Alligator Road Widening

Environmental Assessment

Florence County, South Carolina

SCDOT
South Carolina
Department of Transportation

November
2016

Prepared by:

HDR | ICA

Alligator Road (S-107) Widening From US 52 to US 76
Florence County, South Carolina

ENVIRONMENTAL ASSESSMENT

Submitted by the

S.C. Department of Transportation

11-14-2016
Date of Approval

S.C. Department of Transportation

The following individuals may be contacted for additional information concerning the project:

Mr. Henry Phillips
S.C. Department of Transportation
Environmental Management Division
955 Park Street
Columbia, South Carolina 29201
803-737-1872

Mr. Brian Dix
Program Manager – RPG 2
S.C. Department of Transportation
955 Park Street
Columbia, South Carolina 29201
803-737-1085

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1 INTRODUCTION

Florence County and the South Carolina Department of Transportation (SCDOT) propose to widen Alligator Road (S-107) in Florence County, South Carolina from US-52 to US-76. SCDOT has been retained by Florence County to assist in the planning, review, and construction of this project. Because the project is not utilizing federal dollars for design, right-of-way, and construction, the Federal Highway Administration (FHWA) is not obligated to review the potential environmental, social, and economic effects. However, the project was developed to federal standards and specific environmental studies were conducted by SCDOT in the early stages of project development. These studies, along with consideration of the project's scope of work, were utilized in making the preferred design decision. The project, as proposed, would result in certain modifications to the human and natural environment but it is the finding of Florence County and SCDOT that this project will not have any significant impacts on the environment.

2 PURPOSE AND NEED FOR PROJECT

2.1 Project Setting

The project study area (PSA) includes approximately 415 acres located in southern Florence County within the lower coastal plain of South Carolina. Florence County is the Pee Dee regions' largest County (from a population standpoint) and the City of Florence and surrounding area is the regions' largest urban area. In addition, the Florence urban area serves as a regional center of population, retail trade, medical services, legal services and major educational facilities. The Florence area benefits from having multiple options for regional mobility. This mobility is anchored by I-95 and I-20, which connects Florence with many major eastern cities. In addition, routes such as US 52, US 76, and US 301 serve as critical inter and intra-regional transportation corridors, connecting points in the Florence area with cities across the Carolinas (Figure 1).

The Florence urban area is the commercial center of the Pee Dee region and is expected to continue to grow, particularly in the I-20/I-95 vicinity on the western edge of Florence, and the major highways leading into the urban area. The area is served by Irby Street (U.S. 52), Palmetto Street (U.S. 76), I-20, and I-95 as well as the interchange between the interstates to the west of Florence. This area, including the Florence urban area, the Pee Dee River area, and the Hartsville area is expected to be an area of major industrial expansion over the next twenty years. There are several large public or private industrial parks, located along the western side of the Florence urban area, and should foster additional large-scale development.

The area has extensive water system coverage, including service from the City of Hartsville, the Darlington County Water and Sewer Authority, the City of Florence, and Florence County. The City of Florence has under design a surface water treatment facility on the Great Pee Dee River that could evolve into a regional water treatment plant. The City of Florence has also expanded its wastewater treatment plant and constructed an outfall to the Great Pee Dee River, which should increase the availability of sewer service in the watershed and increase the likelihood of additional growth and development. A 700-acre industrial park at I-95/SC327 has been built and should spur future growth.

According to the US Census, Florence County has seen continuous growth in the last 10 years. Between 2000 and 2012, the population grew from 125,761 to 137,948, an increase of approximately 9% and this growth is expected to continue.

2.2 Existing Facility

Alligator Road is classified as a collector and consists of a two-lane ditch section from US 52 to US 76. The roadway includes dedicated turn lanes at selected intersections. Numerous crossroads, side streets, and access cuts are located along the corridor. The roadway crosses Alligator Branch near its eastern termini with other small conveyances being crossed throughout the corridor. The existing right-of-way along Alligator Road is generally 66 feet, with increased right-of-way at bridge locations.

The project area consists primarily of residential and agricultural land uses with some interspersed commercial land uses. Alligator Road is experiencing tremendous growth as residential, commercial, and industrial land uses continue to develop. The Florence County Comprehensive Plan[1] (currently being updated) designates the project area as primarily Rural

[1] http://florenceco.org/offices/planning/, accessed September 9, 2016.

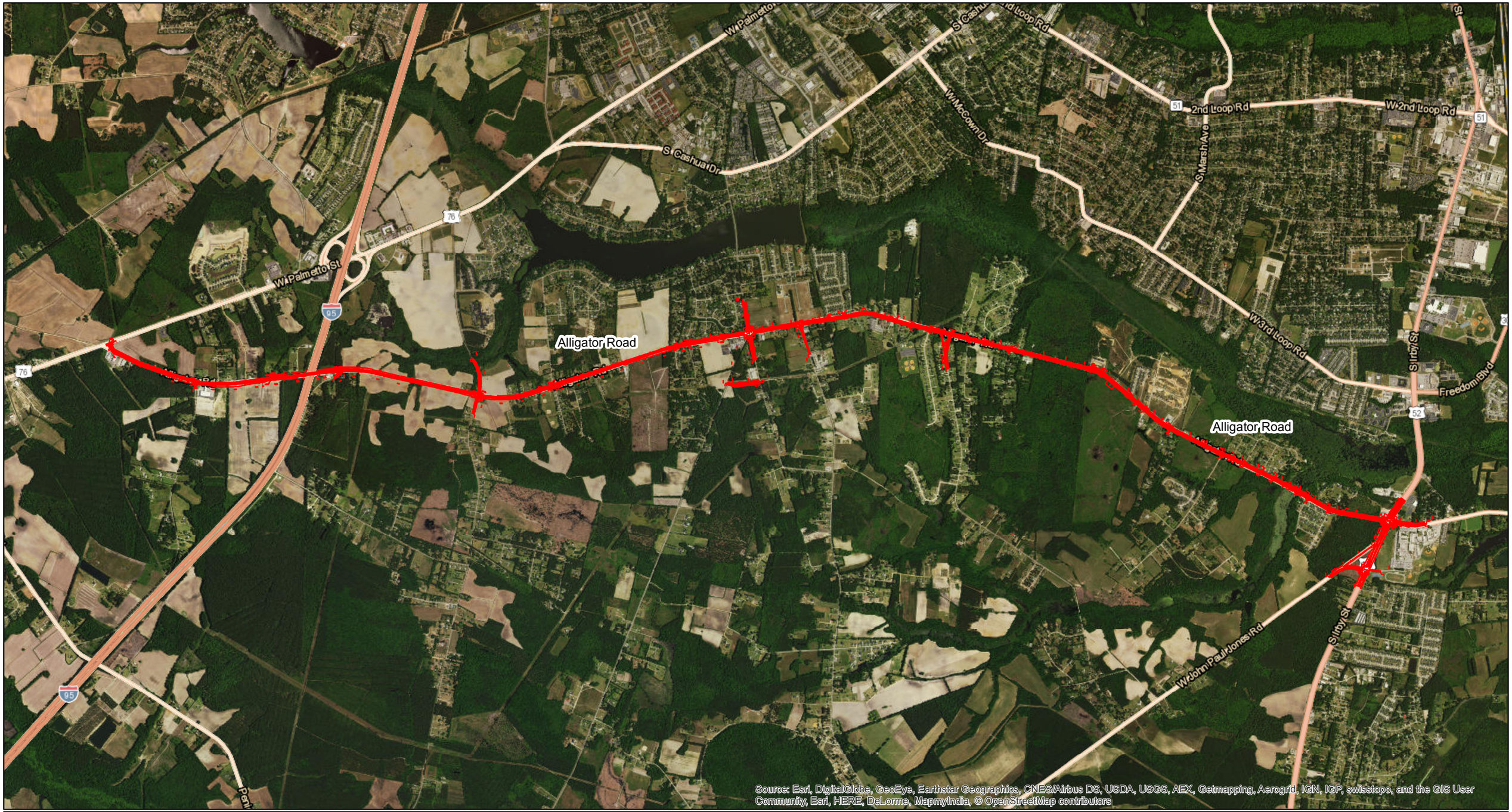

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Figure 1: Aerial Overview

Alligator Road Widening
Florence, SC

N

0 0.375 0.75 1.5 Miles

reservation to protect and sustain existing rural uses including single family homes and associated accessory uses.

2.3 Project Purpose

The purpose of the proposed Alligator Road project is to improve the operational efficiency of the roadway to accommodate existing and future traffic conditions. The secondary purpose is to enhance local connectivity around the City of Florence. Florence County voters recognized the need for the project when they approved the One-Cent Capital Project Sales Tax referendum in November 2006. This project is the sixth priority project listed in the FLATS 2017-2022 TIP financial statement and is funded entirely by the One Cent Capital Project Sales Tax revenues.[2] Specifically, the section of Alligator Road proposed for improvement extends from the intersection US 76 to the intersection of US 52, a distance of approximately 7.5 miles (Figure 2).

2.3.1 Logical Termini

Alligator Road is functionally classified as a collector. Collectors typically have less overall mobility, operate at lower speeds (less than 35 mph), have more frequent and greater access flexibility with adjacent land uses, and serve shorter distance travel. Collectors provide critical connections in the roadway network by bridging the gap between arterials and locals. Thus, the majority of collector streets connect with one another, with local streets, and with non-freeway/expressway arterials. In general, collector streets have two lanes and often have exclusive left-turn lanes at intersections with major and minor arterials and less frequently at intersections with other collector streets.[3] In the Florence area, collector streets have a wide range of physical characteristics, some of which are attributable to the neighborhoods in which they exist. Though different, the one commonality is that of providing good connectivity.

The project termini are logical as the eastern terminus would begin at the US 76 intersection and continue through to the US 52 intersection. US 76, and US 52 are functionally classified as major arterials. Major arterials typically have tightly controlled access and few, if any, individual site driveways. These facilities serve medium to longer distance travel and connect minor arterials and collector streets to freeways and other higher type roadway facilities.[4] Thus, Alligator Road serves as an important roadway in collecting traffic from the local network and distributing it to the system of major and minor arterials for access to the City of Florence, Florence County, and throughout the Pee Dee region.

The proposed project has independent utility since it provides the needed operational, capacity, and safety improvements within the project corridor. This would be achieved by providing additional capacity, improved sight distances, providing additional separation between vehicles through the addition of travel lanes, and improving turning movements at intersections that should reduce collisions by removing the turning movements from the through travel lanes. The proposed project would provide these improvements even if no other projects were completed.

2.4 Project Need

Florence County and the SCDOT have identified a need for widening Alligator Road to accommodate existing and future traffic conditions. The project would also evaluate pedestrian accommodations. The proposed project is being developed to address a variety of transportation needs along this corridor including additional turn lanes, turn lane storage, and median turn

[2] http://florenceco.org/offices/planning/flats/ accessed October 5, 2016
[3] http://florenceco.org/offices/planning/ accessed September 9, 2016.
[4] http://florenceco.org/offices/planning/ accessed September 9, 2016.

Prepared: 9/8/2016
By: HDR | ICA

Figure 2: Project Location
Alligator Road Widening
Florence, SC

0 1 2 Miles

N W E S

lanes. Recommended improvements would provide a more efficient transportation facility for local commuters, through traffic, pedestrians, and provide more desirable access to residential, commercial, and industrial areas located in and around Florence.

2.4.1 Operational Deficiencies

The Florence Area Transportation Study (FLATS) 2035 Long Range Transportation Plan (LRTP) sets priorities for spending various funds on transportation projects in the region. The LRTP is the community's overarching guide to the development of a regional transportation system that meets the current and future mobility needs of the region's residents. This transportation plan covers all modes of transport including automobile, transit, bicycle, pedestrian, railroad, freight, and intermodal movements. The LRTP evaluated the existing transportation network to identify existing and future deficiencies, and to recommend existing and future improvements to accommodate these deficiencies.

The LRTP has identified Alligator Road as a corridor that is nearing its design capacity. This is due to the rapid development that has taken place along the entire corridor. This development includes residential and commercial developments that rely heavily on Alligator Road for local access and access around the City of Florence. Table 1 lists the existing and future build traffic volumes.

Table 1 - Traffic Volumes

Roadway Segment	Average Daily Traffic		
	Existing (2013/2015)	Opening Year (2020)	Design Year (2040)
US 76 to Knollwood	3800 (2013)	4110	4880
Knollwood to US 52	10,500 (2015)	10,920	12,810

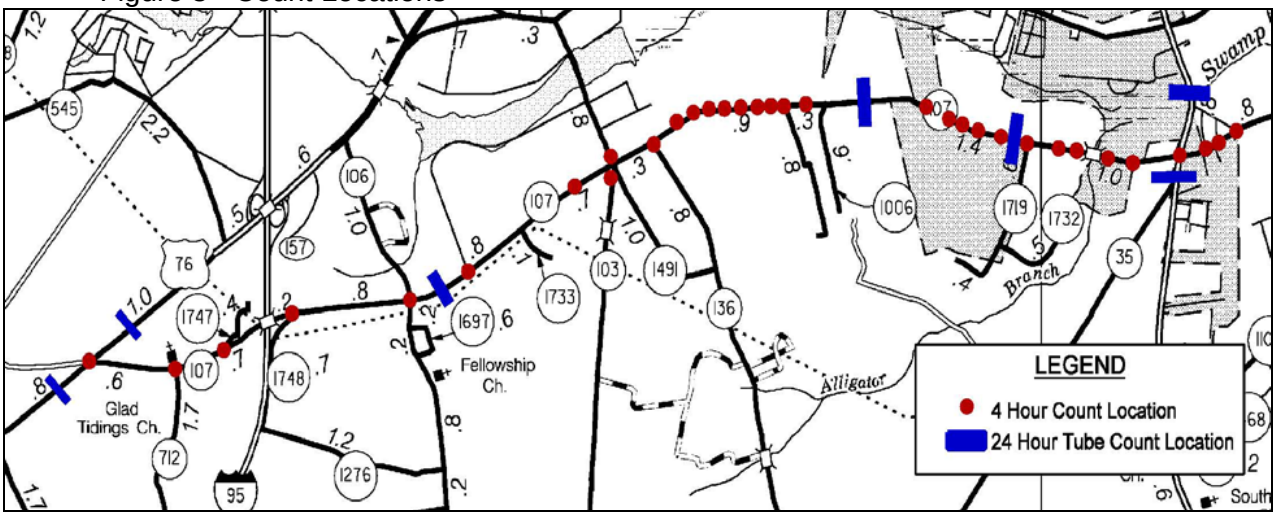
Level of Service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. There are six LOS letter designations ranging between LOS A and LOS F. LOS A describes completely free-flowing conditions and LOS F describes very unstable flow conditions. Table 2 lists the LOS values and describes their respective conditions.

Table 2 - Levels of Service

LOS A:	This level of service describes completely free-flow conditions. Desired speed and movements are virtually unaffected by the presence of other vehicles and constrained only by the geometric features of the roadway and driver preferences
LOS B:	Traffic flow is stable; the presence of other vehicles only slightly restricts freedom to maneuver.
LOS C:	Traffic flow is stable, but the number of bumper-to-bumper groups of vehicles increases due to slow moving vehicles and turning maneuvers.
LOS D:	Unstable traffic flow conditions are approached under LOS D. The desire to pass becomes very high but safe passing opportunities decrease significantly.
LOS E:	Passing is virtually impossible. The slowest moving vehicle controls the travel speed.
LOS F:	Passing is impossible. The slowest moving vehicle controls the travel speed. Very unstable traffic flow conditions exist.

Both 24-hour tube counts and peak hours turning movement counts were conducted along the study corridor (Table 3). LOS analysis were performed during the AM and PM peak hours for the existing year (2013) conditions at fifteen (15) study intersections that had the highest overall volumes. LOS ratings for intersections that are considered acceptable varies by community, facility type, and traffic control devices. A LOS D is usually considered an acceptable level of service at signalized intersections with high traffic volumes. At unsignalized intersections, a LOS D is the desirable goal, but a LOS E or F is often accepted for low to moderate traffic volumes where the installation of a traffic signal is not warranted or is deemed undesirable for signalization for other reasons.

Figure 3 - Count Locations



Five of the fifteen study intersections are currently operating with a turning movement at a LOS D or worse during the AM Peak hour. One of these intersections is signalized and the other four have the substandard service movement located on the side roads. During the PM peak hour each of the intersections are operating at a LOS C or better.

LOS analyses were performed during the AM and PM peak hours for the 2020 opening year No-Build (without improvements) conditions at the study intersections. Six of the fifteen intersections are expected to have turning movements that operate at a LOS D or lower during the 2020 AM peak hour. Again, one of the failing intersections is signalized and the other five are stop controlled with the substandard movement occurring on the side road. No substandard LOS are present during the PM peak hour.

LOS analyses were performed during the AM and PM peak hours for the 2040 design year No-Build (without improvements) conditions at the study intersections. In 2040, it is expected that seven of the fifteen study intersections will operate at a LOS E or worse during the AM peak hour. One of the substandard intersections is signalized and the other six unsignalized intersections have the substandard turning movement on the side road; with the exception of US 52 at E Redbud Lane where the entire intersection fails. The PM peak hour contains four intersections that operate at a LOS D, one of which is signalized. Each substandard movement takes place on the side road at the unsignalized intersections; the entire intersection is substandard at Alligator Road and US 52 (Appendix A).

Table 3 – 2040 No-Build Levels of Service

Intersection	Control	Movement	AM Peak Hour		PM Peak Hour	
			LOS	Delay (sec)	LOS	Delay (sec)
Alligator Road @ US 76 (W Palmetto St)	Free	NB (L)	A	0.0	A	0.0
	Free	SB (L)	A	8.4	A	8.0
	Stop	WB (LR)	B	14.0	C	15.2
Alligator Road @ Knollwood/Walker Swinton Rd	Signal	Overall	B	14.4	B	14.0
Alligator Road @ Savannah Grove Rd	Signal	Overall	B	17.1	B	16.4
Alligator Road @ Garden Gate Way	Free	EB (L)	A	10.0	A	8.7
	Stop	SB (LTR)	C	21.6	B	12.2
Alligator Road @ Womack Gardens Road	Free	EB (L)	A	9.6	A	9.0
	Free	WB (L)	A	0.0	A	8.8
	Stop	NB (LTR)	A	0.0	D	26.4
	Stop	SB (LTR)	E	41.4	C	24.7
Alligator Road @ Community Ln	Free	EB (L)	A	0.0	A	0.0
	Stop	SB (LR)	B	14.9	C	23.5
Alligator Road @ Sunset Memory Gardens	Free	EB (L)	A	0.0	A	0.0
	Free	WB (L)	A	8.8	A	8.9
	Stop	NB (LTR)	E	42.5	C	17.8
	Stop	SB (LTR)	A	0.0	B	12.0
Alligator Road @ Willis Pl	Free	WB (L)	B	13.1	A	8.8
	Stop	NB (LR)	E	43.1	C	17.4
Alligator Road @ Whippoorwill Rd	Free	WB (L)	A	8.9	A	8.9
	Stop	NB (LR)	F	66.0	D	26.8
Alligator Road @ James Turner Rd	Free	WB (L)	A	9.2	A	8.9
	Stop	NB (LR)	C	24.6	C	20.9
Alligator Road @ Woodstream Rd	Free	EB (L)	A	9.0	A	0.0
	Stop	SB (LR)	C	19.2	D	25.1
Alligator Road @ Brookstone Dr	Free	WB (L)	A	9.0	A	8.7
	Stop	NB (LR)	B	14.5	B	13.4
US 52/301 (S Irby St) @ E Redbud Ln	Stop	WB (LR)	F	509.0	C	22.4
	Free	SB (L)	F	65.0	C	20.7
Alligator Road @ US 52/301 (S Irby St)	Signal	Overall	F	106.9	D	43.1
Alligator Road @ E Redbud Ln	Free	EB (L)	B	11.9	A	8.0
	Stop	SB (LR)	F	245.1	C	24.3

Corridor or roadway segment analyses were performed for Alligator Road. Based on average daily traffic volume (ADT), Alligator Road was divided into five segments: US 76 to Twin Church Road, Twin Church Road to Knollwood Road, Knollwood Road to Savanah Grove Road, Savanah Grove Road to Ashford Road, and Ashford Road to US 52. Highway Capacity Software (HCS 2010) was used to evaluate the capacity of the roadway segments. First, the capacity of the roadway segments was analyzed considering a two lane cross section for the 2020 opening year and the 2040 design year.

Based on the results of the capacity analysis, it is expected that the segment of Alligator Road from US 76 to Knollwood Road would operate at LOS C or better for the 2020 opening year and 2040 design year traffic volumes. The segment of Alligator Road from Knollwood Road to US 52 is expected to operate at LOS D for the 2020 opening year and 2040 Knollwood design year

traffic volumes. Table 4 summarizes the results of the capacity analysis for the two lane cross section.

Table 4 - Roadway Segments - Levels of Service Summary - Two Lane Section

Roadway Segment	Opening Year 2020		Design Year 2040	
	AM	PM	AM	PM
Alligator Road from US 76 to Twin Church Rd.				
Eastbound	B	B	B	B
Westbound	B	B	B	B
Alligator Road from Twin Church Rd to Knollwood Rd.				
Eastbound	B	C	C	C
Westbound	B	C	C	C
Alligator Road from Knollwood Rd to Savanah Grove Rd.				
Eastbound	D	D	D	D
Westbound	D	D	D	D
Alligator Road from Savanah Grove Rd to Ashford Dr.				
Eastbound	D	D	D	D
Westbound	D	D	D	D
Alligator Road from Ashford Dr. to US 52				
Eastbound	D	D	D	D
Westbound	D	D	D	D

2.4.2 Safety

2013 traffic count data indicates that the average daily traffic between US 52 and Knollwood/Walker Swinton Road is approximately 10,500 vehicles per day (vpd) and between Knollwood/Walker Swinton Road and US 76 is approximately 3800 vpd. Traffic accident reports indicate that a total of 146 accidents, including 50 injuries, and 94 personal damage only accidents, occurred on Alligator Road from January 2011 through April 2014 (Table 5). One hundred one (101) of these accidents were rear end, angle, or sideswipe collisions, which occur most often during vehicular turning movements. The provision of additional through lanes, a dedicated center turn lane, and intersection improvements should help reduce congestion and potential conflicts by increasing capacity and improving turn lane movements.

Table 5 - Roadway Segment Crash Data Summary

Roadway Segment	Existing AADT (2013/20105)	Segment Length (miles)	Total Crashes	Fatal	Injury	Property Damage Only	Crash Rate (100MVM)
US 76 to Knollwood Road	3800 (2013)	3.71	48	0	15	33	346.5
Knollwood Road to US 52	10,500 (2015)	3.75	98	2	35	61	233.3

2.5 Reasonable Availability of Funding

In November 2006, the voters of Florence County passed a One Cent Capital Project Sales Tax to finance the costs of transportation projects. The tax will last for seven years and all the revenue generated will be used to construct roadway improvements. Alligator Road is one of the

highway capacity projects funded as part of this referendum. The project is also funded in part through the South Carolina State Transportation Infrastructure Bank.

The project is included in the 2011-2015 SCDOT Statewide Transportation Improvement Program (STIP). The STIP allocates $5.3 million dollars for preliminary engineering in fiscal year 2013, and $10.0 million dollars for right-of-way in fiscal year 2015. The 2014-2019 STIP also includes the $10.0 million dollars for right-of-way in fiscal year 2015. The Florence Area Transportation Study (FLATS) 2014-2019 draft Transportation Improvement Program (TIP) includes $45.5 million dollars for construction in fiscal year 2016 (Table 6).

Table 6 - Funding Availability

Funding Source	Phase	Cost
Local	Preliminary Engineering	$5,300,000
Local	Right-of-Way	$23,500,000
Local	Construction	$45,500,000

3 ALTERNATIVES

The Department has considered location and design alternatives in the process of developing the currently proposed "build" alternative. The "no build" alternative, which consists of the Department making no improvements, was considered as a baseline for comparison. Due to the need to alleviate congestion and improve traffic efficiency, the "no build" alternative is not considered acceptable. Additional alternatives were considered that evaluated symmetrical and asymmetrical widening along the existing roadway. These alternatives were further analyzed to evaluate potential impacts on the human and natural environment.

While the proposed location and design of the project represents the best "build" alternative for meeting travel demands while minimizing impacts, input received during the public hearing process and environmental document availability period will be carefully evaluated in the future project development. Modifications will be made where appropriate.

3.1 Proposed Facility

Based on capacity analysis of the roadway, a three-lane roadway section is recommended for Alligator Road from US 76 to Knollwood and a five-lane section between Knollwood and US 52 (Table 8). The roadway between Knollwood Road and US 76 is expected to operate at LOS C for the 2020 opening and 2040 design year traffic volumes (Table 7). The roadway between Knollwood Road and US 52/301 is expected to operate at LOS A for the 2020 opening and 2040 design year traffic volumes (Table 8).

Eight of the fifteen study intersections are expected to operate at undesirable LOS under the no build alternative. However, with the proposed widening, all but three of the intersections are expected to operate at acceptable traffic operating conditions in the 2040 Build conditions. Therefore, the Build alternative is an improvement to the intersection operations.

Table 7 – Roadway Segments – Levels of Service – Three Lane Section

Roadway Segment	Opening Year 2020		Design Year 2040	
	AM	PM	AM	PM
Twin Church Rd from US 76 to Alligator Rd.				
Northbound	B	C	B	C
Southbound	B	B	B	C
Alligator Road from US 76 to Twin Church Rd.				
Eastbound	B	B	B	B
Westbound	B	B	B	B
Alligator Road from Twin Church Rd to Knollwood Rd.				
Eastbound	B	C	C	C
Westbound	B	C	C	C

Table 8 – Roadway Segments – Levels of Service – Five Lane Section

Roadway Segment	Opening Year 2020		Design Year 2040	
	AM	PM	AM	PM
Alligator Road from Knollwood Rd to Savanah Grove Rd.				
Eastbound	A	A	A	A

Westbound	A	A	A	A
Alligator Road from Savanah Grove Rd to Ashford Dr.				
Eastbound	A	A	A	A
Westbound	A	A	A	A
Alligator Road from Ashford Dr to US 52				
Eastbound	A	A	A	A
Westbound	A	A	A	A

3.2 No-Build Alternative

The no-build alternative, which consists of the Department making no improvements to the roadway, was considered a baseline for comparison. The no-build would not provide for the proposed improvements that are necessary to improve traffic efficiency along this corridor. If the improvements are not made, congestion will worsen and safety of the traveling public will be compromised. For these reasons, the no-build alternative is not considered acceptable.

3.3 Alternatives Eliminated From Further Review

Additional alignment alternatives were considered that consisted of widening to the north or south along the entire corridor but were eliminated from further review due to the number of homes and businesses located on each side of the roadway that would be impacted by these alternatives.

Various Transportation System Management (TSM) alternatives were considered; including, signalization, selected intersection improvements, and access management. The TSM alternatives, by themselves, did not accommodate the projected traffic deficiencies and the needed safety improvements; therefore, they did not meet the purpose and need of the project. However, some of these measures (signalization, selected intersection improvements) in conjunction with the widening would help improve the efficiency of the roadway and would be incorporated into the overall widening.

3.4 Build Alternatives

Two build alternatives were considered for this project. These build alternatives were evaluated to identify their abilities to meet the project's purpose and need and compare their impacts. Table 9 lists the probable impacts resulting from the two build alternatives.

3.4.1 Alternative 1 (Five-lane Section)

This alternative would involve a primarily symmetrical widening of Alligator Road with a five-lane section along its' entire length. The alternative would be approximately 7.5 miles long and would include complimentary intersection improvements at selected intersections. The alternative would provide the necessary improvements to accommodate future traffic deficiencies from US 52 to Knollwood Road through the construction of additional travel lanes, designated median turn lane, and various intersection improvements, including, turn lanes and additional storage. The five-lane typical would result in higher impacts to streams, wetlands, floodplains, and structures within the project corridor (Table 9).

3.4.2 Alternative 2 (Three-lane/Five-lane Section)

This alternative would involve the widening of Alligator Road with a five-lane section between US 52 and Knollwood/Walker Swinton Road, and a three-lane section between Knollwood/Walker

Swinton Road and US 76. The alternative would be approximately 7.5 miles long and would include complimentary intersection improvements at selected intersections. The alternative would provide the necessary improvements to accommodate future traffic deficiencies from US 52 to Knollwood Road through the construction of additional travel lanes, designated median turn lane, and various intersection improvements including turn lanes and additional storage. It would also provide a designated median turn lane from Knollwood Road to US 76 which would provide for enhanced traffic flow by removing turning traffic off of the main travel Lanes. This alternative would result in less impacts to streams, wetlands, floodplains, and structures within the project area (Table 9).

Table 9 - Summary of Impacts[1]

Impact Category	Alternative 1 (5-Lane)	Alternative 2 (3/5 – Lane)
Residential relocations	8	5
Commercial relocations	10	4
Farmland (acres)	20	18
Floodplains (acres)	4.7	3.8
Wetlands (acres)	1.2	1.1
Streams (linear feet)	421	302
Threatened/Endangered Species	0	0
State Listed Species	0	0
Cultural Resources		
▪ Architectural	1	1
▪ Archaeological	1	1
Hazardous Material Sites	Yes	No
Underground Utilities	Yes	Yes
Permits	Individual Permit	Individual Permit
Length (miles)	7.5	7.5
Right-of-way (acres)	76	51
Costs (approximate)[2]		
▪ Preliminary Engineering	$5.3 million	$3.7 million
▪ Bridge	$5.5 million	$4.4 million
▪ Roadway	$65.0 million	$57.9 million
▪ Rights of Way	$35.0 million	$31.7 million
Total Costs	$111.0 million	$97.7 million

[1]Impacts are based on right-of-way limits
[2]Costs are estimated based on preliminary design and are subject to change

Several intersection and side-road improvements would be completed as part of both build alternatives. Impacts from these improvements would remain the same between the build alternatives. These improvements are described below.

US 76/Alligator Road Intersection: This intersection would be relocated approximately 400 feet east of its existing location to eliminate the existing skewed intersection. Alligator Road would begin to transition northward on new location approximately 700 feet south of US 76 and would transition into US 76 with a more desirable angle of intersection.

Alligator Road/Twin Church Road Intersection: Twin Church Road would include a minor westward realignment to create a better geometric design that would improve traffic flow approaching and going through the intersection with Alligator Road.

Oliver Road/Walker Swinton Road Intersection: The existing intersection would be eliminated and replaced with a new location connection with Alligator Road approximately 1400 feet south. The new location roadway would be located adjacent to an existing powerline easement. The relocated section of Oliver Road would remain as an access to the Forest Lake Greenhouses.

Alligator Road/Whippoorwill Road Intersection: The existing intersection would be relocated approximately 300 feet east to remove the existing skewed intersection and to more evenly align Whippoorwill Road between Wills Road and McElveen Lane. Whippoorwill Road would begin a northward transition on new location approximately 700 feet prior to the existing intersection with Alligator Road.

US 52/John Paul Jones Road Intersection: The existing intersection would be relocated approximately 800 feet south of its existing location to tie into the entrance to South Florence High School. John Paul Jones Road would begin transitioning on new location approximately 1200 feet west of the existing intersection with US 52.

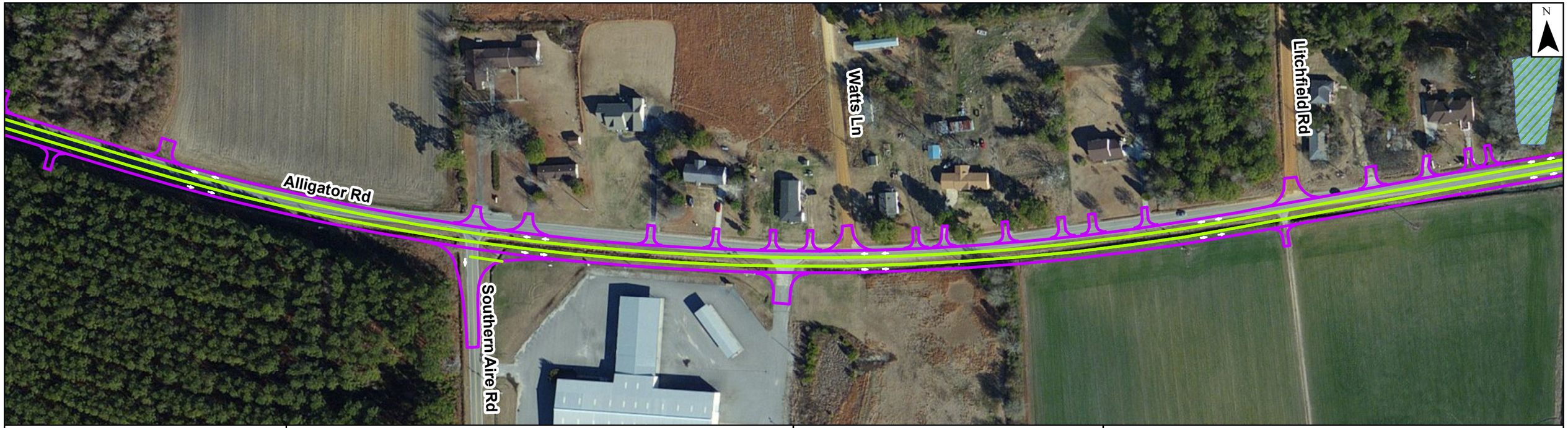
US 52/Alligator Road Intersection: This intersection would include two through lanes in both northbound and southbound directions with dedicated turn lanes onto Alligator Road and East Howe Springs Road. Alligator Road would include two through lanes onto East Howe Springs Road with twin dedicated turn lanes onto northbound US 52. East Howe Springs Road would have a dedicated turn lane onto southbound US 52, a single through lane onto Alligator Road, and a turn lane onto northbound US 52.

3.5 Preferred Alternative

Alternative 2 was selected as the preferred alternative based on the traffic analysis and its minimization of impacts to area resources (Figure 4). This alternative consists of a five-lane curb & gutter section between US 52 and Knollwood Road, and a three-lane ditch section between Knollwood Road and US 76. The five-lane section would consist of two 12-foot inside travel lanes and two outside 14-foot travel lanes with a 15-foot median. It would include a 5-foot sidewalk along both sides of Alligator Road, and along Savannah Grove Road up to Savannah Grove Elementary School. The three-lane ditch section would consist of two 14-foot travel lanes and a 15-foot median with no sidewalks. Representative typical sections are shown in Figure 5.

The widening would begin just north of the US 52 intersection and would continue west to US 76, a distance of approximately 7.5 miles. The bridge at I-95 would be constructed just north of its existing location in order to maintain traffic. The roadway would transition on new location approximately 1500 feet south of I-95 and would transition back onto existing Alligator Road approximately 1500 feet north of I-95. Once the new bridge is completed, traffic would be reassigned to the new bridge and the old bridge would be demolished. New right-of-way would be required at various locations throughout the corridor to accommodate the widening. The alternative would result in five residential and four commercial relocations. The speed limit throughout the corridor would be 45 mph.

The preferred alternative is expected to result in the segment of Alligator Road from US 76 to Knollwood Road operating at LOS C or better for the 2020 opening year and 2040 design year traffic volumes, and the roadway segment of Alligator Road between Knollwood Road and US 52/301 is expected to operate at LOS A for the 2020 opening and 2040 design year traffic volumes.



Prepared by:

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Figure 4a: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 200 400
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands

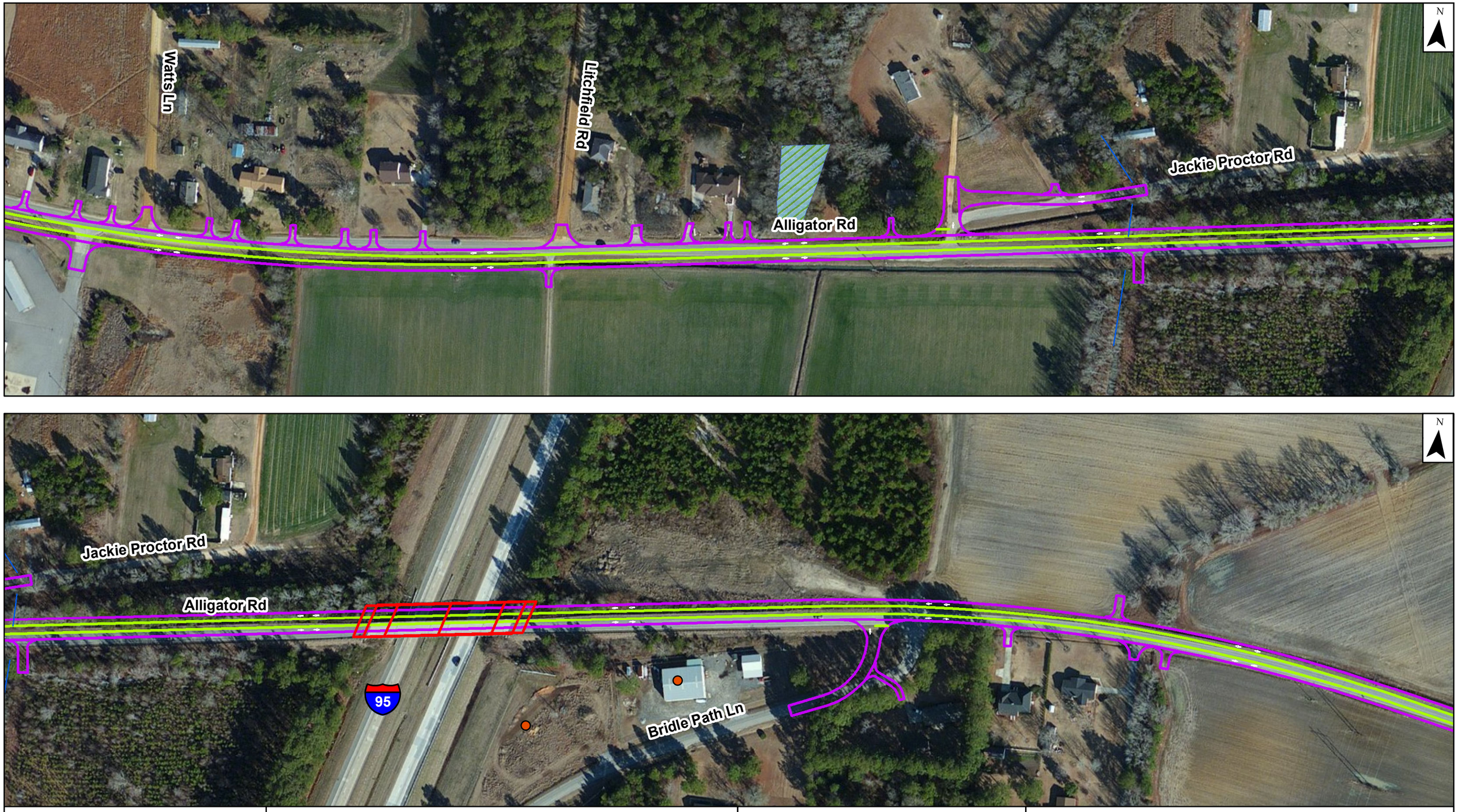

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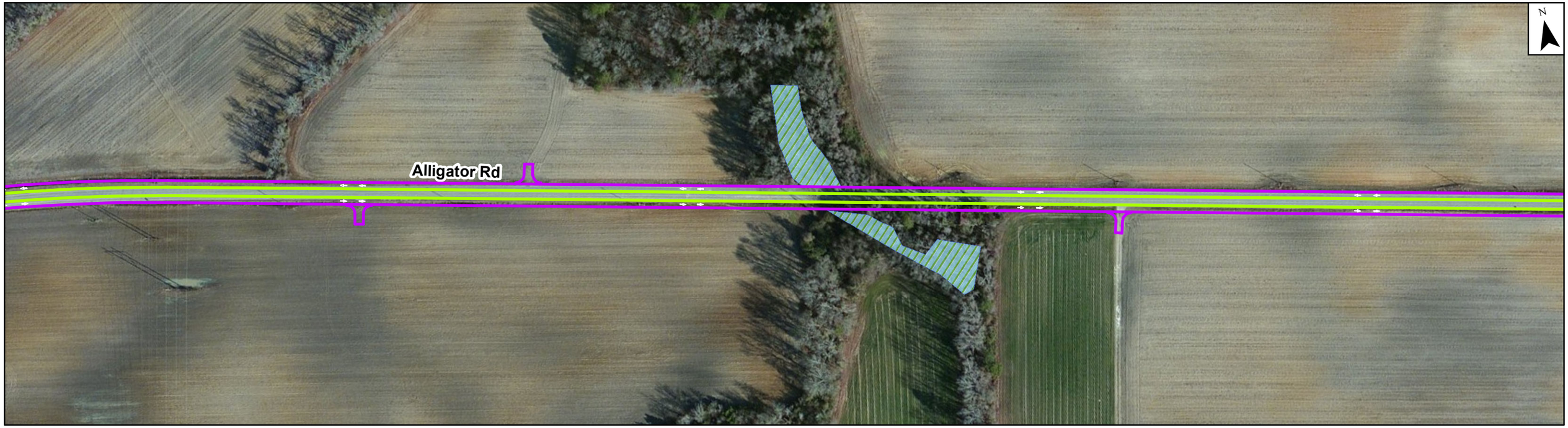
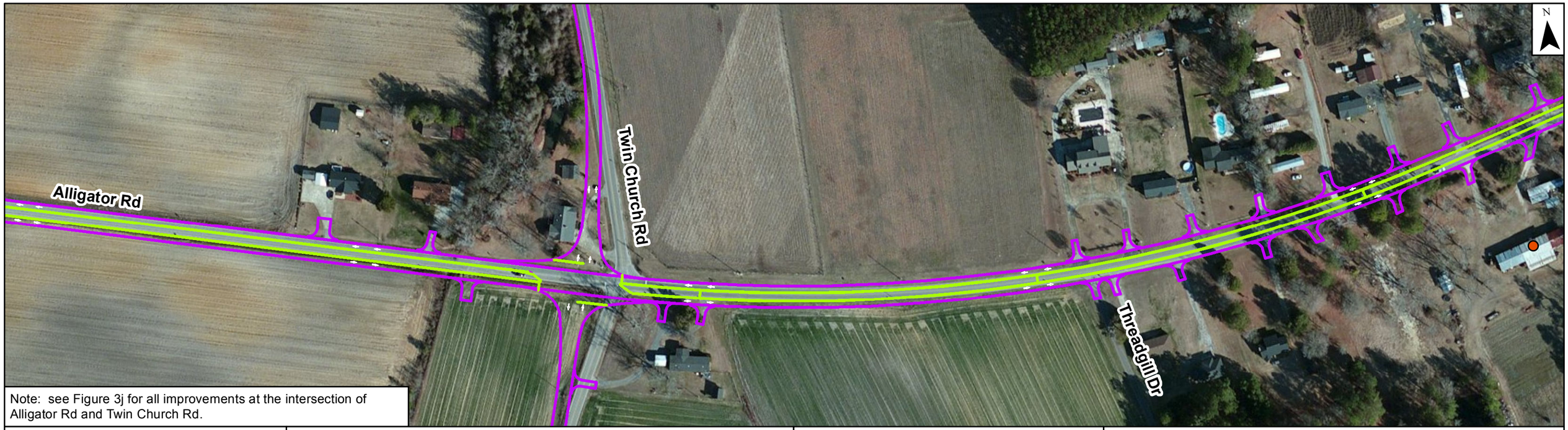
Figure 4b: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 200 400
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands





Note: see Figure 3j for all improvements at the intersection of Alligator Rd and Twin Church Rd.

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Figure 4c: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 200 400
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands

Prepared by:

HDR | ICA

Figure 4d: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 200 400
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands

Alligator Rd
Lunn Dr
S Knollwood Rd
Walker Swinton Rd
Queen Ann Rd

Note: see Figure 3j and 3k for all improvements at the intersection of Alligator Rd and Walker Swinton Rd/ S Knollwood Rd, as well as the connector off Walker Swinton Rd

Alligator Rd
Garden Gate Way
Cross Vine Dr
Womack Gardens Rd
Petal Path
Savannah Grove Rd

Note: see Figure 3k for all improvements at the intersection of Alligator Rd and Savannah Grove Rd.

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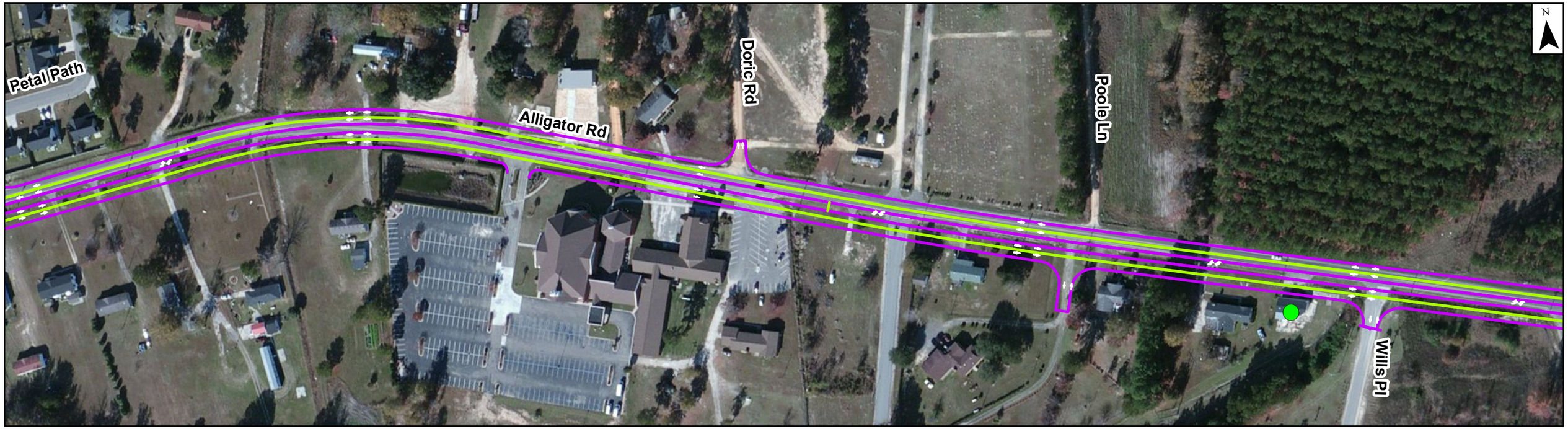
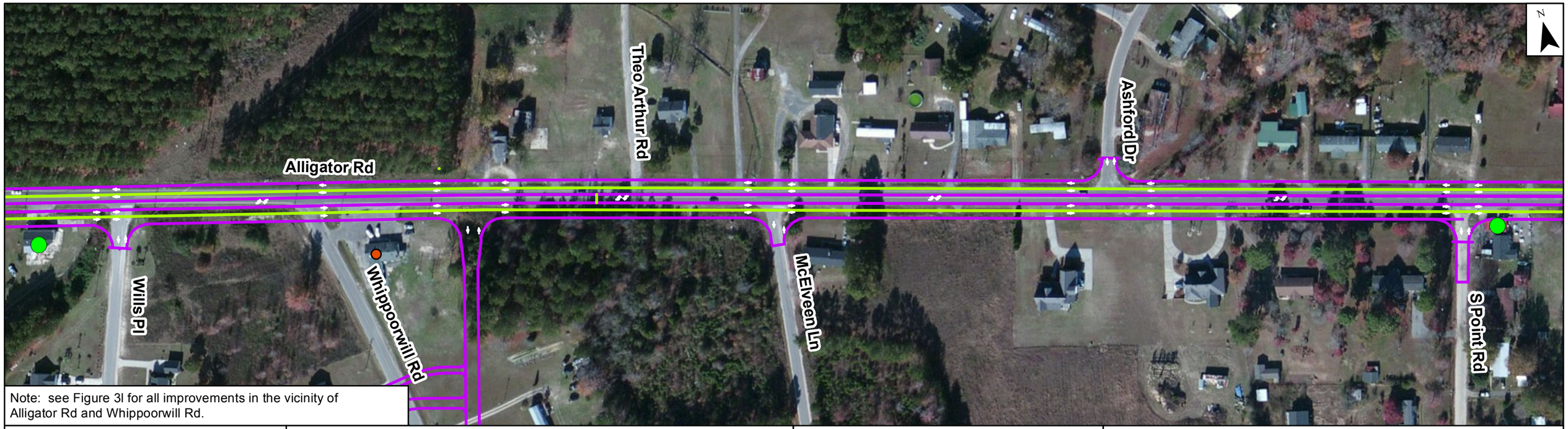
Figure 4e: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 200 400
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands





Note: see Figure 3l for all improvements in the vicinity of Alligator Rd and Whippoorwill Rd.

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Figure 4f: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 200 400
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands

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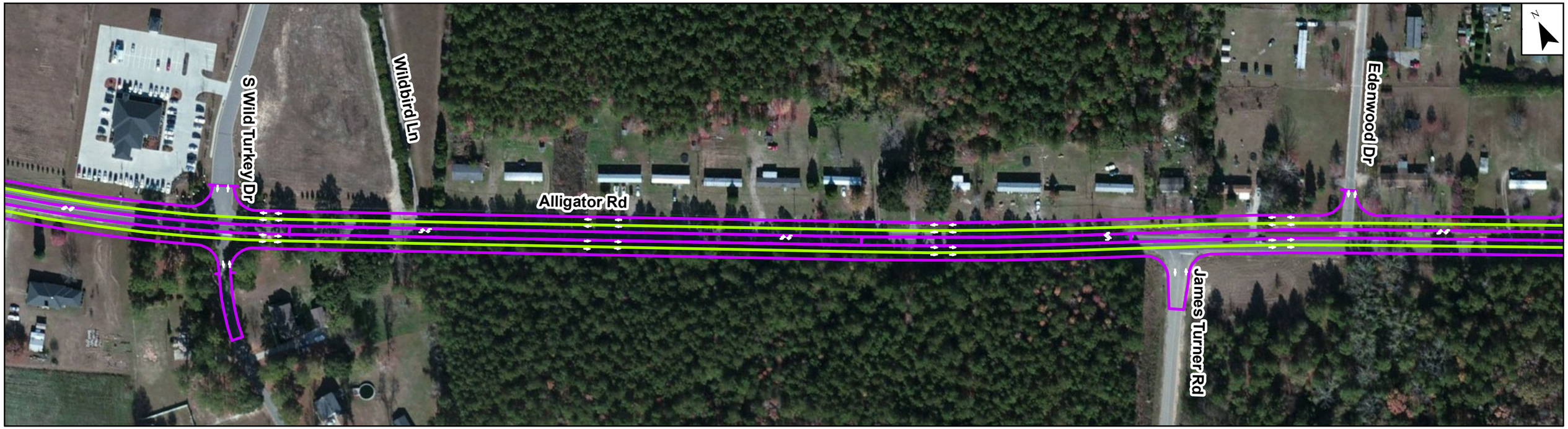
Figure 5g: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 200 400
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands



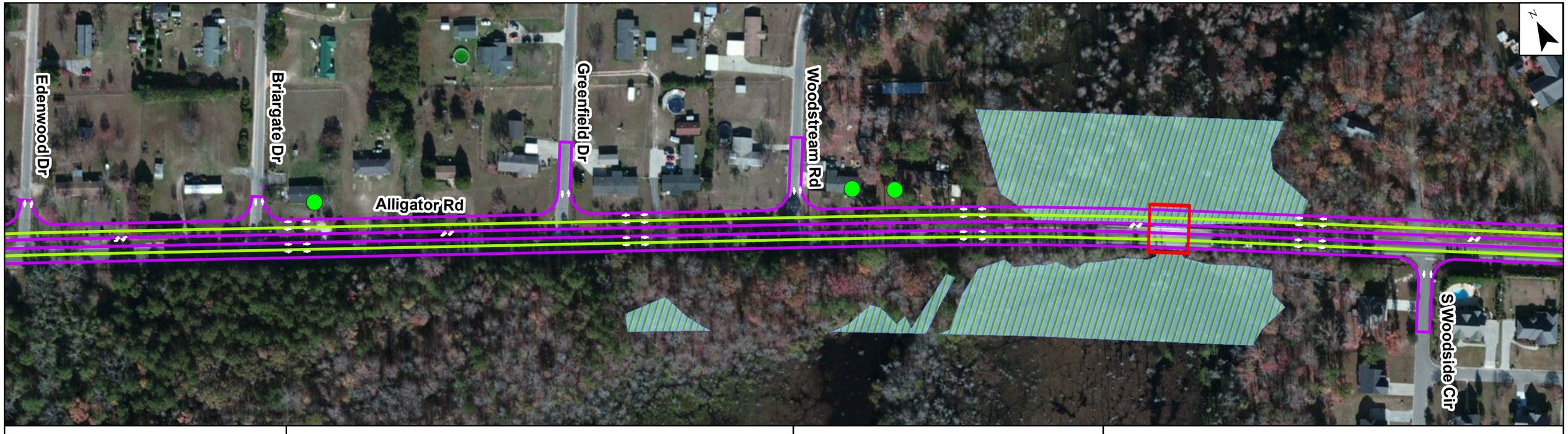


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Figure 5h: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 200 400
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands

Note: see Figure 3l and 3m for all improvements in the vicinity of the intersection at Alligator Rd and US 301/ US 52

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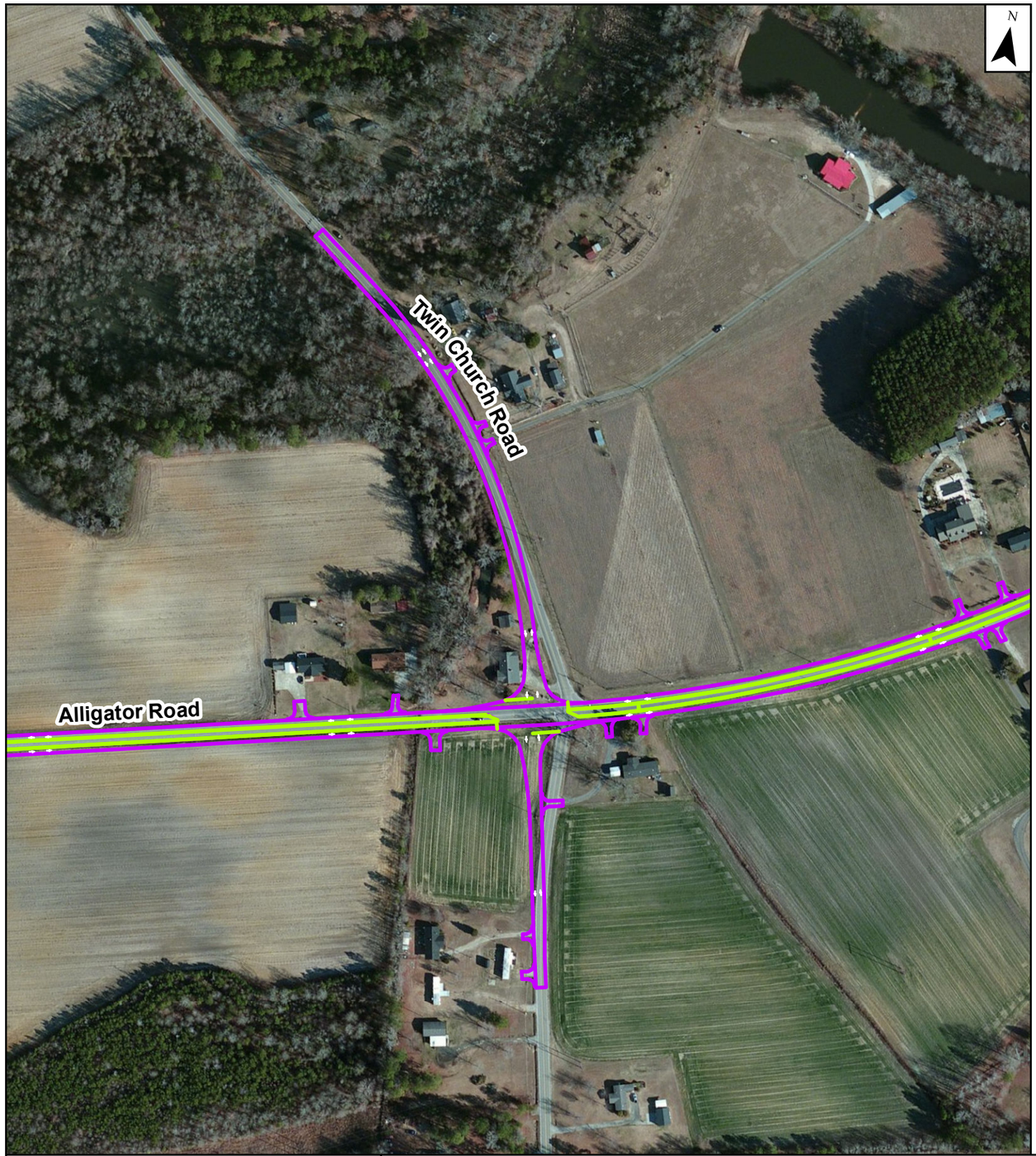
Figure 4i: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 200 400
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands



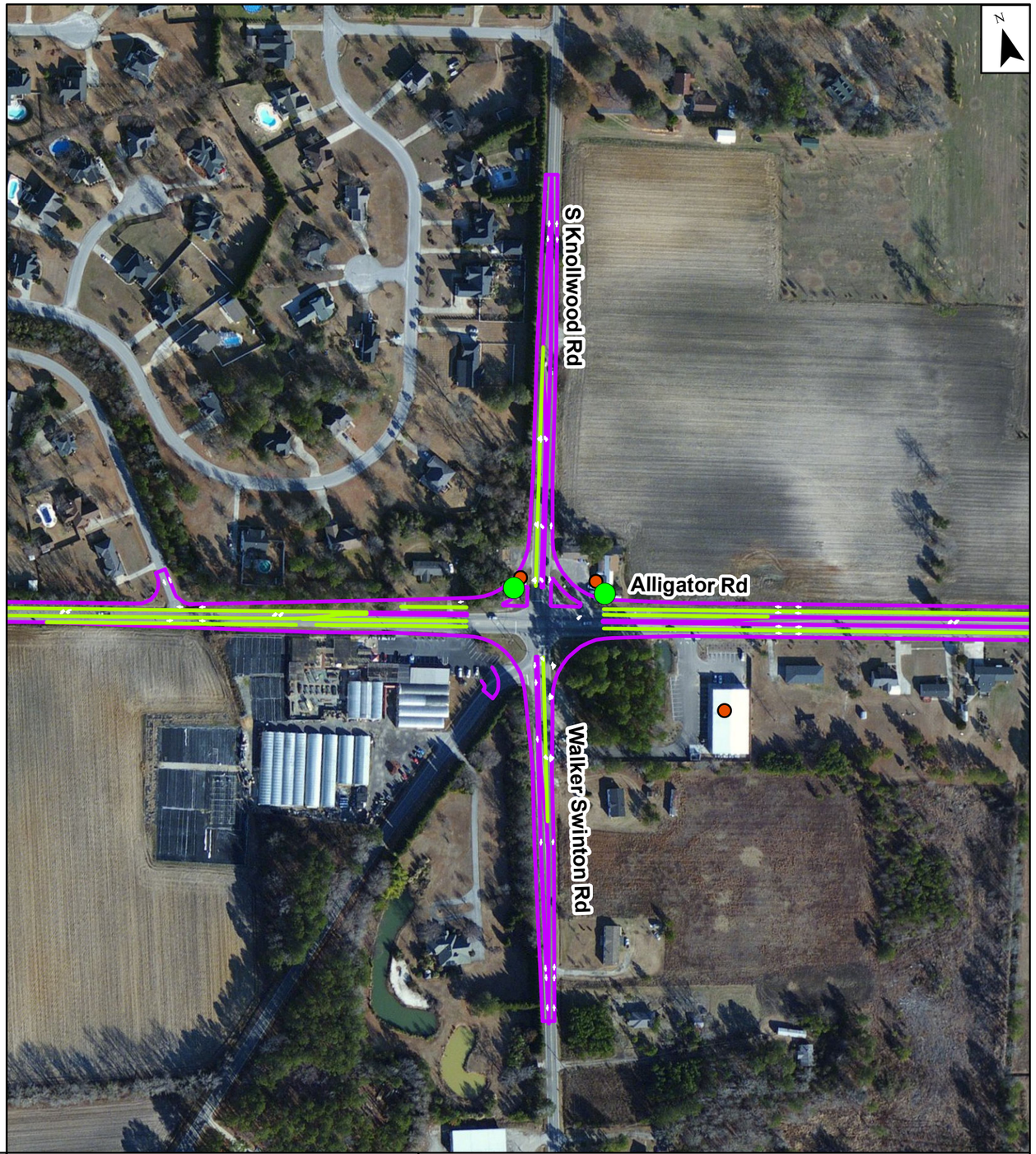


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Figure 4j: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 300 600
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands

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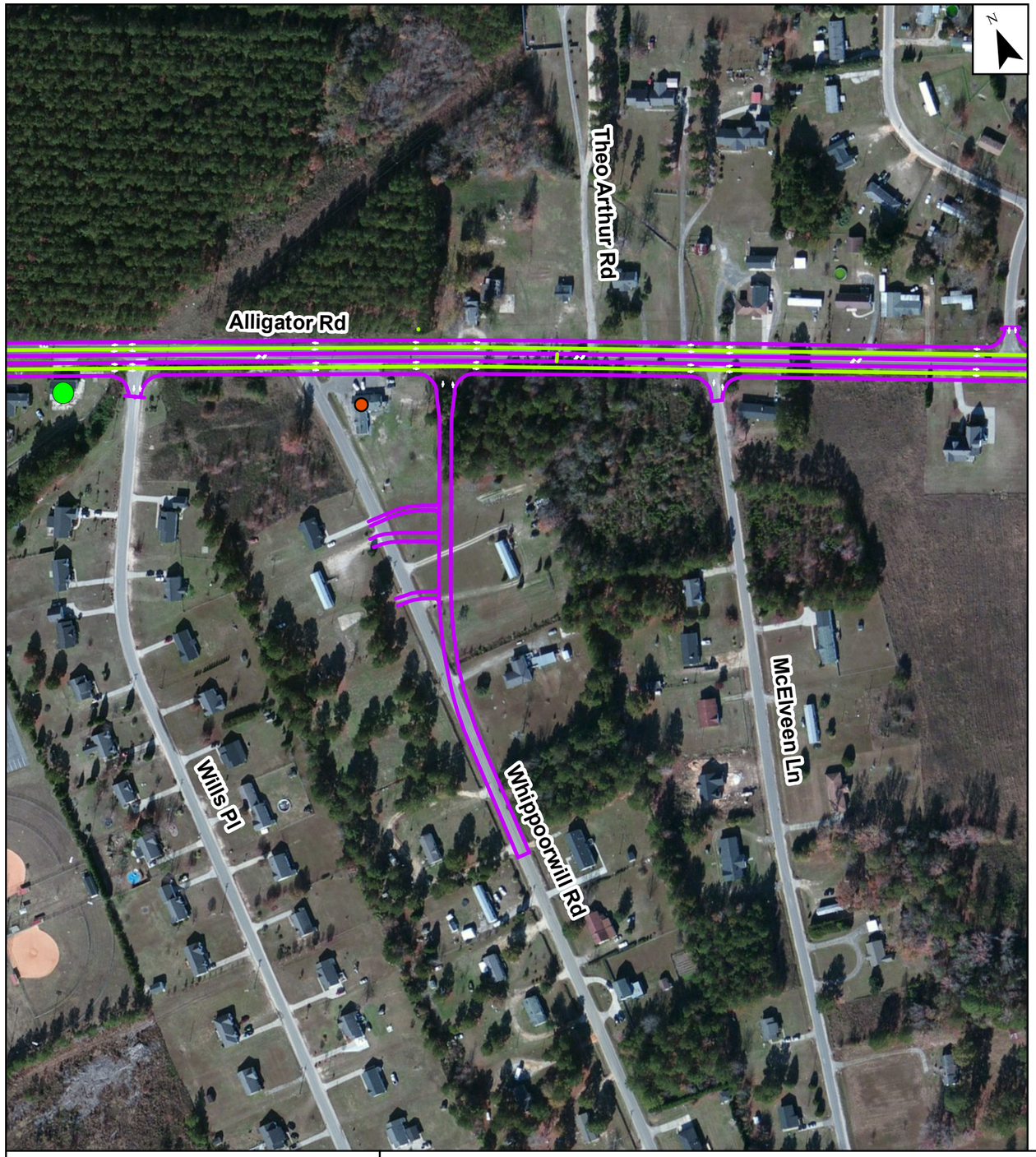
Figure 4k: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 300 600
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands



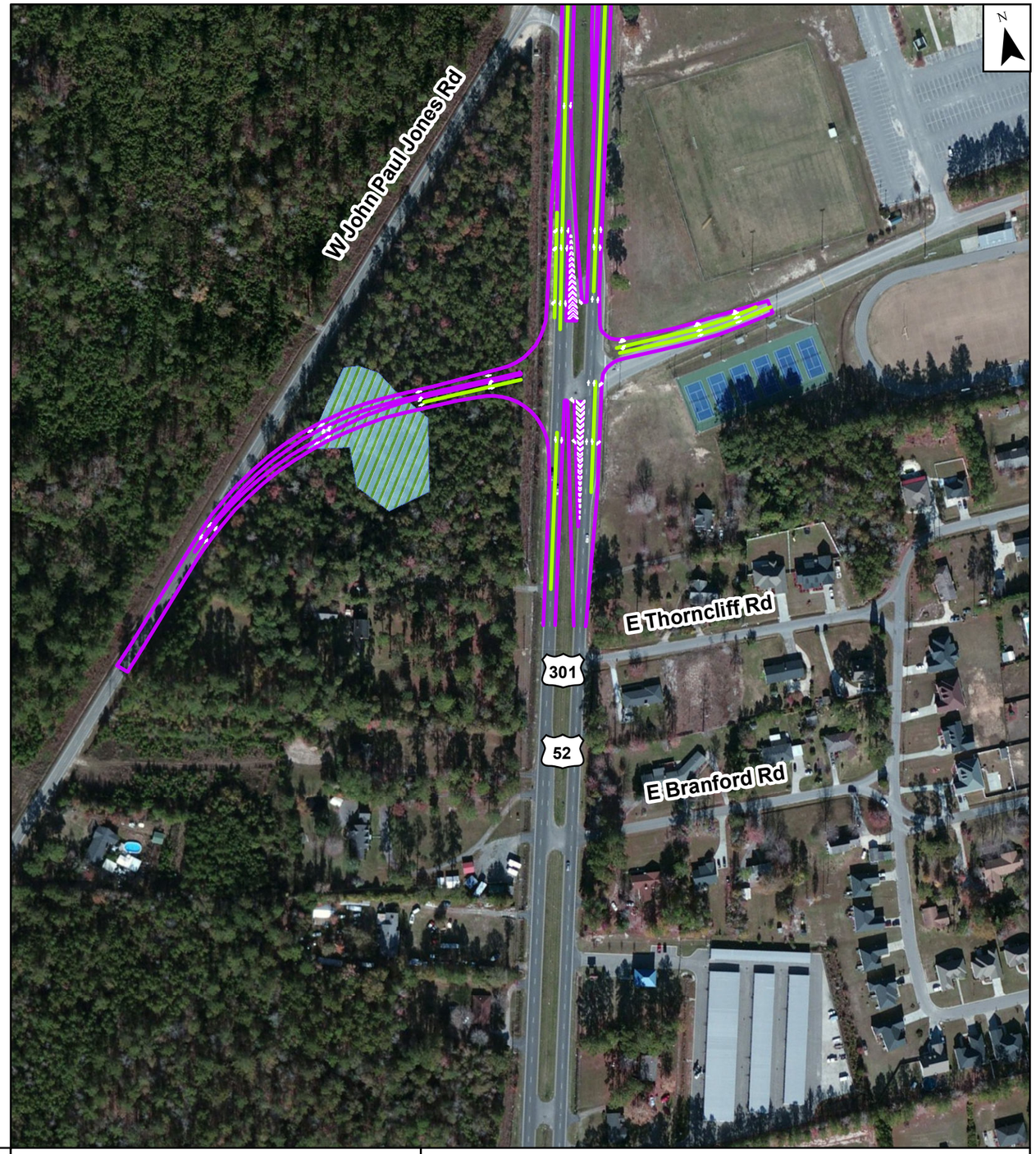


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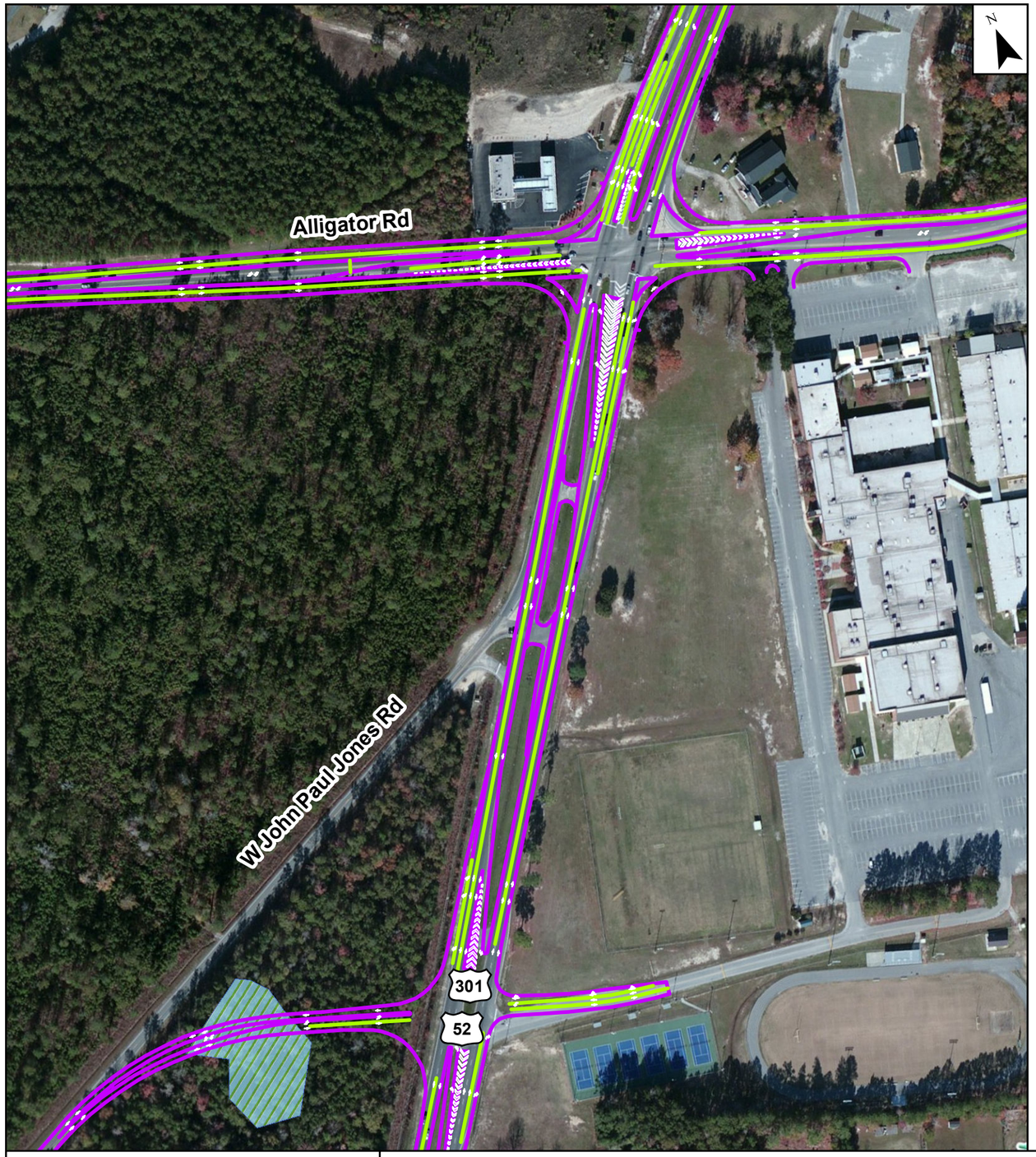
Figure 4I: Preferred Alternative

Alligator Rd Widening
Florence County, SC

0 300 600
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands



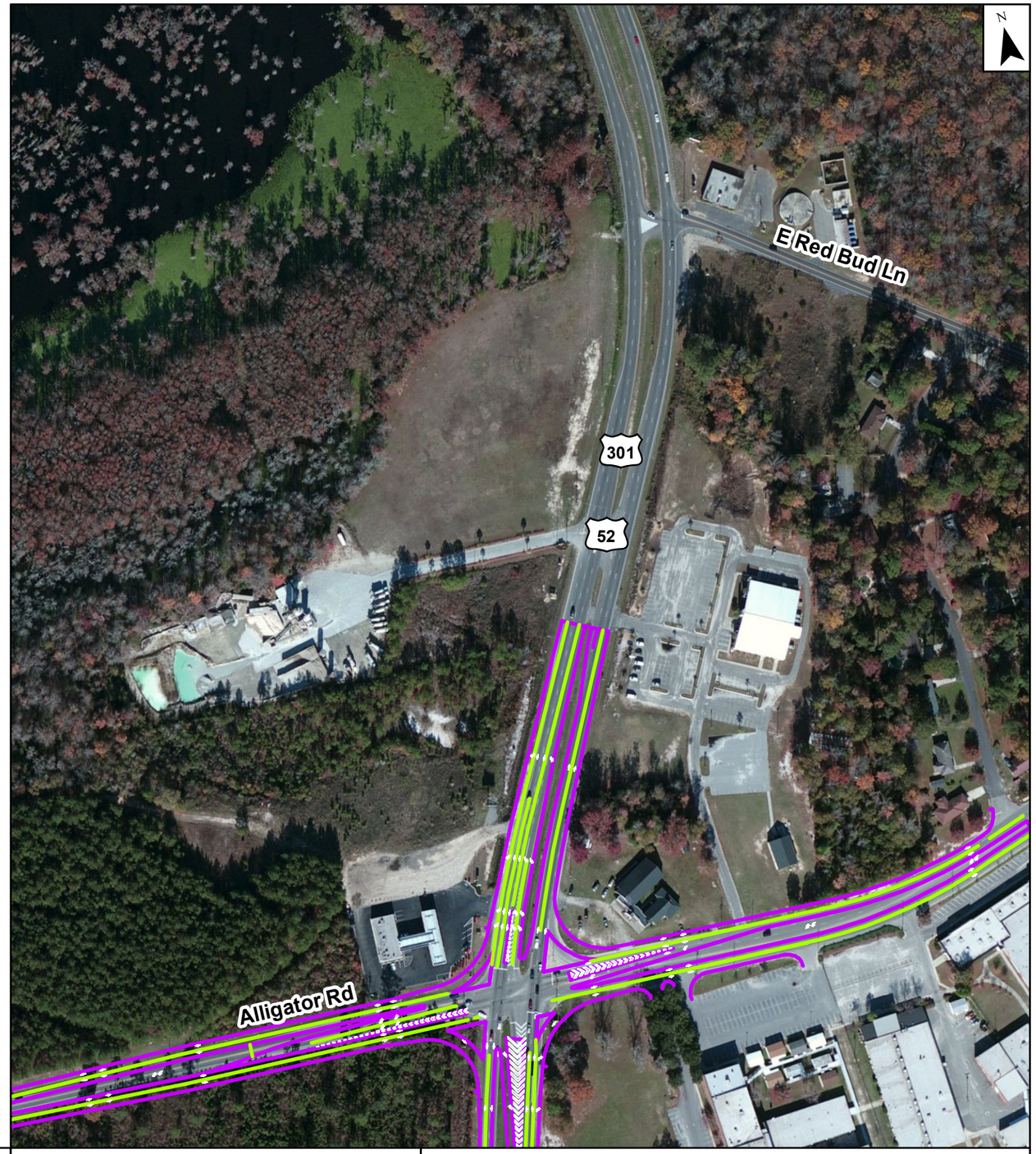


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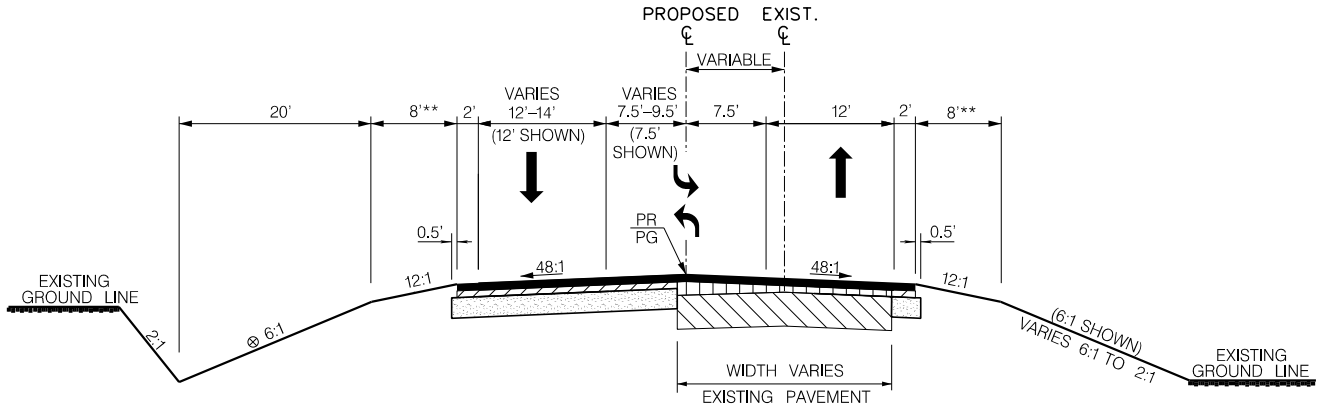
Figure 4m: Preferred Alternative

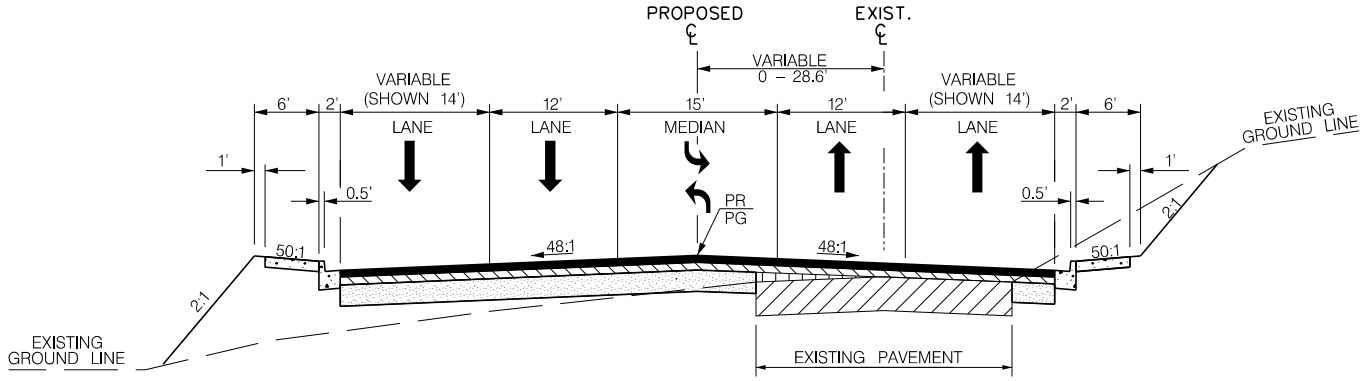
Alligator Rd Widening
Florence County, SC

0 300 600
Feet

- Proposed Travel Way
- Proposed Lane
- Proposed Bridge
- Stream
- Relocation
- Hazardous Materials
- Wetlands



REPRESENTATIVE THREE LANE TYPICAL SECTION



REPRESENTATIVE FIVE LANE TYPICAL SECTION

PRELIMINARY NOT TO SCALE
(NOT TO SCALE)

Prepared by:

HDR | ICA

Figure 5 : Representative Typical Sections

Alligator Road Widening
Florence, SC

4 PROBABLE IMPACTS OF THE PROJECT ON THE ENVIRONMENT

This section includes a discussion on the probable beneficial and adverse social, economic, and environmental effects of the preferred alternative and describes the measures proposed to mitigate any adverse impacts. Environmental studies conducted by Department personnel indicate the absence of any significant adverse impact on the human and natural environment. These studies are incorporated by reference, and used to support this conclusion. The following sections provide a brief overview of the Department's environmental findings.

4.1 Land Use

The PSA is located in Florence County in the lower coastal plain of South Carolina. Specifically, the project lies within the Jeffries Creek watershed. The land uses within the immediate vicinity of the PSA include commercial/industrial development; residential development; undeveloped forested areas; agriculture; and open water associated with Alligator Branch and associated tributaries. Current land uses consists of residential development, light commercial, and transportation uses.

There is a high potential for growth in this watershed. The Florence urban area is the commercial center of the Pee Dee region and is expected to continue to grow, particularly in the I-20/I-95 vicinity on the western edge of Florence, and the major highways leading into the urban area. The surrounding area is served by US 52, US 76, I-20, and I-95 as well as the interchange between the interstates to the west of Florence. This including the Florence urban area, the Pee Dee River area, and the Hartsville area is expected to be an area of major industrial expansion over the next twenty years. There are several large public or private industrial parks, located along the western side of the Florence urban area, and should foster additional large-scale development. The PSA and surrounding area has extensive water system coverage, including service from the City of Hartsville, the Darlington County Water and Sewer Authority, the City of Florence, and Florence County. The City of Florence has under design a surface water treatment facility on the Great Pee Dee River that could evolve into a regional water treatment plant. The City of Florence has also expanded its wastewater treatment plant and constructed an outfall to the Great Pee Dee River, which should increase the availability of sewer service in the watershed and increase the likelihood of additional growth and development. A 700-acre industrial park at I-95/SC327 has been built and should spur future growth. The Florence County One Cent Capital Project Sales Tax should spur growth by financing the proposed widening of SC 51, US 378, US 76, TV Road, Pine Needles Road, and US 301 Bypass.

Savannah Grove Community Park and Sunset Memorial Gardens

The preferred should not adversely affect current or proposed land uses in the area. The Florence County Comprehensive Plan (currently being updated) designates the project area as primarily Rural Preservation that protects and sustains existing rural uses including single family homes and associated accessory uses. This zoning designation would seek to maintain existing

land uses by precluding any non-conforming development. [5] There would be additional right-of-way required along the roadway frontage that would necessitate the relocation of signage, reconfiguration of entrances, and alter some land uses. Based on the proposed improvements, local commercial, industrial, and residential land uses should benefit through improved roadway operating conditions and pedestrian improvements.

4.2 Threatened or Endangered Species

Pursuant to Section 7 of the Endangered Species Act of 1973, a field survey of the proposed new right-of-way was conducted in August 2011. The following list of endangered (E) and threatened (T) species for Florence County was obtained from the most recent listing (2010) by the U.S. Fish and Wildlife Service (USFWS):

Table 10 - Florence County Threatened and Endangered Species

Category	Common Name	Scientific Name	Status
Bird	American wood stork	*Mycteria americana*	Threatened
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA*
	Red-cockaded woodpecker	*Picoides borealis*	Endangered
Fish	Atlantic sturgeon	*Acipenser oxyrinchus*	Endangered
	Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Plant	American chaffseed	*Schwalbea americana*	Endangered
	Canby's dropwort	*Oxypolis canbyi*	Endangered

* Federally protected under the Bald and Golden Eagle Protection Act.

The review of the habitat requirements and previous records for the federally listed species for Florence County, along with the field observations, conclude that there is very low potential for the presence of any federally protected species due to the lack of suitable habitat, the existing land uses along the project area, and scope of improvements. However, limited suitable habitat was identified for the wood stork. As such, a ***"may affect, but not likely to adversely affect"*** determination is recommended for the wood stork with a ***"no effect"*** determination recommended for the remaining species listed for Florence County. A copy of the Natural Resource Technical Memorandum is included in Appendix B and a copy of the USFWS concurrence with this determination is included in Appendix I.

4.3 Farmlands

The Farmland Protection Policy Act of 1981 requires evaluation of farmland conversions to nonagricultural uses. Farmland can be prime farmland, unique farmland, or farmland of statewide or local importance. Prime farmland soils are those that have characteristics favorable for the economic production of sustained high yields of crops. These soils may or may not be presently used as cropland. Conversely, land that is presently used as cropland may or may not be prime farmland.

Through the use of county farmland listings provided by the Natural Resources Conservation Service (NRCS), it has been determined that the PSA would involve lands protected under the

[5] http://florenceco.org/offices/planning/

Act. A Farmland Conversion Impact Rating Form SCS-CPA-160 has been completed for the project corridor. The form provides a site assessment scoring system with criteria for evaluating adverse effects of projects on the protection of farmland. Sites receiving highest scores up to a maximum of 260 are considered most suitable for protection while those with lowest scores are considered least suitable. Sites receiving scores less than the maximum allowable score of 160 are to be given minimal consideration for protection. The score computed for this proposed action was 152. As the total points are less than 160, neither consideration of alternative sites nor additional studies for the study area are required under the Act. A copy of the Farmland Conversion Impact Rating Form is included in Appendix C.

4.4 Water Quality

Florence County is located within the Great Pee Dee River Watershed Unit (03050202). The Great Pee Dee River Basin is located in Marlboro, Chesterfield, Darlington, Florence, Dillon, Marion, Williamsburg, Horry, and Georgetown Counties, and encompasses 22 watersheds and 4,029 square miles within South Carolina, excluding the Lynches River, Black River, and Waccamaw River Basins. The Great Pee Dee River flows across the Sandhills region to the Upper and Lower Coastal Plain regions and into the Coastal Zone region. Of the approximately 2.5 million acres, 33.4% is agricultural land, 25.7% is forested land, 27.9% is forested wetland, 6.3% is urban land, 2.7% is scrub/shrub land, 2.6% is water, 1.2% is nonforested wetland, and 0.2% is barren land. The urban land percentage is comprised chiefly of the Cities of Florence, Darlington, Bennettsville, and Dillon. In the Great Pee Dee River Basin, there are approximately 4,669 stream miles, 10,864 acres of lake waters, and 17,676 acres of estuarine areas. The Great Pee Dee River flows across the North Carolina/South Carolina state line and accepts drainage from Thompson Creek, Crooked Creek, Cedar Creek, Three Creeks, and Black Creek. The river then accepts drainage from Jeffries Creek, Catfish Creek, the Lynches River Basin, the Little Pee Dee River, the Black River Basin and the Waccamaw River Basin before draining into Winyah Bay.[6]

The PSA is located within the Jeffries Creek Watershed (03040201-09), which is located in Darlington and Florence Counties and consists primarily of Jeffries Creek and its tributaries. The watershed occupies 137,115 acres of the Upper and Lower Coastal Plain regions of South Carolina. Land use/land cover in the watershed includes: 36.9% agricultural land, 22.4% forested wetland, 21.6% forested land, 15.4% urban land, 3.1% scrub/shrub land, 0.3% nonforested wetland, and 0.3% water. Jeffries Creek accepts drainage from Beaverdam Creek, Gulley Branch, Pye Branch, Middle Swamp (Oakdale Lake, Forest Lake, Alligator Branch, Billy Branch), Eastman Branch, and Cane Branch. Polk Swamp Canal (Adams Branch, Twomile Creek, Canal Branch) enters the system downstream, followed by Middle Branch, Long Branch, Boggy Branch, More Branch, and Willow Creek (Little Willow Creek, Cypress Creek, Spring Branch, Claussen Branch). The Jeffries Creek Watershed drains into the Great Pee Dee River. There are a total of 229.5 stream miles and 353.2 acres of lake waters in this watershed. Jeffries Creek and Middle Swamp are classified FW* (dissolved oxygen not less than 4.0 mg/l and pH between 5.0 and 8.5) and the remaining streams in the watershed are classified FW[7].

The proposed Alligator Road widening includes replacing the existing bridge over Alligator Branch. Alligator Branch is a tributary to Middle Swamp and generally flows northwards to Forest

[6] http://www.scdhec.gov/HomeAndEnvironment/Water/Watersheds/WatershedMap/PeeDeeWatershed/GreatPeeDeeRiver/

[7] http://www.scdhec.gov/HomeAndEnvironment/Water/Watersheds/WatershedMap/PeeDeeWatershed/GreatPeeDeeRiver/

Lake/Middle Swamp, which drains to Jeffries Creek approximately 8 miles downstream of Forest Lake. Jeffries Creek ultimately drains to the Great Pee Dee River approximately 20 miles from the confluence with Middle Swamp. SCDHEC maintains an ambient surface water quality monitoring station (PD-230) along Middle Swamp at SC 51, approximately 2.5 river miles downstream of the PSA. At this location, the required standards for dissolved oxygen and *E. coli* are not maintained. As such, this portion of Middle Swamp and it's tributaries are listed in the *State of South Carolina's 2014 303(d) List* of impaired waters as aquatic life uses (i.e. DO excursions) and recreational uses (*E.coli* excursions) are not maintained.[3]which is impaired due to low dissolved oxygen levels (D.O.) approximately 3.8 miles downstream of the proposed bridge.[8]

The proposed impervious roadway surface would increase to 67 feet between US 52 and Knollwood and 39 feet between US 76 and Knollwood. Therefore, this design would increase the surface area for the accumulation of particulate matter and increase the volume of runoff. Motor vehicles are a major source for roadway pollutants, and research demonstrates that pollutant concentrations are expected to increase with increased traffic volumes. The roadway design would incorporate appropriate Best Management Practices to adequately capture, convey, and discharge stormwater in compliance with SCDOT's Water Quality Design Manual.[9] In addition, the grassed shoulders would retain some runoff and provide natural filtration.

The project would have the potential to temporarily impact water quality during construction through various land-disturbing activities. These activities would increase the potential for sediment loading in runoff by mechanized land clearing, removal of vegetation, and alteration of land contours. As a result of these potential impacts, the Clean Water Act, as amended, regulates stormwater discharges from construction sites greater than 1 acre through the NPDES Stormwater Program. In South Carolina, the SCDHEC is responsible for administering this program. As such, the NPDES permit for the proposed project would be administered by SCDHEC through the Stormwater, Construction & Agricultural Permitting Division, in conjunction with the State Sediment, Erosion, and Stormwater Management Program. These programs would ensure that the potential impacts would be avoided and minimized through the use of best management practices such as seeding, installation of silt fences, temporary sediment basins, and other similar practices. The contractor would also be required to minimize this impact through implementation of construction best management practices, reflecting policies contained in 23 CFR 650B and SCDOT's Supplemental Specifications on Seeding and Erosion Control Measures (January 01, 2015). These regulations and guidance specifically prescribe the policies and procedures for the control of erosion, abatement of water pollution, and prevention of damage by sediment deposition from all construction activities.

4.5 Permits

The project would require the placement of fill in freshwater wetlands and streams located throughout the project corridor. It is anticipated that the construction of this project would be authorized under a US Army Corps of Engineers Individual Permit. Mitigation would consist of debiting the Lynches River Mitigation Site in Florence County.

4.5.1 Public Interest Factors

According to U.S. Army Corps of Engineers regulations (33CFR Part 320.4 (a)(1):
The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest.

[8] http://www.scdhec.gov/HomeAndEnvironment/Docs/tmdl_14-303d.pdf, last accessed August 26, 2016.
[9] http://www.scdot.org/doing/stormwater_designManual.aspx, last accessed October 5, 2016.

Evaluation of the probable impact which the proposed activity may have on the public interest requires a careful weighing of all those factors which become relevant in each particular case.

In addition, all factors which may be relevant to the proposal must be considered including the cumulative effects thereof: among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of
property ownership and, in general, the needs and welfare of the people.

The public interest review factors for this project were considered in the development and selection of the Preferred Alternative. The Summary of Impacts (Table 7, page 11) quantifies impacts to many of these categories that were considered during the evaluation of the alternatives, including wetlands, streams, protected species, historic properties, floodplains, business and residential relocations, noise, farmlands, and hazardous material sites. The potential impacts of these features to land use, community impacts, impacts to Section 4(f) 6(f) properties, economic impacts, wildlife impacts, and general environmental concerns were considered for all reasonable alternatives.

4.5.2 Section 404 (b)(1) Guidelines

The Section 404(b)(1) guidelines are U.S. Environmental Protection Agency regulations (40 CFR Part 230) that regulate the deposition of dredge or fill material in wetlands. They are essential during consideration for the issuance or denial of a permit to fill or alter jurisdictional waters of the United States. A permit for the wetland, stream, and pond impacts from this project will be needed, therefore these guidelines should be followed in the development of a Preferred Alternative. USACE regulations (33 CFR Part 320(a)(1) state:

For activities involving 404 discharges, a permit will be denied if the discharge that would be authorized by such permit would not comply with the Environmental Protection Agency's 404(b)(1) guidelines.

The USEPA regulations (40 CFR 230.10(a)) require that:

No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have, so long as the alternative does not have other significant adverse environmental consequences.

It must be demonstrated that avoidance and minimization steps have been taken to reduce the unavoidable impacts associated with the project and that there is no other alternative with "less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."

The consideration of impacts to aquatic habitat during the alternatives analysis is documented in Chapter 4 'Probable Impacts of the Project on the Environment.' Based on the information outlined in Chapter 4, the 'Preferred Alternative' is the least environmentally damaging practicable alternative (LEDPA).

The effort to reduce impacts to jurisdictional waters of the United States would continue through the refinement of the design of the Preferred Alternative. The compensatory mitigation for unavoidable impacts from the project would be provided by the Lynches River Mitigation Site that was authorized under a Nationwide 27 that was approved on August 23, 2013.

4.6 Waters of the U.S.

Waters of the U.S. (WOUS), as it applies to the jurisdictional limits of the authority of the U.S. Army Corp of Engineers (USACE), is defined in 33 CFR Part 328, and includes:

- 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;
- All interstate waters including interstate wetlands;
- 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;
- All impoundments, tributaries, and adjacent wetlands to the waters defined above;
- The territorial seas.

Potential WOUS were identified along the project area, and the proposed project was evaluated to determine the impacts to these areas. The impacts would require the approval from the appropriate regulatory agencies, which ensures that impacts are avoided and minimized where practicable.

The evaluation of potential jurisdictional waters of the U.S. included a review of available mapping, specifically the National Wetland Inventory (NWI) maps, soil surveys, USGS topographic quadrangles (*Timmonsville, Florence West*), color aerial photography, GIS data, and 2006 NAPP false-color infrared aerial photography. The review of initial mapping identified Alligator Branch along with potential wetlands and other WOUS located within the PSA. Various site visits have been conducted throughout project development, with the most recent conducted in September 2015 to further evaluate and document the potential WOUS. In summary, it was determined that the 415 acre PSA includes 2,253 LF of jurisdictional tributaries and approximately 9.54 acres of jurisdictional wetlands (Figure 6). These findings and determinations are currently being coordinated with the USACE for final verification/determination of the jurisdictional status.

4.6.1 Streams and Open Water

The various review and investigations identified five unnamed tributaries to Forest Lake/Middle Swamp that exhibit characteristics of a jurisdictional tributary per the USACE regulations and guidelines. The stream reaches within the PSA generally include small, first to second order streams with perennial to seasonal water flow. The tributaries are generally surrounded by undeveloped forested areas, residential land uses, and/or agricultural land uses. The substrate is largely silt/sand, with available habitat dependent upon flow regime.

These streams, including Alligator Branch, generally flow northwards to Forest Lake/Middle Swamp, which drains to Jeffries Creek approximately 8 miles downstream of Forest Lake. Jeffries Creek ultimately drains to the Great Pee Dee River approximately 20 miles from the

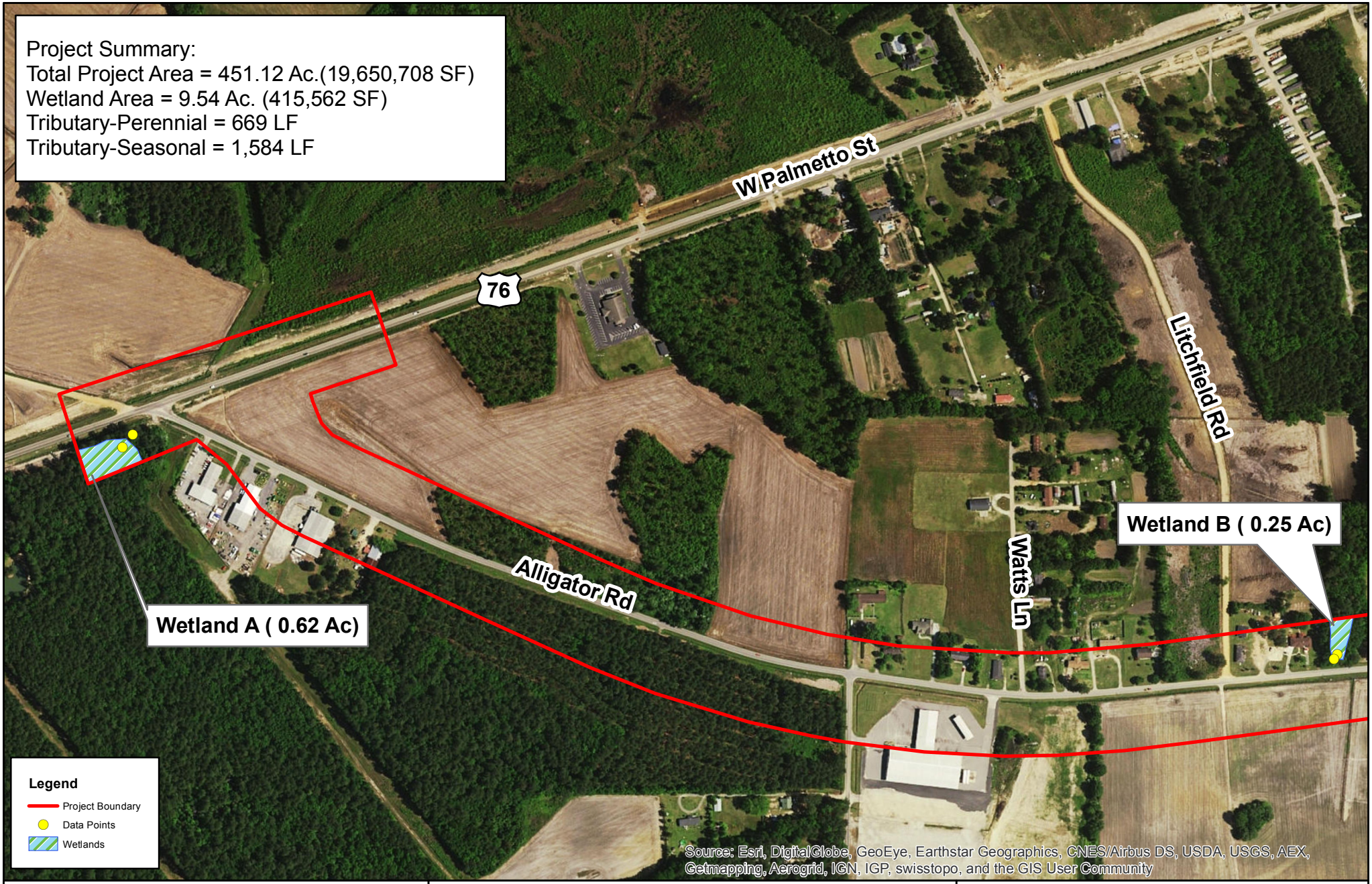
confluence with Middle Swamp. The proposed project would impact a total of 302 LF of streams. These impacts are generally culvert extensions necessary to accommodate the widening.

These features are summarized in Table 11, and described in further detail in the Natural Resource Technical Memorandum (NRTM) included in Appendix B.

Table 11 - Stream Summary Table

Feature Name	Linear Feet of Stream Within PSA	Linear Feet of Stream Impacted*	Description
Tributary 1	309	82	Second order, perennial flow
Tributary 2	962	56	Second order, seasonal flow
Tributary 3	360	63	Second order, perennial flow
Tributary 4	366	57	Second order, seasonal flow
Tributary 5	256	44	First order, seasonal flow

* Impacts are based on right-of-way limits – impacts likely to be less based on construction limits



Prepared:
9/8/2016
By:

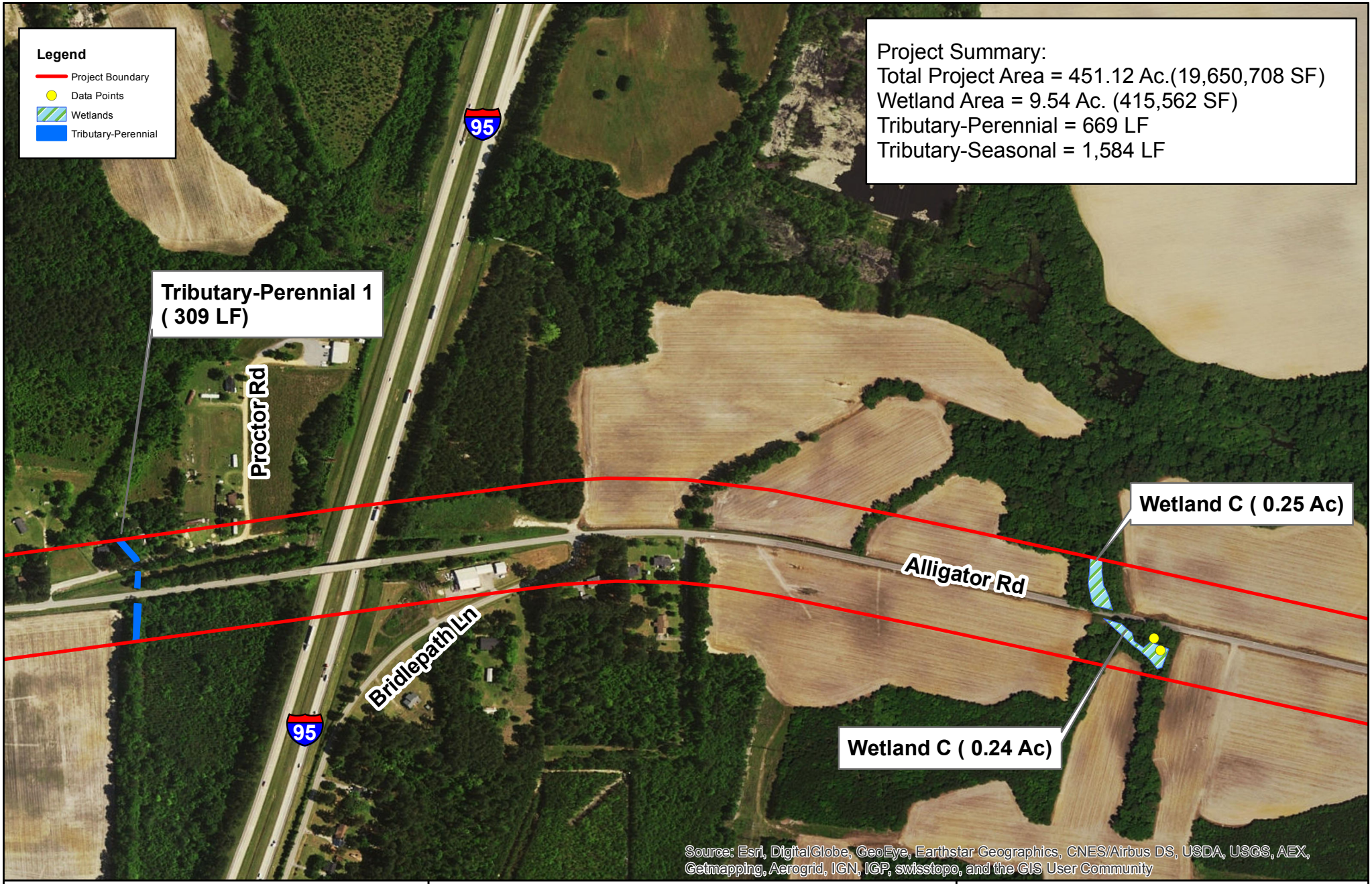
HDR | ICA

Figure 6a: Jurisdictional Features

Alligator Rd Widening
Florence County, SC

N
W E
S

0 200 400 800 Feet



Prepared:
9/8/2016
By:

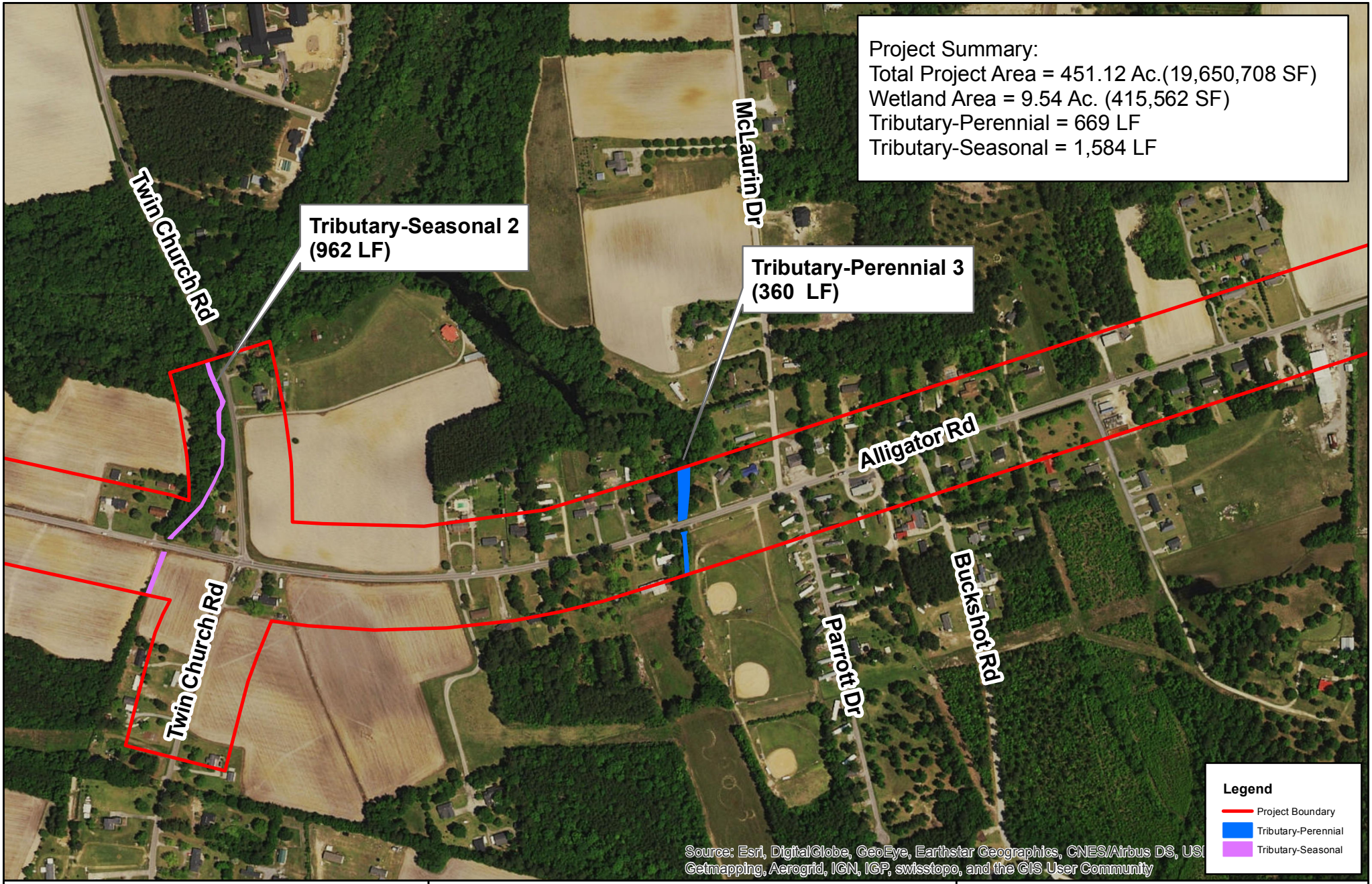
HDR | ICA

Figure 6b: Jurisdictional Features

Alligator Rd Widening
Florence County, SC

0 200 400 800 Feet

N
W E
S



Prepared:
9/8/2016
By:

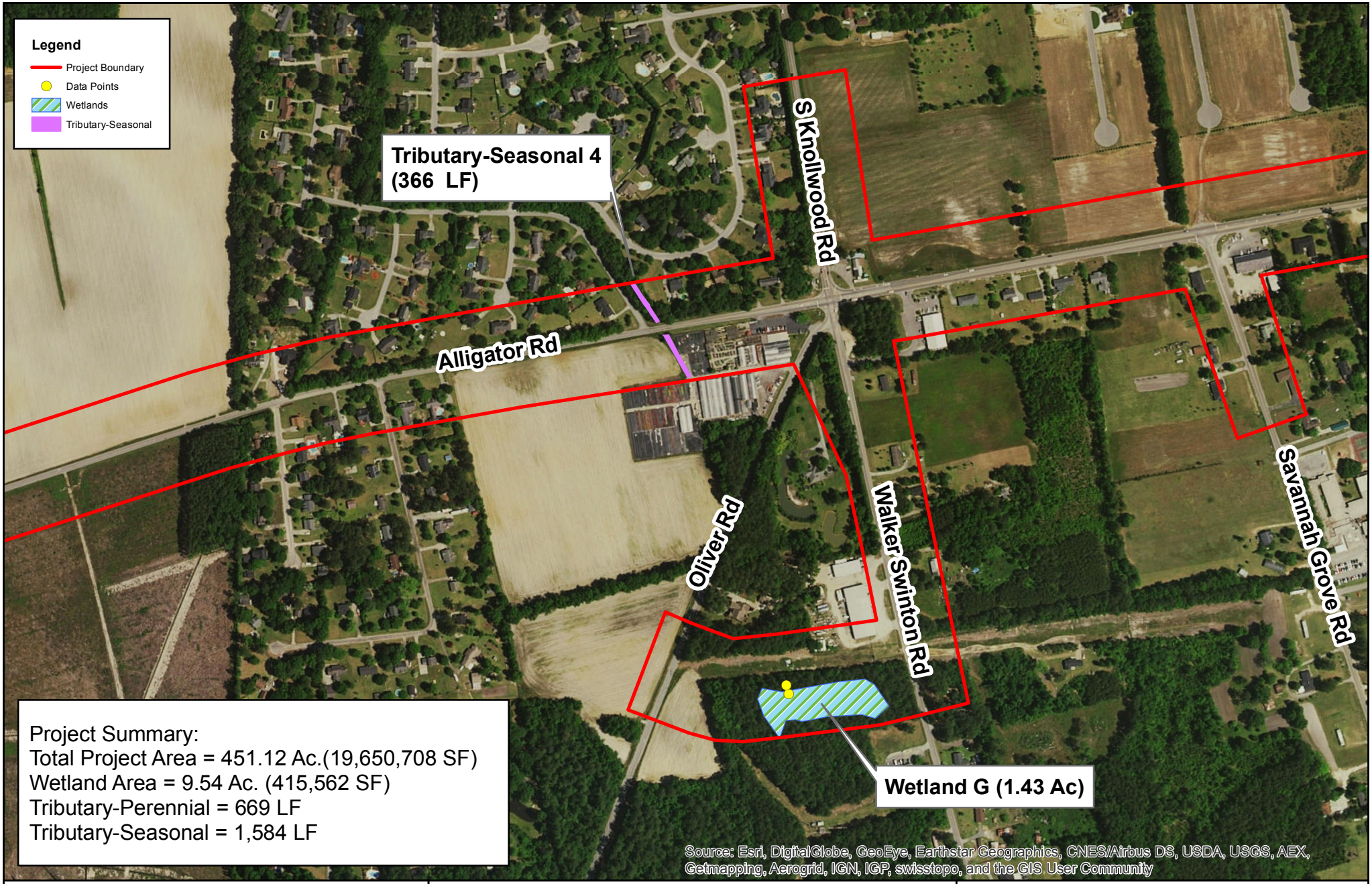
HDR | ICA

Figure 6c: Jurisdictional Features

Alligator Rd Widening
Florence County, SC

N
W E
S

0 200 400 800 Feet



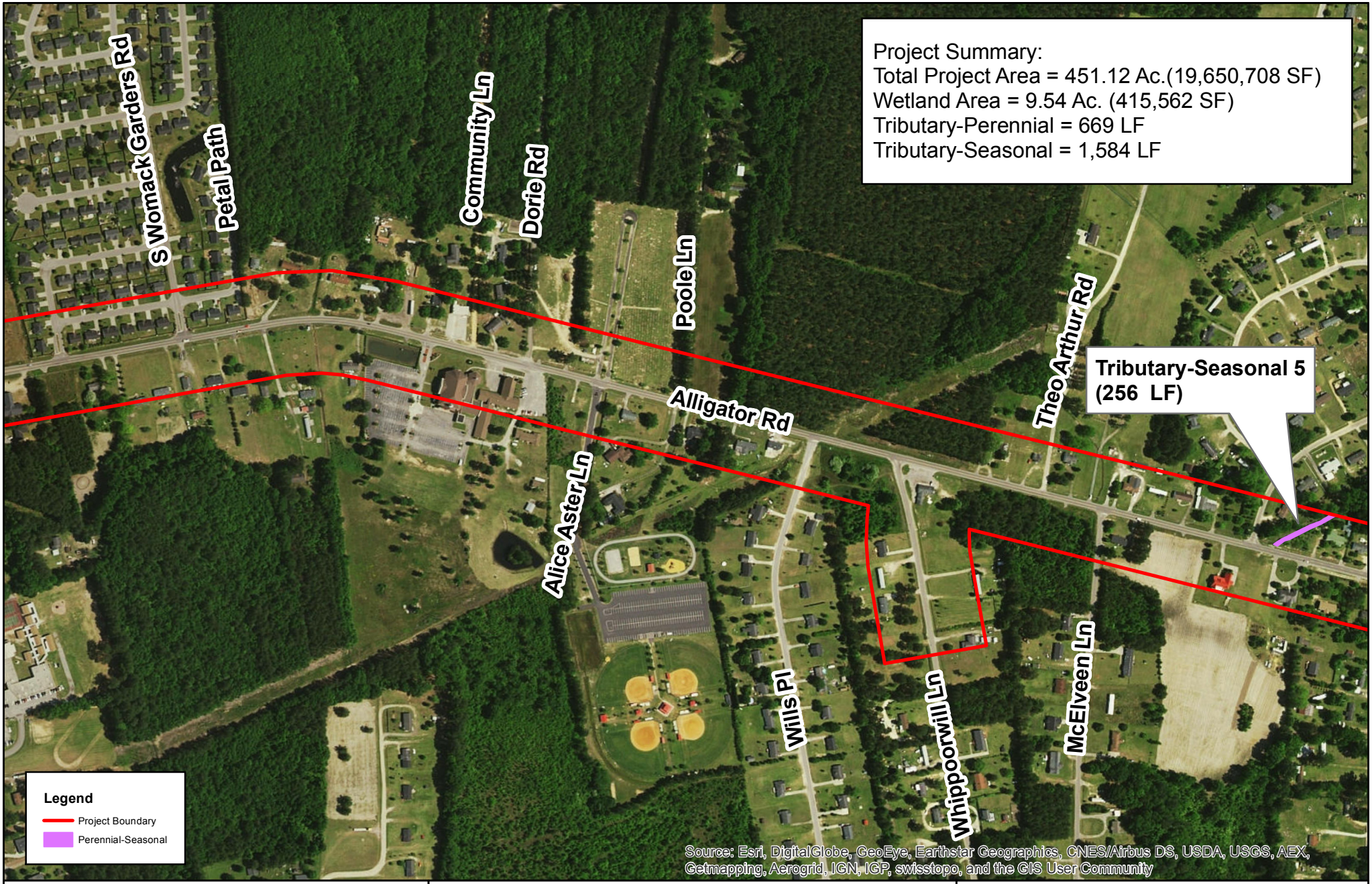
Prepared: 9/8/2016
By: HDR | ICA

Figure 6d: Jurisdictional Features

Alligator Rd Widening
Florence County, SC

N W E S

0 200 400 800 Feet



Prepared:
9/8/2016
By:

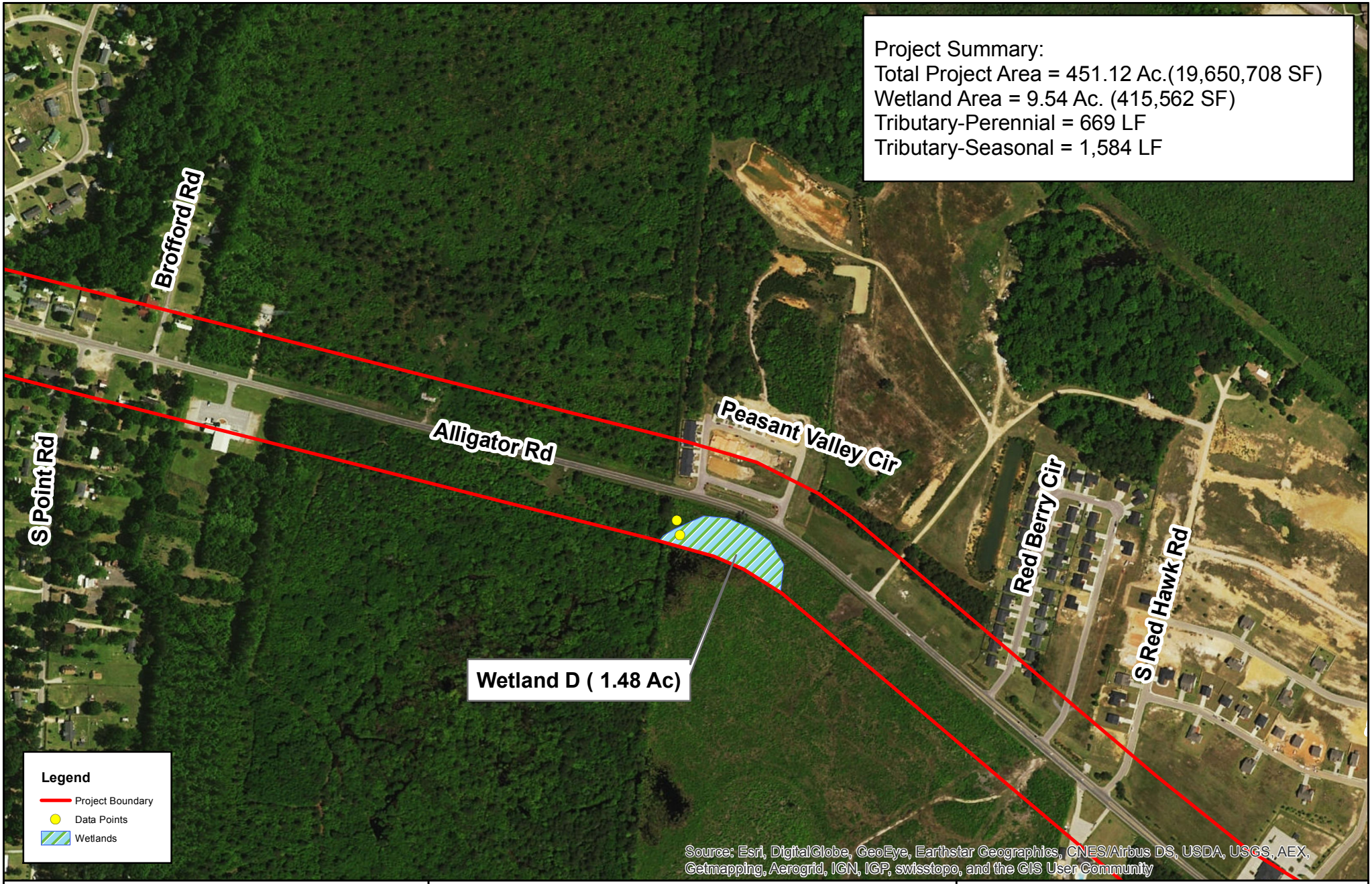
HDR | ICA

Figure 6e: Jurisdictional Features

Alligator Rd Widening
Florence County, SC

0 200 400 800 Feet

N
W E
S



Prepared:
9/8/2016
By:

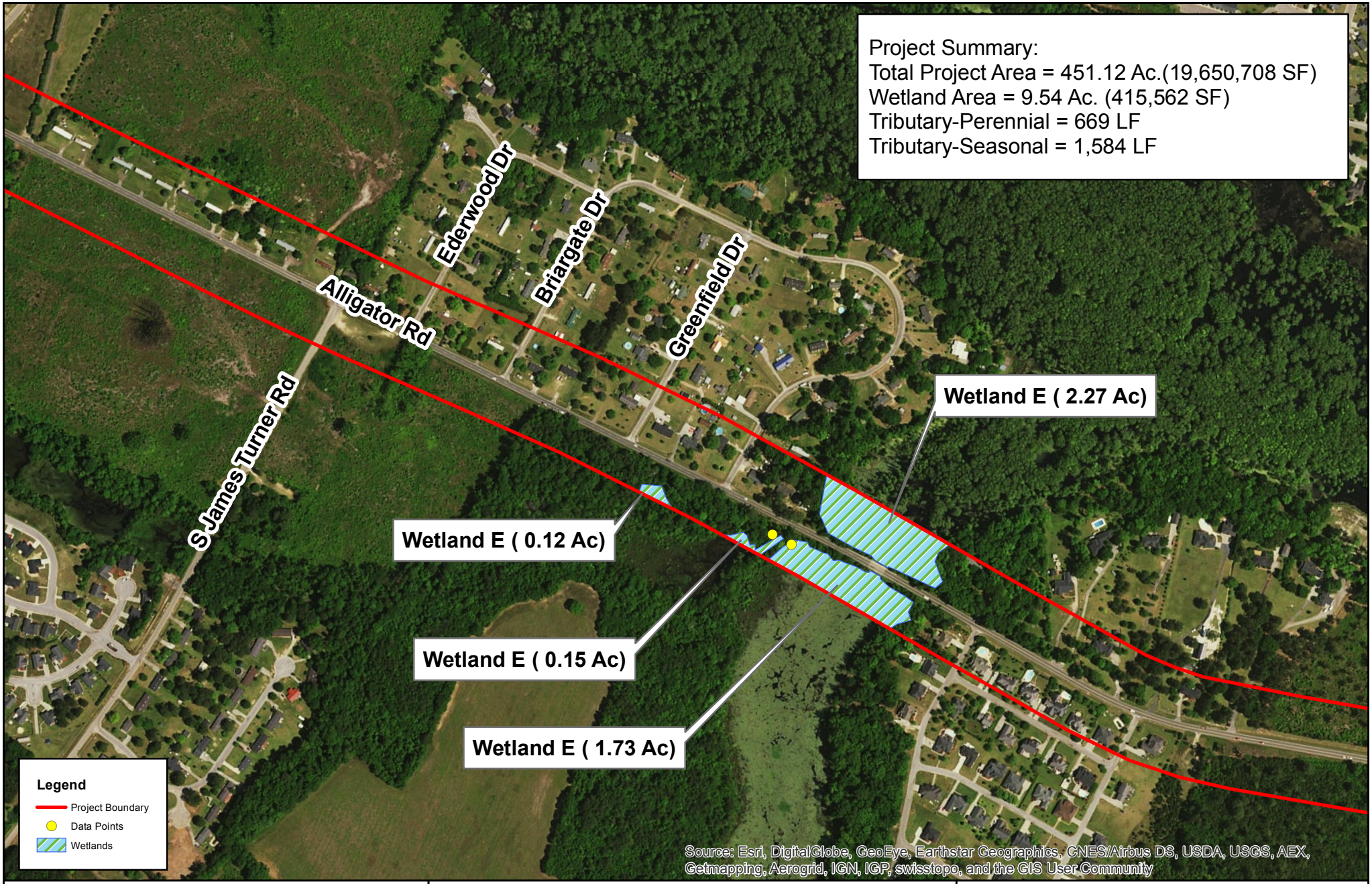
HDR | ICA

Figure 6f: Jurisdictional Features

Alligator Rd Widening
Florence County, SC

N
W E
S

0 200 400 800 Feet



Prepared:
9/8/2016
By:

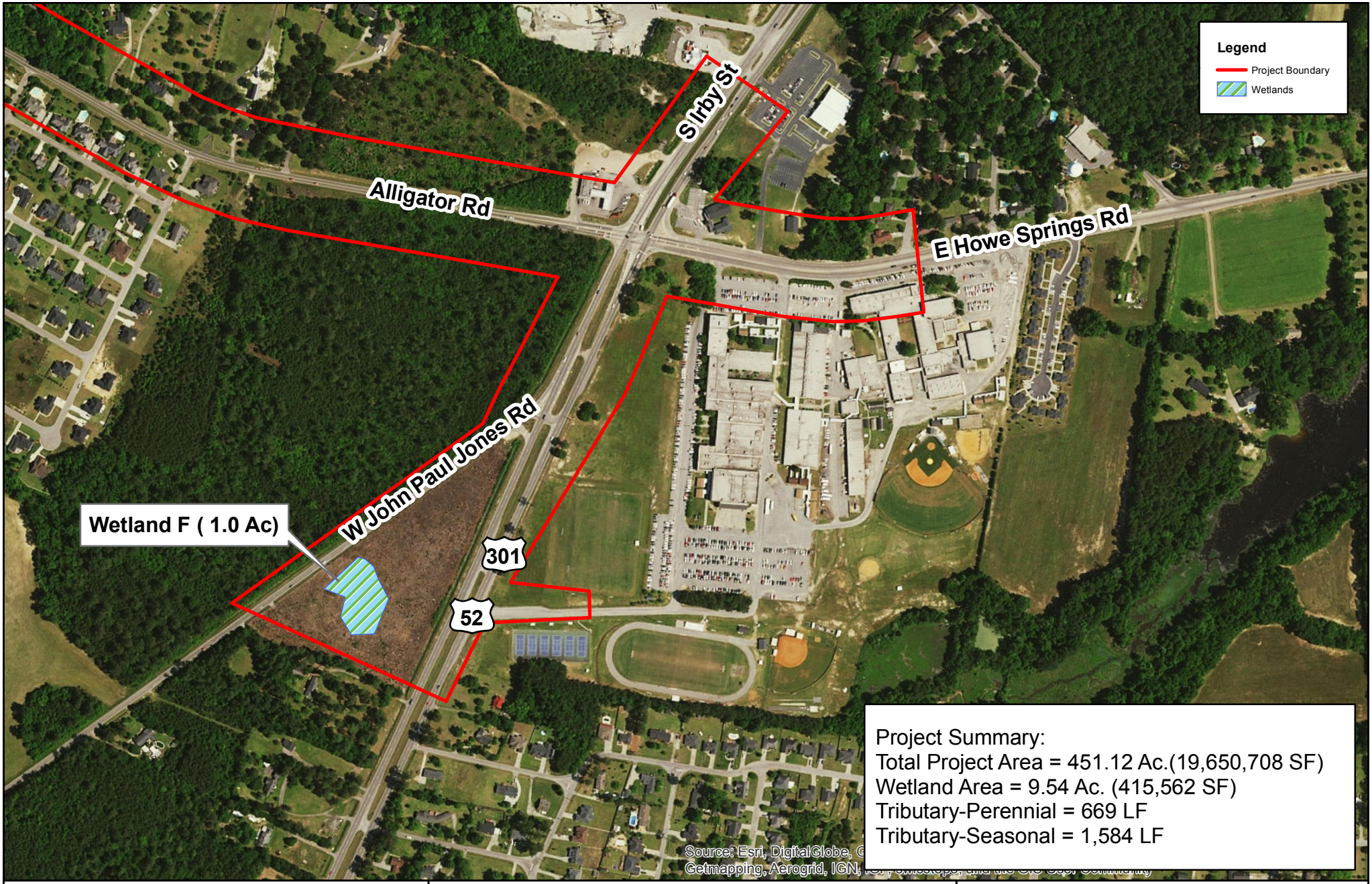
HDR | ICA

Figure 6g: Jurisdictional Features

Alligator Rd Widening
Florence County, SC

N
W E
S

0 200 400 800 Feet



Prepared:
9/8/2016
By:

HDR | ICA

Figure 6h: Jurisdictional Features

Alligator Rd Widening
Florence County, SC

N
W E
S

0 200 400 800 Feet

4.6.2 Wetlands

Wetland habitats are defined as those areas that are inundated by water with sufficient frequency and duration to support vegetation that is tolerant of saturated soil conditions. The USACE utilizes specific hydrologic, soil, and vegetation criteria in establishing the boundary of wetlands within their jurisdiction. The detailed field assessment concluded that the project area seven individual wetland areas, including Alligator Branch, totaling 9.54 acres. These wetlands would be considered as Category 3 wetlands based on the USFWS Resource Category criteria as outlined in the USFWS Mitigation Policy, 46 CFR 7644-7663. Category 3 wetlands are community types of high to medium wildlife value which are relatively abundant on a national basis.

The vegetative communities and available habitat vary largely depending upon landscape position. The main drainage and swamp of Alligator Branch constitutes 4.27 acres (i.e. Wetland E). Within the PSA, Alligator Branch is a ponded/backwater swamp system, with various habitats including open water, emergent, and forested, including snags. The main drainage includes *Salix nigra* (black willow), *Nyssa aquatica* (water tupolo) and various snags with the forested fringe areas dominated by *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Nyssa sylvatica* (black gum), *Carpinus caroliniana* (ironwood), *Morella cerifera* (wax myrtle), *Arundinaria gigantea (*giant cane), and *Saururus cernuus* (lizard's-tail). The other wetland areas include small stream forests wetlands that are directly associated with a tributary and/or a larger wetland complex associated with offsite waters. The vegetation along this areas is dominated by sweetgum, red maple, *Quercus nigra* (water oak), *Q.* (willow oak), *Pinus taeda* (loblolly pine), *Smilax rotundifolia* (horsebrier), *Ligustrum sinense* (Chinese privet), and giant cane. Hydrologic conditions along these areas vary from surface water to geomorphic positions, with hydric soils indicated by a depleted matrix. The wetland areas transition to upland areas and/or are bordered by agricultural or disturbed lands uses. These wetlands function primarily as filtration, flood storage, and riparian buffers, while providing habitat for common birds, mammals, and reptiles. The proposed project would impact a total of 1.1 acres of wetlands. These impacts are primarily due to the addition of fill needed to accommodate the widening. The wetlands areas are summarized in Table 12, and described in detail in the NRTM included in Appendix B.

Table 12 - Wetland Summary Table

Feature Name	Area Within PSA (acres)	Area of Impact*	Description
Wetland A	0.62	0	Palustrine, forested wetland
Wetland B	0.25	0.02	Palustrine, forested wetland; associated with Tributary 2
Wetland C	0.49	0.15	Palustrine, forested wetland; small stream forest headwater habitat
Wetland D	1.48	0.03	Palustrine, scrub-shrub; recent clear-cut
Wetland E	4.27	0.85	Palustrine forested; Alligator Branch
Wetland F	1.0	0	Palustrine, scrub-shrub; recent clear-cut
Wetland G	1.43	0.15	Palustrine, forested wetland

* Impacts are based on right-of-way limits – impacts likely to be less based on construction limits

Executive Order 11990 – Protection of Wetlands was issued, in furtherance of the National Environmental Policy Act, in order to avoid impacts to wetlands wherever there is a feasible alternative. Executive Order 11990 requires new construction in wetlands to be avoided unless there are no practicable alternatives to the impacts, and the project incorporates all practicable measures to minimize impacts. The assessment of the applicability of alternatives to wetland impacts and the incorporation of avoidance measures considers economic, environmental, and other pertinent factors. Therefore, wetlands were given special consideration during development and evaluation of this project. It was determined that the present design would pose the least disruption to wetlands other than the "no build" alternative.

Implementing erosion control measures, which include seeding of slopes, hay bale emplacement, silt fences, and sediment basins as appropriate, would also minimize impact on adjacent wetlands. Other best management practices would be required of the contractor to ensure compliance with policies reflected in 23 CFR 650B.

Based on the above considerations, it appears that there is no practicable alternative to the proposed new construction in these wetland areas, thus the proposed project complies with Executive Order 11990. In addition, the proposed action would include all practicable measures to minimize harm to wetlands that may result from construction.

4.7 Terrestrial and Aquatic Wildlife

The proposed project was evaluated to determine the potential impacts on terrestrial and aquatic wildlife along the proposed corridor. This assessment included a field evaluation of existing site conditions and adjacent habitat types, along with a review of available mapping and literature. The existing area primarily consists of residential and commercial land uses interspersed with open forest and farmlands. There are several open natural areas that could provide habitat for certain wildlife species such as small mammals and birds.

The proposed project would directly impact approximately 51 acres, with the majority of these impacts occurring in close proximity of the existing transportation right-of-way. Habitats that would generally be impacted include a mixed pine upland forest, open farmland, and various open forested areas. These habitat types can be found throughout the area, although, they are becoming less abundant due to existing conversion to more urban land uses.

The proposed project was also coordinated with the USFWS to determine potential impacts to any protected species or critical habitat. As previously documented, various studies have been conducted that evaluate the potential presence of protected species and impacts associated with the project, and these studies are appended to this document by reference.

4.8 Floodplains

Based on a study of the Flood Insurance Rate Maps (FIRM), published by the Federal Emergency Management Agency (FEMA), the proposed project would involve construction within the 100-year flood limits of Alligator Branch near the eastern project termini as shown on FIRM panel No. 45041C0143E effective December 16, 2014. The FIRM for the PSA designates Zone AE floodplains in the project vicinity. Zone AE floodplains are areas inundated by 1% annual chance flooding, for which base floodplain elevations have been determined.[10]

[10] http://map1.msc.fema.gov/idms/IntraView.cgi?KEY=63444920&IFIT=1

A preliminary hydraulic study has been performed to SCDOT guidelines for Hydraulic Design Studies. The results indicated that the bridge replacement would not increase the backwater of the natural 100-year storm event more than one foot at any cross-sectional area and two foot of freeboard would be obtained above the 50-year design water surface elevation. The project is not expected to be a significant or longitudinal encroachment as defined under 23 CFR 650A. In addition, the project would be developed in accordance with Executive Order 11988 (Floodplain Management and 23 CFR 650 subpart A), and roadway/bridge design would comply with all appropriate floodplain regulations and guidelines. Final hydraulic evaluations will be completed as part of the final design of the project. The design will be completed in accordance with SCDOT and FEMA regulations. The "South Carolina Department of Transportation – Location and Hydraulic Design of Encroachments of Floodplains Checklist" is included in Appendix D.

4.9 Air Quality

This project would is consistent with the South Carolina Air Quality State Implementation Plan (SIP) regarding the attainment of the National Ambient Air Quality Standards (NAAQS). Presently, Florence County meets all air quality standards for automobile related pollutants. The State Bureau of Air Quality at the South Carolina Department of Health and Environmental Control (SCDHEC) has determined that transportation control measures (TCMs) are not required to maintain the area's air quality.

4.9.1 Mobile Source Air Toxic Analysis (MSAT)[11]

For each alternative in this EA, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT for each of the build alternatives would be slightly higher than that for the no build alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the preferred action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOVES2010b model, emissions of all of the priority MSAT decrease as speed increases. Because the estimated VMT under each of the Alternatives are nearly the same, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the project alternatives will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under each alternative there may be localized areas where ambient concentrations of MSAT could be higher under certain build alternatives than the no build alternative. The localized increases in MSAT concentrations would likely be most pronounced along the five-lane roadway section that would be built between US 52 and Knollwood. However, the magnitude and the duration

[11] http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm

of these potential increases compared to the no-build alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the build alternative could be higher relative to the no build alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

4.10 Noise

The Code of Federal Regulations (CFR) Section 23, Part 772 contains the Federal Highway Administration (FHWA) traffic noise standards. The South Carolina Department of Transportation (SCDOT) has implemented these standards in its Traffic Noise Abatement Policy. A traffic noise analysis is required for proposed Federal-aid highway projects that will construct a highway on new location or physically alter an existing highway, which will significantly change either the horizontal or vertical alignment of the road or increase the number of through-traffic lanes. Noise abatement measures have been considered for reducing or eliminating the traffic noise impacts in accordance SCDOT's Traffic Noise Abatement Policy.

An analysis was performed on Alligator Road between US 52 and US 76 to determine the effect of the project on traffic noise levels in the immediate area. This investigation includes an inventory of existing noise sensitive land uses, and a field survey of background (existing) noise levels in the PSA. It also includes a comparison of the predicted noise levels and the background noise levels to determine if traffic noise impacts can be expected resulting from the proposed project. Traffic noise impacts are predicted for this project. TNM version 2.5, A Federal Highway Administration (FHWA) traffic noise prediction model was used in the analysis to compare existing and future Leq(h) noise levels. Leq(h) is the average energy of a sound level over a one hour period. A-weighted decibels (dBa) are the units of measurement used in the study.

Existing noise measurements were taken in the vicinity of the project to quantify the existing acoustic environment and to provide a base for assessing the impact of noise level increases. Model inputs included existing and proposed roadway characteristics, estimated traffic volumes, and receiver locations. Table 13 lists the traffic data used to estimate Leq(h) noise levels expected to occur in the PSA by the year 2037.

Table 13 - Traffic Data for Noise Analysis

Roadway Section	Speed (mph)	Two Way Design Hourly Traffic	One Way Hourly Traffic	Hourly Volume Cars (vph)	Hourly Volume Medium Trucks (vph)	Hourly Heavy Trucks (vph)
2015 Traffic Computations						
US 52 to Knollwood	45	984	492	477	10	5

Knollwood to US 76	45	456	228	220	5	3
2035 Traffic Computations						
US 52 to Knollwood	45	1200	600	582	12	6
Knollwood to US 76	45	557	279	270	6	3

Table 14 shows the comparison of field measurements versus modeled noise levels. The calculated noise levels for the measurement sites range from 54.3 to 61.4 dBA. The difference between calculated and field measured noise levels at all nine locations is 3 dBA or less, validating the results of the TNM model.

Table 14 - TNM Calculated Noise Levels vs. Field Measurements

Site	Location	Field Measurement Noise Level (dBA)	TNM Calculated Noise Level (dBA)	Difference (dBA)
1	409 Danielle Run	58.4	61.4	-3.0
2	699 Alligator Road	59.8	58.0	1.8
3	3246 Pleasant Valley Circle	59.9	57.0	2.9
4	2411 Alligator Road	58.9	58.6	0.3
5	2921 Cross Vine Drive	58.9	61.0	-2.1
6	3022 Alligator Road	58.9	60.1	-1.2
7	3302 Alligator Road	55.2	54.3	0.9
8	4055 Alligator Road	55.8	58.5	-2.7
9	1210 Alligator Road	56.8	58.5	-1.7

Difference = Measured Leq minus Modeled Leq

The Federal Highway Administration (FHWA) has developed Noise Abatement Criteria (NAC) and procedures to be used in the planning and design of highways to determine whether highway noise levels are or are not compatible with various land uses (Table 14). The abatement criteria and procedures are set forth in the aforementioned Federal reference (Title 23 CFR Part 772). Activity Category A consists of tracts of land that are locally significant for their serenity and quiet surroundings. Activity Category B consists of residential properties. Activity Category C consists of exterior locations of public outdoor areas, places of worship, cemeteries, recreational areas, etc. Activity Category D consists primarily of the same activities as Activity Category C but is for interior locations. Activity Category E consists of hotel/motels, offices, restaurants, and other developed land with activities not included in Activity Categories A-D. Activity F consists of agricultural lands, airports, and commercial/industrial facilities. Activity G is for undeveloped lands not presently permitted. Activity Categories adjacent to the project are mostly Category B.

Traffic noise impacts occur when the predicted traffic noise levels either: (a) approach or exceed the FHWA noise abatement criteria (“approach” meaning within 1 dBA of the value listed in Table 15), or (b) substantially exceed the existing noise levels. According to the SCDOT Traffic Noise Abatement Policy, a 15 dBA increase is deemed to be a “substantial increase.” Consideration for noise abatement measures must be given to receivers that fall in either category.

Table 15 - FHWA Noise Abatement Criteria

Activity Category	Activity Criteria\2\		Evaluation Location	Activity Description
	Leq(h)	L10(h)		
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to

				continue to serve its purpose.
B\3\	67	70	Exterior	Residential
C\3\	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E\3\	72	75	Exterior	Motels, hotels, offices, restaurant/bars, and other developed lands, properties or activities not included in A-D or F
F	--	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	--	--	--	Undeveloped lands that are not permitted

The results of the noise analysis indicate that traffic related noise impacts would occur to 35 receivers under the 2040 Build Alternative. However, 21 receivers would be impacted by the 2040 No Build conditions. No receivers in the PSA would substantially exceed the FHWA noise abatement criteria (Table 16). The information is shown graphically in the Traffic Noise Analysis Report in Appendix F.

Table 16 - Impacted Receivers

ROADWAY LOCATION	TOTAL NO. OF RECEIVERS	APPROXIMATE # OF IMPACTED RECEIVERS ACCORDING TO TITLE 23 CFR PART 772 / SCDOT POLICY					
		A	B	C	D	E	F
2040 Year No-Build Alternative							
Alligator Road	249	---	20	1	---	---	---
2040 Year Build Alternatives							
Alligator Road	249	---	33	2	---	---	---

If traffic noise impacts are predicted, noise abatement measures for reducing or eliminating the noise impacts must be considered. Noise abatement measures were evaluated for this project but were found not to be acoustically feasible since it would not provide at least a 5 dBA noise reduction to impacted receivers due to the number of access breaks. Each impacted property has a nearby driveway that accesses Alligator Road or an intersecting road. Most impacts in the project are within 100 feet of the proposed roadway. At this distance, an effective barrier would be approximately 800 feet long with no breaks in access. One or more access breaks would be required at any impacted receiver in the PSA, making a barrier incapable of providing at least a 5 dBA noise reduction to be feasible. For these reasons, noise barriers are not feasible for reducing or eliminating noise impacts for this project. The SCDOT Feasibility and Reasonableness Worksheet is included in Appendix F.

The major construction elements of this project are expected to be earth removal, hauling, grading, paving, and pile driving. General construction noise impacts, such as temporary speech interference for passers-by and those individuals living or working near the project, can be expected particularly from pile driving, paving operations, and earth moving equipment during construction. However, considering the relatively short-term nature of construction noise and the likely limitation of construction to daytime hours, these impacts are not expected to be substantial. To minimize construction noise, the contractor will be required to comply with the SCDOT 2007 Standard Specifications for Highway Construction, which includes specifications regarding nuisance noise avoidance.

4.11 Hazardous Waste and Underground Storage Tanks

Hazardous waste/material sites are regulated by the Resource Conservation and Recovery Act (RCRA), as amended, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, and the Superfund Amendments and Reauthorization Act of 1986 (SARA). An Initial Site Assessment (ISA) was conducted in May 2013 to identify possible sites involving the presence and/or past use of underground storage tanks (USTs), above ground storage tanks (ASTs), and/or other hazardous materials within the project corridor. A review of the SCDHEC CERCLA site inventory and an on-site reconnaissance survey of the project corridor were performed as part of the ISA. The results are summarized below and shown in Figure 4.

4.11.1 Documented Contamination Sites

Based on the outlined methods of investigation, the following sites with documented contamination were identified within the research distances of the Project Corridor. Complete information on these sites can be found in the hazardous materials survey report in Appendix G.

- Former Atkinson Grocery, located on Alligator Road, adjacent to the north of the Project Corridor.
- Dad-D-O Grocery (former Gause's Grocery), located at 2426 Alligator Road, adjacent to the north of the Project Corridor.

4.11.2 Potential Contamination Sites

Based on the outlined methods of investigation, the following sites with potential contamination were identified within the research distances of the Project Corridor.

- Sparrow & Kennedy – John Deere Dealer, located at 4328 Alligator Road, adjacent to the southwest of the Project Corridor.

- Tadco Re-Builders, located at 4302 Alligator Road, adjacent to the southwest of the Project Corridor.

- Small Contracting Business, located at 2237 Bridle Path Lane, adjacent to the southwest of the Project Corridor.

- Vacant Lot located at the southeastern corner of I-95 at Alligator Road, adjacent to the southwest of the Project Corridor.

- Florence Transmission and Marine Service, located at 3376 Alligator Road, adjacent to the south of the Project Corridor.

- Antique Store, located at the northeast corner of Alligator Road and Knollwood Road, adjacent to the north of the Project Corridor.
- Dollar General, located at 3040 Alligator Road, adjacent to the south of the Project Corridor.

- Garage Facility, located at 2330 Savannah Grove Road, approximately 150 feet south of the Project Corridor.

4.11.3 Additional Information

- Based on the apparent age of the residences and other structures, it is possible that some of these structures would have small heating oil USTs or ASTs. If any of these properties will be considered for acquisition, further inspection for the potential presence of USTs or ASTs may be warranted.

- No obvious indications of environmental impact due to electrical transformer leakage or sewer system components were noted during this investigation. However, it should be noted that further coordination with utility companies might be warranted prior to relocating/removing electrical transformers and or relocating sewer system components.
- Asbestos containing materials (ACMs) may be present in structures located in the Project Corridor. Asbestos surveys of any buildings to be demolished should be conducted in accordance with Asbestos Hazard Emergency Response Act (AHERA) standards, as required by DHEC prior to building demolition. Any ACMs should be handled in accordance with state and federal regulations.

- Lead based paint (LBP) may be present in structures located in the Project Corridor. OSHA requires that workers be protected from exposure to airborne lead. Therefore, precautions should be exercised to prevent exposure to airborne lead in the event that this project would involve the demolition or renovation of structures with LBP.

4.11.4 Summary and Recommendations

Based on the findings of this assessment and the available information, the Former Atkinson Grocery, the Dad-D-O Grocery (former Gause's Grocery), the former gas station at the corner of Alligator Road and McLauren Drive (impacted), the antique store, the former gas station at the corner of Alligator Road and South Point Road, and the Save More site are considered to represent a moderate to high potential for subsurface contamination to the Project Corridor. The other referenced sites are considered to represent a low to moderate potential for subsurface contamination to the Project Corridor. However, any properties to be partially or wholly acquired,

or any sites where highway or related construction will occur, may require further inspection and assessment.

Upon completion of preliminary engineering plans, it may be warranted to conduct detailed investigations of those suspect sites potentially impacted by the roadway improvements, or any portion of the Project Corridor that has the potential to have been adversely impacted by any of the referenced environmental sites. The determination of areas that may warrant Phase II Assessment services should be site specific, based on hydrogeologic conditions, distance from specific environmental concerns, and other relative factors. Specific Phase II Assessment recommendations can be formulated upon review of preliminary engineering and right-of-way plans.

4.11.5 Bridge Asbestos and Lead Based Paint Summary

Asbestos and lead based paint surveys of the bridge structures to be replaced for this project was also completed. A summary of the survey results is provided below:

Bridge Over I-95

- Asbestos containing transite drain pipes were found to be located along the sides of the bridge deck.
- Lead based paint is present on the steel tie rods, plates, bridge shoes, and associated metal bolts.

Bridge Over Alligator Swamp

- No materials suspected to contain asbestos were found to be present on the bridge structure.
- No painted surfaces were found to be present on the bridge structure, and therefore, no lead based paint is present.

4.12 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 as amended requires federal agencies to consider the effects of their actions on historic properties. In accordance with 36 CFR 800.4, archival research and coordination with the State Historic Preservation Officer (SHPO) was performed to identify and help predict the locations of significant cultural resources in the vicinity of the proposed action. The archaeological and architectural surveys performed were designed to provide the necessary management data to allow for the sites and properties to be evaluated for recommendations of eligibility to the National Register of Historic Places (NRHP).

A reconnaissance-level cultural resource survey of the corridor was conducted between May and June of 2013. This survey was conducted over the entire Alligator Road corridor from US 76 to US 52. The archaeological survey universe extended 100 feet to either side of the existing right-of-way. The architectural survey universe was 600 feet wide, extending 300 feet to either side of the present road centerline.

The project consisted of background research, reconnaissance-level architectural and archaeological field survey, and an initial assessment of potential effects for each alignment. Background research was conducted to identify all previously recorded archaeological sites and historic resources in the vicinity of the PSA. The Archsite GIS database from the South Carolina Department of Archives and History was reviewed to identify previously recorded archaeological sites, architectural resources, and National Register listed properties in the immediate vicinity of Alligator Road. In addition, historic maps were examined to identify areas that may be archaeological or historically sensitive.

4.12.1 Architectural Survey

Two previously recorded residential resources, Rogers House (0168) and 2016 West Palmetto Street (0169), were located within 0.5 mile of the Area of Potential Effect (APE). These resources were described as not eligible for listing on the NRHP and are not located within the APE. Two bridges carrying Alligator Road were also identified during background research, but neither appears to be over 50 years of age.

The present survey identified 17 historic resources (Table 17). Four of these resources are residential buildings with at least one historic outbuilding on site. Five of the resources are buildings or structures originally used for agricultural, commercial, religious, or, civic/social purposes. All of the architectural resources are recommended as not eligible for listing on the NRHP.

Table 17 - Newly Surveyed Historic Resources

Site No.	Location	Date	NRHP Recommendation
0473	2115 Alligator Road	c. 1940	Not Eligible
0474	Barn at 2429 Alligator Road	c. 1930	Not Eligible
0475	2433 Alligator Road	c. 1930	Not Eligible
0476	2437 Alligator Road	c. 1920	Not Eligible
0477	2441 Alligator Road	c. 1919	Not Eligible
0477.01	Outbuilding at 2441 Alligator Road	c. 1960	Not Eligible
0478	Savannah Grove Baptist Church	c. 1939	Not Eligible
0479	2707 Alligator Road	c. 1948	Not Eligible
0480	2810 Alligator Road	c. 1940	Not Eligible
0480.01	Shed at 2810 Alligator Road	c. 1945	Not Eligible
0480.02	Well House at 2810 Alligator Road	c. 1940	Not Eligible
0481	Atkinson's Grocery	c. 1948	Not Eligible
0482	3416 Alligator Road	c. 1940	Not Eligible
0483	Dairy Barn at 3439 Alligator Road	c. 1947-1949	Not Eligible
0483.01	Concrete Stave Silo at 3439 Alligator Road	c. 1947-1949	Not Eligible
0484	3511 Alligator Road	c. 1940	Not Eligible
0485	2277 Twin Church Road	c. 1950	Not Eligible
0485.01	Outbuilding at 2277 Twin Church Road	c. 1955	Not Eligible
0487	3523 Alligator Road	c. 1940	Not Eligible
0487.01	Well House at 3523 Alligator Road	c. 1940	Not Eligible
0488	Crown Masonic Lodge No. 383	c. 1952	Not Eligible
0489	2836 Alligator Road	c. 1950	Not Eligible
0486	4141 Alligator Road	c. 1940	Not Eligible

4.12.2 Archaeological Survey

A pedestrian survey was conducted to inspect exposed soils, document any alterations to the natural landforms, and to identify potential archaeological deposits. The Area of Potential Effect (APE) contains a mixture of cleared and uncleared land and commercial and residential areas. In well drained, relatively level areas, shovel tests were excavated at a 30-meter interval on either side of the existing right-of-way. In more poorly drained and more steeply sloping areas, shovel test intervals were widened to 60 meters, although shovel tests were not excavated in wet soils or in obviously disturbed areas. Site boundaries were delineated on a 10-meter grid. Shovel tests were approximately 30 centimeters in diameter and excavated until culturally sterile subsoil was encountered. All soils were screened through 0.25-inch mesh hardware cloth to ensure systematic artifact recovery. Shovel tests used to investigate sites and delineate site boundaries were excavated in arbitrary 10-centimeter levels within natural strata in order to better assess integrity. Where possible, all site boundaries were delineated until two sterile shovel tests were encountered. A visual inspection and delineation tests were also placed just outside of the right-of-way, when possible, to assess whether sites continued beyond the survey area and to help estimate their extent. During the survey, two archaeological sites (38FL475 and 38FL476) were identified.

Site 38FL475 – This site is a late nineteenth- to early twentieth-century historic artifact scatter with a small prehistoric component. The site is situated on a low rise in the front lawn of 2830 Alligator Road, which is occupied by a mobile home. A visual inspection of the lawn did not reveal any surface features in the immediate area. It is likely that an older house once occupied the property where the mobile home now sits. In addition, a 1950s-era one-story, rectangular house (2846 Alligator Road - 0489) is situated to the west of 38FL475.

A total of 19 shovel tests were excavated in a 10-meter (50-ft.) grid pattern until two negative shovel tests were achieved within the APE. One of those tests was placed outside of the APE to determine whether the site continued to the south. Five shovel tests, including the test placed outside of the APE, were positive for cultural material. Positive tests indicate that the site is at least 20x30 meters in size. Because the majority of the testing was confined to the current project's APE, the southern boundary of the site remains unknown.

The site, as it exists within the PSA, is recommended as not eligible for the NRHP. However, the eligibility of the remainder of the site is unknown. The lithic artifacts are undiagnostic of a particular time period. Additionally, the historic artifact scatter was light and sparse and undiagnostic of a precise time period. It does not appear that the surveyed portion of the site has the potential to yield information important to the history of the region.

Site 38FL476 – This site is the Langston Family Cemetery is located on a ridge nose overlooking Alligator Branch on the south side of Alligator Road. The cemetery is situated in a mixture of hard and softwood with moderate groundcover, and does not appear on any historic maps. Four grave markers were visible on the surface including three headstones and one footstone. The footstone presumably once had an associated headstone. It is possible that this stone was either removed from the cemetery or has fallen over and is present beneath the ground surface. Based on the position of the grave markers, the cemetery measures at least 12x18 meters. Although recommended as not eligible for inclusion on the NRHP, the cemetery is protected under several South Carolina Codes that safeguard historic cemeteries including: South Carolina Codes 27-43-10, 27-43-20, 27-43-30, and 16-17-600. Permits are required for the exhumation and transport of human remains by SC DHEC (South Carolina Code of Regulations Section 61-19-28, 29). It is recommended that the cemetery be avoided, if possible.

Copies of cultural resource survey report and SHPO coordination/concurrences are included in Appendix H.

4.13 Relocation Impacts

The PSA was reviewed for potential relocations resulting from the proposed project. The preferred alternative would result in four residential and five commercial relocations. All acquisition and relocation will be conducted in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and all relocation resources will be made available to displacees without discrimination.

4.14 Social and Economic

The U.S. Census data was evaluated to determine the demographic composition of the proposed PSA. Alligator Road corridor is located within Census Tracts 15.03 and 15.04 in Florence County. The findings are summarized in the Table 18.

Table 18 - Summary of U.S. Census Data.

Demographic Characteristic	South Carolina	Florence County	Census Tract 15.03 Florence County	Census Tract 15.04 Florence County
Total Population	4,723,723	137,948	3,458	4,944
White	3,231,027	76,561	2,103	2,974
Black/African American	1,327,366	57,524	984	1,835
Hispanic or Latino	250,357	3,173	364	105
Median Household Income	$44,587	$41,325	$64,196	$56,985

Source: US Census 2012 QuickFacts

4.14.1 Social

It is not anticipated that the proposed action and associated relocations would result in any appreciable change in local population and employment patterns in the area. Right-of-way acquisitions from residential properties are not expected to cause a change in existing land uses. Property owners would be compensated for the right-of-way taking and any damages to remaining property, in accordance with SCDOT policy and the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended. Relocation would not significantly disrupt community activities. Various design measures are being considered to ensure that the proposed project will not change the general character of the area.

Traffic services would be maintained throughout project construction with no anticipated adverse effects on emergency services in the area. After the proposed project's completion, improved traffic service for both public and private uses would be realized.

4.14.2 Economic

The proposed project was evaluated for potential economic impacts to the surrounding communities. The economic impacts considered include the anticipated impacts to local businesses, employment, tax base, and property values. As a result, it is anticipated that the proposed project would result in both positive and negative economic impacts. The cost of the proposed project is estimated at $69.0 million, which would be a direct cost to the local and regional governments. Also, the acquisition of approximately 51 acres of additional right-of-way would result in a slight reduction in property tax assessments.

4.15 Environmental Justice

The proposed project was evaluated in accordance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations). As summarized in Table 14, the demographics of Census Tracts 15.03 and 15.04 in Florence County include an approximate 28% and 37% minority population, respectively, whereas the minority population for Florence County is approximately 42%. The census data also reveals that the median household income in 2012 within Census Tract 15.03 is $64,196, and within Census Tract 15.04 is $56,985, as compared to $$41,325 for Florence County. This median income level is also substantially greater than the $16,020.00 (household size of 2) poverty guideline established for 2016 by the U.S. Department of Health and Human Services. These findings are consistent with the field observations of the immediate PSA. Therefore, the project is not expected to specifically benefit, harm, or disproportionately impact, any social group, including low-income, elderly, handicapped, non-drivers, minority, or ethnic groups.

The project is not expected to change neighborhood or community cohesion, school districts, police and fire protection, emergency medical services, highway traffic and safety, minority or other social groups, or permanently affect existing travel patterns and accessibility.

4.16 Indirect and Cumulative Impacts

The Federal Highway Administration (FHWA) and other federal agencies responsibility to consider direct, indirect, and cumulative impacts in the NEPA process was established in the Council on Environmental Quality (CEQ) Regulations for implementing the Procedural Provisions of the National Environmental Policy Act.[12] The CEQ regulations define the impacts and effects that must be addressed and considered by federal agencies in satisfying the requirements of the NEPA process. The CEQ regulations note three impact categories; namely, direct, indirect, and cumulative. According to FHWA guidance, the determination or estimation of future impacts is essential to both indirect and cumulative impact analysis.[13] The National Cooperative Highway Research Program also developed a report entitled; *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* that outlines an eight step process for completing an indirect effect analysis.[14] This indirect impact analysis followed this eight step process.

Two resources were identified for study as part of the Indirect and Cumulative Impact Analysis. The identification of these resources took into consideration input received during the agency coordination and public involvement process. The indirect impact analysis focuses on:

- Water Quality
- Land Uses

4.16.1 Indirect Impacts

Indirect impacts, or effects, are reasonably foreseeable impacts to the environment that are caused by an action, but occur later in time, or are further removed in distance from the PSA. Indirect impacts are generally associated with impacts from induced growth, and other impacts that result from the induced changes in the existing land use patterns, population density, or

[12] 40 CFR § 1500-1508
[13] FHWA Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process (2003)
[14] NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation

growth rate of an area.[15] Transportation projects often reduce travel time, enhancing the attractiveness of surrounding land for development through changes in accessibility. These changes in access could influence local development trends. Subsequently, these land use changes could lead to environmental impacts such as habitat fragmentation or water quality issues.[16]

Step 1 – Study Area Boundaries

Indirect and cumulative impacts are analyzed for resources of concern within particular geographic and temporal boundaries. This allows for the appropriate context to be developed for each resource. Study area boundaries are developed through consideration of input received during the agency coordination and public involvement process.

The indirect impacts will be assessed for each notable resource within a particular geographical area with the existing condition being the historical baseline. For the indirect analysis our study area will be within the adjacent properties along the project corridor. This study area is bounded on the east and west by the project termini, and extends approximately 200 foot north and south of the existing roadway centerline. The study area contains approximately 415 acres.

Step 2 – Study Area Communities Trends and Goals

There is a high potential for growth in this watershed. The Florence urban area is the commercial center of the Pee Dee region and is expected to continue to grow, particularly in the I-20/I-95 vicinity on the western edge of Florence, and the major highways leading into the urban area. The watershed is served by US 52, US 76, I-20, and I-95 as well as the interchange between the interstates to the west of Florence. This watershed, including the Florence urban area, the Pee Dee River area, and the Hartsville area is expected to be an area of major industrial expansion over the next twenty years. There are several large public or private industrial parks, located along the western side of the Florence urban area, and should foster additional large-scale development. This watershed has extensive water system coverage, including service from the City of Hartsville, the Darlington County Water and Sewer Authority, the City of Florence, and Florence County. The City of Florence has under design a surface water treatment facility on the Great Pee Dee River that could evolve into a regional water treatment plant. The City of Florence has also expanded its wastewater treatment plant and constructed an outfall to the Great Pee Dee River, which should increase the availability of sewer service in the watershed and increase the likelihood of additional growth and development. A 700-acre industrial park at I-95/SC327 has been built and should spur future growth. The Florence County One Cent Capital Project Sales Tax should spur growth by financing the proposed widening of SC 51, US 378, US 76, TV Road, Pine Needles Road, and US 301 Bypass.

<u>Water Quality</u>

The PSA is located within the Jeffries Creek Watershed (03040201-09). It is located in Darlington and Florence Counties and consists primarily of Jeffries Creek and its tributaries. The watershed occupies 137,115 acres of the Upper and Lower Coastal Plain regions of South Carolina. Land use/land cover in the watershed includes: 36.9% agricultural land, 22.4% forested wetland, 21.6% forested land, 15.4% urban land, 3.1% scrub/shrub land, 0.3% nonforested

[15] FHWA Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process (2003)

[16] AASHTO Center for Environmental Excellence, Indirect and Cumulative Impacts http://environment.transportation.org/environmental_issues/indirect_effects/

wetland, and 0.3% water. Jeffries Creek accepts drainage from Beaverdam Creek, Gulley Branch, Pye Branch, Middle Swamp (Oakdale Lake, Forest Lake, Alligator Branch, Billy Branch), Eastman Branch, and Cane Branch. Polk Swamp Canal (Adams Branch, Twomile Creek, Canal Branch) enters the system downstream, followed by Middle Branch, Long Branch, Boggy Branch, More Branch, and Willow Creek (Little Willow Creek, Cypress Creek, Spring Branch, Claussen Branch). The Jeffries Creek Watershed drains into the Great Pee Dee River. There are a total of 229.5 stream miles and 353.2 acres of lake waters in this watershed. Jeffries Creek and Middle Swamp are classified FW* (dissolved oxygen not less than 4.0 mg/l and pH between 5.0 and 8.5) and the remaining streams in the watershed are classified FW.

Land Uses

The immediate area consists of open forested areas, farmlands, with residential and commercial developments. Residential development is occurring more frequently due to the local access provided by Alligator Road to downtown Florence and other areas within the region. These land uses are expected to continue due to local zoning, planning, and development trends in the area. Residential land uses are primarily located between US 52 and Twin Church Road (S-106) but are interspersed with open forest and agricultural land uses. Agricultural land uses are primarily located from S-106 to US 76. Approximately 51 acres of new right-of-way would be acquired to accommodate the proposed improvements.

Step – 3 Notable Features

The indirect impact analysis focuses on land use and water quality as these resources have been identified as the primary concerns.

The immediate area consists of residential, commercial, agricultural, and open forest with Alligator Branch located at the eastern end of the project. Alligator Branch is a tributary to Middle Swamp which separates the Alligator Road PSA from downtown Florence. Middle Swamp flows into Jeffries Creek and ultimately discharges into the great Pee Dee River.

Transportation land uses are also present in the surrounding area. Major highways leading into the urban area include US 52, US 76, I-20, and I-95 as well as the interchange between the interstates to the west of Florence. US 76 and US 52 are the termini for the project. All of these highways are important routes for moving commuters and goods and services into and out of the Florence area.

Step 4 – Impact Causing Activities of the Proposed Action

Water Quality

Indirect impacts would be related to the addition of impervious surface to the existing conditions. The proposed impervious roadway surface would increase to 67 feet between US 52 and Knollwood and 39 feet between US 76 and Knollwood. Therefore, this design would increase the surface area for the accumulation of particulate matter and increase the volume of runoff. Motor vehicles are a major source for roadway pollutants, and research demonstrates that pollutant concentrations are expected to increase with increased traffic volumes.[17]

Roadways and bridges have the potential to impact water quality through stormwater runoff, which may contain elevated levels of suspended solids, heavy metals, aromatic hydrocarbons, oil and grease, nutrients, and other pollutants. Many of these pollutants are generated from motor

[17] Kayhanina, M., Singh, A., Suverkropp, C., Borroum, S. “Impact of Annual Average Dailty Traffic on Highway Runoff Pollutant Concentration”. Journal of Environmental Engineering, Volume 129, Issue 11, pp. 975-990 (November 2003).

vehicles through the emission and deposition of exhaust and discharge of fluids and solids during normal automobile operation. There are various factors that influence the type, quantities, and impacts of highway runoff on the surrounding aquatic environment. These include, but are not limited to roadway design, surrounding landscape, type and volume of traffic, and rain events. Highway runoff is dependent upon numerous variables, and therefore, the specific impacts are both site- and event-specific.[18]

Land Uses

The preferred alternative would widen the existing roadway to a five-lane curb and gutter and three-lane ditch section. These improvements would extend from US 52 to US 76 for a distance of approximately 7.5 miles. The improvements would require the acquisition of additional right-of-way immediately adjacent to existing Alligator Road. Traffic would be impacted throughout the construction process with temporary lane closures and potential access closures.

Step 5-6 – Identify and Analyze Potential Impacts

Water Quality

The proposed project would increase the capacity of the roadway by adding an additional through lane in each direction to accommodate future traffic. The increased impervious surfaces could increase pollutant concentrations. The runoff from the roadway would sheet flow across a grassed shoulder and side slopes, which is consistent with existing conditions. The runoff from the proposed bridges would be diffused through scuppers (i.e. drains) that are constructed to provide adequate drainage for the bridges, and is consistent with the current facility. The widening of the proposed bridges would increase the impervious surfaces subject to runoff but the grassed side slopes would help control runoff[19] and the wetlands themselves would act as natural filters for the reduction of potential pollutants.[20]

The project would have the potential to temporarily impact water quality during construction through various land-disturbing activities. These activities would increase the potential for sediment loading in runoff by mechanized land clearing, removal of vegetation, and alteration of land contours.

The proposed impervious roadway surface would increase to 67 feet between US 52 and Knollwood and 39 feet between US 76 and Knollwood. This would result in an additional 26 acres of impervious surface. Therefore, this design would increase the surface area for the accumulation of particulate matter and increase the volume of runoff. Motor vehicles are a major source for roadway pollutants, and research demonstrates that pollutant concentrations are expected to increase with increased traffic volumes. The grassed shoulders and median would retain some runoff and provide natural filtration. The captured runoff would be discharged to open areas that would provide for filtration prior to entering the receiving waters.

The project would have the potential to temporarily impact water quality during construction through various land-disturbing activities. These activities would increase the potential for sediment loading in runoff by mechanized land clearing, removal of vegetation, and alteration of land contours. As a result of these potential impacts, the Clean Water Act, as amended, regulates stormwater discharges from construction sites greater than 1 acre through the NPDES Stormwater Program. In South Carolina, the SCDHEC is responsible for administering this

[18] Environmental Protection Agency. National Management Measures to Control Nonpoint Source Pollution *from Urban Areas.* (November 2005, EPA-841-B-05-004).
[19] SC Stormwater Management and Sediment Control Handbook for Land Disturbance Activities (1998).
[20] EPA Office of Water. *Functions and Values of Wetlands.* EPA 843-F-01-002c (2001).

program. As such, the NPDES permit for the proposed project would be administered by SCDHEC through the Stormwater, Construction & Agricultural Permitting Division, in conjunction with the State Sediment, Erosion, and Stormwater Management Program. These programs would ensure that the potential impacts would be avoided and minimized through the use of best management practices such as seeding, installation of silt fences, temporary sediment basins, and other similar practices. The contractor would also be required to minimize this impact through implementation of construction best management practices, reflecting policies contained in 23 CFR 650B and SCDOT's Supplemental Specifications on Seeding and Erosion Control Measures (January 12, 2009). These regulations and guidance specifically prescribe the policies and procedures for the control of erosion, abatement of water pollution, and prevention of damage by sediment deposition from all construction activities.

Land Uses

The potential indirect impacts along the PSA could result from induced growth, land use changes, and/or changes in travel patterns as a result of the proposed activity. A change in travel patterns could result in greater, or lesser, traffic volumes along the corridor as a result of the project. Induced growth and land use changes would be specific to secondary development as a result of the roadway improvements. However, Florence County has prepared future land use plans that direct the types and locations of future development. Although the immediate area is realizing increased development, the widening of the roadway could accelerate this development.

Step 7 – Evaluate Analysis Results

Both qualitative and quantitative methods were used to identify and analyze the potential indirect impacts to the various resources of concern resulting from this proposed project. These methods and/or resources included:

- GIS overlays of resource information obtained from public and private sector agencies
- Historical photographs
- Computer Aided Drawing and Design (CADD)
- County planning documents
- Internet research
- Public involvement information.

Table 19 lists the potential impacts resulting from this project. Current land uses and proposed land use designations will provide the necessary restrictions to help control future land uses that would potentially affect the character and integrity of the area. However, unforeseen changes in public and/or private land use patterns could affect the characteristics of the area in the future.

Table 19 - Indirect and Cumulative Impact Matrix

Resources	Indirect Impacts	Cumulative Impacts			
		Past	Present	Reasonable Foreseeable	Overall
Land Uses	Induced secondary development	Agricultural land uses and open forested areas	Conversion of open forest and farmlands to urban land uses.	Increased density of developments along corridor	Increased conversion of open land to urban land uses
Water Quality	Runoff from additional	Agriculture; transportation;	Runoff from increased	Continued urbanization along	Continued urbanization;

Resources	Indirect Impacts	Cumulative Impacts			
		Past	Present	Reasonable Foreseeable	Overall
	impervious surfaces; temporary construction impacts	urbanization	impervious surfaces; additional development	corridor and surrounding vicinity; additional impervious surfaces	additional impervious surfaces; additional runoff

Environmental impacts from the preferred proposal, when added to past, present, and reasonably foreseeable future projects, would result in indirect impacts to environmental resources of concern. Impacts to water quality resulting from construction activities would be related to surface water runoff, accidental release of fuel or hydraulic fluids, and sedimentation from soil erosion. Changes in land use would be primarily due to the conversion of open forest and agricultural lands to urban uses.

Step 8 – Assess Consequences and Develop Mitigation

There is a high potential for growth in this watershed. The Florence urban area is the commercial center of the Pee Dee region and is expected to continue to grow, particularly in the I-20/I-95 vicinity on the western edge of Florence, and the major highways leading into the urban area. The watershed is served by US 52, US 76, I-20, and I-95 as well as the interchange between the interstates to the west of Florence. This watershed, including the Florence urban area, the Pee Dee River area, and the Hartsville area is expected to be an area of major industrial expansion over the next twenty years. There are several large public or private industrial parks, located along the western side of the Florence urban area, and should foster additional large-scale development. This watershed has extensive water system coverage, including service from the City of Hartsville, the Darlington County Water and Sewer Authority, the City of Florence, and Florence County. The City of Florence has under design a surface water treatment facility on the Great Pee Dee River that could evolve into a regional water treatment plant. The City of Florence has also expanded its wastewater treatment plant and constructed an outfall to the Great Pee Dee River, which should increase the availability of sewer service in the watershed and increase the likelihood of additional growth and development. A 700-acre industrial park at I-95/SC327 has been built and should spur future growth. The Florence County One Cent Capital Project Sales Tax should spur growth by financing the proposed widening of SC 51, US 378, US 76, TV Road, Pine Needles Road, and US 301 Bypass.

Florence Area Transportation Study's Long Range Plan and the Pee Dee Council of Governments Long Range Plan directs the types and locations of future development. These plans designate specific areas for commercial/industrial development, residential development, conservation areas, and direct development away from important environmental resources. Impacts such as additional runoff from impervious surfaces would be mitigated through best management practices. Upland development and other changes in land use would be mitigated through more sustainable development practices such as increased setbacks from the roadway, limited mainline access points from new developments, and buffers around residential/commercial/industrial developments.

Federal and local regulations, including those administered by the USACE, FEMA, and Florence County regulate and restrict certain development activities within floodplain and wetland areas, further directing potential development to less environmentally sensitive areas. Additionally, to

minimize water quality impacts, the contractor would provide stormwater management and sediment control measures during construction in compliance with SCDHEC standards, SCDOT Best Management Practices, as well as federal and state laws regarding stormwater management and water quality.

4.16.2 Cumulative Impacts

Cumulative impacts are the impacts on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.[21] According to the FHWA, cumulative impact analysis is resource specific and generally performed for the environmental resources directly impacted by a Federal action under study, such as a transportation project.[22] The Council on Environmental Quality (CEQ) developed *Guidance for Preparers of Cumulative Impact Analysis: Approach and Guidance*[23] that includes an eight step process for preparing cumulative impact assessments. This cumulative impact analysis followed this eight step process.

Two resources were identified for study as part of the Indirect and Cumulative Impact Analysis. The identification of these resources took into consideration input received during the agency coordination and public involvement process. The cumulative impact analysis focuses on:

- Water Quality
- Land Uses

Step 1 – Identification of Important Resources

Two categories of potential issues for the indirect and cumulative impact analysis were identified: water quality and land uses as these were identified as resources of primary concern.

Step 2 – Study Area

Indirect and cumulative impacts are analyzed for resources of concern within particular geographic and temporal boundaries. This allows for the appropriate context to be developed for each resource. Study area boundaries are developed through consideration of input received during the agency coordination and public involvement process. The study area for the cumulative impacts will be the FLATS boundary as this is the major urban land use in the local area. This urban area incorporates the majority of land use changes that have occurred over the last several years. The historical baseline will be in the mid-1970's as I-20 and I-95 had both been completed by that time. These two Interstate routes were the driving force behind the growth that occurred in the City of Florence and surrounding area.

Step 3 – Current Health and Context of the Affected Resources

<u>Water Quality</u>

Many land activities can individually or cumulatively contribute to pollution. Eight categories of nonpoint source pollution (NPS) sources have been identified as contributing to water quality degradation in South Carolina: agriculture, forestry, urban areas, marinas and recreational boating, mining, hydrologic modification, wetlands and riparian areas disturbance, land disposal,

[21] FHWA Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process (2003)
[22] FHWA Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process (2003)
[23] CEQ Guidance for Preparers of Cumulative Impact Analysis: Approach and Guidance (2005)

and groundwater contamination. There are programs, both regulatory and voluntary, in-place that address all eight categories.

Urbanization has been linked to the degradation of urban waterways. The major pollutants found in runoff from urban areas include sediment, nutrients, oxygen-demanding substances, heavy metals, petroleum hydrocarbons, pathogenic bacteria, and viruses. Suspended sediments constitute the largest mass of pollutant loadings to receiving waters from urban areas. Construction sites are a major source of sediment erosion. Nutrient and bacterial sources of contamination include fertilizer usage, pet wastes, leaves, grass clippings, and faulty septic tanks.[24]

Historical land uses in the general vicinity of the Alligator Road project corridor consisted primarily of farming, hunting, fishing, and logging. Farming activities have the potential to degrade the State's waters through the addition of sediment, nutrients, organics, elevated temperature, and pesticides. In South Carolina, pesticides, fertilizers, animal waste, and sediment are potential sources of agricultural NPS pollution. Agricultural activities also have the potential to directly impact the habitat of aquatic species through physical disturbances caused by livestock or equipment, and through the management of water.[25]

Land Uses

Since the completion of I95 and I20 in the mid 1970's, historical land uses (noted above) have been generally replaced by residential, commercial, and transportation land uses. These land uses have the potential for increasing sediment loads into area waters through clearing and grading activities but are generally regulated under state and federal discharge requirements.

Step 4 – Identify Direct and Indirect Impacts of the Proposed Project that Might Contribute to a Cumulative Impact

Water Quality

Roadways and bridges have the potential to directly impact water quality through stormwater runoff, which may contain elevated levels of suspended solids, heavy metals, aromatic hydrocarbons, oil and grease, nutrients, and other pollutants. Many of these pollutants are generated from motor vehicles through the emission and deposition of exhaust and discharge of fluids and solids during normal automobile operation. Indirect impacts would be related to the addition of impervious surface to the existing conditions. The proposed impervious roadway surface would increase to 67 feet between US 52 and Knollwood and 39 feet between US 76 and Knollwood. This would result in an additional 26 acres of impervious surface. Therefore, this design would increase the surface area for the accumulation of particulate matter and increase the volume of runoff.

Land Uses

Direct impacts would include the acquisition of additional right-of-way; land disturbance and construction associated with the project; temporary road and lane closures; increased capacity and connectivity; and increased access for alternative travel modes. Indirect impacts would be additional residential and commercial development.

[24] SCDHEC. Santee River Basin – Watershed Water Quality Assessment (2005).
[25] SCDHEC. Santee River Basin – Watershed Water Quality Assessment (2005).

Step 5 – Other Reasonably Foreseeable Actions

On November 7, 2006, Florence County voters approved a One-Cent Capital Project Sales Tax for roads for up to seven years. This penny tax went into effect on May 1, 2007. The one-cent sales tax is estimated to generate $148 million over the seven years, which when combined with a grant from the State Infrastructure Bank of $250 million will yield $398 million for the road projects. The road projects to be funded from the One-Cent Capital Project Sales Tax are specifically listed below in order of priority approved on the referendum:

- Pine Needles Road Project: Widening of Pine Needles Road from Southborough Road to South Ebenezer Road
- US 378 Project: Widening of US 378 from US 52 near Lake City to SC 41 in Kingsburg
- US 76 Project: Widening US 76 from I-95 to Main Street in Timmonsville
- TV Road Project: Widening of TV Road to four lanes from Wilson Road to I-95
- Pamplico Highway Project: Widening SC 51 from Claussen Road to US Route 378
- 301 By Pass: Completion of the 301 ByPass from US 76 near Timmonsville to the intersection of US 52/301 and Howe Springs Road

Step 6-7 – Assess Potential Cumulative Impacts and Report Results

Water Quality

This project, along with other reasonably foreseeable projects would have the potential to temporarily impact water quality during construction through various land-disturbing activities. These activities would increase the potential for sediment loading in runoff by mechanized land clearing, removal of vegetation, and alteration of land contours. As a result of these potential impacts, the Clean Water Act, as amended, regulates stormwater discharges from construction sites greater than 1 acre through the NPDES Stormwater Program. In South Carolina, the SCDHEC is responsible for administering this program. As such, the NPDES permit for the proposed project would be administered by SCDHEC through the Stormwater, Construction & Agricultural Permitting Division, in conjunction with the State Sediment, Erosion, and Stormwater Management Program. These programs would ensure that the potential impacts would be avoided and minimized through the use of best management practices such as seeding, installation of silt fences, temporary sediment basins, and other similar practices. The contractor would also be required to minimize this impact through implementation of construction best management practices, reflecting policies contained in 23 CFR 650B and SCDOT's Supplemental Specifications on Seeding and Erosion Control Measures (January 12, 2009). These regulations and guidance specifically prescribe the policies and procedures for the control of erosion, abatement of water pollution, and prevention of damage by sediment deposition from all construction activities.

The proposed project requires a Section 401 Water Quality Certification from the SCDHEC to ensure that no water quality standards are violated as a result of the project. The contractor will be responsible for ensuring the project complies with the policies and procedures of the SCDHEC, Section 401 Water Quality Certification (R. 61-101), and that no water quality standards are expected to be violated as a result of the project. Periodic environmental commitment reviews will be completed to evaluate project compliance with applicable State and federal regulations, and project specifications.

Land Uses

Conversion of current land uses to more urban land uses could be accelerated by the construction of this project. Current zoning plans and policies would help direct development into more suitable areas and away from important resources. As previously noted, this area is already

becoming more urban but improvements to the local roadway network could lead to accelerated development.

The project would improve the operational efficiency of Alligator Road by increasing the capacity of the roadway and improving access to area residences and businesses. Other reasonably foreseeable transportation projects would improve the local and regional roadway network through improved connectivity and movement of goods and services. The improved network could lead to additional development and increased usage of local and regional roadways. However, the project is expected to result in minimal cumulative impacts as this area is already undergoing significant changes in land use which are expected to continue as this area becomes more urbanized due to its proximity to downtown Florence.

Step 8 – Assess the Need for Mitigation

Various alternatives were developed and evaluated and during the development of the project and measures incorporated to avoid and/or minimize impacts to area resources. Impacts to wetlands will be permitted and compensatory mitigation will be provided to ensure “no net loss” of wetlands. Best Management Practices will be utilized during construction to minimize temporary construction impacts. Proposed land use plans will control the type and intensity of development along this corridor which will aid maintaining the natural characteristics of the area.

The Federal Highway Administration (FHWA) and other federal agencies responsibility to consider direct, indirect, and cumulative impacts in the NEPA process was established in the Council on Environmental Quality (CEQ) Regulations for implementing the Procedural Provisions of the National Environmental Policy Act. The CEQ regulations define the impacts and effects that must be addressed and considered by federal agencies in satisfying the requirements of the NEPA process. The CEQ regulations note three impact categories; namely, direct, indirect, and cumulative. According to FHWA guidance, the determination or estimation of reasonably foreseeable actions is essential to both indirect and cumulative impact analysis.

Direct impacts, or effects, are those impacts caused by an action and occur at the same time and place. Direct impacts resulting from the proposed project would be fill in wetlands and floodplains, change in land use (e.g. upland forest to transportation right-of-way), and displacements of residents, among others. These impacts may or may not occur, depending upon the alternative chosen.

Indirect impacts, or effects, are reasonably foreseeable impacts to the environment that are caused by an action, but occur later in time, or are further removed in distance from the PSA. Indirect impacts are generally associated with impacts from induced growth, and other impacts that result from the induced changes in the existing land use patterns, population density, or growth rate of an area. Transportation projects often reduce travel time, enhancing the attractiveness of surrounding land for development through changes in accessibility. These changes in access could influence local development trends. Subsequently, these land use changes could lead to environmental impacts such as habitat fragmentation or water quality issues. The potential indirect impacts along the PSA could result from induced growth, land use changes, and/or changes in travel patterns as a result of the proposed activity. Induced growth and land use changes would be specific to secondary development as a result of the bridge replacements. A change in travel patterns could result in greater, or lesser, traffic volumes along the corridor as a result of the project.

Cumulative impacts, or effects, are the impacts on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable

future actions. According to the FHWA, cumulative impact analysis is resource specific and generally performed for the environmental resources directly impacted by a Federal action under study, such as a transportation project. Cumulative impacts would occur when impacts resulting from the proposed project are added to historical changes in land use.

There is a high potential for growth in this region. The Florence urban area is the commercial center of the Pee Dee region and is expected to continue to grow, particularly in the I-20/I-95 vicinity on the western edge of Florence, and the major highways leading into the urban area. The area is served by US 52, US 76, I-20, and I-95 as well as the interchange between the interstates to the west of Florence. The Florence urban area, the Pee Dee River area, and the Hartsville area are expected to be an area of major industrial expansion over the next twenty years. There are several large public or private industrial parks, located along the western side of the Florence urban area, and should foster additional large-scale development. The region has extensive water system coverage, including service from the City of Hartsville, the Darlington County Water and Sewer Authority, the City of Florence, and Florence County. The City of Florence has a surface water treatment facility on the Great Pee Dee River that could evolve into a regional water treatment plant. The City of Florence has also expanded its wastewater treatment plant and constructed an outfall to the Great Pee Dee River, which should increase the availability of sewer service in the watershed and increase the likelihood of additional growth and development. A 700-acre industrial park at I-95/SC327 has been built and should spur future growth. The Florence County One Cent Capital Project Sales Tax should spur growth by financing the proposed widening of SC 51, US 378, US 76, TV Road, Pine Needles Road, and US 301 Bypass.

Various alternatives were developed and evaluated during the development of the project and measures incorporated to avoid and/or minimize impacts to area resources. If area resources that have federal or state protection are impacted, then appropriate permits and/or certifications will be obtained and compensatory mitigation will be provided. Best Management Practices will be utilized during construction to minimize temporary construction impacts. Land use plans will control the type and intensity of development along this corridor which will aid in maintaining the natural characteristics of the area. Based on the existing or proposed land use designations, the character of the area, limited infrastructure, and the fact that the proposed project would essentially replace existing conditions, there should be minimal indirect or cumulative impacts resulting from this project.

5 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

The project has been coordinated with various agencies and stakeholders to identify issues to be considered in the development of the project. Upon approval of the EA, the Department will conduct a Public Hearing to provide an opportunity to review and comment on the project. A copy of the approved EA will be available at the hearing and at the Department's Central and District offices prior to the hearing. The following section summarizes the meetings that have been held thus far.

5.1 General Public

September 15, 2014 - A Public Information Meeting was held in the South Florence High School 'Commons' located at 3200 South Irby Street, Florence, SC. The purpose of the meeting was to provide information and solicit input from area residents on the proposed project. A total of 104 people registered their attendance at the meeting. A total of 417 comments were received either at the meeting or within the 15 day comment period. A summary of the comments are included in Appendix I.

5.2 Agency Coordination

February, 2014 – A Letter of Intent (LOI) was disseminated to stakeholders to apprise them of the commencement of the proposed project. The LOI generally described the project and asked for any comments on the proposal (Appendix I). Following is a list of recipients.

Table 20 - LOI Recipients

Ms. Ramona McConney	US Environmental Protection Agency Region 4 Office of the Environmental Assessment
Mr. Kelly Laycock	US Environmental Protection Agency Region 4 Wetlands Regulatory Section
Ms. Tina Hadden	US Army Corps of Engineers Charleston District
Ms. Elizabeth Williams	US Army Corps of Engineers Charleston District
Mr. Steve Brumagin	US Army Corps of Engineers
Mr. Jim Chaplin	Columbia Field Office Director US Housing and Urban Development
Ms. Elizabeth Johnson	SC Dept. of Archives and History - Deputy SHPO
Ms. Sarah Stephens	SC Dept. of Archives and History
Mr. Greg Mixon	SC Dept. of Natural Resources
Ms. Elizabeth Johnson	Deputy State Historic Preservation Officer SC Dept. of Archives & History
Dr. Johnathan M Leader	SC State Archaeologist SC Dept. of Archaeology & Anthropology-USC
Ms. Susan Davis	SC Dept. of Natural Resources
Mr. Bob Perry	Director of Environmental Programs SC Dept. of Natural Resources
Ms. Diane Lynch	Field Supervisor US Fish and Wildlife Service

Ms. Heather Preston	Director Water Quality Division Bureau of Water SC Dept. of Health & Environmental Control
Mr. David Wilson	Bureau Chief Bureau of Water SC Dept. of health & Environmental Control
Mr. Mark Giffin	Bureau of Water SC Dept. of Health & Environmental Control
Ms. Myra C Reece	Bureau Chief Bureau Air Quality SC Dept. of Health & Environmental Control
Ms. Daphne Neel	Chief, Bureau of Land & Waste Management SC Dept. of Health and Environmental Control
Mr. Don Siron	Director Division of UST Management Bureau of Land & Waste Management SC Department of Health & Environmental Control
Ms. Alison Hathcock	Division of UST Management Bureau of Land & Waste Management SC Department of Health & Environmental Control
Mr. Robbie Brown	Director Air Planning Development and Outreach Division Bureau of Air Quality SC Department of Health & Environmental Control
Mr. Pat Walker	Bureau Chief Bureau of Environmental Services SC Department of Health & Environmental Control
Ms. Christine Sanford-Coker	Regional Director Region 7 Environmental Quality Control
Mr. Duane Parrish	Executive Director SC Dept. of Parks Recreation and Tourism
Mr. Ralph Haile	Commissioner of Human Affairs
Mr. Bobby Hitt	SC Secretary of Commerce
Mr. Hugh Weathers	Commissioner SC Dept. of Agriculture
Ms. Bonnie Anderson	Inter Governmental Review SC Budget & Control Board
Mr. Ben Gregg	Executive Director SC Wildlife Federation
Mr. Guy Sabin	Section Chief Environmental Management SC Forestry Commission
Mr. Calvin Bailey	Coastal Region Forester SC Forestry Commission
Mr. Robert Lee	Division Administrator FHWA
Dr. Wenonah G Haire	Tribal Historic Preservation Officer Catawba Indian Nation
Mr. Kurt Henning	Chapter Coordinator - Sierra Club
Mr. Mark Robertson	Executive Director - The Nature Conservancy
Mr. Randall Overton	Bridge Management Specialist - USCG

Mr. Brodie Rich	Bridge Management Specialist - USCG
Mr. Johnny Brown	Pee Dee Council of Governments
Mr. Russell G. Townsend	Tribal Historic Preservation Office Eastern Band of Cherokee Indians
Mr. George Wickliffe	Tribal Historic Preservation Office United Keetoowah Band of Cherokee
Ms. Elizabeth Harm	Heritage Corridor
Mr. Jack Tiller	Ridge Heritage Association
Ms. Andrea Marks	Chapter Coordinator - Sierra Club
Mr. George Thornton	National Wild Turkey Foundation
Mr. Harrison Rearden	SCDOT District 6 Commissioner
Mr. Mike Wooten	SCDOT District 7 Commissioner
Mr. Stephen Wukela	City of Florence - Mayor
Mr. Drew Griffin	City of Florence - City Manager
Mr. James Scofield	Florence County Council Chairman
Mr. K G Smith, Jr.	Florence County Administrator
Senator Kevin Johnson	
Senator Hugh K. Leatherman, Sr.	
Senator Yancey McGill	
Senator Kent Williams	
Representative Terry Alexander	
Representative Lester Branham, Jr.	
Representative Kristopher Crawford	
Representative Phillip Lowe	
Representative Robert Williams	

1122 Lady Street
Suite 1100
Columbia, SC 29201
(p) 803.254.5800

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