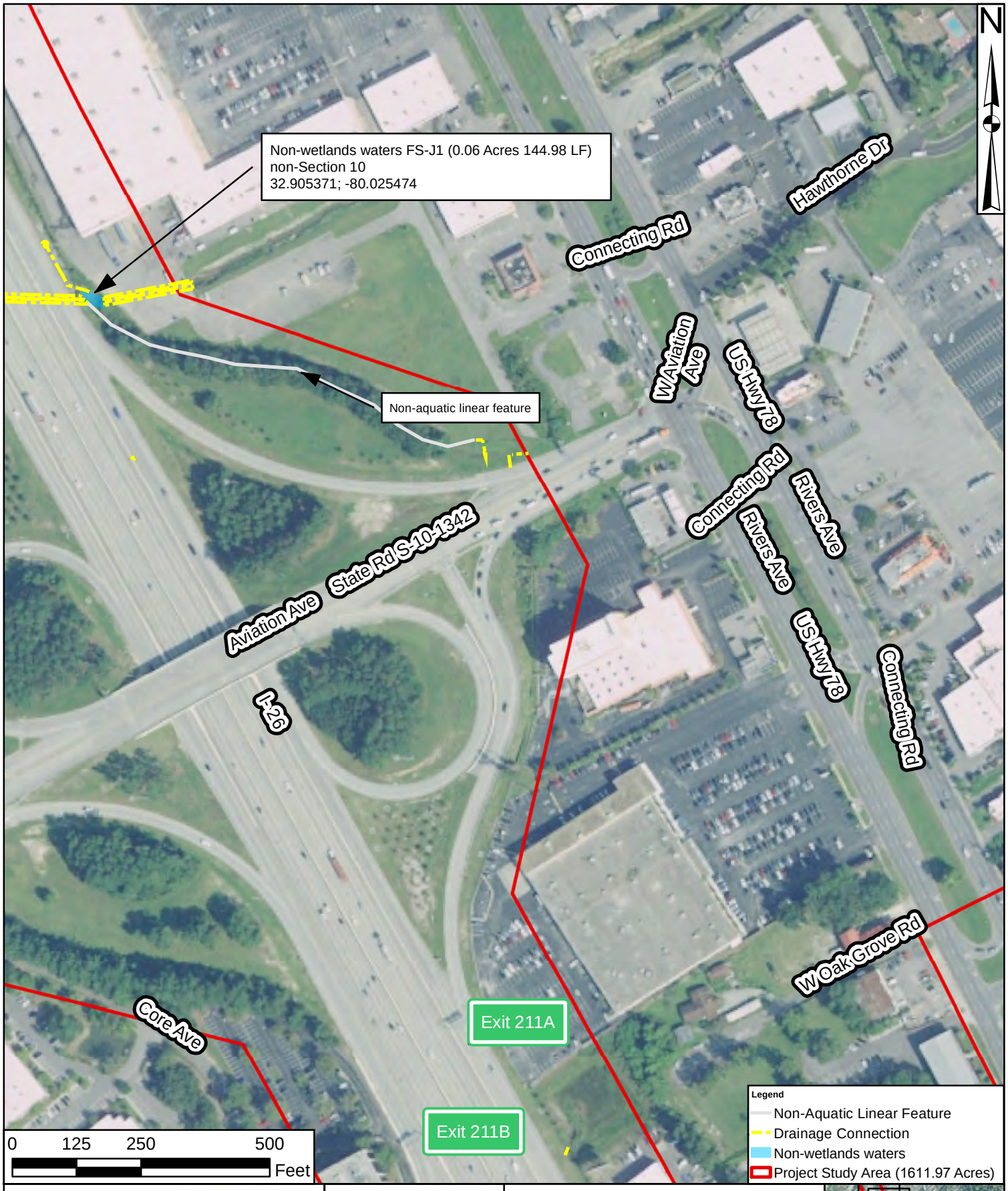

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2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
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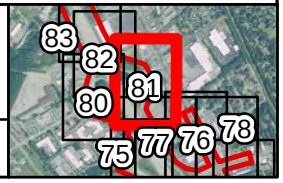

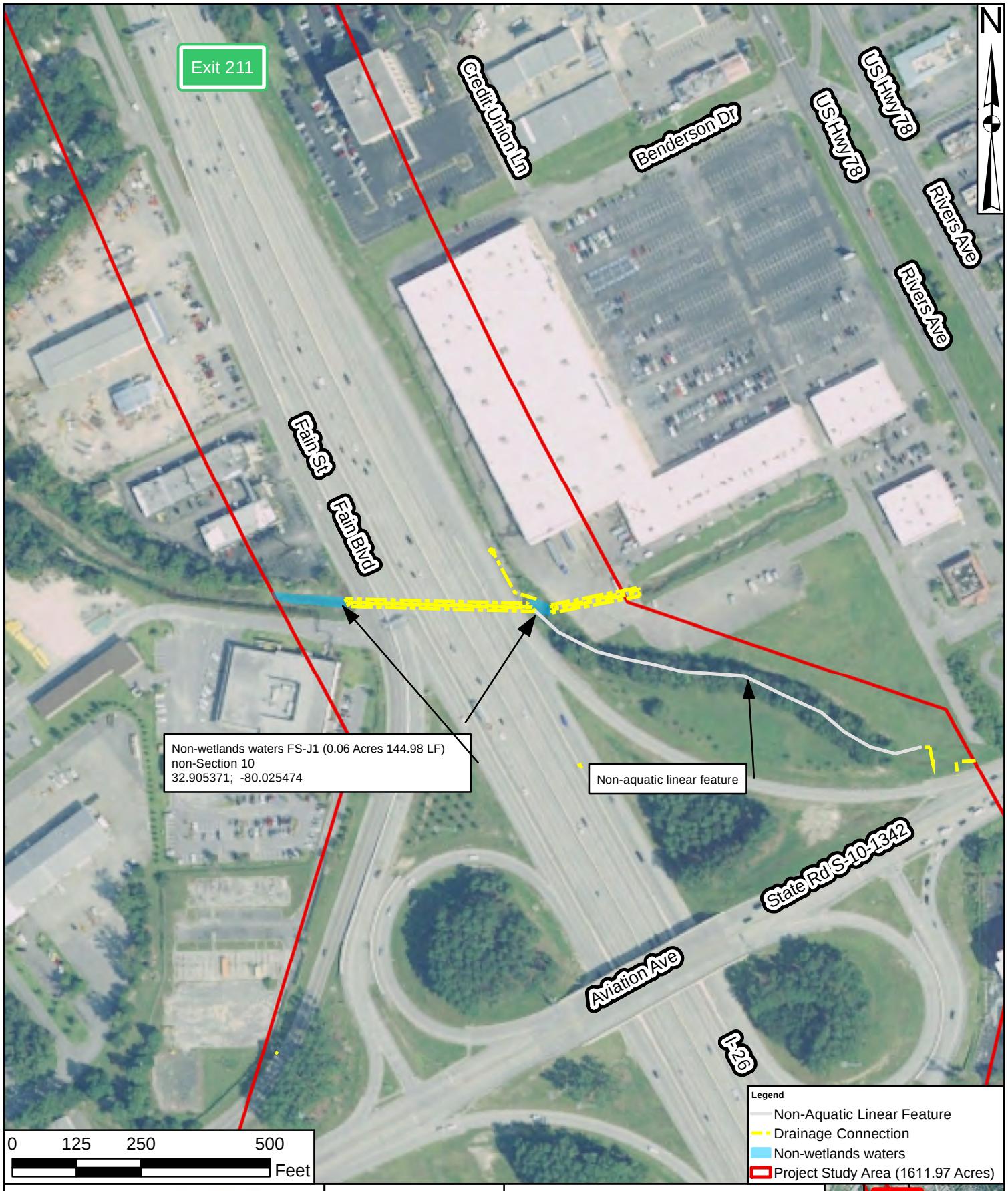

South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

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2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Aquatic Resources

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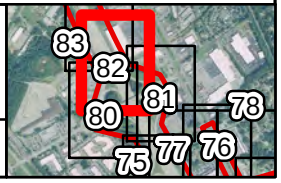

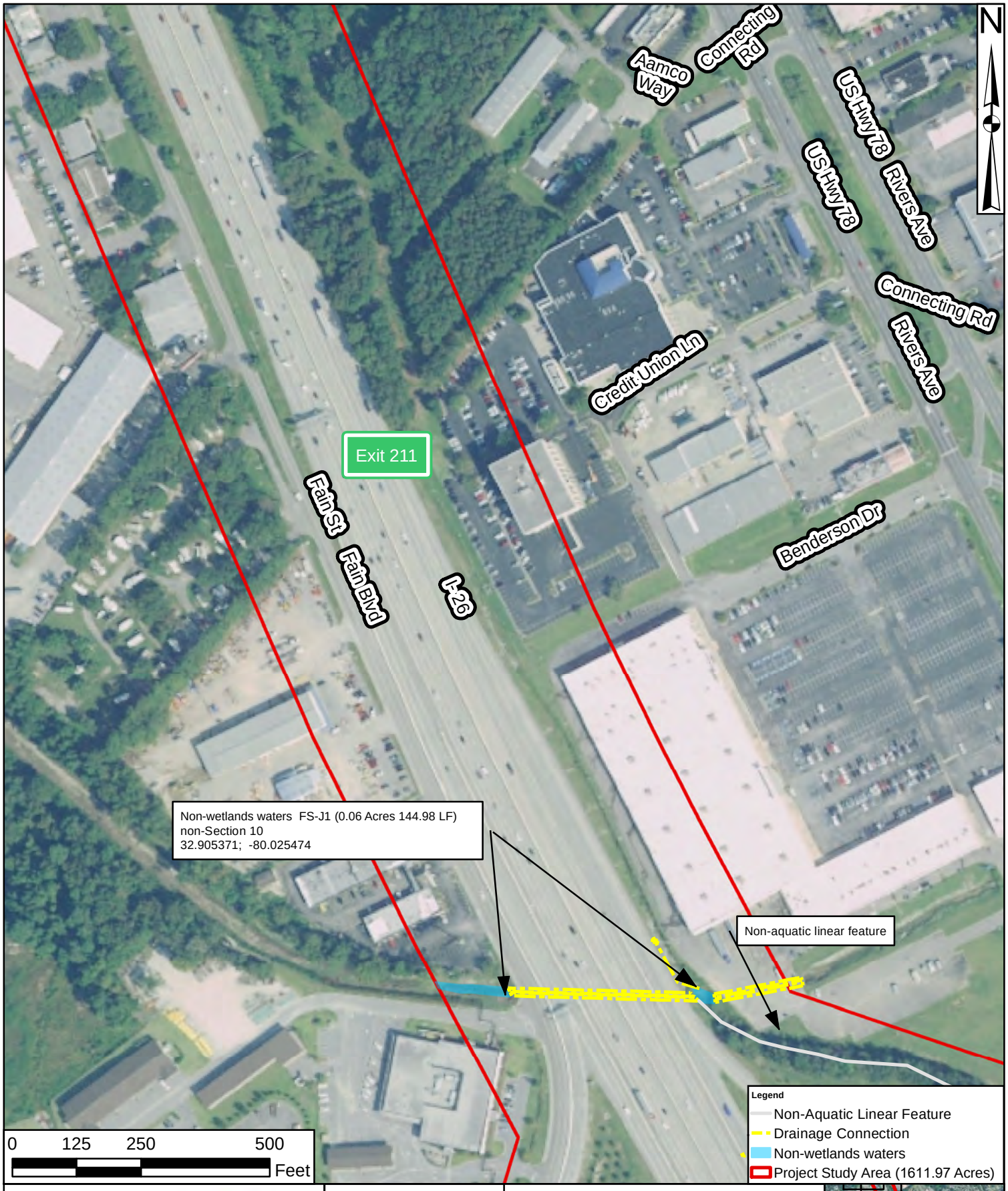

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2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Aquatic Resources

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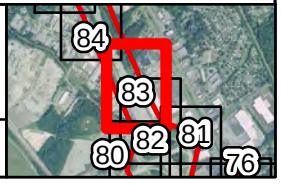

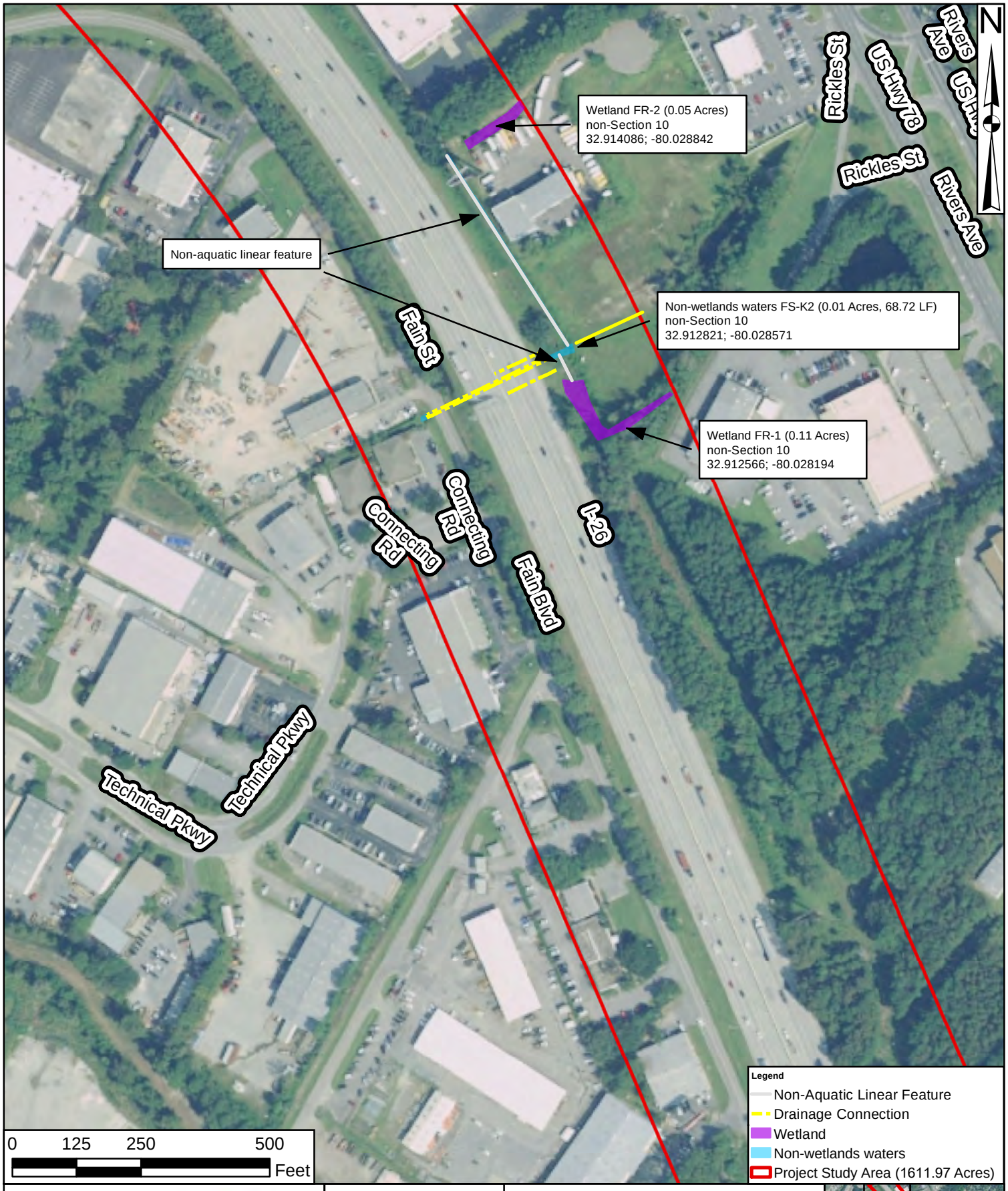

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

Source:
NRCS NAIP Aerial
2017

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
October 31 2019

Drawn By: RHH
QA/QC: KLM

Aquatic Resources

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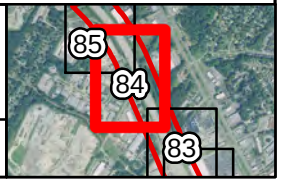

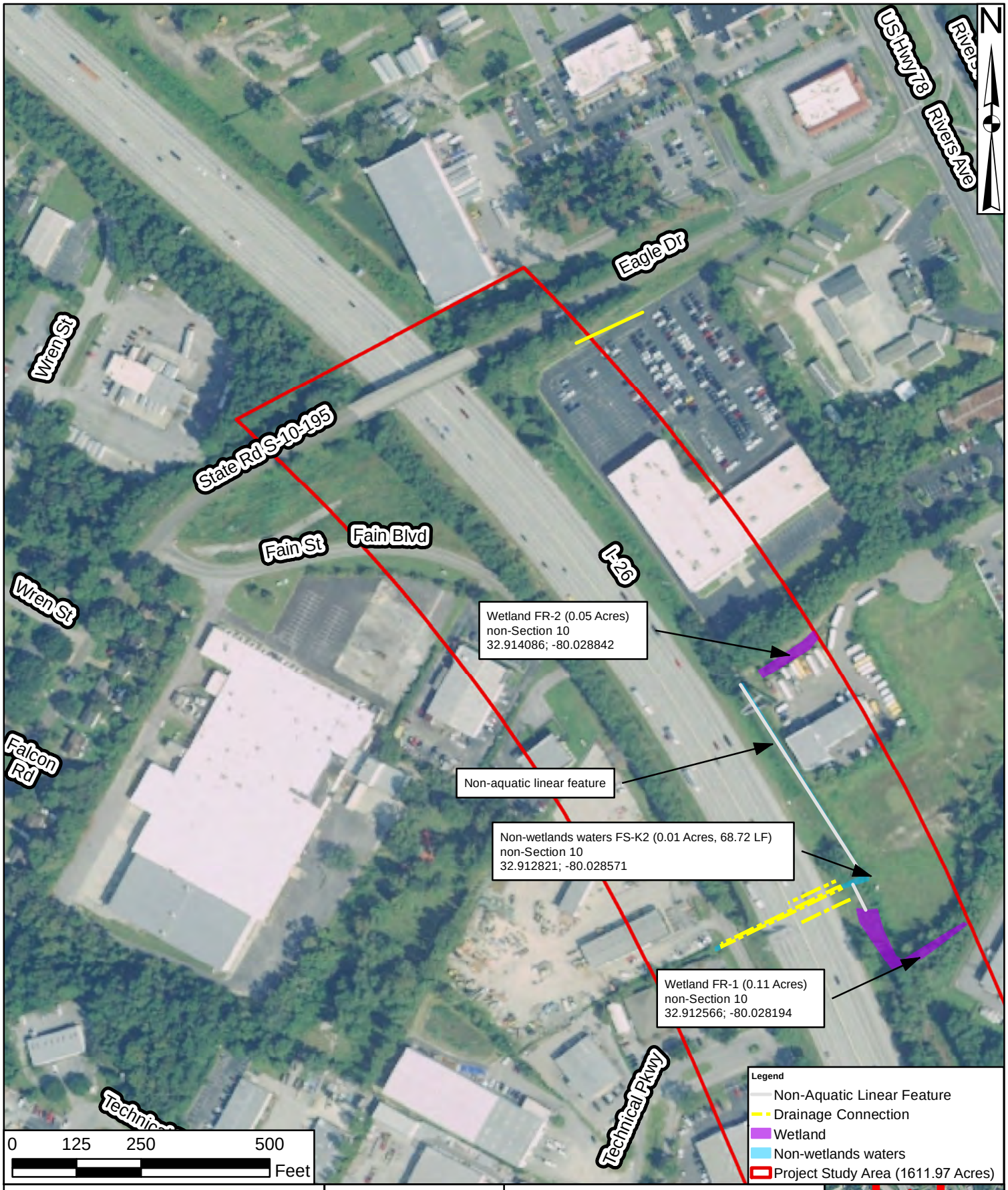

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

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Charleston County
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October 31 2019

Drawn By: RHH
QA/QC: KLM

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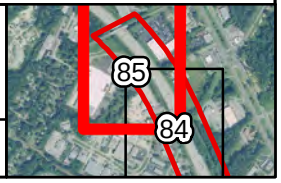

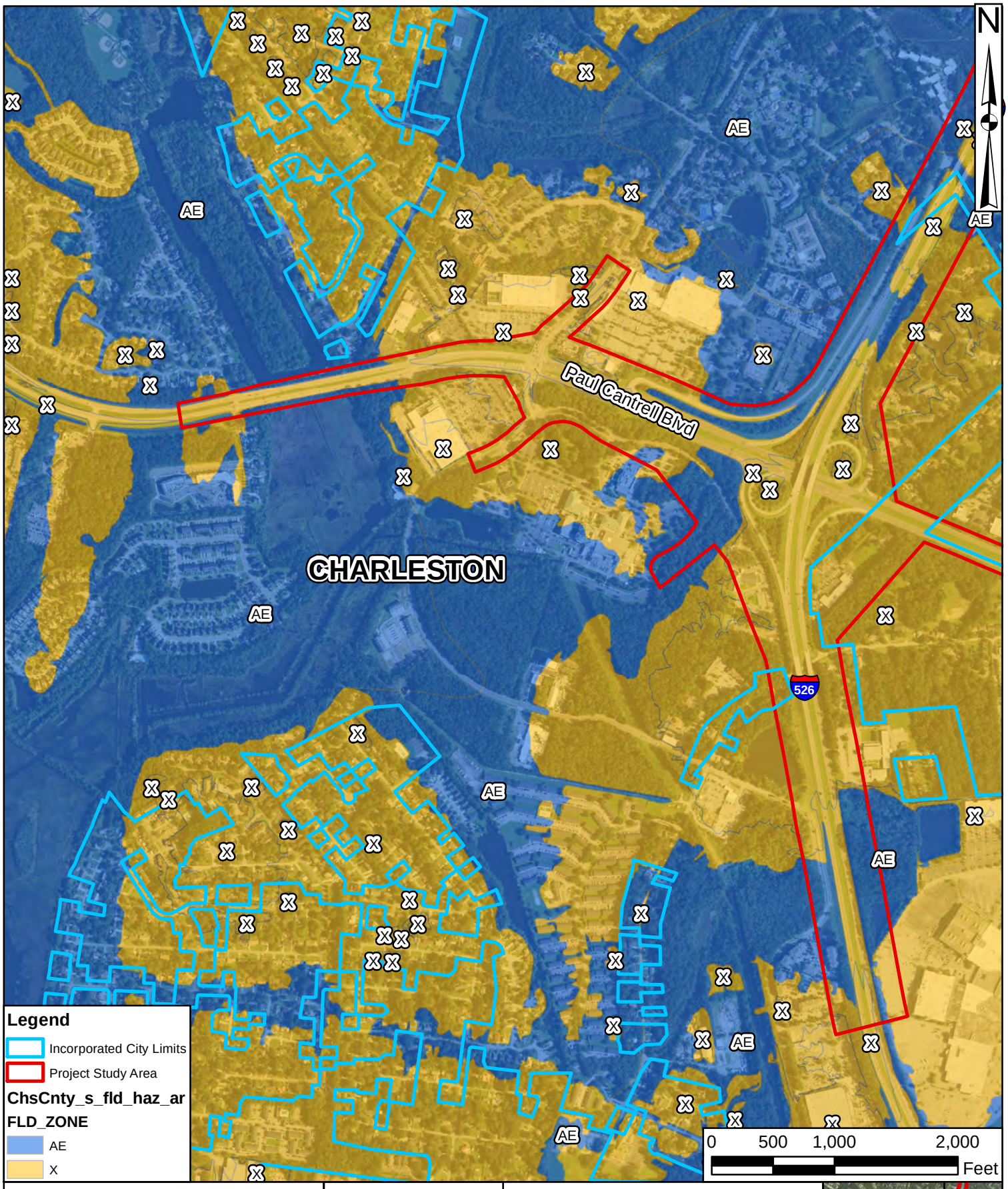

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I-526 WEST LOWCOUNTRY CORRIDOR

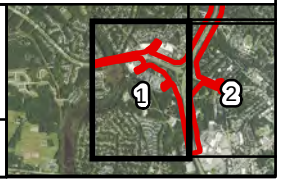
Source:
FEMA Floodplain Q3flood 2019

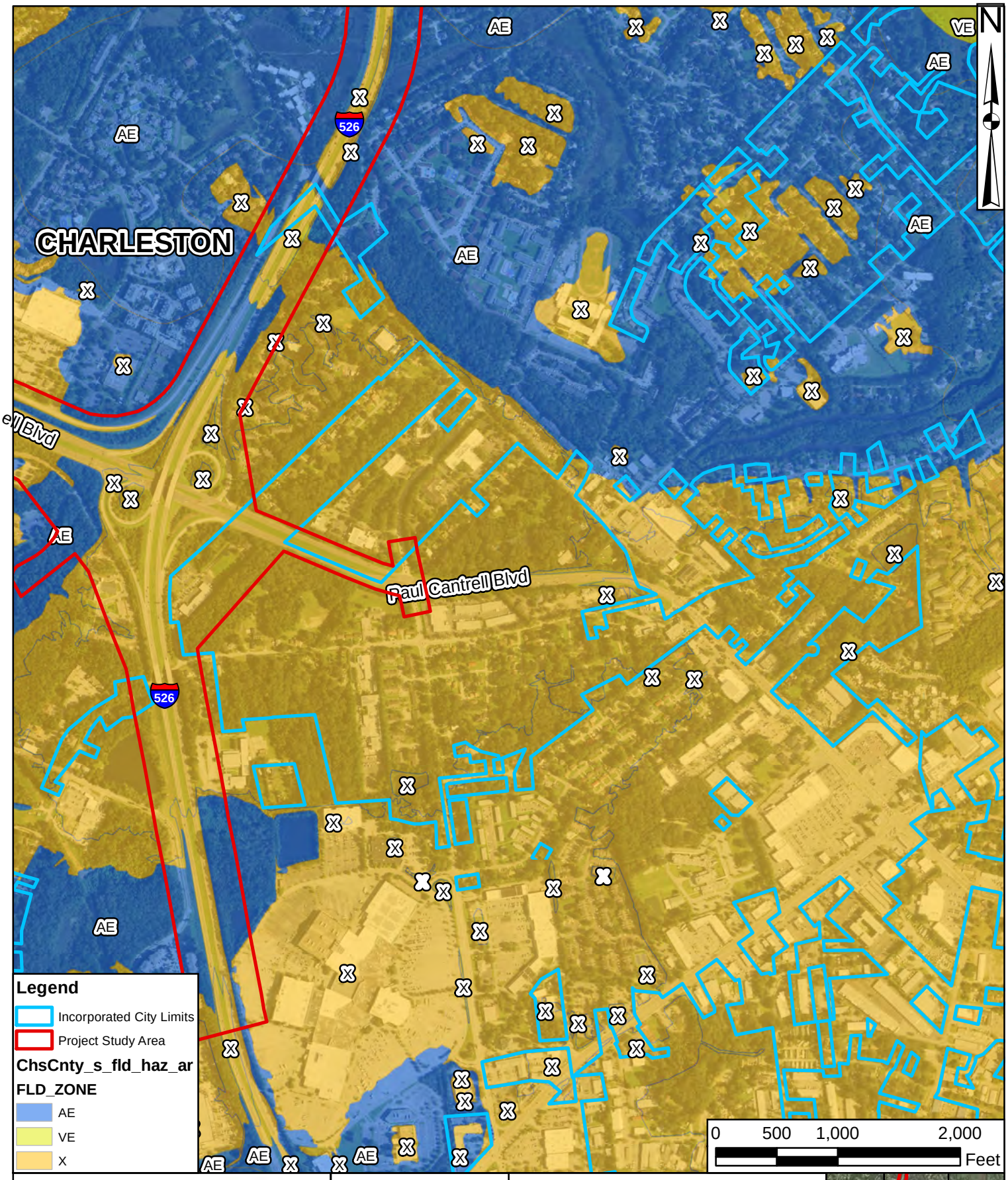
I-526 Lowountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 1 of 11





SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

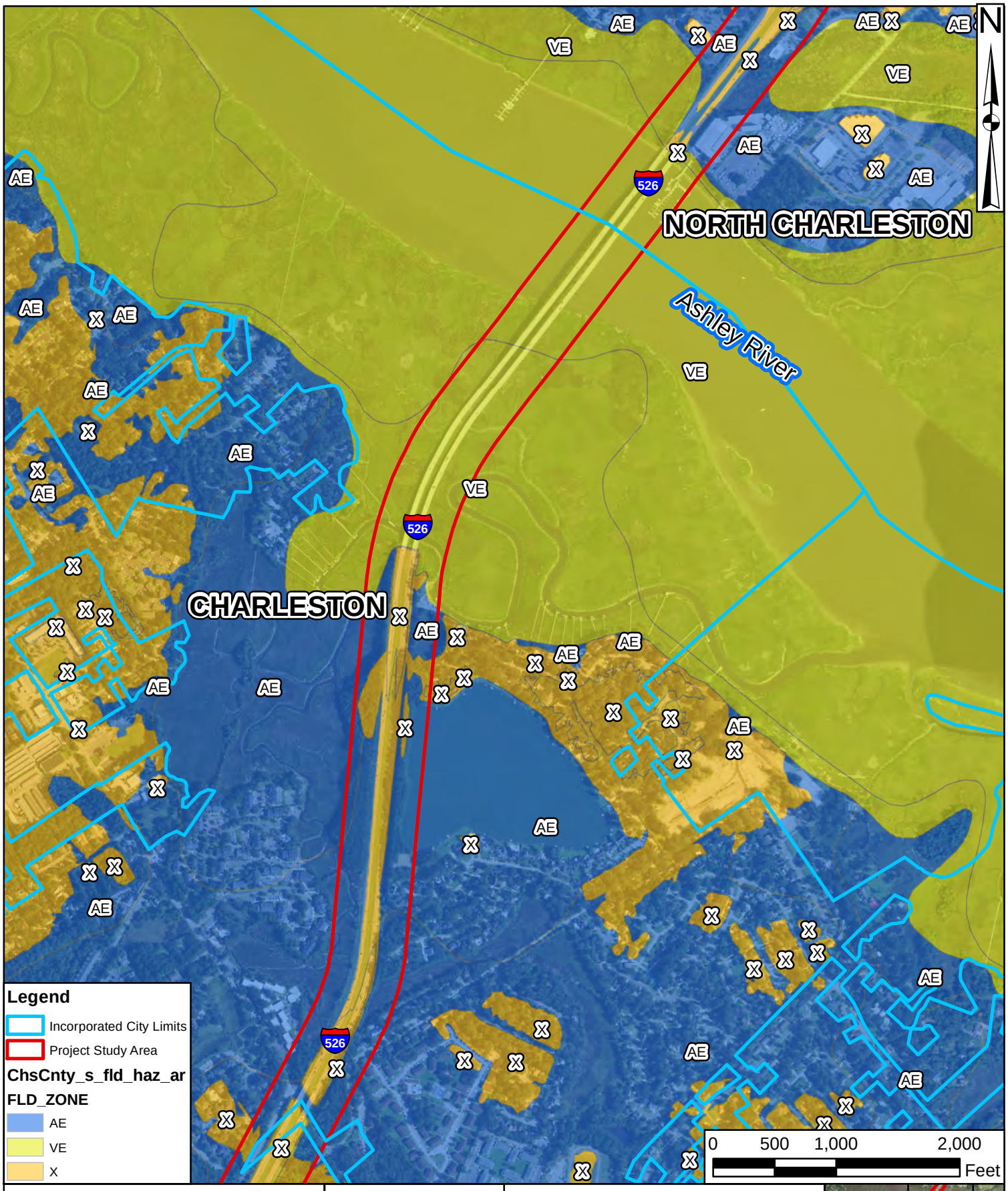
Source:
FEMA Floodplain Q3flood 2019

I-526 Lowountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 2 of 11



SCDOT South Carolina Department of Transportation

526 WEST LOWCOUNTRY CORRIDOR

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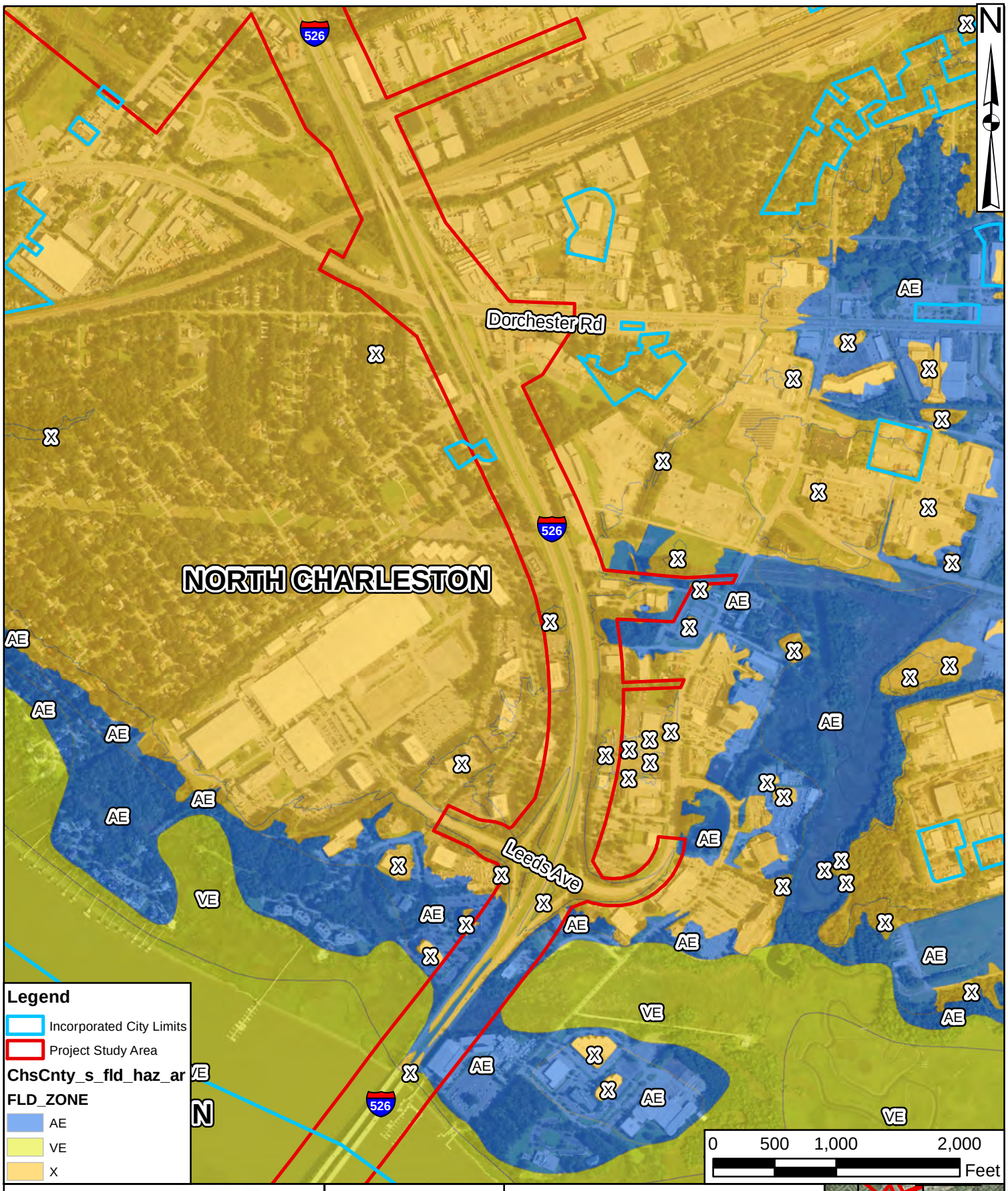
FEMA Floodplain Q3flood 2019

I-526 Lowountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 3 of 11



SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

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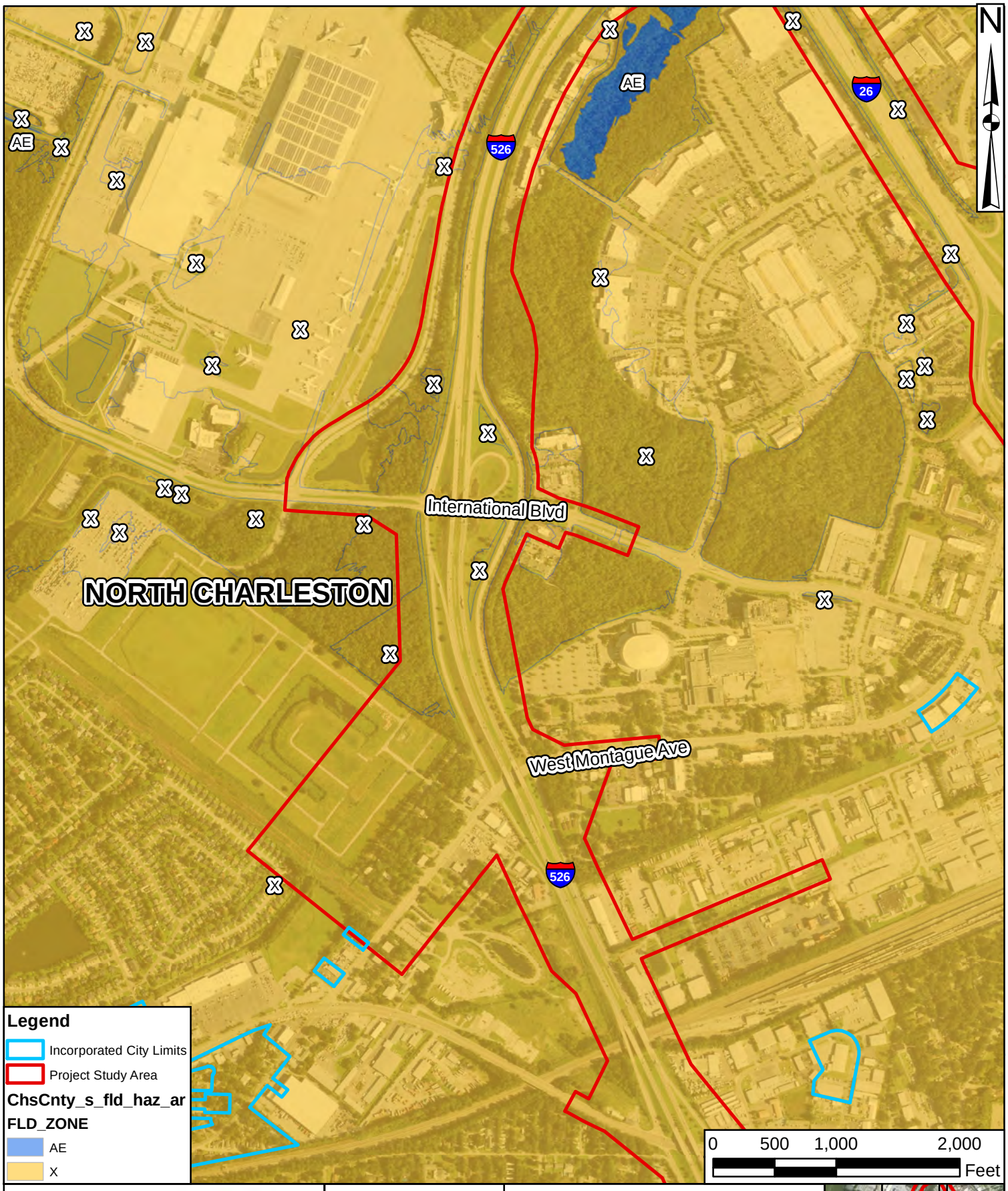
FEMA Floodplain Q3flood 2019

I-526 Lowountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 4 of 11



SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

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FEMA Floodplain Q3flood 2019

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Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
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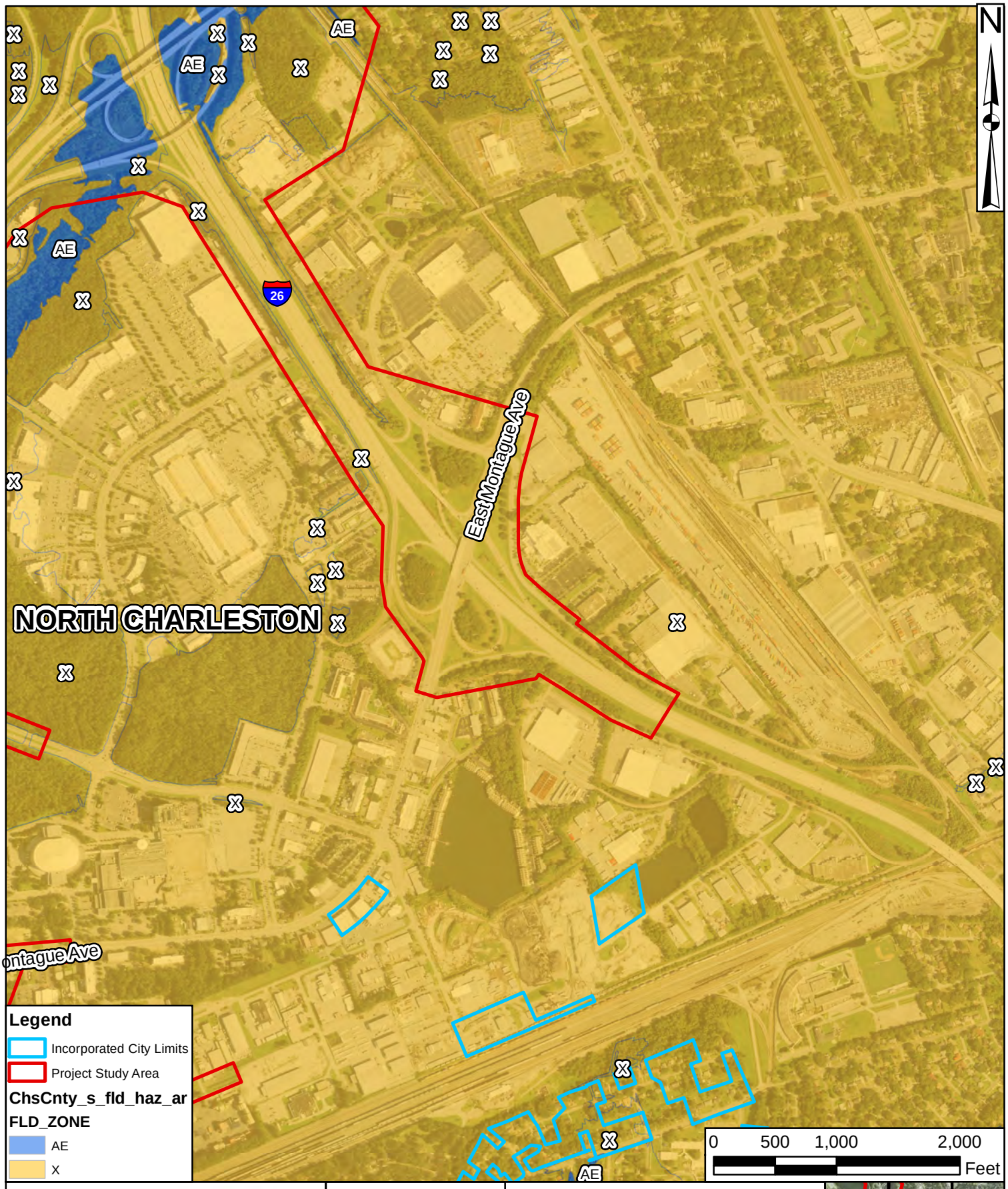

SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

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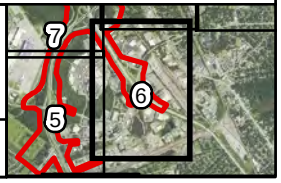
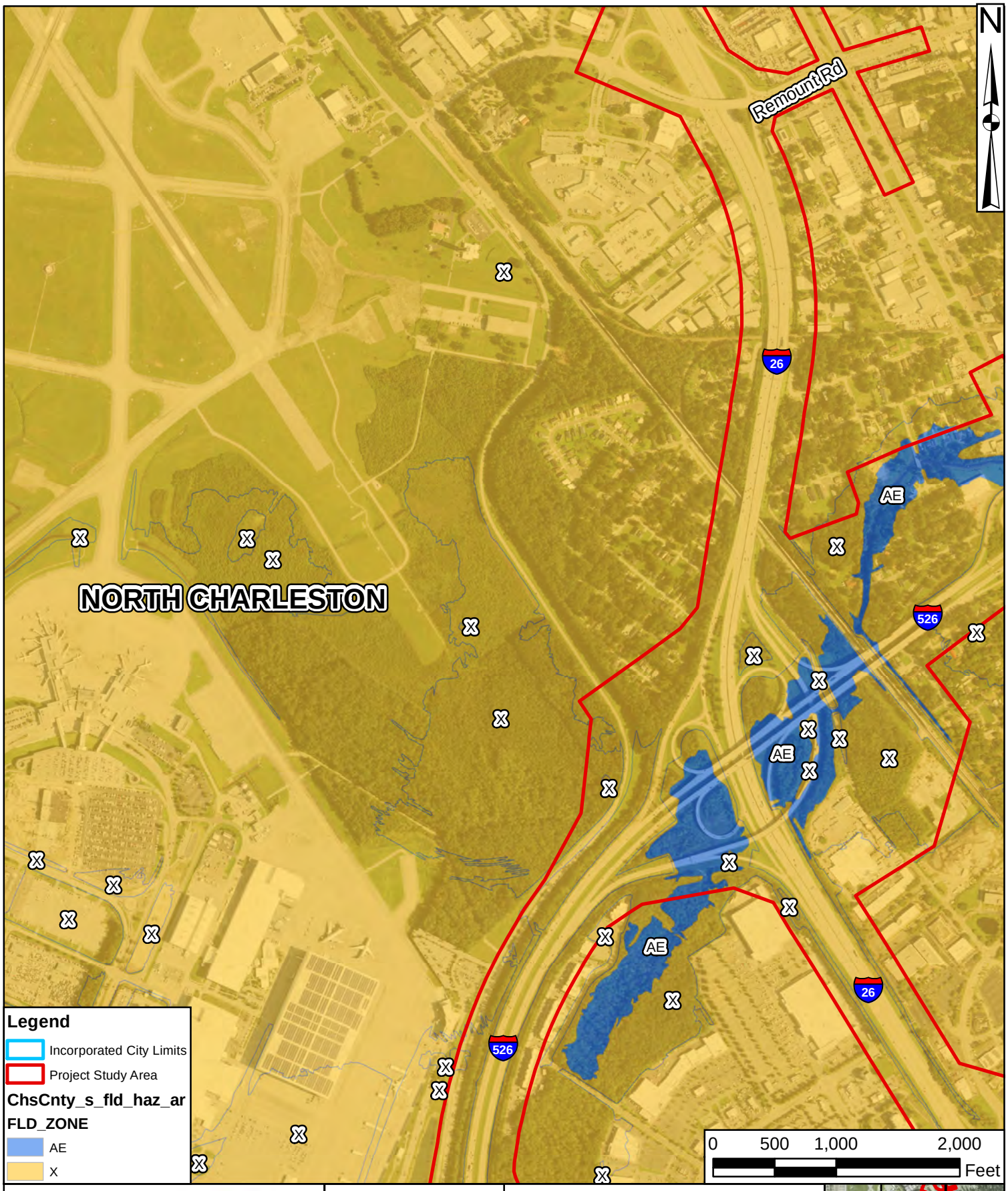
Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 6 of 11





SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

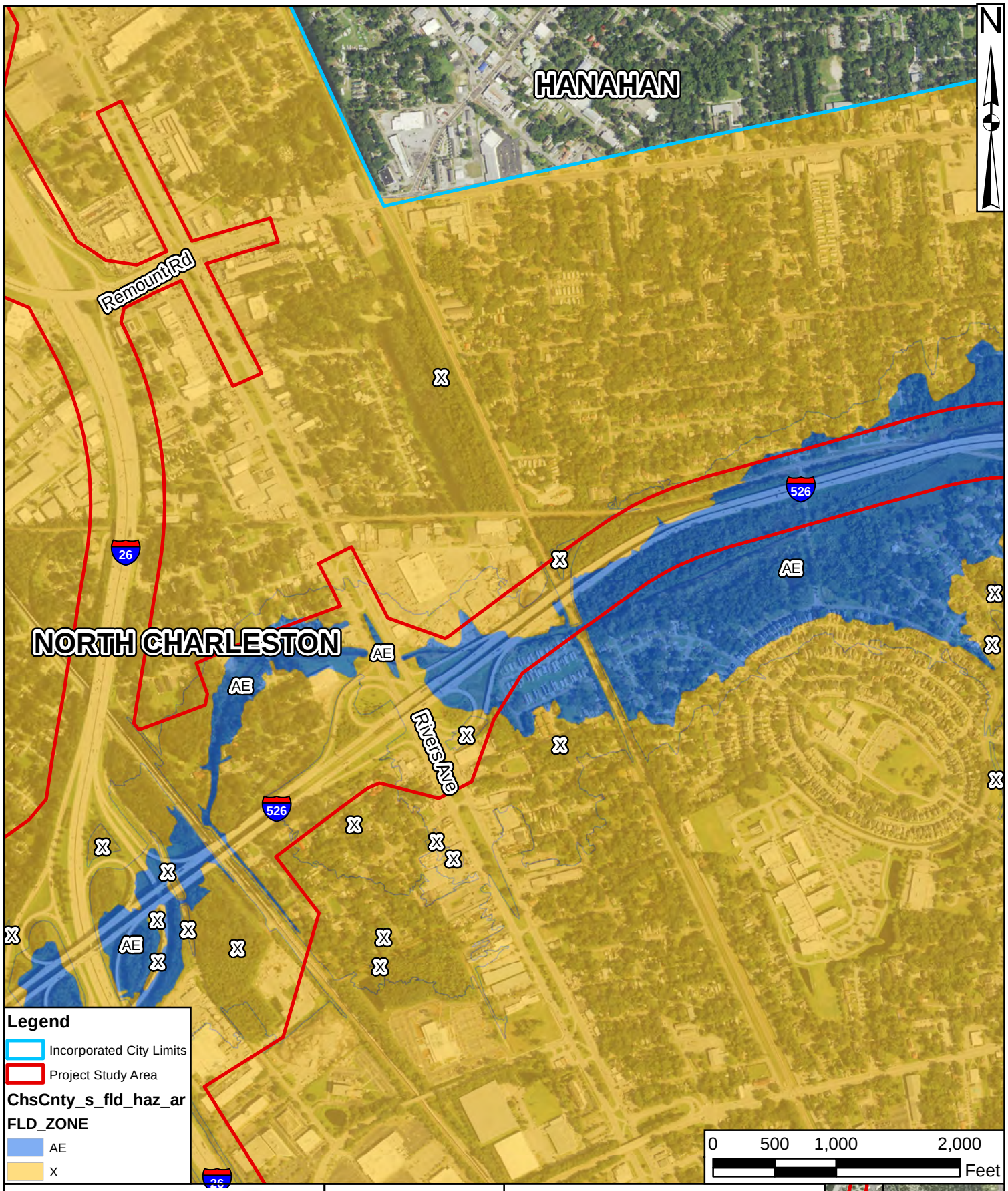
Source:
FEMA Floodplain Q3flood 2019

I-526 Lowountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 7 of 11



SCDOT South Carolina Department of Transportation

I-526 WEST LOWCOUNTRY CORRIDOR

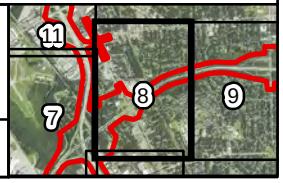
Source:
FEMA Floodplain Q3flood 2019

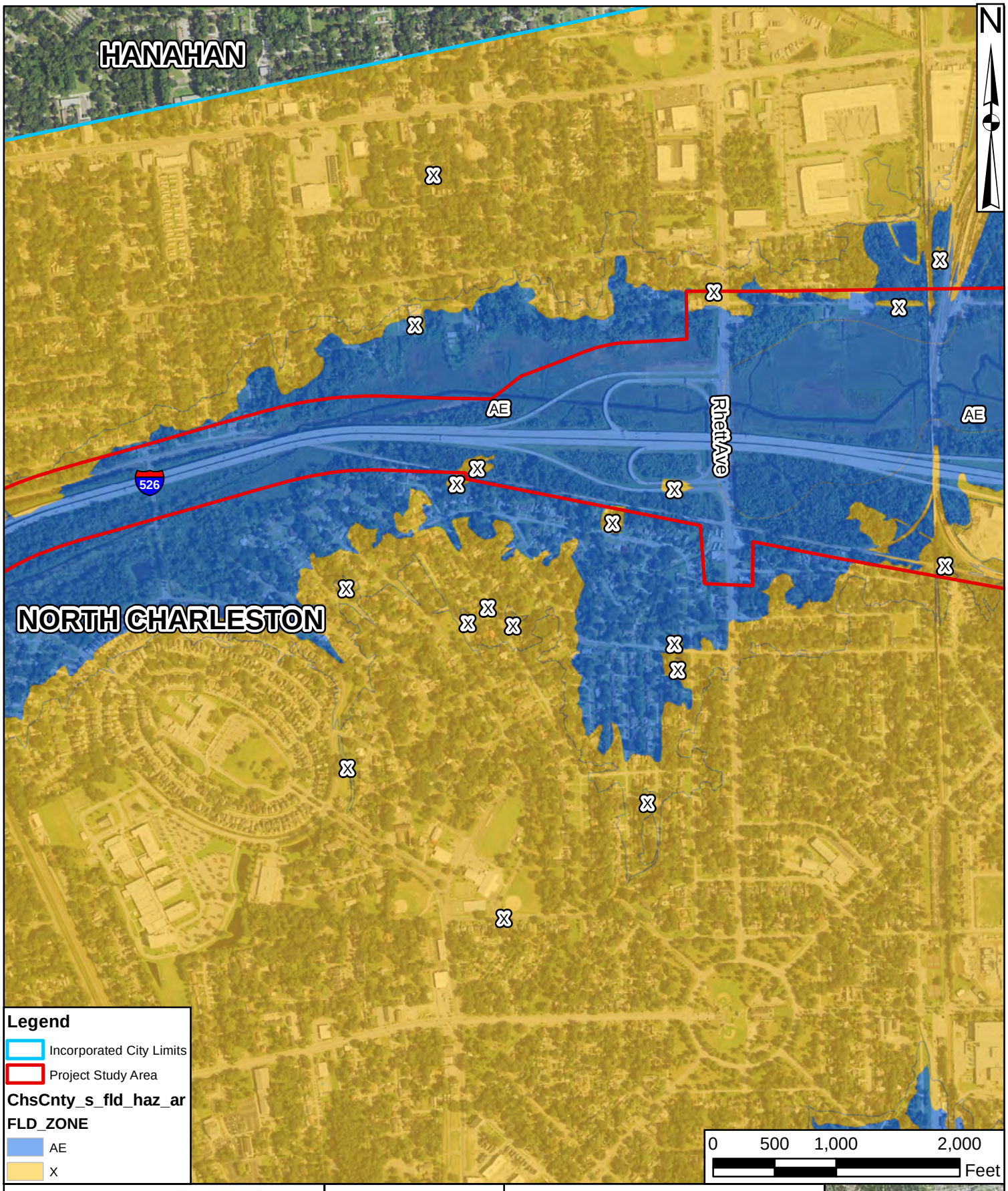
I-526 Lowountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 8 of 11





SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

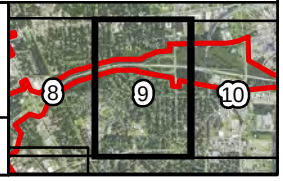
Source:
FEMA Floodplain Q3flood 2019

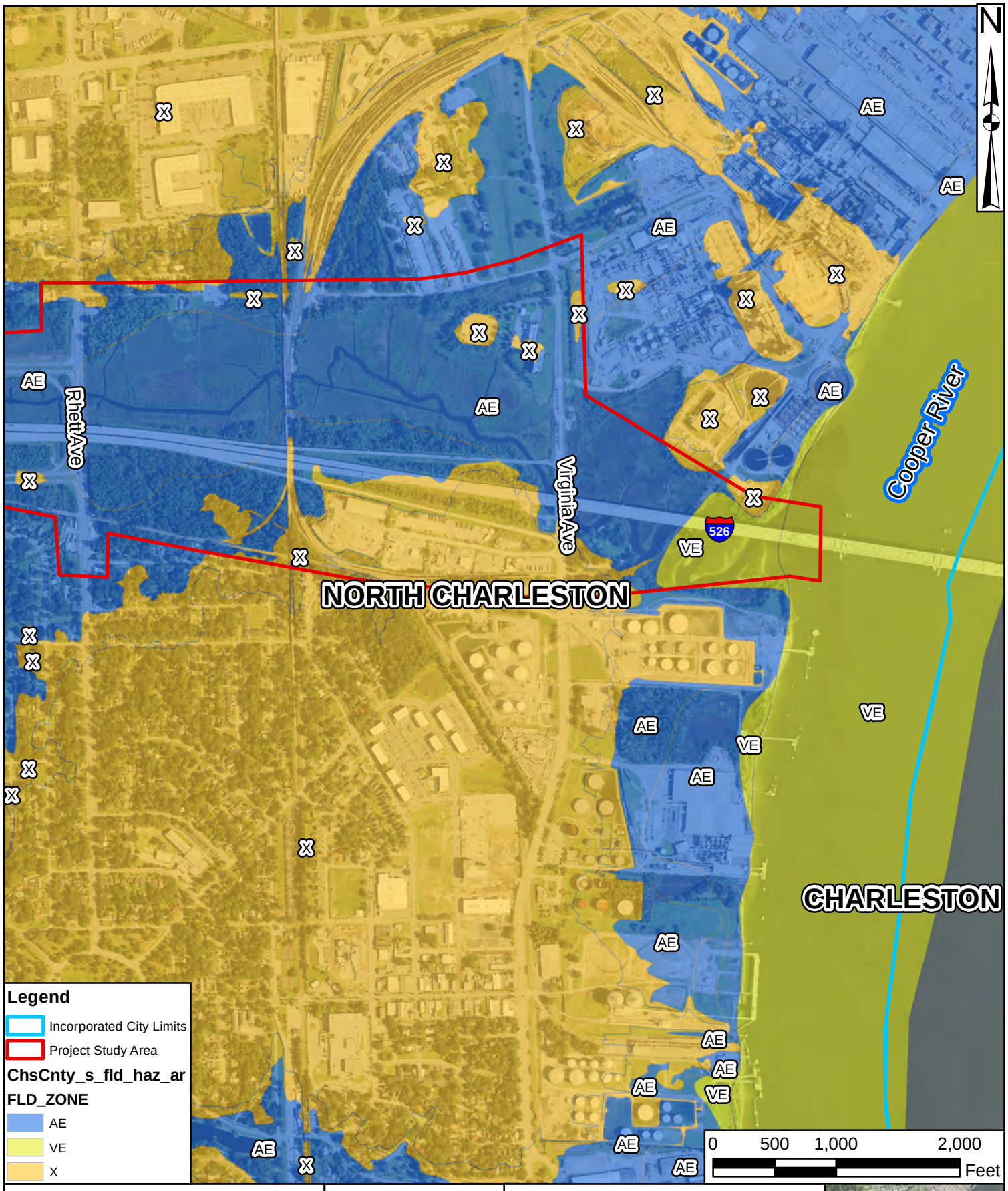
I-526 Lowountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 9 of 11





SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

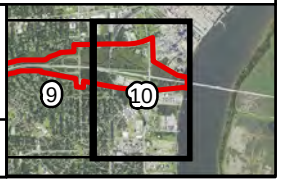
Source:
FEMA Floodplain Q3flood 2019

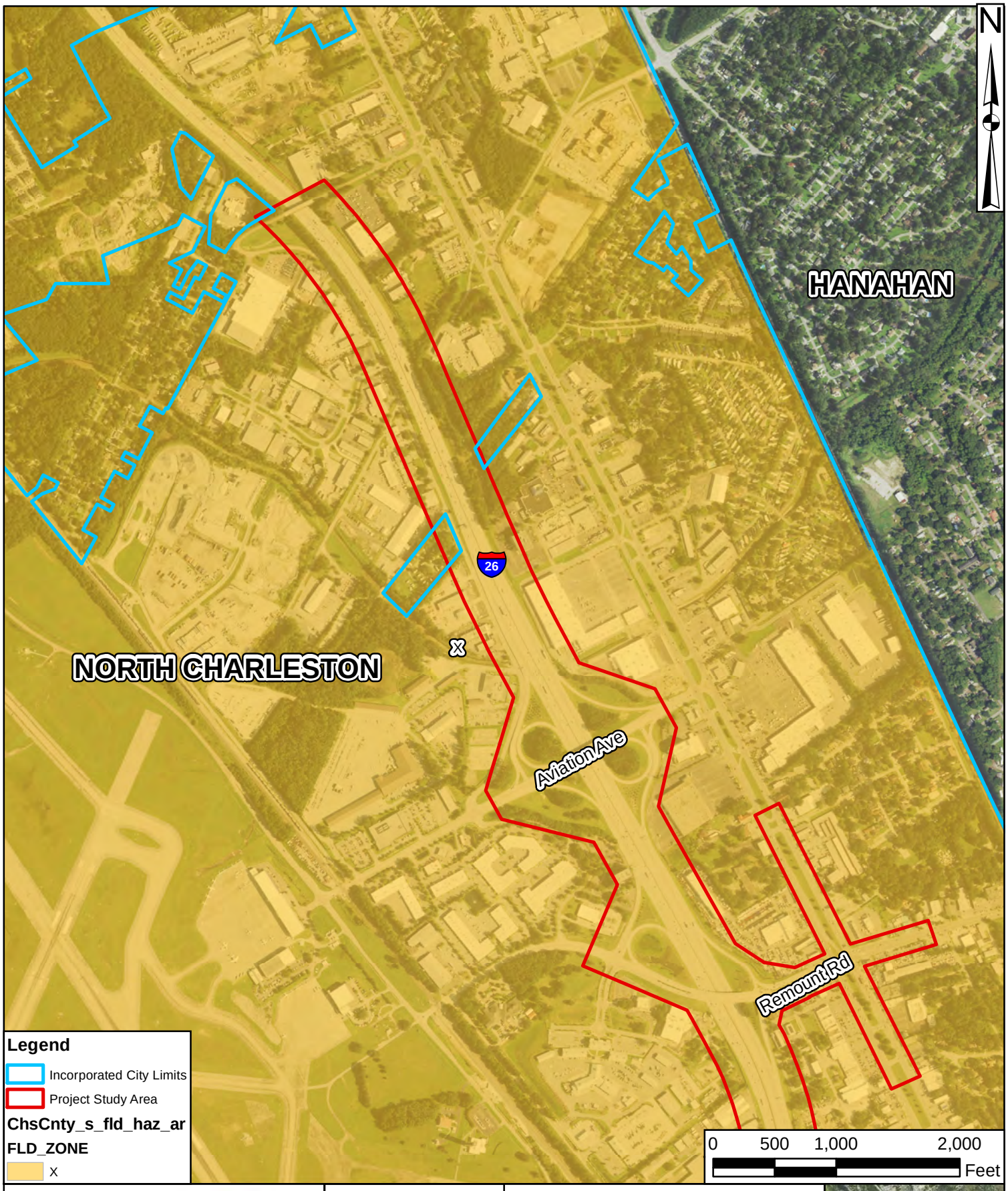
I-526 Lowountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 10 of 11





SCDOT South Carolina Department of Transportation

WEST 526 LOWCOUNTRY CORRIDOR

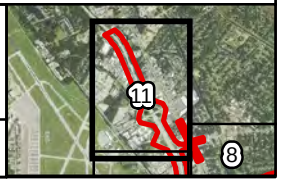
Source:
FEMA Floodplain Q3flood 2019

I-526 Lowcountry Corridor West
Charleston County
SCDOT P032102
February 2020

Drawn By: RHH
QA/QC: KLM

FEMA Floodzones

Figure 9
Sheet 11 of 11



APPENDIX B

SCDHEC Watershed and Water Quality Information

1/28/2020

Watershed and Water Quality Information

Applicant Name: I-526 West Lowcounty Corridor
Permit Type: Construction
Latitude: 32.8380
Longitude: -80.0227
MS4 Designation: Small MS4
Monitoring Station: RO-14360
Within Coastal Critical Area: YES
Water Classification (Provisional): SA-SP
Waterbody Name: ASHLEY RIVER
Entered Waterbody Name:

NH3N	Ammonia	FC	Fecal Coliform
CR	Chromium	FCB	Fecal Coliform (Shellfish)
CU	Copper	BIO	Macroinvertebrates (Bio)
HG	Mercury	TP	(Lakes) Phosphorus
NI	Nickel	TN	(Lakes) Nitrogen
PB	Lead	CHLA	(Lakes) Chlorophyll a
ZN	Zinc	ENTERO	(Beach) Enterococcus
DO	Dissolved Oxygen	HGF	Mercury (Fish)
PH	pH	PCB	PCB (Fish)

Station	NH3N	CR	CU	HG	NI	PB	ZN	DO	PH	TURBIDITY	ECOLI	FCB	BIO	TP	TN	CHLA	ENTERO	HGF	PCB
RO-14360						X					X	X	X	X	X	X		X	X
MD-052	A	A	A	A	A	X	A	A	A	A	X	X	X	X	X	X	A	X	X
MD-049	A	A	A	A	A	X	A	A	A	A	X	X	X	X	X	X	A	X	X

F = Standards Fully Supported
N = Standards Not Supported
A = Assessed at Upstream Station
X = Parameter Not Assessed at Station
T = Within TMDL Approved Watershed

In TMDL Watershed: Yes
TMDL Site: MD-052
TMDL Report No: 0506-13
TMDL Parameter: DO
TMDL Document Link: http://www.scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/Chas_Hbr_DO_TMDL.pdf