Environmental Report

Draft 02

May 2023

Environmental Report

SC Highway 41 Corridor Improvements Project

Charleston and Berkeley Counties, South Carolina

Draft 02

May 2023

Prepared for
Charleston County

Prepared by

Charleston County
Transportation Development

4045 Bridge View Drive, Suite C204, North Charleston, SC 29405

www.hwy41sc.com

This page intentionally left blank.

Contents

1.0 Introduction 6

2.0 Purpose and Need of the Project 9
2.1 Project Setting 9
2.2 Existing Facilities 9
2.3 Project Purpose 10
2.4 Project Need 10
2.4.1 Growth Trends 10
2.4.2 Increased Traffic Congestion 10
2.4.3 Safety Concerns 12
2.4.4 Provide Bicycle and Pedestrian Accommodations 14
2.4.5 Inadequate Interconnection of Transportation Modes 14
2.5 Logical Termini and Independent Utility 16
2.6 Reasonable Availability of Funding 16

3.0 Alternatives 17
3.1 Proposed Facility 17
3.2 Alternatives Screening Process 21
3.3 Alternatives Considered but Eliminated 21
3.4 No-Build Alternative 23
3.5 Build Alternatives 23
3.5.1 Alternative 1 23
3.5.2 Alternative 7A 24
3.5.3 Compromise Alternative 24
3.6 Recommended Preferred Alternative 27

4.0 Environmental Resources and Potential Impacts 28
4.1 Land Use 28
4.1.1 Existing Land Use 28
4.1.2 Impacts to Land Use 30
4.1.3 Mitigation 30
4.2 Waters of the U.S. 33
4.2.1 Streams and Open Waters 37
4.2.2 Wetlands 37
4.2.3 Mitigation 38
4.3 Water Quality 39
4.3.1 Existing Water Quality 39
4.3.2 Impacts to Water Quality 41
4.3.3 Mitigation 41
4.4 Floodplains 41

4.4.1 Existing Floodplains 42
4.4.2 Impacts to Floodplains 44
4.4.3 Mitigation 44
4.5 Wildlife 44
4.5.1 Existing Wildlife 44
4.5.2 Impacts to Wildlife 45
4.5.3 Mitigation 45
4.6 Threatened or Endangered Species 46
4.6.1 Existing Threatened or Endangered Species 46
4.6.2 Impacts to Threatened or Endangered Species 47
4.6.3 Mitigation 52
4.7 Essential Fish Habitat 52
4.7.1 Impacts to Essential Fish Habitat 52
4.7.2 Minimization and Mitigation 53
4.8 Farmlands 54
4.9 Air Quality 55
4.9.1 Existing Air Quality 55
4.9.2 Impacts to Air Quality 58
4.9.3 Mitigation 61
4.10 Noise 61
4.10.1 Noise Impacts 62
4.10.2 Mitigation 63
4.11 Hazardous Materials 64
4.11.1 Existing Hazardous Material Sites 64
4.11.2 Impacts on Hazardous Materials 66
4.11.3 Mitigation 66
4.12 Cultural Resources 66
4.12.1 Existing Cultural Resources 66
4.12.2 Impacts on Existing Cultural Resources 68
4.12.3 Mitigation 68
4.13 Communities and Socioeconomic Resources 68
4.13.1 Existing Communities and Socioeconomic Resources 69
4.13.2 Impacts on Communities and Socioeconomic Resources 74
4.13.3 Mitigation 74
4.14 Environmental Justice 75
4.14.1 Existing Environmental Justice Conditions 75
4.14.2 Impacts on Environmental Justice Conditions 80
4.14.3 Mitigation 80
4.15 Visual Resources 80
4.15.1 Existing Visual Resources 80

4.15.2 Impacts on Visual Resources 80
4.16 Right-of-Way, Relocation, and Displacements 81
4.17 Indirect and Cumulative Impacts 81
4.17.1 Indirect Impacts 81
4.17.2 Cumulative Impacts 82

5.0 Agency Coordination/Public Involvement 88
5.1 Agency Coordination 88
5.1.1 Response Letter Summaries 88
5.1.2 Meeting Summaries 89
5.2 Public Involvement 93
5.2.1 Goals and Objectives 93
5.2.2 Public Outreach 94
5.2.3 Public Meetings 95
5.2.4 Stakeholder Meetings 98
5.2.5 Community Meetings 99
5.2.6 Stakeholder and Elected Officials 102
5.2.7 Public and Stakeholder Comments 103
5.2.8 Environmental Justice 105

6.0 References 109

Tables

Table 2-1. Study Area Socioeconomic Trends 10
Table 2-2. Existing and Projected Traffic Conditions 12
Table 2-3. Crashes by Year and Type 12
Table 2-4. Crashes by Type in Segments of SC 41 (between 2011 and 2017) 13
Table 3-1. Alternatives Eliminated by Initial Screening Process 21
Table 3-2. Summary of Impacts for the Build Alternatives 26
Table 4-1. Monitoring Stations near the Project Study Area 40
Table 4-2. ESA Federally Threatened and Endangered Species 46
Table 4-3. Soils within the Study Area 54
Table 4-4. Charleston County Air Quality 56
Table 4-5. Existing and Projected Traffic Conditions 58
Table 4-6. VMT (daily) along SC 41 59
Table 4-7. Noise Abatement Criteria: Hourly A-Weighted Sound Level (Decibels) 62
Table 4-8. Modeled Noise Impacts along SC 41 63
Table 4-9. REC Findings 65
Table 4-10. Study Area Socioeconomic Trends 73
Table 4-11. Study Area Demographic Profile 73
Table 4-12. Study Area Economic Profile 73

Table 4-13. Study Area Minority Populations at Block Group Level 76
Table 4-14. Study Area Low-Income Populations at Block Group Level 78
Table 4-15. Summary of other past, present, or reasonably foreseeable future actions in the vicinity of the project study area....82
Table 5-1. Federal, State, and Local Recipients of the LOI 88
Table 5-2. Mailings and Email Distributions 94
Table 5-3. Public Meetings 96
Table 5-4. Outreach Overview 96
Table 5-5. Outreach Deployment 97
Table 5-6. Meeting Materials 98
Table 5-7. Stakeholder Working Group Members 98
Table 5-8. Stakeholder Working Group Meetings 99
Table 5-9. Community Meetings 100
Table 5-10. Stakeholder Letters....102
Table 5-11. Elected Official Letters....102
Table 5-12. Top Ten Comment Topics 104
Table 5-13. Environmental Justice Outreach....105
Table 5-14. Flyer Distribution Locations....106
Table 5-15. Environmental Justice One-on-One Meetings....107

Figures

Figure 1-1. Project Location....7
Figure 1-2. Project Study Area 8
Figure 2-1. Definition of Level of Service....11
Figure 2-2. Hurricane Evacuation Zones and Routes....14
Figure 3-1. SC 41 Proposed Typical Section between US 17 and Joe Rouse Road and from Dunes West Boulevard to Clements Ferry Road....18
Figure 3-2. SC 41 Proposed Typical Section between Joe Rouse Road and Dunes West Boulevard 19
Figure 3-3. Laurel Hill Parkway Proposed Typical Section 20
Figure 3-4. Alternatives Screening Process 21
Figure 3-5. Build Alternatives 25
Figure 4-1. Charleston County Land Use 31
Figure 4-2. Berkeley County Land Use....32
Figure 4-3. Compromise Alternative in Relation to Waters of the U.S. in the Northern Portion of the Detailed Project Study Area....34
Figure 4-4. Compromise Alternative in Relation to Waters of the U.S. in the Central Portion of the Detailed Project Study Area....35
Figure 4-5. Compromise Alternative in Relation to Waters of the U.S. in the Southern Portion of the Detailed Project Study Area....36
Figure 4-6. Floodplains....43

Figure 4-7. National MSAT emission trends 2010–2050 for vehicles operating on roadways using USEPA's MOVES2014a Model 57
Figure 4-8. Major Community Resources 70
Figure 4-9. Census Tracts 71
Figure 4-10. TAZ Boundaries 72
Figure 4-11. Minority Populations at Block Group Level 77
Figure 4-12. Per Capita Income Rates 79
Figure 5-1. Comment Management Process 104

Appendices

Appendix A – Purpose and Need Report
Appendix B – Alternatives Screening Report
Appendix C – Traffic Analysis Report
Appendix D – Preliminary Jurisdictional Determination
Appendix E – USFWS Biological Assessment
Appendix F – NMFS Biological Assessment
Appendix G – Essential Fish Habitat Assessment
Appendix H – Noise Analysis Report
Appendix I – Limited Environmental Records Review
Appendix J – Cultural Resources Study
Appendix K – Community Characterization Report
Appendix L – Community Impact Assessment
Appendix M – Phillips Community Cultural Landscape Technical Report
Appendix N – Seven Mile Community Technical Report
Appendix O – Agency Coordination

1.0 Introduction

Charleston County proposes to improve SC Highway 41 (SC 41) for a total of approximately 5.6 miles from US Highway 17 (US 17) across the Wando River Bridge to Clements Ferry Road, located in Berkeley and Charleston Counties, South Carolina (Figure 1-1). The proposed project also includes improvements to the intersection of SC 41 and US 17, a new tie-in road between SC 41 and Winnowing Way, and a 1.3-mile new location roadway, Laurel Hill Parkway, between SC 41 and Park West Boulevard. This project has a combination of committed funds from Charleston County, Charleston Area Transportation Study (CHATS) and the Town of Mount Pleasant. Taxpayers voted in 2016 to increase Charleston County's sales tax and as a result, SC 41 was allotted $130 million of sales tax funding to fully fund the proposed improvements. Additionally, the CHATS Transportation Improvement Program (TIP) has allocated two million dollars for this project.

The project as proposed would result in certain modifications to the human and natural environment. However, the South Carolina Department of Transportation (SCDOT) has determined that no significant impacts would occur in accordance with 23 Code of Federal Regulations (CFR) 771.115(c) for processing as an Environmental Report (ER). Specific environmental studies were conducted in the early stages of project development and understandings of the scope of work to be performed were utilized in making this decision. The project study area is illustrated in Figure 1-2.

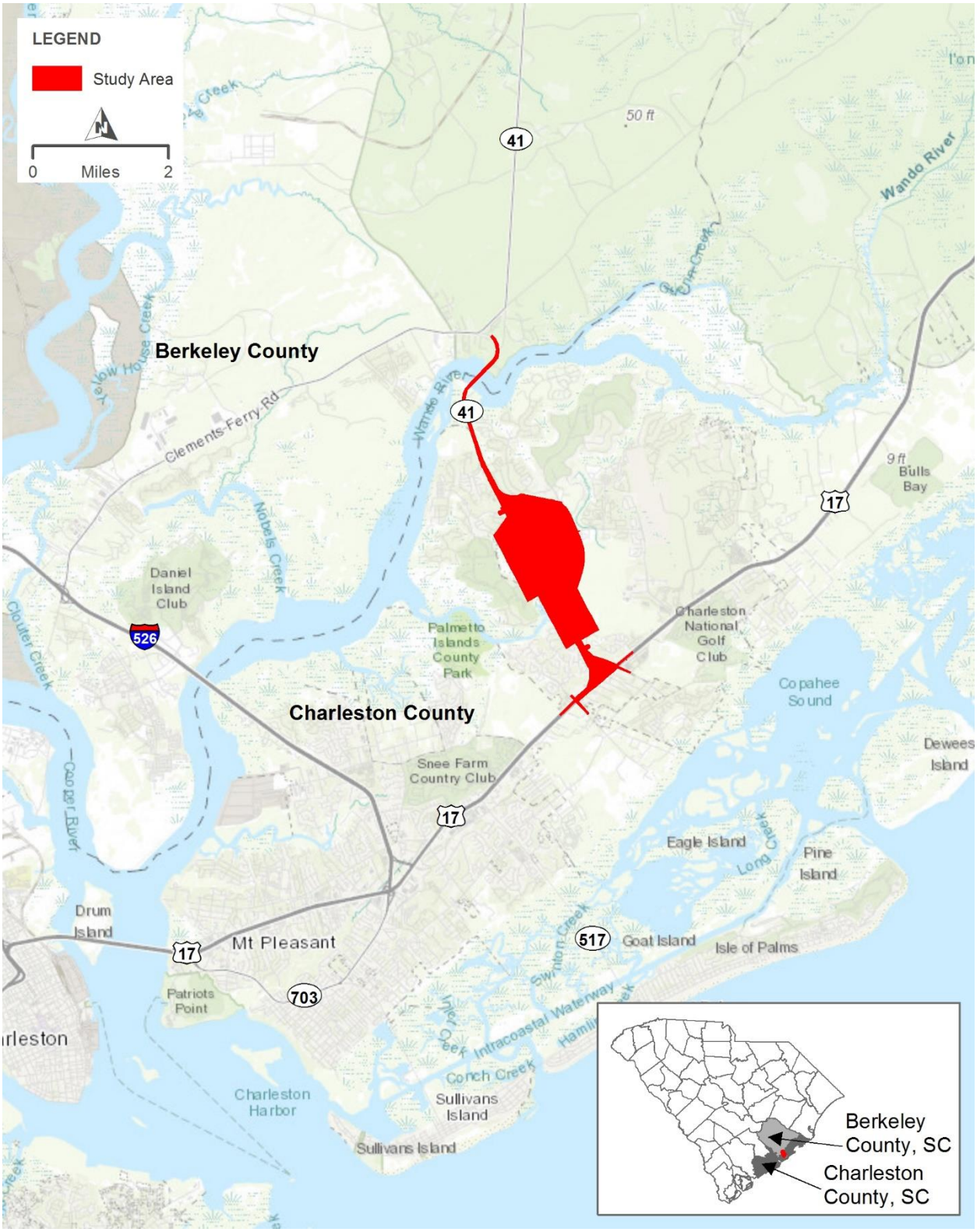

Figure 1-1. Project Location

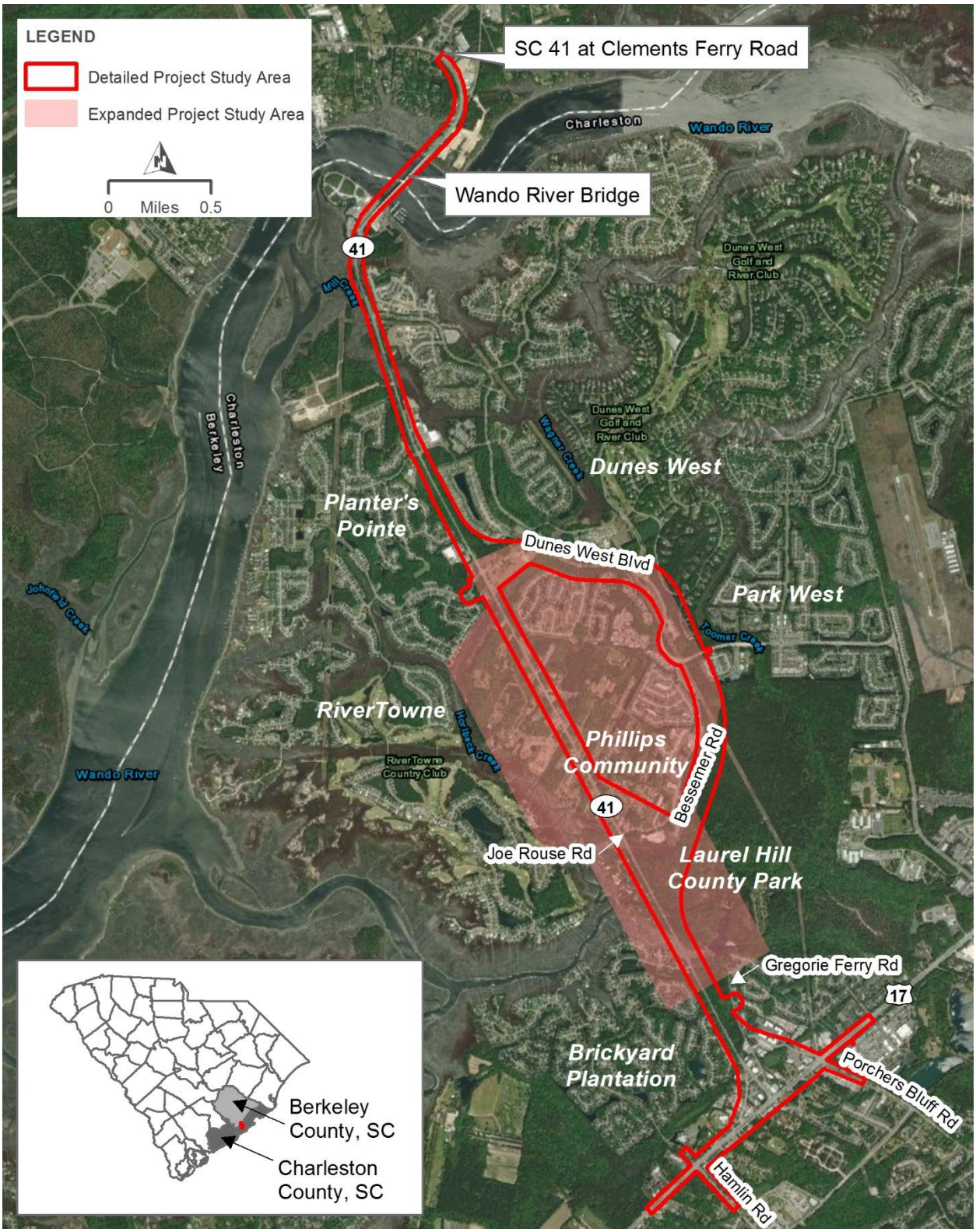

Figure 1-2. Project Study Area

2.0 Purpose and Need of the Project

2.1 Project Setting

The project area is located in southern Berkeley County and central Charleston County in the Lower Coastal Plain of South Carolina. Specifically, the proposed project lies in the Wando River Watershed, in the Town of Mount Pleasant.

The project study area has been defined as a mainline corridor of SC 41 from US 17 in Mount Pleasant across the new Wando River Bridge to Clements Ferry Road in Berkeley County. The project also includes improvements to the intersection of SC 41 and US 17, a new tie-in road between SC 41 and Winnowing Way, and a 1.3-mile new location roadway, Laurel Hill Parkway, between SC 41 and Park West Boulevard. The study corridor also includes US 17 from the intersection with Hamlin Road to the entrance to the Market at Oakland and an expanded study area around Laurel Hill County Park and the Phillips Community between Bessemer Road and Dunes West Boulevard. The purpose of the expanded study area is to fully evaluate the potential project effects on the County Park, adjacent communities, and associated roadways. The study corridor also includes a 300-foot-wide corridor on either side of the centerline on Dunes West Boulevard and Bessemer Road. Additionally, the project study area includes crossings over Horlbeck, Mill, and Wagner Creeks. While the study corridor includes the Wando River, no construction is anticipated within or directly adjacent to the river since the SC 41 bridge was recently replaced in 2017.

The land uses within the immediate vicinity of the project study area include incorporated areas, vacant/undeveloped areas, agriculture, estuarine and marine wetlands and deepwater, freshwater wetlands, residential, commercial, industrial, public/institutional, and parks/recreation/open space.

This area of Berkeley and Charleston counties is experiencing tremendous growth, primarily due to planned residential and commercial developments. The commercial growth is primarily located in the Charleston County portion of the study area, whereas, residential growth is primarily located in the Berkeley County portion of the study area, to the north of the Wando River in and around the Cainhoy community.

2.2 Existing Facilities

SC 41 is a two-lane roadway with grassed shoulders and roadside ditches from US 17 to/beyond Clements Ferry Road. Numerous crossroads and side streets are located along the corridor, including Harper's Ferry Way, Planter's Pointe Boulevard, Wood Park Drive, Dunes West Boulevard, Rivertowne Parkway, Oliver Brown Road, Parker's Island Road, Canyon Lane, Bennett Charles Road, Joe Rouse Road, Bessemer Road, Tradewind Drive, Colonnade Drive, and Gregorie Ferry Road. The existing right-of-way (ROW) along SC 41 is approximately 25 feet from centerline on both sides of the roadway.

SC 41 serves as a minor arterial highway that provides vehicular access between US 17 and Clements Ferry Road, as well as north to Huger, South Carolina. The roadway provides important access to communities and residential developments including Cainhoy, Dunes West, Planters Pointe, Rivertowne, Phillips, Park West, Cardinal Hill, Horlbeck Creek, Brickyard/Colonnade, Gregorie Ferry, Ivy Hall, and Seven Mile, and commercial/industrial businesses. SC 41 is currently designated as a hurricane evacuation route.

The new Wando River Bridge opened for traffic in July 2017. The new 55-foot vertical clearance fixed-span four-lane bridge replaced an ailing swing span two-lane bridge.

2.3 Project Purpose

The primary purpose of the proposed SC 41 Corridor Improvements Project is to reduce traffic congestion within the SC 41 corridor to accommodate future traffic projections. The secondary purposes of the proposed SC 41 Corridor Improvements Project are to enhance safety throughout the corridor, improve transportation system and community connections, and provide bicycle and pedestrian accommodations, while minimizing community and environmental impacts.

2.4 Project Need

The proposed project is needed to address anticipated local and regional growth, increased traffic congestion, safety and emergency response concerns, and inadequate interconnections of transportation modes, including pedestrian and bicycle facilities.

2.4.1 Growth Trends

South Carolina as a whole is growing, as is the Charleston metropolitan area. Population growth and employment growth are expected in all census tracts (CTs) within the study area between 2015 and 2040 (Table 2-1). The anticipated population growth ranges from 24.7 percent to 31.4 percent in the Charleston County CTs, while the anticipated population growth in the Berkeley County CTs ranges from 74.6 percent to 484.4 percent.

Table 2-1. Study Area Socioeconomic Trends

Geography	2015 Pop.	2040 Pop.	% Change	2015 House-holds	2040 House-holds	% Change	2015 Employment	2040 Employment	% Change
Charleston County	365,512	480,661	31.5%	160,496	206,799	28.8%	235,338	308,125	30.9%
46.08*	23,194	28,919	24.7%	8,130	10,310	26.8%	2,127	6,675	214%
46.09	6,914	9,087	31.4%	2,738	3,791	38.4%	1,900	2,743	44.4%
Berkeley County	167,509	359,311	114.5%	65,533	141,096	115.3%	71,650	125,335	74.9%
204.04	4,324	25.270	484.4%	1,755	10,051	472.7%	3,687	7,003	89.9%
204.05	2,853	4,982	74.6%	1,126	1,918	70.3%	1,874	2,213	18.1%

Sources: BCDCOG 2017a; 2020

* CT 46.08 was split into CTs 46.15, 46.16, and 46.18 for 2020 Census

Anticipated population growth is high in the study area, but the greatest potential for population increase affecting the SC 41 corridor is expected in two CTs just north of the study area in the Cainhoy community of Berkeley County. An approved master plan development called Cainhoy Plantation is located on Clements Ferry Road just north of the study area. Much of Berkeley County's population growth is due to the development of new communities, including Cainhoy Plantation. It is anticipated that the Cainhoy Plantation will have 9,000 homes by 2045 (The Post and Courier 2016).

2.4.2 Increased Traffic Congestion

A preliminary traffic analysis was conducted on various segments along SC 41 and the major cross-streets (Bessemer Road, Dunes West Boulevard, and Park West Boulevard). Traffic volume data was measured in September 2017 and compared to 2015 SCDOT traffic data and the CHATS Travel Demand Model. The CHATS Travel Demand Model (CHATS model) was calibrated using the 2015 and 2017 traffic data and adjusted for planned future growth near the corridor.

The CHATS model predicts the distribution of new trips that are generated by growth, throughout the roadway network. The existing measured traffic volumes, as well as the future 2045 traffic volumes predicted by the model, expressed as average annual daily traffic (AADT), were used to evaluate the current and future level of service (LOS) for each roadway segment in the study area). Table 2-2 shows the AADT and LOS for each evaluated segment of roadway. LOS is a method of measuring the vehicle-carrying capacity of a street or freeway (Figure 2-1). When the capacity of a road is exceeded, the result is congestion, delay, and a poor level of service. LOS is represented by a letter "grade" ranging from A for excellent conditions – that is, traffic is light and free-flowing – to F for failure conditions – that is, extremely congested, gridlock traffic. LOS B though LOS E describe progressively worse traffic conditions. Typically, LOS E and F are considered to be unacceptable operating conditions and LOS D and above are generally considered acceptable.

This capacity evaluation shows that certain segments within the SC 41 corridor operate near or over capacity (LOS C and F) (Table 2-2). By 2045, the congestion on these roads is expected to increase, and the projected increase in traffic is likely to exacerbate this.

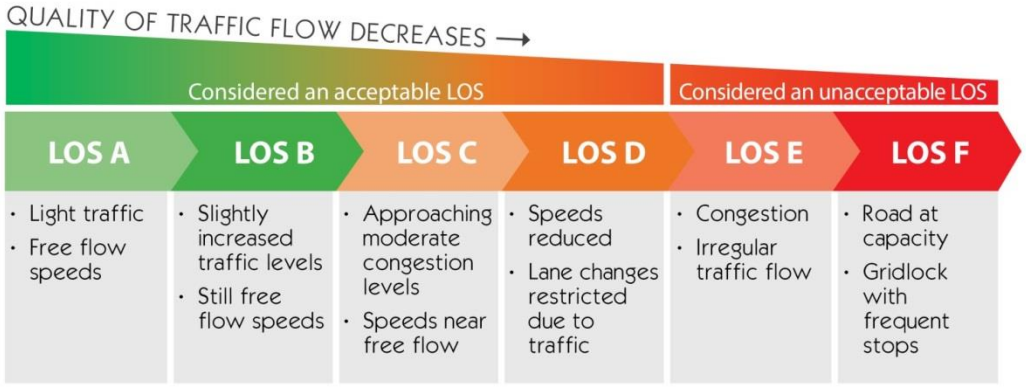

Figure 2-1. Definition of Level of Service

Table 2-2. Existing and Projected Traffic Conditions

Segment Description		2017 AADT	Existing LOS	2040 AADT	2040 LOS (No-Build)
SC 41	US 17 to Joe Rouse Rd	21,400	F	32,300	F
	Joe Rouse Rd to Dunes West Blvd	15,400	C	26,800	F
	Dunes West Blvd to Wando River	13,100	C	26,200	F
Bessemer Road	SC 41 to Park West Blvd (E–W)	4,200	C	6,400	B
Park West Boulevard	Bessemer Rd to Park West Blvd (N–S)	4,150	C	13,700	C
Dunes West Boulevard	Park West Blvd to SC 41	7,800	C	14,100	C

2.4.3 Safety Concerns

2.4.3.1 Traffic Collisions

Seven years of crash data (2011 to 2017) provided by the South Carolina Department of Public Safety (DPS) was used to analyze the location, type, and crash severity within the project corridor. Types of crashes can include head on, rear end, single vehicle, sideswipe, or angle collisions. Crash severity is classified as property damage, injury, or fatality.

Within the study area, a total of 575 crashes were reported to DPS during the seven-year study period. Of the total crashes, DPS reported 272 accidents south of Joe Rouse Road, 107 accidents between Joe Rouse Road to Dunes West Boulevard, and 196 accidents north of Dunes West Boulevard. Table 2-3 provides a summary of the type of crashes.

Table 2-3. Crashes by Year and Type

Year	Angle	Head On	Rear End	Single Vehicle	Sideswipe	Total
2011	7	2	24	9	1	43
2012	6	3	18	20	4	51
2013	13	3	43	12	5	76
2014	18	0	49	5	4	76
2015	23	2	71	10	4	110
2016	27	3	56	13	3	102
2017	25	1	74	12	5	117
Total	**119 (21%)**	**14 (2%)**	**335 (58%)**	**81 (14%)**	**26 (5%)**	**575**

The types of crashes were evaluated by segments of SC 41. The number of crashes is greatest on SC 41 between US 17 and Joe Rouse Road.

Table 2-4 provides a summary by the type and location of crashes.

Table 2-4. Crashes by Type in Segments of SC 41 (between 2011 and 2017)

Segment	Angle	Head On	Rear End	Single Vehicle	Sideswipe	Total
SC 41 between US 17 and Joe Rouse Rd.	42	5	173	35	17	205
SC 41 between Joe Rouse Rd. and Dunes West Blvd.	10	1	83	11	2	90
SC 41 between Dunes West Blvd. and Wando River	67	8	79	35	7	160
Total	**119**	**14**	**335**	**81**	**26**	**575**

The number and type of crashes is comparable to surrounding highways, such as US 17. The most frequent collisions were rear-end collisions (58 percent) with angle accidents and single vehicle accidents making up 21 and 14 percent of the total collisions, respectively. Volume of traffic and traffic congestion are usually contributing factors to these types of collisions. The growth of angle crashes may be attributable to increased intersection and driveway movements. The number of collisions annually in the SC 41 corridor has increased by 172 percent over the seven years studied. Thirty-three percent of these accidents resulted in three fatalities and injuries to 272 people.

In addition to safety concerns, crashes often cause unavoidable congestion, and when they occur during the rush hours, they worsen the congestion that already exists from travel demand during those time periods.

2.4.3.2 Emergency Responsiveness and Hurricane Evacuation Route

South Carolina's coastline is vulnerable to hurricanes and both the South Carolina Emergency Management Division's (SCEMD) Hurricane Plan and the Berkeley-Charleston-Dorchester Council of Governments (BCDCOG) CHATS Long-Range Transportation Plan (LRTP) mention that SC 41 within the project area is designated as a hurricane evacuation route (SCEMD 2020a) (SCEMD 2020b) (BCDCOG 2018a). During stakeholder meetings, emergency responders expressed concerns about responsiveness to incidents along SC 41 because of traffic congestion. Reducing congestion along SC 41 is critical to providing access for hurricane evacuations and emergency responders.

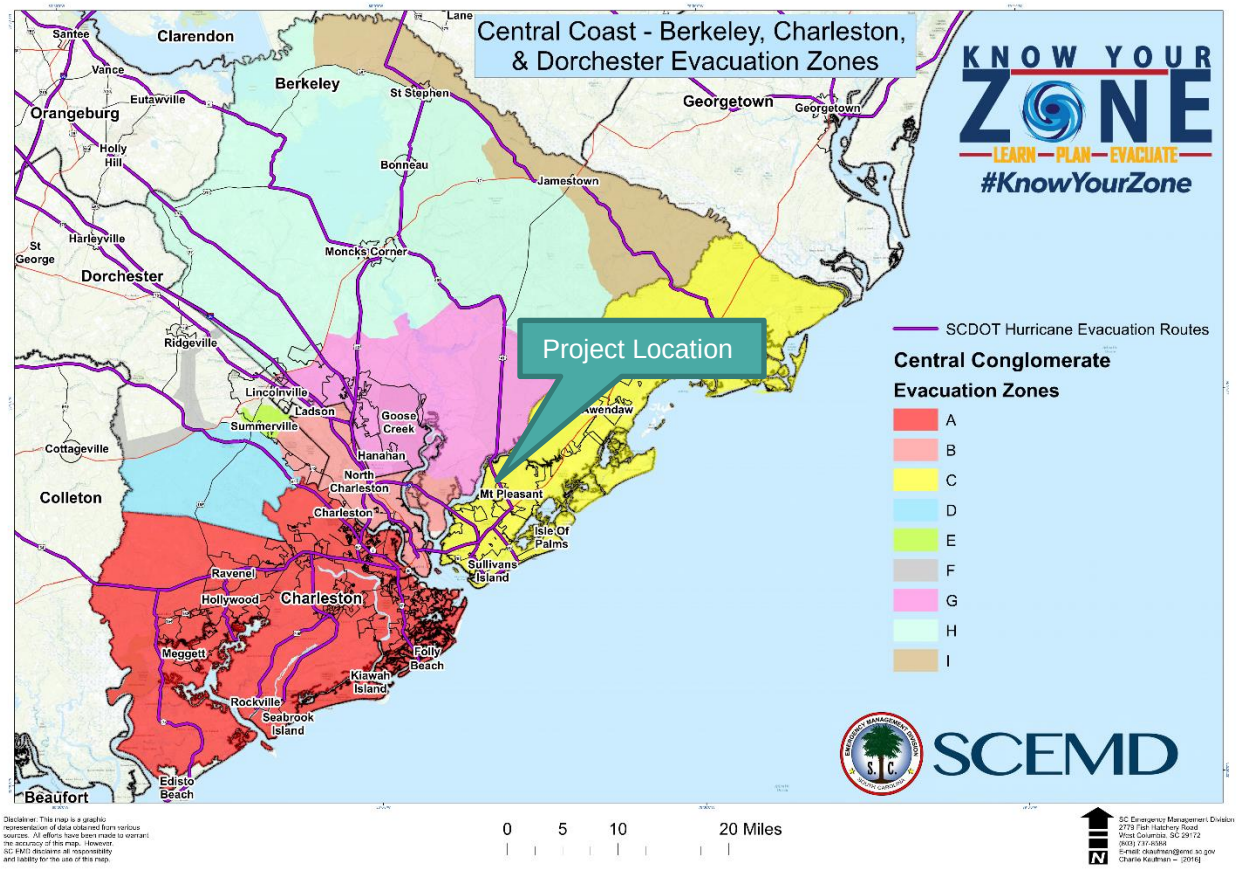

Figure 2-2. Hurricane Evacuation Zones and Routes

2.4.4 Provide Bicycle and Pedestrian Accommodations

A need has been identified for adequate bicycle and pedestrian accommodations to be provided on SC 41 to serve non-motorized users. The CHATS 2035 LRTP Update included survey data that indicated that out of 404 survey responses, 244 responses (60 percent) rated "sidewalks, greenways, and pedestrian signals" as "poor". Out of 405 responses, 308 responses (76 percent) rated "on-road bicycle facilities, greenways, designated routes, and bike racks" as "poor." Additionally, the CHATS 2040 LRTP included survey data that indicated that out of 2,160 survey responses, 47 percent are "unsatisfied or very unsatisfied" by their family's choices for riding a bicycle near their home. The Berkeley and Charleston County Comprehensive Plans also include objectives to improve conditions and connectivity for bicycles and pedestrians. By providing a safe means of travel for bikers and pedestrians, multi-use paths would provide a safe alternative to vehicular travel that is emission and cost-free.

2.4.5 Inadequate Interconnection of Transportation Modes

2.4.5.1 Pedestrian and Bicycle Facilities

SC 41 within the study area is a two-lane roadway with grassed shoulders and roadside ditches. Bicycle and pedestrian facilities in the project study area include 1.3 miles of sidewalks along SC 41 between Virginia Rouse Road and Joe Rouse Road, sidewalks along US 17, a four-foot shoulder on the new Wando River Bridge, and several miles of biking trails in Laurel Hill County Park. Laurel Hill County Park is a 745-acre park owned by Charleston County Parks & Recreation Commission (CCPRC) that abuts SC 41 and the Park West, Ivy Hall, and Carol Oaks subdivisions. This park features several miles of running, walking,

or biking trails (CCPRC 2017a). In a response to the Letter of Intent (LOI), the CCPRC provided comments supporting bicycle and pedestrian access to Laurel Hill County Park.

The Mount Pleasant Way bicycle and pedestrian network recommends improving large-scale connectors such as SC 41 to provide citizens with the ability to use alternative modes of transportation for a greater percentage of their traveling needs (Town of Mount Pleasant 2020).

The Town of Mount Pleasant's Comprehensive Plan and Charleston County's People 2 Parks Plan identifies a potential bicycle and pedestrian corridor along SC 41 between Harper's Ferry Way and US 17 and along the entire length of Dunes West and Park West Boulevards. CCPRC recommends implementing this bicycle and pedestrian corridor concurrently with the proposed project. The BCDCOG CHATS LRTP identifies additional potential bicycle and pedestrian lanes on SC 41 across the Wando River Bridge to Clements Ferry Road and along the entire length of Bessemer Road between SC 41 and Park West Boulevard (Town of Mount Pleasant 2020) (CCPRC 2017b) (BCDCOG 2018b).

The Mount Pleasant Way bicycle and pedestrian network would implement multi-use paths parallel to existing roads and bike lanes or wider sidewalks adjacent to the roadway where appropriate, connecting to parks and recreation facilities along the way. Mount Pleasant Way would exist along the SC 41 corridor between Dunes West Boulevard and US 17 and along the entire length of Dunes West and Park West Boulevards, connecting to Laurel Hill County Park. From Park West Boulevard, it would continue heading southwest along US 17, down Porcher's Bluff Road, and continue southwest along the entire length of Rifle Range Road. Mount Pleasant Way would continue northwest along Coleman Boulevard, connecting to Shem Creek Park, Patriots Point, and Memorial Waterfront Park. From Memorial Waterfront Park, it would continue northeast along Harry M. Hallman Jr Boulevard/Wingo Way, Mathis Ferry Road, and Long Point Road, connecting to Palmetto Islands County Park and Boone Hall Plantation before reconnecting to Rifle Range Road. Mount Pleasant Way is also proposed along Billy Swails Boulevard, Sweetgrass Basket Parkway, and Hungry Neck Boulevard (Town of Mount Pleasant 2020).

2.4.5.2 Transit Infrastructure and Access

Public and mass transit options are growing in interest in the BCD region. The region's two transit providers, Charleston Area Regional Transportation Authority (CARTA) and TriCounty Link, coordinate their routes and scheduling to provide an interregional transit connection for transit patrons in and around the SC 41 area. The SC 41 segment between the Wando River and US 17 is a vital link in making this collaborative effort feasible. The TriCounty Link transit agency operates fixed-route services that connect transit patrons from communities north of the Wando River to the Charleston urbanized area. This includes a route that provides service along this section of SC 41, from Cainhoy/Clements Ferry Road to the SC 41/US 17 junction, where it connects with CARTA service. While CARTA does not operate buses along this section of SC 41, it does have a stop at the SC 41/US 17 junction that connects with the TriCounty Link service. In addition, there is a CARTA Park-and-Ride facility located within one-half of a mile from the SC 41/US 17 junction (BCDCOG 2014).

The BCDCOG Regional Transit Framework Plan, completed in September 2018, sets the foundation for transit investment as part of the overall multi-modal transportation system. This plan encourages community and stakeholder engagement, identifies the region's transit needs and ideals (including the US 17 corridor and SC 41/US 17 junction), incorporates existing regional plans and priorities, and prioritizes transit improvements and solutions (BCDCOG 2018c).

2.5 Logical Termini and Independent Utility

Pursuant to Federal Highway Administration (FHWA) regulations (23 CFR §771.111(f), a project should have logical termini and independent utility for transportation improvements as well as an appropriate geographical boundary for evaluating environmental impacts. To have independent utility, a project must be a usable and a reasonable expenditure even if no other transportation improvements are constructed.

The proposed project termini include the intersections of Clements Ferry Road to the north and US 17 to the south. The terminus at Clements Ferry Road is determined to be a rational endpoint as the section of Clements Ferry Road from Jack Primus to SC 41 is currently under construction to be widened from a two-lane road to a four-lane roadway. Therefore, the proposed project would essentially be connecting to, and extending this roadway typical section. The SCDOT and FHWA previously completed an Environmental Report and subsequent FONSI for the segment of Clements Ferry Road that is currently under construction (SCDOT 2018). The terminus at US 17 is also determined to be a rational endpoint as this is SC 41's southern terminus.

The proposed project is determined to have independent utility since it would provide much needed capacity and safety improvements within the congested project corridor even if no other existing or future projects are completed. In addition, the project would not create a need for improvements on other roadways or require additional improvements to be effective for addressing the stated purpose and need. The project would improve the LOS of the proposed segment and would not worsen the adjacent facilities or require additional improvements to adjacent facilities to achieve the improved LOS. In addition, bicycle and pedestrian facilities would be constructed to provide continuity with advanced and planned facilities for Berkeley/Charleston counties. It should also be noted that there are several additional transportation improvement projects located adjacent to and in proximity of the proposed project.

2.6 Reasonable Availability of Funding

This project has a combination of committed funds from Charleston County, CHATS, and the Town of Mount Pleasant. Taxpayers voted in 2016 to increase Charleston County's sales tax and as a result, SC 41 was allotted $123 million of sales tax funding for the proposed improvements. The South Carolina Transportation Infrastructure Bank (SCTIB) allocated $62 million for the SC 41 project improvements. Additionally, the CHATS TIP has also allocated two million dollars for this project.

3.0 Alternatives

Various location and design alternatives were evaluated during the development of the project. The initial development and screening of the range of alternatives was completed through further modifications to the CHATS Travel Demand Model. The model distributes trips in part according to the capacity of the links (roads) within the network. By adding lanes (capacity) to a link, more traffic may be drawn to that link. Similarly, if a new link (roadway on new alignment) is placed in the model, connecting two existing links, some of the existing or forecasted traffic on those adjoining links may be drawn to the new connecting link (road). A wide variety of alternatives were modeled in this manner, by either adding capacity directly to SC 41, or by adding connecting or parallel roadways in an attempt to distribute the traffic demand, relieve congestion and reduce travel times. Twelve different improvement alternatives and a No-Build Alternative were initially analyzed in the CHATS model.

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 future project development, and modifications will be made where appropriate.

3.1 Proposed Facility

The primary purpose of the proposed SC 41 Corridor Improvements Project is to reduce traffic congestion within the SC 41 corridor to accommodate future traffic projections. The secondary purposes of the proposed SC 41 Corridor Improvements Project are to enhance safety throughout the corridor, improve transportation system and community connections, and provide bicycle and pedestrian accommodations, while minimizing community and environmental impacts.

Along SC 41, the proposed typical section would include four 12-foot travel lanes, curb and gutter with a planted median between US 17 and Joe Rouse Road and from Dunes West Boulevard to Clements Ferry Road, with a five-foot sidewalk on the west side and a 10-foot multi-use path on the east side (Figure 3-1). On SC 41 between Joe Rouse Road and Dunes West Boulevard, the proposed typical section would include a three-lane curb and gutter section with one travel lane in each direction, a center two-way left turn lane, and a five-foot sidewalk on both sides (Figure 3-2). The proposed typical section along Laurel Hill Parkway would include two lanes with curb and gutter and a 10-foot multi-use path on the east side (Figure 3-3). With construction of the proposed facility, both individual intersection and overall delays are expected to decrease, and the LOS would improve.

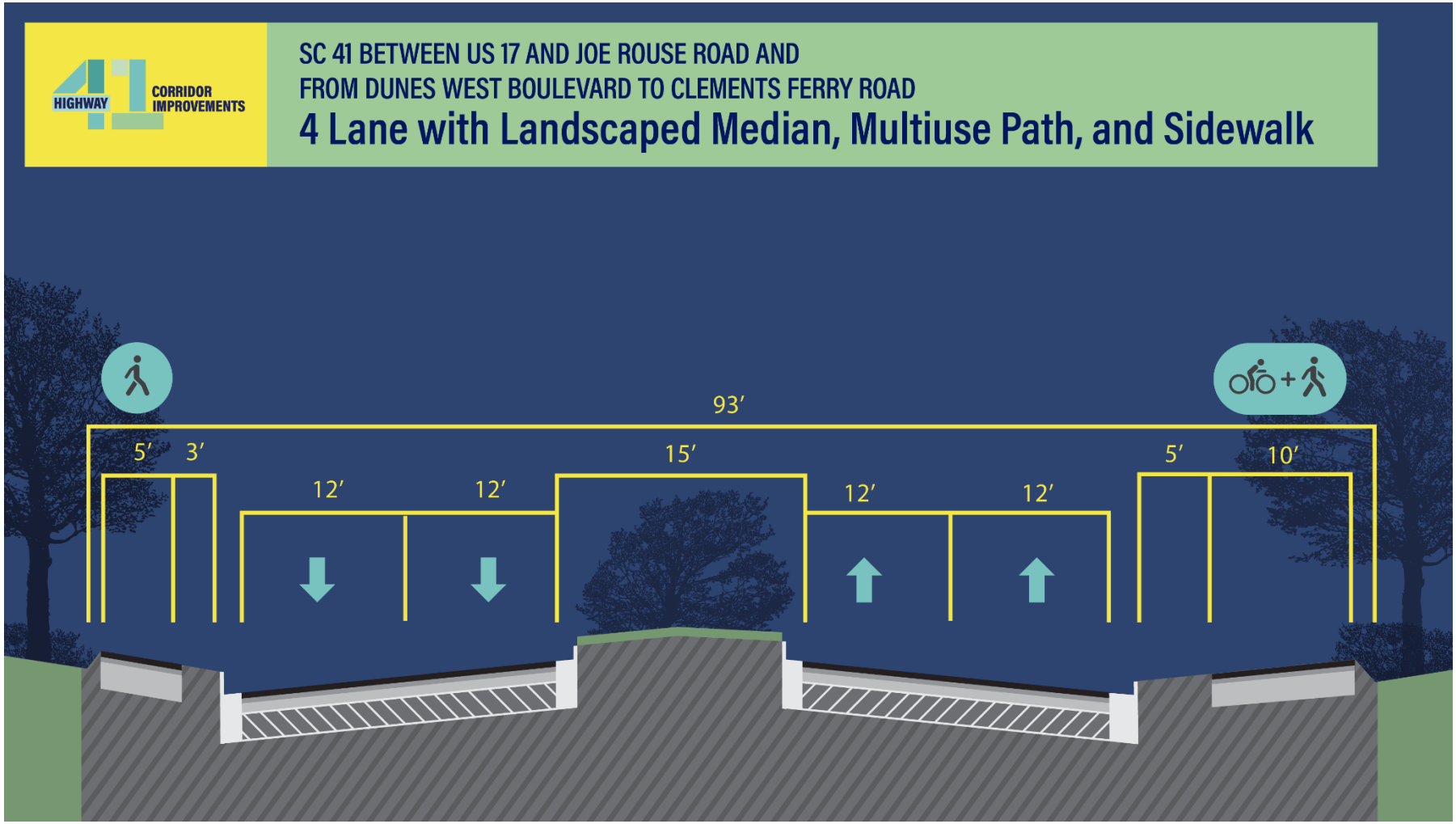

Figure 3-1. SC 41 Proposed Typical Section between US 17 and Joe Rouse Road and from Dunes West Boulevard to Clements Ferry Road

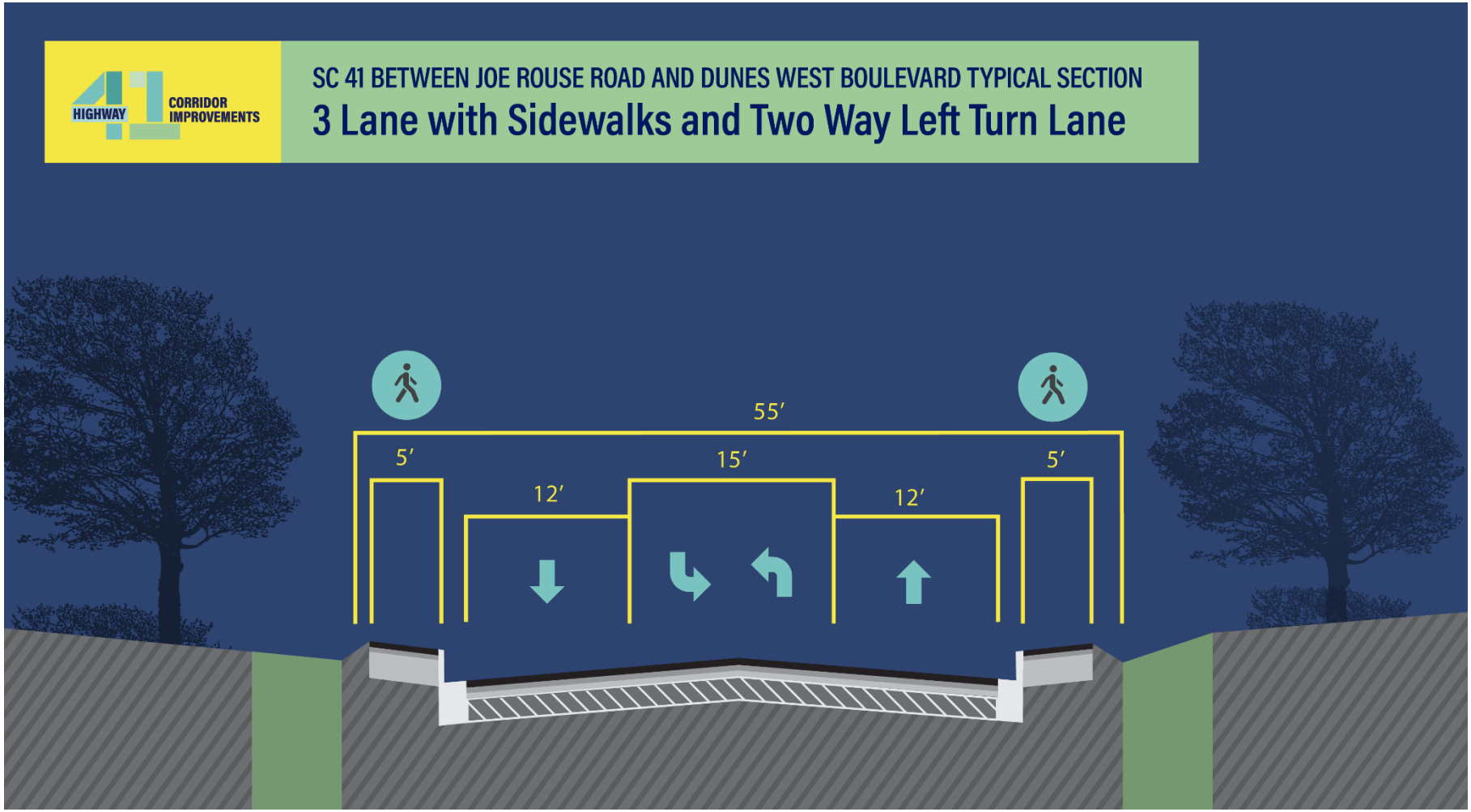

Figure 3-2. SC 41 Proposed Typical Section between Joe Rouse Road and Dunes West Boulevard

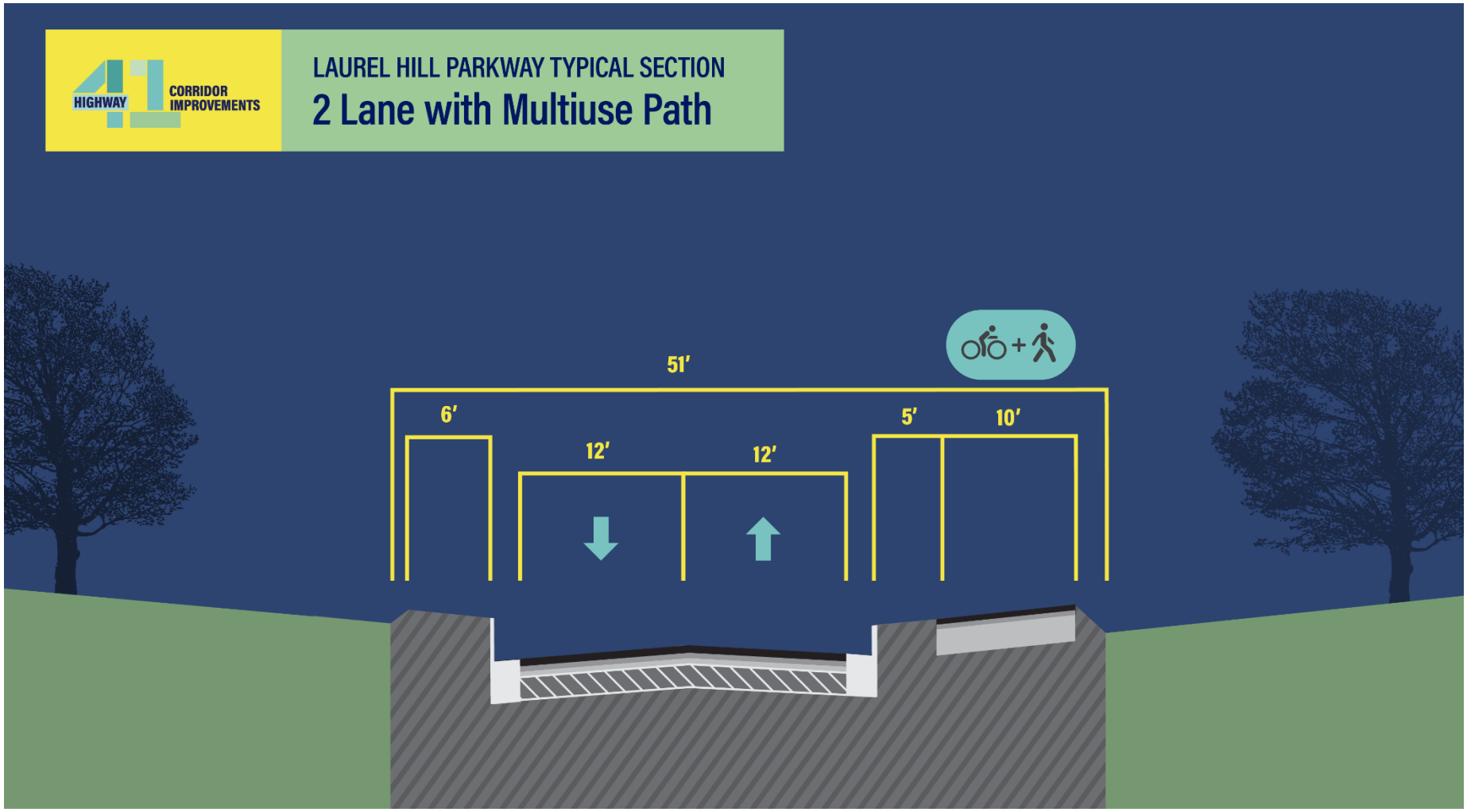

Figure 3-3. Laurel Hill Parkway Proposed Typical Section

3.2 Alternatives Screening Process

Figure 3-4 illustrates the alternatives screening process.

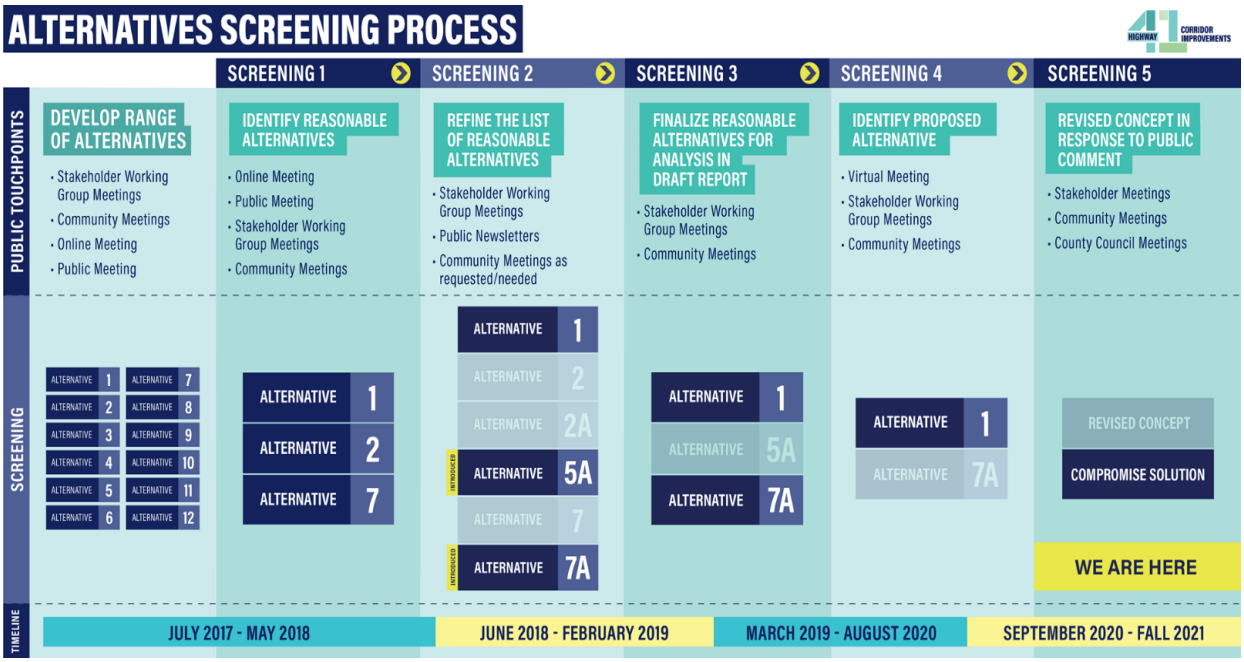

Figure 3-4. Alternatives Screening Process

3.3 Alternatives Considered but Eliminated

Twelve different improvement alternatives and a No-Build Alternative were analyzed in the CHATS Travel Demand Model. The results of the traffic distribution and planning level capacity analysis were presented to the SC 41 project team at a meeting on January 26, 2018. These results demonstrated that some of the alternatives did not relieve congestion issues on SC 41 for design year 2045, and consequently do not meet the purpose and need of the project. Table 3-1 summarizes the eliminated alternatives and the corresponding deficiency. For a more detailed summary, please refer to the Alternatives Screening Memos, presented in Appendix B.

Table 3-1. Alternatives Eliminated by Initial Screening Process

Build Alternative	Elimination Justification
3	Conversion of Joe Rouse Road, Bessemer Road and Dunes West Boulevard to one-way did not relieve congestion to acceptable levels.
4	The new alignments did not attract enough traffic volume to reduce congestion levels on SC 41 to acceptable levels.
5	
6	
8	Alternatives that included six lanes on SC 41 from US 17 to Joe Rouse Road provide excess capacity in this segment and do not reduce congestion levels in other segments of SC 41 to acceptable levels.
9	
10	
11	
12	

Following the initial planning level screening analysis, the alternatives were refined and a detailed analysis of Alternatives 1, 2, and 7 was performed. The refinement included an update of growth forecasts in the project area to correspond to changes in development plans for Cainhoy Plantation. The developer recently committed to preserve approximately fifty percent of the previously master planned area. This forecast was applied to the remaining alternatives prior to conducting more detailed LOS analyses.

Alternative 1 was found to continue to meet the purpose and need for the project and was advanced to Level 3 screening. Alternative 2 was eliminated from further consideration because the more detailed traffic analysis confirmed a three-lane section through the Phillips Community would have a failing LOS. Therefore, Alternative 2 was eliminated from moving forward because it does not meet the purpose and need of the project.

Alternative 2A was developed during Level 2 screening based on public input received during the May 16, 2018 public meeting and outreach with the Phillips Community. Alternative 2A included a three-lane section through the Phillips Community, similar to Alternative 2, but also included a three-lane section through Bessemer Road and Dunes West Boulevard. During traffic analysis, Alternative 2A did not attract enough traffic volume to reduce congestion levels on SC 41 to an acceptable LOS and was eliminated from further consideration.

While Alternative 5 was determined to not meet the project purpose and need for traffic operations in Level 1, as a result of public comment received, the project team re-evaluated Alternative 5 in an effort to look at alternate ways to distribute traffic in the area. Alternative 5 had initially considered two lanes along a transmission line easement, which did not meet the purpose and need of the project to improve traffic operations along SC 41. During the May 16 to June 16, 2018 public comment period, the County received correspondence from stakeholders, including members from the Phillips Community and the South Carolina Coastal Conservation League that stressed the importance of considering alternatives that minimize impacts to environmental and cultural resources, including the Phillips Community. This correspondence asked about the possibility of a five-lane alternative along the transmission line easement. Based on stakeholder input, the project team added Alternative 5A to Level 2 for consideration.

Alternative 5A would create a parallel five-lane roadway primarily along the existing Dominion Energy South Carolina power line easement running from US 17, through Ivy Hall, Laurel Hill County Park, Dunes West, and tying into SC 41 near Harpers Ferry Way. The traffic analysis showed that Alternative 5A meets the project purpose and need of improving traffic operations and congestion on SC 41; therefore, Alternative 5A was advanced to the Level 3 screening.

Alternative 7A was developed during the Level 2 screening in response to public comments in opposition to Alternative 7 and to lessen impacts on residential areas along Bessemer Road. Alternative 7A modified Alternative 7 to reroute SC 41 parallel to Bessemer Road and onto Laurel Hill County Park property, turn along the power line easement, and then back along Dunes West Boulevard. The traffic analysis showed that Alternative 7A meets the project purpose and need of improving traffic operations and congestion on SC 41; therefore, Alternative 7A was advanced to the Level 3 screening. Alternative 7 was subsequently eliminated from further consideration in favor of advancing Alternative 7A.

Alternatives 1, 5A, and 7A were advanced to the Level 3 screening. During Level 3 screening, the project team began to evaluate the alternatives based on public input, environmental factors, cost, and logistics.

During Level 3 screening, Alternative 5A was eliminated from further evaluation because of the significant impacts to utilities and the environment. Alternative 5A would result in the most property impacts, and the

most tidal and non-tidal wetland impacts. Alternative 5A also cuts through a Charleston County Parks & Recreation Commission (CCPRC) park, Laurel Hill County Park, and would prevent CCPRC from using the property for its intended use as a park as stipulated in its land trust. For more details, please refer to the Alternatives Analysis Screening Report (Appendix B).

Alternatives 1 and 7A were advanced to the Level 4 screening. During Level 4 screening, the project team continued to evaluate the alternatives based on public input, environmental factors, cost, and logistics. A screening matrix was used to compare these criteria (located in Appendix B), and Alternative 1 was selected as the Proposed Alternative as it provided the best option to meet the project purpose and need while minimizing wetland impacts, would result in the fewest acres of right-of-way acquisition, and had the lowest estimated total cost of approximately $125 million.

Upon identification of Alternative 1 as the Proposed Alternative, the project team went back to the neighborhoods, communities, and project stakeholders to gather their input. The feedback provided by the communities identified additional concerns to the Phillips and Seven Mile Communities, The Phillips Community's primary concern with Alternative 1 was the need to acquire right of way throughout the Community and continued encroachment on their residences. Their primary request was for the maximum footprint of the project to be contained within the existing 75-foot-wide right-of-way within their community along SC 41. The Seven Mile Community's primary concern was the continued widening of US 17 within the limits of their community, and they wanted no additional lanes added to US 17 within the Seven Mile Community.

The project team took a second look at Alternative 7A and created a hybrid of Alternative 1 and 7A called the Compromise Alternative. The Compromise Alternative would widen SC 41 to a four-lane curb and gutter section with a planted median between US 17 and Joe Rouse Road, and from Dunes West Boulevard to Clements Ferry Road, with a five-foot sidewalk on the west side and a 10-foot-wide multi-use path on the east side. In the Phillips Community along SC 41 between Joe Rouse Road and Dunes West Boulevard, the proposed typical section would be a three-lane curb and gutter section with one travel lane in each direction, a center two way left turn lane, and five-foot sidewalks on both sides. The proposed project also includes improvements to the intersection of SC 41 and US 17, a new tie-in road between SC 41 and Winnowing Way, and 1.3-mile new location roadway, Laurel Hill Parkway, between SC 41 and Park West Boulevard. The proposed typical section along Laurel Hill Parkway consists of two-lanes with curb and gutter and a 10-foot multi-use path on the east side. This alternative avoids the need for proposed right-of-way from within the Seven Mile Community and minimizes impacts to the Phillips Community.

3.4 No-Build Alternative

The No-Build Alternative, which consists of making no improvements to SC 41, was considered a baseline for comparison. The No-Build Alternative would not provide for the proposed improvements that are necessary to improve traffic efficiency along this corridor. If the improvements are not made, traffic congestion will worsen, and safety of the traveling public will be compromised. Therefore, the No-Build Alternative would not meet the purpose and need for the project.

3.5 Build Alternatives

3.5.1 Alternative 1

Alternative 1 consists of widening SC 41 to a five-lane roadway with a center raised island or two-way left-turn lane from US 17 to the Wando River Bridge (Figure 3-5). This alternative would also include a sidewalk

along the east side of the roadway and a multi-use path for bicyclists and pedestrians along the west side of the roadway along the entire length. This alternative would be approximately 4.6 miles long and would include complementary intersection improvements at selected intersections. This alternative would provide the necessary improvements to accommodate future traffic deficiencies from US 17 to Clements Ferry Road through the construction of additional travel lanes, a center two-way left-turn lane in some sections, and a multi-use path. As shown in Table 3-2, this alternative would result in no residential or commercial relocations, and impact approximately 5.3 acres of estuarine (tidal) and 2.9 acres of freshwater (non-tidal) wetlands.

3.5.2 Alternative 7A

Alternative 7A consists of widening SC 41 to a five-lane roadway with a center raised island or two-way left-turn lane from US 17 to Joe Rouse Road and from Dunes West Boulevard to the Wando River Bridge and a three-lane roadway with a center two-way left-turn lane from Joe Rouse Road to Dunes West Boulevard. Alternative 7A would also reroute SC 41 parallel to Bessemer Road and onto Laurel Hill County Park property, parallel to the power line easement, and then back along Dunes West Boulevard (Figure 3-5). This reroute would also be a five-lane roadway with a center raised island. This alternative would also include a sidewalk along the east side of the roadway and a multi-use path for bicyclists and pedestrians along the west side of the roadway along the entire length. This alternative would be approximately 5.3 miles long and would include complementary intersection improvements at selected intersections. This alternative would provide the necessary improvements to accommodate future traffic deficiencies from US 17 to Clements Ferry Road through the construction of additional travel lanes, a center two-way left-turn lane in some sections, and a multi-use path. As shown in Table 3-2, this alternative would result in no residential or commercial relocations, and impact approximately 5.0 acres of tidal and 6.2 acres of non-tidal wetlands.

3.5.3 Compromise Alternative

The Compromise Alternative consists of widening SC 41 to a four-lane roadway with a planted median from US 17 to Joe Rouse Road and from Dunes West Boulevard to Clements Ferry Road and a three-lane roadway with a center two-way left-turn lane from Joe Rouse Road to Dunes West Boulevard. The Compromise Alternative would also construct a parallel road to Bessemer Road onto Laurel Hill County Park property, parallel to the power line easement, and then tie into Park West Boulevard via a new roundabout and continuing along Dunes West Boulevard (Figure 3-5). This new location parkway would be a two-lane roadway with a multi-use path for bicyclists and pedestrians along the east side of the roadway. Along SC 41, this alternative would include a sidewalk along the west side of the roadway and a multi-use path on the east side of the roadway from US 17 to Joe Rouse Road and from Dunes West Boulevard to Clements Ferry Road and a sidewalk on both sides of the roadway between Joe Rouse Road and Dunes West Boulevard. This alternative would be approximately 5.6 miles long and would include complementary intersection improvements at selected intersections. This alternative would provide the necessary improvements to accommodate future traffic deficiencies from US 17 to Clements Ferry Road through the construction of additional travel lanes, a center two-way left-turn lane in some sections, and a multi-use path. As shown in Table 3-2, this alternative would result in no residential or commercial relocations, impact approximately 7.2 acres of tidal and 3.4 acres of non-tidal wetlands.

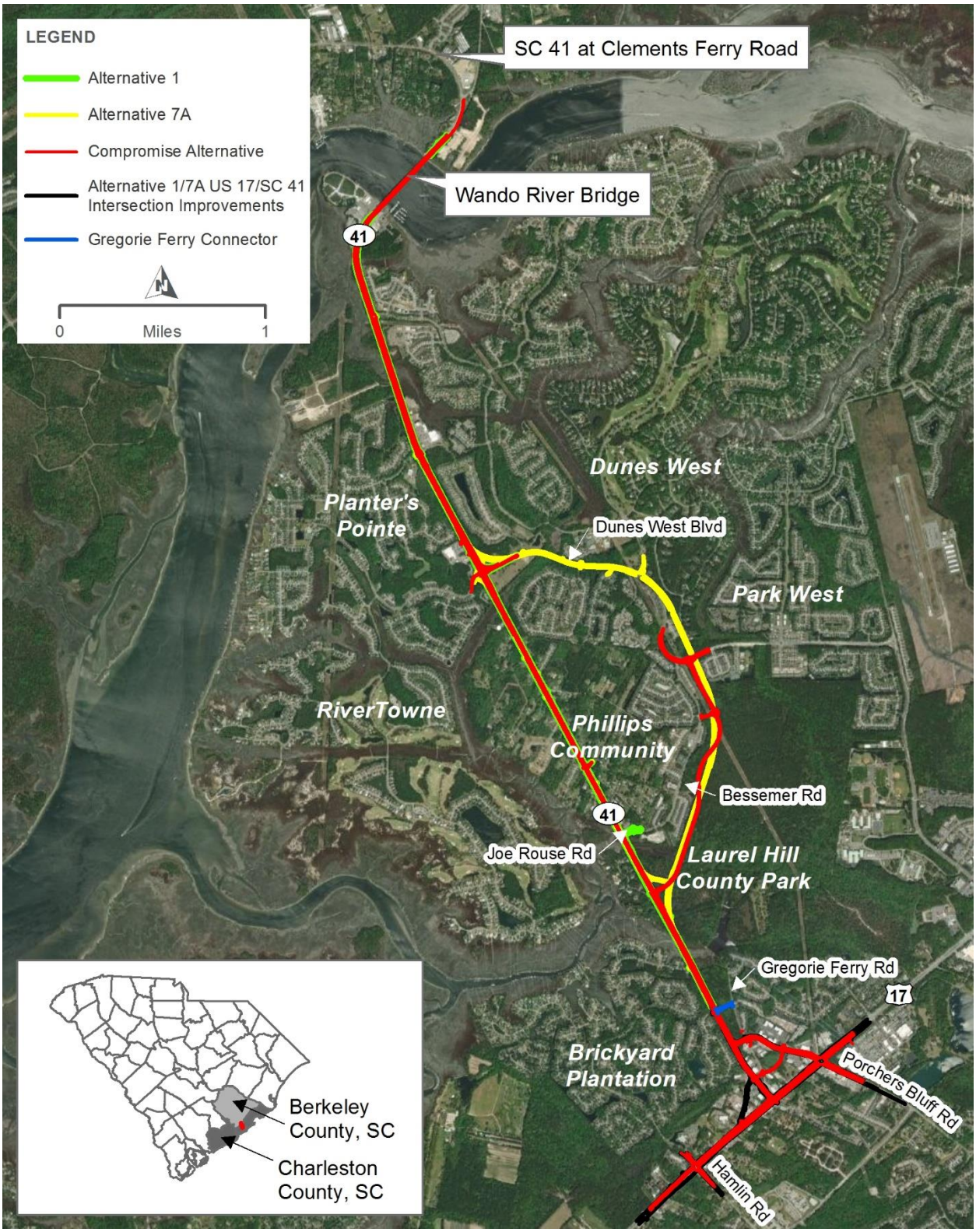

Figure 3-5. Build Alternatives

Table 3-2. Summary of Impacts for the Build Alternatives

Impact Category		Units	Alternative 1	Alternative 7A	Compromise Alternative
Property Impacts	Right-of-Way	Acres	30.4	58.3	44.1
	Right-of-Way	Parcels	229	170	108
	Residential Relocations		0	0	0
	Commercial Relocations		0	0	0
Wetland Impacts	Estuarine (Tidal)	Acres	5.3	5.0	3.4
	Freshwater (Non-Tidal)		2.9	6.2	7.2
Floodplain Impacts	AE (100-Year)	Acres and Percentage	23.05 24%	30.59 22%	22.72 25%
	0.2% Annual Chance Flood Hazard (500-Year)		18.25 19%	25.61 19%	15.83 17%
	X (Outside of 500-Year)		52.06 54%	75.31 56%	45.64 50%
Threatened and Endangered Species		Effect Determination	May affect/not likely to affect	May affect/not likely to affect	May affect/not likely to affect
Laurel Hill County Park		Acres	0.7	19.4	16.2
Noise	NAC B (Residential)	Receivers	58	100	36
	NAC C (Recreational)		0	1	1
	NAC D (Churches)		0	0	0
	NAC E (restaurant patios)		2	2	4
	Feasible and Reasonable Noise Abatement Barriers	Barriers	0	2	0
Cultural Resources	NRHP Archaeological Sites	Sites	1	2	1
	NRHP Eligible Phillips Community Cultural Landscape		Potential adverse effect	No adverse effect	No adverse effect
	NRHP Sweetgrass Basket Corridor Traditional Cultural Property		Potential adverse effect	Potential adverse effect	No adverse effect
Communities	Brickyard/ Colonnade	Severity Rating	Minor	Minor	Minor
	Cardinal Hill		Minor	Minor	Minor

Impact Category		Units	Alternative 1	Alternative 7A	Compromise Alternative
	Dunes West		Minor	Minor to Moderate	Minor
	Gregorie Ferry		Minor	Minor	Minor
	Horlbeck Creek		Minor	Minor	Minor
	Ivy Hall		Minor	Minor	Minor
	Park West		Minor	Minor to Moderate	Minor to Moderate
	Phillips Community		Moderate to Major	Minor	Minor to Moderate
	Planter's Pointe		Minor	Minor	Minor
	Rivertowne		Minor	Minor	Minor
	Seven Mile		Minor to Moderate	Minor to Moderate	Minor to Moderate
	Cainhoy		No direct effects	No direct effects	No direct effects
	Community Resources	Sites	2	3	3
	Public Health and Safety Resources		1	2	2
Phillips Community Cultural Landscape	Right-of-Way	Acres	4.7	0.6	0.6
	Right-of-Way	Parcels	85	2	2
	Residential Relocations		0	0	0
	Commercial Relocations		0	0	0
Environmental Justice Community Impacts		Phillips Community	Disproportionately high and adverse effects	No disproportionate adverse effects	No disproportionate adverse effects
		Seven Mile Community	No disproportionate adverse effects	No disproportionate adverse effects	No disproportionate adverse effects

3.6 Recommended Preferred Alternative

The Compromise Alternative was selected as the Recommended Preferred Alternative (RPA) as it minimizes impacts to the Phillips Community, eliminates property impacts to the Seven Mile Community at the SC 41/US 17 intersection, provides a two-lane parkway around Park West and along the edge of the Laurel Hill County Park, provides a multi-use path connecting US 17 to the new path built by Berkeley County's Clements Ferry project, and meets the purpose and need for the next 20+ years. It also provides intersection improvements that reduce accident frequencies by allowing turning vehicles to move out of the through lane. It creates a center raised island or two-way left-turn lane to provide a separation between opposing lanes and allows left turning vehicles to move out of the through lanes. The Compromise Alternative would be constructed using standard construction methods. The Compromise Alternative would result in the fewest amount of required right-of-way parcels, floodplain impacts, and least amount of noise impacts.

4.0 Environmental Resources and Potential Impacts

The following section includes a discussion on the environmental resources and the probable beneficial and adverse social, economic, and environmental effects of the Recommended Preferred Alternative (RPA), and describes the measures proposed to mitigate any adverse impacts. Environmental studies were conducted for the proposed project, are incorporated by reference, and used to support this conclusion. The following provides a brief overview of the environmental findings.

4.1 Land Use

The project study area is located in southern Berkeley County and central Charleston County in the lower coastal plain of South Carolina. Specifically, the proposed project lies in the Wando River Watershed, in the Town of Mount Pleasant.

4.1.1 Existing Land Use

Current land uses within the immediate vicinity of the project study area include incorporated areas, vacant/undeveloped areas, agriculture, estuarine and marine wetlands and deep water, freshwater wetlands, residential, commercial, industrial, public/institutional, and parks/recreation/open space (Figure 4-1 and Figure 4-2) (Berkeley County 2010) (Charleston County 2018).

Future land uses within the immediate vicinity of the project area include recreation/open space, conservation/marsh/wetlands, settlement community, mixed neighborhood, conventional residential neighborhood, traditional residential neighborhood, rural residential, community scale commercial, neighborhood scale commercial, business and industry, community facilities, and marine/waterfront gateway (Berkeley County 2010) (Charleston County 2018) (Town of Mount Pleasant 2020).

4.1.1.1 Recreation/Open Space

Recreation/open space supports the use of land for parks and structured recreational activities in private or public ownership. Golf courses, recreation facilities, ball fields, athletic facilities, as well as boat landings are appropriate in these areas. Nature Centers or interpretive landscapes with structures are included in this category.

4.1.1.2 Conservation/Marsh/Wetlands

Conservation/marsh/wetlands supports the protection of land without structures for the preservation of natural areas and buffers between development. Wildlife preserves, trail networks, marsh and wetlands, forests, buffers, ponds, and other passive recreation which are under public or private ownership are appropriate in this category.

4.1.1.3 Settlement Community

The settlement community land use designation is intended to protect and recognize the importance of the unique development characteristics of historic African-American settlements and sustain their strong sense of place and community. These areas currently contain low-density residential uses with few to no commercial uses, depending on the community. They exhibit a semi-rural character, often with significant tree cover. A hallmark of these areas is a subdivision pattern and site plan features which are more organic and unique to each community.

4.1.1.4 Mixed Neighborhoods

Mixed neighborhoods support compact residential development with an opportunity for a variety of housing types with similar scale and architectural character. Single-family detached homes, accessory dwelling units, attached townhouses or duplexes, small scale multi-family buildings, and multi-family communities are appropriate in these areas. A 9,000-acre master-planned, mixed-use development known as Cainhoy Plantation is proposed near the study area on Clements Ferry Road in Berkeley County. Two schools have already been constructed as part of the development.

4.1.1.5 Conventional Residential Neighborhood

Conventional residential neighborhoods consist of low-density single-family subdivisions, which are a significant portion of the town's existing development. Continuation of this development type is appropriate on remaining large lots in these areas, in compliance with the requirements of existing compatible zoning districts. These neighborhoods do not generally continue the grid and block pattern found in the traditional core of Mount Pleasant but do tend to have internal networks of cul-de-sacs and wide curvilinear streets.

4.1.1.6 Traditional Residential Neighborhood

Traditional residential neighborhoods include a range of single-family housing types. Single-family detached homes and attached townhouses or duplexes with individual external entrances are appropriate in these areas. This development type is suitable where existing or as redevelopment and infill, or as a transitional land use between commercial properties and Conventional Residential Neighborhoods.

4.1.1.7 Rural Residential

Rural residential supports the preservation of the traditional rural low country landscape. Agriculture, forest, marsh, and rural estate residential on large lots, and small rural neighborhood commercial such as general stores, farm markets, feed stores, or service/convenience stations, institutional uses like schools, places of worship, or public facilities are appropriate uses in these areas. These areas should respect the natural and agricultural heritage of the Lowcountry, and minimal disturbance to existing landscapes should be prioritized.

4.1.1.8 Community Scale Commercial

Community scale commercial allows for moderate concentrations of small to medium-scale commercial uses designed to serve a broader community area of approximately a three-mile radius. This is the predominant commercial classification within the town, including retail, office, services, grocery stores, boutique hotels and restaurant uses. These uses should accommodate significant amounts of parking as local destination uses for the town.

4.1.1.9 Neighborhood Scale Commercial

Neighborhood scale commercial allows for small concentrations of small-scale commercial uses designed to serve a neighborhood area of approximately a quarter mile-radius. These areas are within walking or bicycling distance from neighborhoods, so they may only need to accommodate small amounts of parking for quick stops. Retail, office, services, and restaurant uses are appropriate in these areas.

4.1.1.10 Business and Industry

The business and industry character area type supports the continued operation of the State Ports Authority and creation of a business hub near the East Cooper airport with warehousing, light manufacturing, office, and distribution facilities.

4.1.1.11 *Community Facilities*

Community facilities provide public and institutional support to the residents of the town. This land use designates areas that are intended for use by federal, state, and local government agencies, houses of worship, hospitals, schools, and recreational and educational facilities. These uses are included under the Activity Center Character Area because they are major destinations within the community and require the same consideration as shopping or entertainment destinations related to their impact on traffic generation and demand for parking.

4.1.1.12 *Marine/Waterfront Gateway*

The marine/waterfront gateway should be an integrated district with a network of parks, pedestrian paths and streetscapes, including docks and public walks along the waterfront. Land uses should be focused on the waterfront, including maritime-based commercial/industrial, marinas, offices, hotels and lodging facilities, tourist attractions, recreational/event facilities, restaurants, parks, and multi-family residences. Opportunities to protect traditional industries such as shrimping, fishing, crabbing, oystering, boat building along Shem Creek are strongly supported. The creation of public spaces and outdoor dining/retail environments is strongly encouraged. Development patterns should promote resiliency, a mix of uses, internal trip capture, and alternative means of transportation. Waterfront land uses include two existing hubs, Patriot's Point and Shem Creek Boardwalk, that serve as both recreational and entertainment destinations. A third waterfront hub is proposed at the Wando River Bridge at the entrance to the Town of Mount Pleasant on SC 41 (Town of Mount Pleasant 2020).

4.1.2 Impacts to Land Use

The RPA would not adversely affect current or proposed land uses in the area. The RPA would result in the acquisition of 44.1 acres of additional ROW. The required ROW would necessitate the relocation of signage, utilities, and reconfiguration of driveway entrances. Since this is a proposed widening project, the improvements would not provide new access and are not anticipated to cause a direct change in adjacent land use. Local land uses would benefit from the proposed improvements through improved operating conditions.

4.1.3 Mitigation

Existing land use was taken into consideration during design of the RPA. A number of areas adjacent to the existing roadway such as businesses, residences, and environmentally sensitive areas (i.e., wetlands and streams) were designated as sensitive areas and were avoided to the extent practicable. Due to the lack of impacts, no mitigation is proposed for land use.

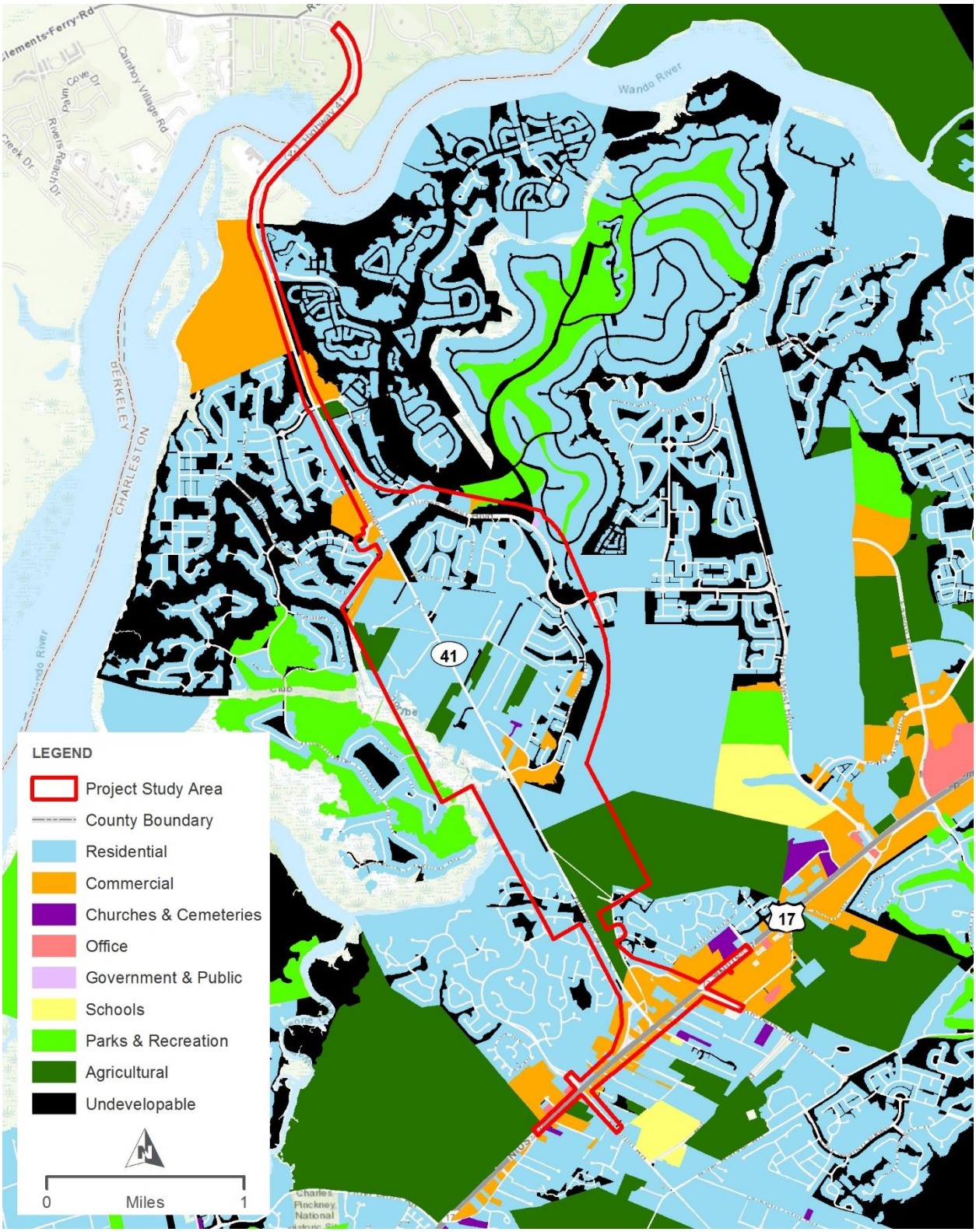

Figure 4-1. Charleston County Land Use

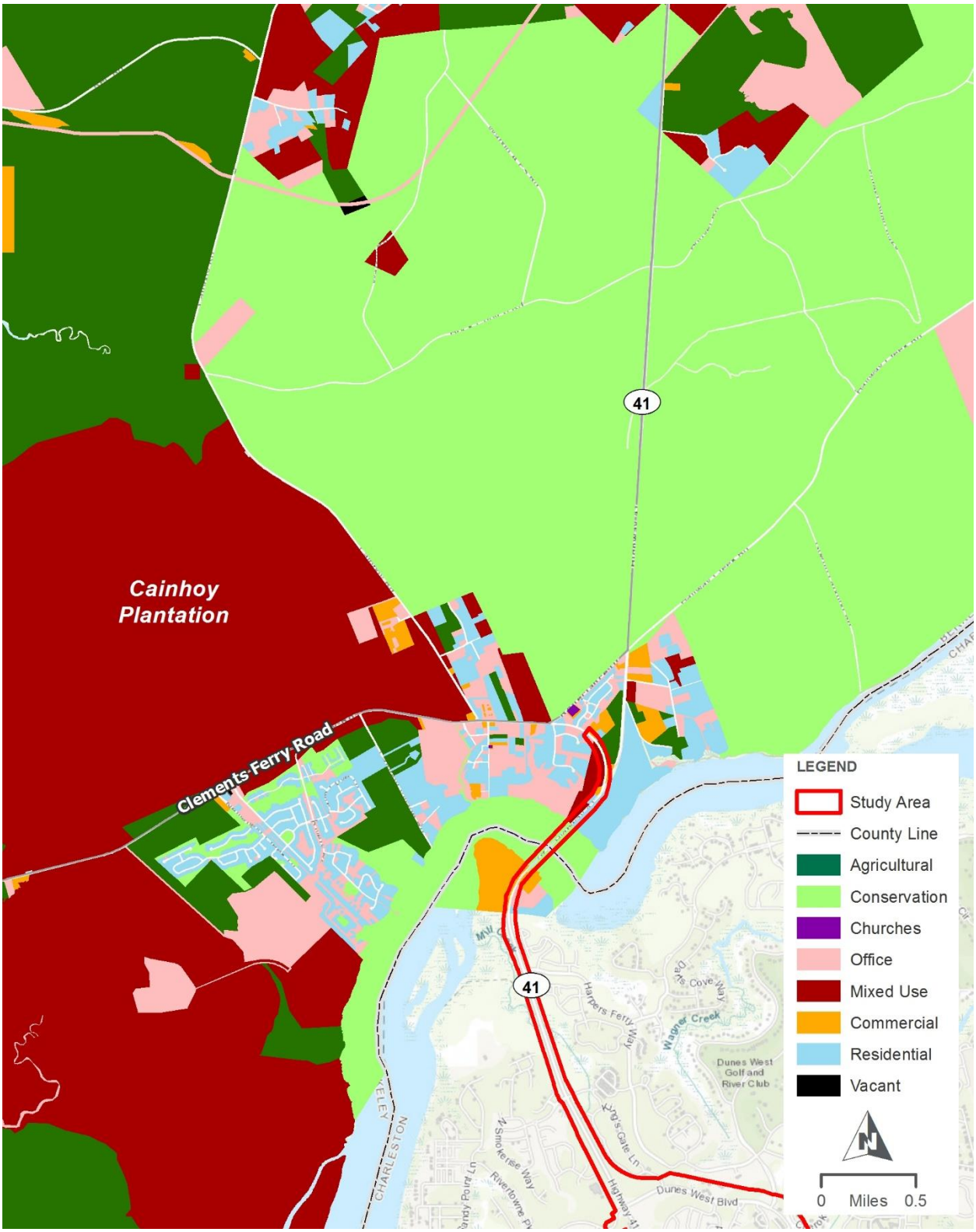

Figure 4-2. Berkeley County Land Use

4.2 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 Corps 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; and
- The territorial seas.

Between October 3 and October 16, 2017, March 8 – 12, 2019, and on December 27, 2021, environmental scientists reviewed the project study area for WOUS under Section 404 of the Clean Water Act (CWA). The project study area was examined according to the methodology described in the USACE 1987 Wetland Delineation Manual, USACE Post-Rapanos guidance, and the USACE Atlantic and Gulf Coastal Plain Regional Supplement. This approach utilizes the three-parameter approach that characterizes and identifies wetland hydrology, presence of hydrophytic vegetation, and hydric soil conditions. The delineation of critical area (emergent tidal salt marsh) is based upon the prevalence of salt water tolerant vegetation (predominantly emergent herbaceous) and the ebb and flood of the daily tidal cycle.

The field delineation of wetlands has been completed and a jurisdictional determination was submitted to the USACE for verification of delineated WOUS boundaries. The identification and subsequent delineation of WOUS within the project area involved placing colored flagging along the upland/wetland boundary, and the subsequent surveying of these flags. Prior to undertaking fieldwork, environmental scientists conducted a desktop review of the project study area utilizing a number of resources including the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soils maps, U.S. Geological Survey (USGS) topographic maps, and U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps. The on-site review revealed nine tidal wetlands (42.6 acres), 55 non-tidal wetlands (61.8 acres), 26 open water features (4.9 acres), and four freshwater streams (2,016 linear feet [LF]) within the detailed project study area (Figure 4-3, Figure 4-4, and Figure 4-5). Tidal waters within the detailed project study area are also regulated as “Critical Area” by the South Carolina Department of Health and Environmental Control (SCDHEC) Office of Ocean and Coastal Resource Management (OCRM).

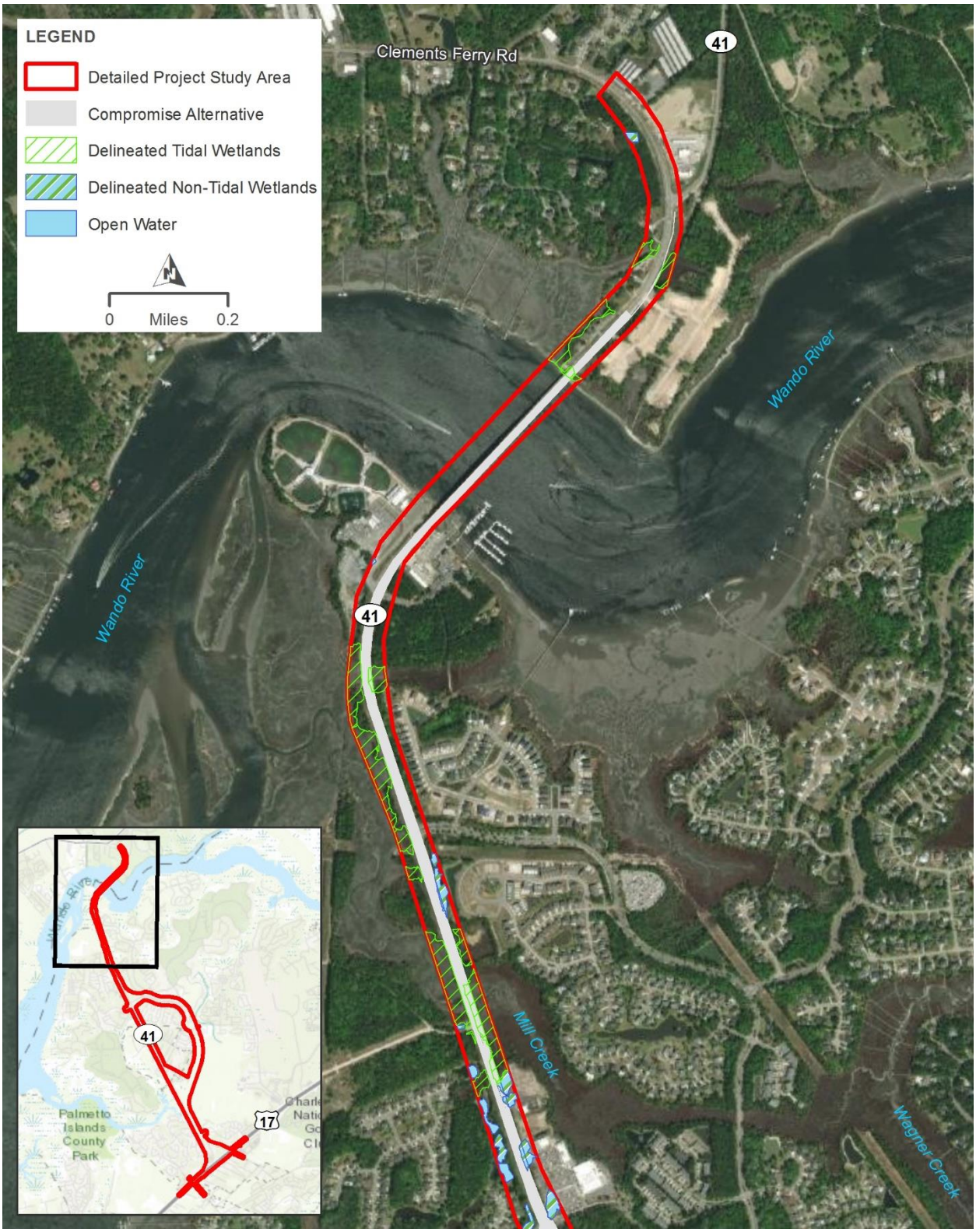

Figure 4-3. Compromise Alternative in Relation to Waters of the U.S. in the Northern Portion of the Detailed Project Study Area

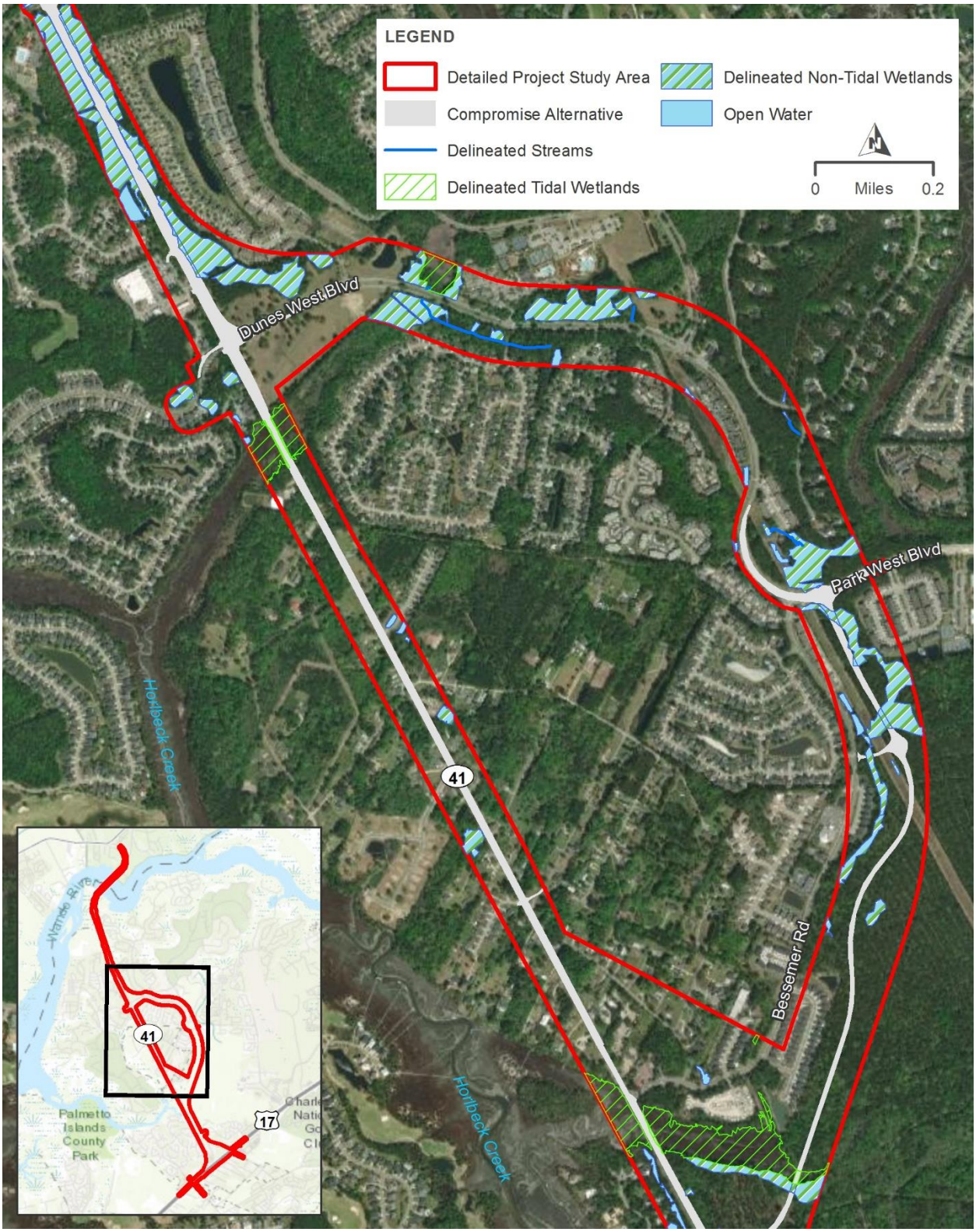

Figure 4-4. Compromise Alternative in Relation to Waters of the U.S. in the Central Portion of the Detailed Project Study Area

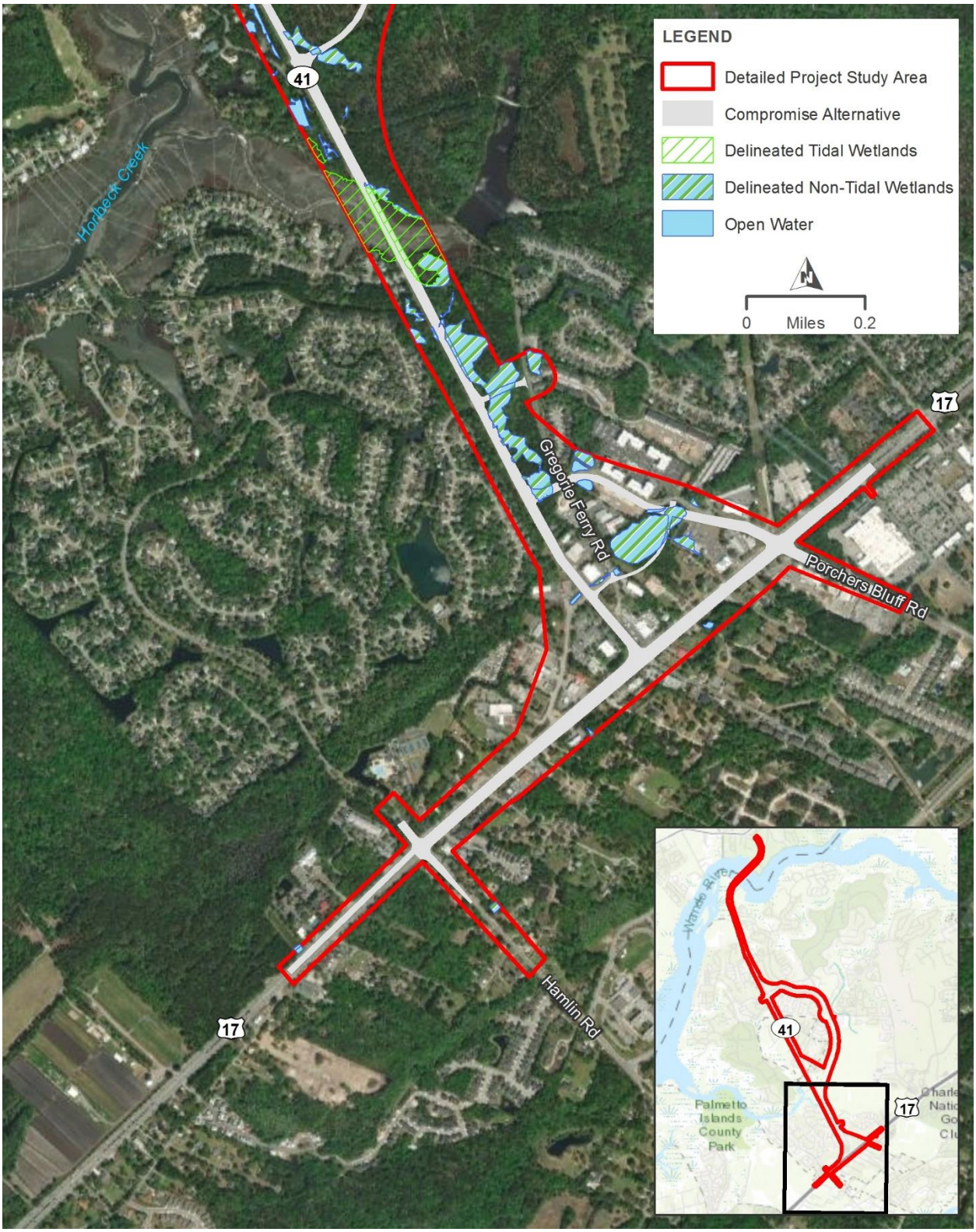

Figure 4-5. Compromise Alternative in Relation to Waters of the U.S. in the Southern Portion of the Detailed Project Study Area

4.2.1 Streams and Open Waters

4.2.1.1 Existing Streams and Open Waters

There are five linear drainage features and 26 open water features located within the detailed project study area. The linear drainage features include a brackish water river (Wando River) and four freshwater streams. The Wando River is classified as a marine intertidal river with an unconsolidated shore composed of cobble/gravel and sand. The Wando River originates in the l'on swamp in the Francis Marion National Forest and flows in a general southwest direction before flowing into the Cooper River, near Daniel Island, SC.

Stream 2 is classified as a riverine lower perennial stream; streambed of sand/mud. Stream 2 is 1,335.3 LF in length and is characterized by low pool substrate characterization and low pool variability. Its channel sinuosity is absent and its bank stability is moderate. However, Stream 2 does have high vegetative protection and high riparian vegetative zone width. It scored a 13.5 on the USACE low gradient stream assessment data sheet.

Stream 3 is classified as a riverine lower perennial stream; streambed of sand/mud/submerged vegetation. Stream 3 is 137.0 LF in length and is characterized by moderate pool substrate characterization and moderate pool variability. Its channel sinuosity is absent and its bank stability is high. However, Stream 3 does have moderate vegetative protection and moderate riparian vegetative zone width. It scored a 14.0 on the USACE low gradient stream assessment data sheet.

Stream 4 is classified as a riverine lower perennial stream; streambed of sand/mud/submerged vegetation. Stream 4 is 154.7 LF in length and is characterized by moderate pool substrate characterization and low pool variability. Its channel sinuosity is absent and its bank stability is moderate. However, Stream 4 does have moderate vegetative protection and moderate riparian vegetative zone width. It scored a 13.5 on the USACE low gradient stream assessment data sheet.

Stream 5 is classified as a riverine lower perennial stream; streambed of sand/mud/submerged vegetation. Stream 5 is 389.2 LF in length and is characterized by moderate pool substrate characterization and low pool variability. Its channel sinuosity is low and its bank stability is high. However, Stream 5 does have moderate vegetative protection and high riparian vegetative zone width. It scored a 15.5 on the USACE low gradient stream assessment data sheet.

4.2.1.2 Impacts to Streams and Open Waters

The RPA would avoid impacts to all five linear drainage features. However, the RPA would result in a total of approximately 0.1 acre of impact to two open water features (Open Water 1 and 2) through the addition of permanent fill material to accommodate the proposed widening.

4.2.2 Wetlands

4.2.2.1 Existing 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 assessment and identification of wetlands within the detailed project study area included a review of available data, mapping, and a series of field investigations. Per above, the wetland areas were delineated and surveyed per USACE guidelines and methods. The delineated wetland areas within the detailed project study area include nine tidal wetlands totaling 42.6 acres and 56 non-tidal wetlands totaling 61.8 acres.

The non-tidal wetlands within the detailed project study area consist of forested, emergent, and scrub-shrub wetlands. These areas are of common distribution within the outer coastal plain and provide various habitat functions. These areas contain the three criteria of near surface hydrology, hydric soils, and hydrophytic vegetation for wetland determination. Typical of these types of surface features, they interact with near surface groundwater conditions during periods of higher rainfall and function as drainageways to transport surface water runoff from adjacent uplands and higher elevation wetlands to downstream waters.

The tidal wetlands within the detailed project study area consist of intertidal emergent persistent and emergent subtidal unconsolidated bottom mud wetlands, also regulated as Critical Area by SCDHEC-OCRM. These areas are subject to the ebb and flood of the daily tidal cycle and are dominated by saltwater tolerant vegetation. These types of emergent wetlands are of common distribution within the vicinity of the project area and typically function as an interface between adjacent uplands/forested wetlands and open tidal surface waters. These areas are subject to the SC Coastal Zone Management Act and Section 10 of the Rivers and Harbors Act due to the tidal influence.

4.2.2.2 Impacts to Wetlands

The RPA would result in various unavoidable impacts to tidal and freshwater wetlands. Approximately 4.6 acres of tidal/critical area wetlands and 6.3 acres of freshwater wetlands would be impacted through the addition of permanent fill material to accommodate the proposed widening (Figure 4-3, Figure 4-4, and Figure 4-5). These impacts would be adjacent to the existing roadway and are necessary to accommodate the roadway widening. These impacts would include fill impact for construction of the proposed roadway, along with clearing impacts to install and maintain erosional control measures during construction.

The proposed project would avoid impacts to all five linear drainage features. However, the project would result in a total of approximately 0.1 acre of impact to two open water features (Open Water 1 and 2) through the addition of permanent fill material to accommodate the proposed widening.

Executive Order (EO) 11990 - Protection of Wetlands was issued, in furtherance of the National Environmental Policy Act (NEPA), in order to avoid impacts to wetlands wherever there is a feasible alternative. EO 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 and WOUS were given special consideration during development and evaluation of this project. The RPA would permanently impact approximately 11 acres of wetlands.

4.2.3 Mitigation

The RPA for improving the mainline and various intersections considers the wishes of the Phillips and Seven Mile communities to whom strong community bonds and traditional values are of the utmost importance. Based on these considerations, it appears that there is no practicable alternative to the proposed new construction in these potential jurisdictional WOUS; the proposed action would include all practicable measures to minimize harm to wetlands that may result from construction. The Council on Environmental Quality (CEQ) has defined mitigation in 40 CFR §1508.20 to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts. Therefore, the three general types of mitigation include avoidance, minimization, and compensatory mitigation.

Based on preliminary design, it is anticipated that the proposed project would be permitted under an Individual Permit. Avoidance and minimization of impacts were implemented using bridges and strategic shifting of roadway segments to avoid impacts to WOUS. In addition, final project design would evaluate the practicability of increasing roadway fill slopes (i.e., steeper) and/or reducing the length of pipes/culverts within streams to further minimize impacts. Additional minimization measures would be incorporated with final project delivery, including the implementation of appropriate erosion control measures, including but not limited to seeding of slopes, silt fences, and sediment basins. Other best management practices (BMPs) would be required of the contractor to ensure compliance with policies reflected in 23 CFR 650B.

Compensatory mitigation would be required after avoidance and minimization actions are exhausted. Compensatory mitigation would be required to offset unavoidable impacts and functional loss of WOUS. The compensatory mitigation associated with the documented impacts would be developed and coordinated during the Section 404/401 permitting process and would be developed and implemented per the current USACE requirements. The preferred mitigation techniques would be the purchase of mitigation credits from an approved mitigation bank, followed by permittee-responsible mitigation. As such, it is anticipated that compensatory mitigation for project impacts will be attained through the purchase of mitigation credits from a USACE-approved mitigation bank.

4.3 Water Quality

Water quality refers to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose. It is most frequently used by reference to a set of standards against which compliance can be assessed. The most common standards used to assess water quality relate to health of ecosystems, safety of human contact, and drinking water.

4.3.1 Existing Water Quality

Pursuant to the 1976 South Carolina Code of Laws, the SCDHEC shall declare regulations to implement the Pollution Control Act. Regulation 61-69, Classified Waters, provides a listing of water bodies in the state, their locations, and classifications. Regulation 61-68, Water Classifications and Standards, establishes water quality uses, general rules, and specific water quality criteria for each classification. These water quality standards also serve as a basis for decision making in other water quality program areas, including the National Pollutant Discharge Elimination System (NPDES). The U.S. Environmental Protection Agency (USEPA) has approved these water quality standards in accordance with Section 303(c) of the CWA and 40 CFR §131. Regulation 61-68 and 61-69 can be obtained from the SCDHEC, Bureau of Water (SCDHEC 2012a) (SCDHEC 2012b).

The project study area is located within the Wando River Watershed. The watershed is located in Berkeley and Charleston Counties and consists primarily of the Wando River and its tributaries. The watershed occupies 72,340 acres of the Coastal Zone region of South Carolina. Land use/land cover in the watershed includes 33.1 percent forested land, 22.6 percent forested wetland, 17.0 percent non-forested wetland, 16.8 percent urban land, 7.7 percent water, 2.4 percent agricultural land, and 0.4 percent barren land (SCDHEC 2017).

The Wando River headwaters flow through I'on Swamp (Mayrants Reserve) and accepts drainage from Alston Creek, Darrell Creek, Deep Creek, Toomer Creek, and Wagner Creek before receiving Guerin Creek drainage (Lachicotte Creek, Old House Creek, Fogarty Creek) near Cat Island. I'on Swamp and Guerin Creek drainages flow through the Francis Marion National Forest. Johnfield Creek enters the river downstream followed by Horlbeck Creek, Boone Hall Creek, Foster Creek, Beresford Creek (Martin Creek,

Sanders Creek, Hopewell Creek), Ralston Creek, Rathall Creek, Bermuda Creek, Hobcaw Creek, and Molasses Creek. The Wando River then drains into the Cooper River, which flows into the Charleston Harbor. There are a total of 46.3 stream miles, 38.7 acres of lake waters, and 5,408.6 acres of estuarine areas in this watershed (SCDHEC 2017).

SCDHEC has classified the Wando River at SC 41 as a Shellfish Harvesting Water (SFH). Class SFH are tidal saltwaters protected for shellfish harvesting and uses listed in Class SA and Class SB. Class SA and SB waters are suitable for primary and secondary contact recreation, crabbing, fishing, and for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora. However, SCDHEC may designate prohibited areas where shellfish harvesting for market purposes or human consumption shall not be allowed (SCDHEC 2017).

In addition to determining water quality classifications and standards, SCDHEC develops a priority list of water bodies that do not currently meet State water quality standards pursuant to Section 303(d) of the CWA and 40 CFR 130.7. This list is developed by SCDHEC on a biannual basis and reviewed and approved by the USEPA. It is commonly referred to as the 303(d) List of Impaired Waters and can be obtained from SCDHEC, Bureau of Water (SCDHEC 2018).

To monitor the Wando River's water quality, SCDHEC has established 22 shellfish monitoring stations, eight of which are located within 1.6 miles of the project study area, and eight ambient water quality monitoring sites, two of which are located within one mile of the project study area (Table 4-1). Shellfish monitoring station 09B-03 and ambient water quality monitoring site (MD-115) are the closest, located on the Wando River at the SC 41 Bridge.

A Total Maximum Daily Load (TMDL) addressing dissolved oxygen was developed for the Charleston Harbor, which covers the Charleston Harbor, Cooper River, Ashley River, and Wando River. A TMDL addressing fecal coliform was developed for the Wando River shellfish sites (SCDHEC 2019).

Table 4-1. Monitoring Stations near the Project Study Area

Station #	Location	Distance from project study area (mi)	Use	Impairment Status	Cause of Impairment
MD-115	Wando River at SC 41 Bridge	0 mi	Aquatic Life	Not Impaired	N/A
RT-052100	Boone Hall Creek, 1.5 mi WNW of Intersection of US 17 and SC 41	1.0 mi SW	Recreation	Impaired	Enterococci
09B-02	Wando River at Horlbeck Creek	1.6 mi SW	Shellfish Harvesting	Not Impaired	N/A
09B-07	Boone Hall Creek, Opposite County Recreation Area	1.1 mi SW	Shellfish Harvesting	Impaired	Fecal Coliform
09B-08	Wando River at Marker #29	1.0 mi W	Shellfish Harvesting	Not Impaired	N/A
09B-11	Wando River at Guerin Creek	1.1 mi E	Shellfish Harvesting	Not Impaired	N/A
09B-17	Wando River Midway Between Stations 8 and 11 (at Old Dry Dock)	0.3 mi E	Shellfish Harvesting	Not Impaired	N/A
09B-21	Horlbeck Creek at Power Line Crossing	1.1 mi SW	Shellfish Harvesting	Not Impaired	N/A
09B-22	Wando River at Foster Creek	1.4 mi W	Shellfish Harvesting	Not Impaired	N/A

Sources: SCDHEC 2017; SCDHEC 2018

4.3.2 Impacts to Water Quality

The RPA does have the potential to impact water quality through both the quantity and quality of stormwater runoff. The proposed project would result in an estimated 27.6 acres of new impervious (paved) surface area with the SC 41 improvements. This would increase the amount of runoff due to the increase in impervious material, which would be captured and conveyed within the existing stormwater systems. The existing drainage systems include various open and closed (i.e., piped) drainage features that effectively convey stormwater offsite. This drainage system would be improved and designed to accommodate the volume of stormwater associated with the RPA.

Potential impacts to stormwater quality resulting from vehicular traffic were considered. Water quality pollutants commonly associated with vehicular traffic include suspended solids, heavy metals, nutrients, and oil-and-grease. The proposed project is not expected to affect the existing traffic volumes or vehicle mix, and therefore would result in similar pollutant-loading as the existing condition.

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. This potential shall be minimized through the use of erosion control BMPs which may include the use of silt fence, sediment basins, sediment tubes, or temporary and permanent cover.

4.3.3 Mitigation

An estimated 27.6 acres of new impervious surface would be created with the widening of SC 41. The project would incorporate applicable designs and techniques to minimize temporary and permanent construction impacts including various strategies and techniques as outlined in the SCDOT Stormwater Quality Design Manual. These techniques include various strategies to collect, treat, and convey stormwater prior to discharging to receiving waters. Stormwater control measures, both during construction and post-construction, are required for SCDOT projects with land disturbance and/or constructed in the vicinity of 303(d), TMDL, ORW, tidal, and other sensitive waters in accordance with the SCDOT's Municipal Separate Storm Sewer System Permit. The contractor would be required to minimize potential stormwater impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650B and SCDOT's Supplemental Specifications on Seed and Erosion Control Measures (latest edition).

The potential impacts (during and after construction) of the proposed project on water quality would also be evaluated through Section 401 and 402 of the CWA, which is administrated through applicable SCDHEC regulations. These regulations require prior approval for land disturbing activities (Section 402), and approval/certification for impacts to Waters of the State (Section 401) to ensure compliance with water quality standards and classified uses. The contractor will be required to minimize possible water quality impacts through implementation of BMPs, reflecting policies contained in 23 CFR 650B and the Department’s Supplemental Specification on Erosion Control Measures (latest edition) and Supplemental Technical Specifications on Seeding (latest edition). Other measures including seeding, silt fences, sediment basins, etc. as appropriate will be implemented during construction to minimize impacts to water quality.

4.4 Floodplains

EO 11988, Floodplain Management, requires that efforts be made by federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains. When there is a practicable alternative, federal agencies are required to avoid direct or

indirect support of floodplain development. EO 11988 prohibits floodplain encroachments that are uneconomic, hazardous, or would result in incompatible development of the floodplain. It also prohibits any action that would cause a critical interruption of an emergency transportation facility, a substantial flood risk, or an adverse impact on the floodplain's natural resource values.

4.4.1 Existing Floodplains

The 100-year floodplain is defined and regulated by the Federal Emergency Management Agency (FEMA) as any land area susceptible to being inundated by water from any source, an event that has a one-percent chance of occurring in any given year. Development within the floodplain must meet the requirements set forth by FEMA for the National Flood Insurance Program (NFIP) (FEMA 2007).

Based on the Flood Insurance Rate Maps (FIRM), published by FEMA, the proposed project would involve construction within the regulated 100-year floodplain of the Wando River. The FIRMs reviewed for this project were panels 45019C0340K, 45019C0345K, and 45019C0526K in Berkeley and Charleston Counties and panels 45019C0527K and 45019C0535K in Charleston County (all dated 09/13/2019) (Figure 4-6). FIRMs depict areas within the 100-year floodplain with zone distinctions of AE and VE. Zone AE classification identifies areas within the floodplain in which existing detailed studies have already determined base flood elevations and Zone VE classification identifies coastal areas with velocity hazard (wave action) in which existing detailed studies have already determined base flood elevations. The majority of floodplains within the project study area are designated Zone AE with occasional pockets of 0.2 percent annual chance flood hazard (500-year floodplain) and Zone X (outside of 500-year floodplain), and Zone VE. Because base flow elevations have been established for the floodplains in the project study area, FEMA requirements limit encroachment in the 100-year floodplain to activities that do not increase the base elevation by more than one-tenth foot, rounded to the nearest one-tenth foot, or "no-rise" (FEMA 2007).

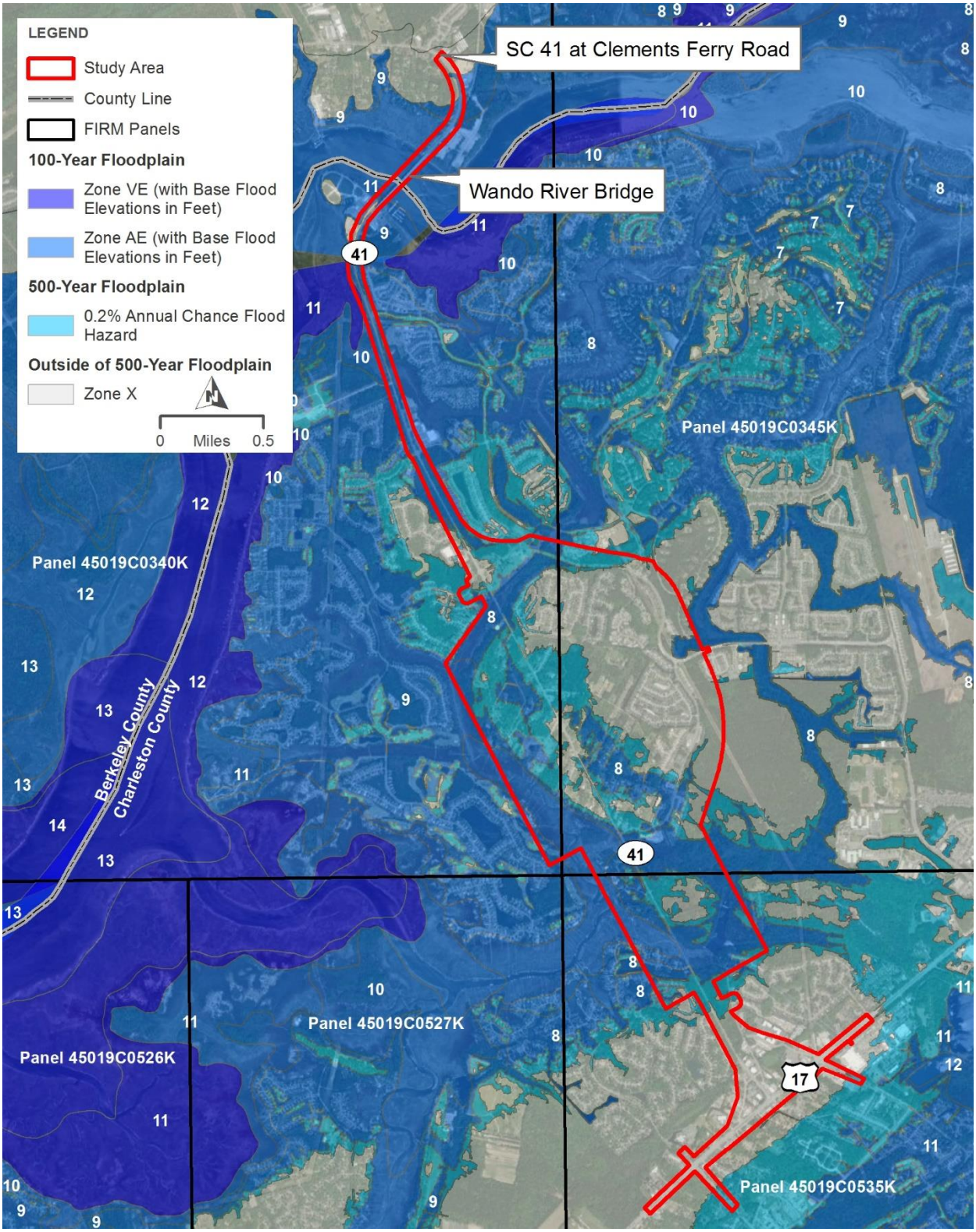

Figure 4-6. Floodplains

4.4.2 Impacts to Floodplains

The RPA would result in approximately 22.7 acres of direct 100-year floodplain impacts through the placement of fill material and construction of the proposed roadway improvements. 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 EO 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.

4.4.3 Mitigation

Approximately 22.7 acres (25 percent) of the RPA are within the 100-year floodplain; thus, total avoidance of impacts to floodplains is not possible. Impacts to floodplains were considered throughout the preliminary design phase and were minimized in several ways. Much of the improvements would be constructed along the existing alignment of SC 41, which would minimize impacts by utilizing as much of the existing roadway as possible. Additionally, the majority of the new location Laurel Hill Parkway parallel to Bessemer Road would be constructed outside of the 100-year floodplain. Final hydraulic analysis and documentation would be completed as part of the final design of the project to avoid impacts to the existing floodplains. Coordination with the Berkeley and Charleston County Floodplain Administrators would also occur to mitigate impacts.

4.5 Wildlife

The proposed project was evaluated to determine any potential impacts to terrestrial and aquatic wildlife. These impacts are expected to be minimal as much of the project study area has been developed or is zoned for urban land uses and is dominated by the existing roadway and its associated zone of disturbance. However, with project area encompassing a corridor of approximately 300 feet wide around the existing alignment, which currently includes various land uses and natural habitat communities adjacent to the approximate 5.6-mile-long route. These habitat communities include forested freshwater wetlands/drainageways, critical area (emergent tidal salt marsh), pine stands and mixed pine hardwoods.

4.5.1 Existing Wildlife

The salt marshes are estuaries of Horlbeck Creek, Mill Creek, and the Wando River. The salt marsh throughout the surveyed project area is a mosaic of high marsh; dominated by sea oxeye and black needlerush and fully inundated or low marsh; dominated by smooth cordgrass and mud flats. Common macrobenthic species in the salt marsh include fiddler crabs, ribbed mussels, and periwinkle snails.

Freshwater wetlands identified within the project study area are characterized by a tree canopy consisting of laurel oak, sweet gum, red maple, and slash pine. The shrub strata consists primarily of dwarf palm, wax myrtle, Chinese privet, and sweetgum. The herbaceous strata are composed of bladder sedge, royal fern, netted chain fern, and slender spike grass. These areas are of common distribution within the outer coastal plain and provide various habitat functions including providing habitat for numerous common fish, reptiles, mammals, birds, and macroinvertebrates.

Terrestrial or upland habitats adjacent to the salt marsh primarily consist of the SC 41 roadway, along with residential and commercial developments. Upland habitats associated with the undeveloped forests include a tree stratum consisting of water oak, loblolly pine, sweet gum, and red maple with a shrub stratum of wax myrtle and Chinese privet. The herbaceous/woody vine stratum in these habitats is primarily composed of yellow jasmine, common green briar, muscadine, and Japanese honeysuckle. The amount of coverage

within the understory is largely dependent on the density of the canopy within the differing age classes of this habitat type. These communities are frequented by various common mammals, bird, and reptile species.

4.5.2 Impacts to Wildlife

The proposed project was evaluated to determine any potential impacts to terrestrial and aquatic wildlife. The proposed improvements would be largely constructed within and/or immediately adjacent to the existing transportation facilities. As such, the project is expected to require approximately 44.1 acres of new ROW that would directly adjoin the existing ROW. The areas of new ROW may maintain isolated areas of the forested habitat, but the majority of the area would be directly converted to transportation facilities or be subject to routine maintenance and access. However, the potential loss of terrestrial habitat would be along the edge of the existing roadways, which would not create further fragmentation of the undeveloped land.

The project would result in the direct loss of approximately 10.9 acres of WOUS through the construction of the proposed improvements. The area of impact to these features would occur immediately adjacent to the existing roadway and have been previously altered from their historic state; however, they provide suitable habitat for various aquatic species, including, but not limited to, aquatic macro-invertebrates, amphibians, reptiles, and fish. These impacts would be isolated along portions of the tributaries with additional suitable habitat provided upstream and/or downstream of the impacts. In addition, the overall roadway width would be increased, creating a wider barrier for wildlife and increasing the risk of wildlife–auto collisions.

4.5.3 Mitigation

Potential impacts to terrestrial and aquatic wildlife would be minimized through the design, location, and construction techniques utilized for the project. The proposed improvements are generally located along the existing alignment, which minimizes the overall footprint and area of impacts. In addition, this would not result in additional fragmentation of habitat, which would isolate and limit wildlife mobility. The proposed design would avoid impacts to two tributary systems, including one tidal creek, by completely bridging these features. This would maintain the existing hydrologic regime and habitat characteristics. Various BMPs would be utilized during construction to further minimize potential impacts. These may include, but be limited to erosion and sediment control, and stormwater management.

The federal Migratory Bird Treaty Act, 16 U.S. Code (U.S.C.) § 703–711, states that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. SCDOT will comply with the Migratory Bird Treaty Act of 1918 regarding the avoidance of taking of individual migratory birds and the destruction of their active nests.

Impacts on bird species would be minimized by conducting vegetation clearing activities outside of the prime nesting season (April 1 through September 1) for most bird species. Should vegetation disturbances occur during the nesting season, pre-construction nesting survey(s) would be performed ahead of project activities involving the clearing of vegetation or wetland disturbances to identify and mitigate for effects on nesting birds.

The project contractor(s) would comply with the Migratory Bird Treaty Act of 1918, USFWS's Nationwide Standard Conservation Measures (USFWS 2015), and USFWS's National Bald Eagle Management Guidelines (USFWS 2007) with regard to avoiding impacts on migratory birds and the destruction of active

nests. General guidelines for the protection of birds and their habitats include personnel education regarding individual birds and/or nest identification and observation; solid waste handling and storage; incidental take; habitat loss minimization; implementation of standard sediment and erosion control measures; limitation of lighting of adjacent habitats; and minimization of noise (USFWS 2015). If a nest is observed during construction that was not discovered during the field investigations, the contractor will cease work and will contact SCDNR to determine whether the nest is active and identify appropriate impact avoidance or mitigation measures.

4.6 Threatened or Endangered Species

The Endangered Species Act (ESA) of 1973 was passed to conserve the ecosystems upon which endangered and threatened species depend and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Areas known as critical habitats, essential to the conservation of listed species, also can be designated under the ESA.

4.6.1 Existing Threatened or Endangered Species

Section 7 of the ESA requires that, through consultation (or conferencing for proposed species) with the USFWS and/or the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of critical habitat.

Pursuant to Section 7 of the ESA, a field survey of the proposed project area was conducted as detailed in the Biological Assessments (Appendix E and F). A list of federally protected species within the project study area was obtained from the USFWS Information for Planning and Conservation (IPaC) website. Federally endangered and threatened species under the exclusive jurisdiction of USFWS and under shared jurisdiction with NOAA-NMFS are identified in Table 4-2. Note that the bald eagle was de-listed in August 2007 but remains protected under the Bald and Golden Eagle Protection Act (BGEPA).

Table 4-2. ESA Federally Threatened and Endangered Species

Common Name	Scientific Name	Federal ESA Designation	Critical Habitat Designated?	Suitable Habitat Within the Project Area?	Effect Determination
American chaffseed	*Schwalbea americana*	Endangered	No	No	No Effect
Canbys dropwort	*Oxypolis canbyi*	Endangered	No	No	No Effect
Pondberry	*Lindera melisifolia*	Endangered	No	Yes	No Effect
West Indian Manatee	*Trichechus manatus*	Threatened	Yes	Yes	May Effect, Not Likely to Adversely Affect
Northern long-eared bat	*Myotis septentrionalis*	Threatened	No	Yes	May Effect, Not Likely to Adversely Affect
Frosted flatwoods salamander	*Ambystoma cingulatum*	Threatened	Yes	Yes	May Effect, Not Likely to Adversely Affect
Green sea turtle*	*Chelonia mydas*	Threatened	Yes	No	No Effect
Hawksbill sea turtle**	*Eretmochelys imbricata*	Endangered	Yes	Yes	May Effect, Not Likely to Adversely Effect

Common Name	Scientific Name	Federal ESA Designation	Critical Habitat Designated?	Suitable Habitat Within the Project Area?	Effect Determination
Kemp's Ridley sea turtle*	*Lepidochelys kempii*	Endangered	No	No	May Effect, Not Likely to Adversely Affect
Leatherback sea turtle*	*Dermochelys coriacea*	Endangered	Yes	No	No Effect
Loggerhead sea turtle*	*Caretta caretta*	Threatened	Yes	No	May Effect, Not Likely to Adversely Affect
Bald eagle	*Haliaeetus leucocephalus*	BGEPA	No	Yes	No Effect
Bachman's warbler	*Vermivora bachmani*	Endangered	No	Yes	No Effect
Eastern Black Rail	*Laterallus jamaicensis ssp.jamaicensis*	Threatened	No	Yes	May Effect, Not Likely to Adversely Affect
Piping plover	*Charadrius melodus*	Threatened	Yes	No	No Effect
Red-cockaded woodpecker	*Picoides borealis*	Endangered	No	No	May Effect, Not Likely to Adversely Affect
Red knot	*Calidris canutus rufa*	Threatened	No	No	No Effect
Wood stork	*Mycteria americana*	Threatened	No	Yes	May Effect, Not Likely to Adversely Affect
Monarch Butterfly	*Danaus plexxipus*	Candidate	No	Yes	No Effect
Atlantic sturgeon**	*Acipenser oxyrhynchus oxyrhynchus*	Endangered	Yes	Yes	May Effect, Not Likely to Adversely Effect
Shortnose sturgeon**	*Acipenser brevirostrum*	Endangered	No	Yes	May Effect, Not Likely to Adversely Effect
Giant Manta Ray**	*Mobula birostris*	Threatened	No	No	No Effect
Oceanic Whitetip Shark**	*Carcharhinus longimanus*	Threatened	No	No	No Effect
Blue whale**	*Balaenoptera musculus*	Endangered	No	No	No Effect
Fin whale**	*Balaenoptera physalus*	Endangered	No	No	No Effect
North Atlantic right whale**	*Eubalaena glacialis*	Endangered	Yes	No	No Effect
Sei whale**	*Balaenoptera borealis*	Endangered	No	No	No Effect
Sperm whale**	*Physeter macrocephalus*	Endangered	No	No	No Effect

* NOAA-NMFS and USFWS share jurisdictional responsibility for sea turtles under the ESA. The USFWS has responsibility in the terrestrial environment while the NOAA-NMFS has responsibility in the marine environment.
**** NOAA-NMFS** has sole jurisdiction.

4.6.2 Impacts to Threatened or Endangered Species

The review of the habitat requirements and previous records for the federally listed species for Berkeley and Charleston Counties, along with the field observations, conclude that there is low potential for the presence of any federally protected species along the project area. However, based on the scope of the work and limited available habitat, it was determined that the project "may effect, not likely to adversely affect" the following eleven species: West Indian manatee, Northern long-eared bat, frosted flatwoods salamander, Hawksbill sea turtle, Kemp's Ridley sea turtle, Loggerhead sea turtle, Eastern black rail, red-cockaded woodpecker, wood stork, Atlantic sturgeon, and Shortnose sturgeon. In addition, it was determined that the project would have "no effect" on the remaining federally protected species listed for Berkeley and Charleston Counties.

A discussion of the eleven species with a "may effect, not likely to adversely affect" determination is provided below. For species receiving a "no effect" determination, please see the USFWS and NOAA Biological Assessments in Appendices E & F for additional information.

4.6.2.1 West Indian manatee

The West Indian manatee was listed as endangered in 1967 but was reclassified as threatened in 2017, and critical habitat was designated in 1976. A recovery plan was developed in 1980 and updated in 1989 and 1996. The USFWS critical habitat for the West Indian manatee is limited to coastal regions of southern Georgia and Florida. No critical habitat occurs in the study area.

West Indian manatees are large herbivorous marine mammals reaching 10 to 13 feet in length and up to 1,000 pounds in weight. They are classified as slow-moving, herbivorous mammals found in coastal habitats. Manatees are usually solitary but will occasionally occur in large groups or mating herds. Manatees are a marine species, although they are attracted to freshwater outlets. They prefer slow-moving waters between three and six feet deep where they feed on marsh grasses, floating vegetation, and algae. Manatees often inhabit areas with turbid and noisy conditions (FWC 2007). The most significant threat faced by manatees is death or serious injury from vessel collisions (USFWS 2003a; FWC 2007). Manatees cannot survive prolonged exposure to water temperatures below 18 degrees C (65 degrees F) (MMC 2022). The U.S. populations appear to originate from Florida, but transient groups and individuals can be found in Alabama, Georgia, and South Carolina coastal waters during the summer months (NatureServe 2021b). The Wando River, located at the north end of the study area, contains suitable habitat for the West Indian manatee. However, no construction would occur within the Wando River during this project; therefore, the project may affect, but is not likely to adversely affect, the West Indian manatee.

4.6.2.2 Northern long-eared bat

The northern long-eared bat (NLEB) historically occupied the mountain region of three counties in northwestern South Carolina: Oconee, Pickens, and Greenville. The earliest summer record dates back to 1931 from Rocky Bottom in Pickens County (SCDNR 2020c). Mist net and harp trap sampling records from the late 1980s through the 1990s confirmed the presence of NLEB in the summer and fall throughout the mountains of South Carolina. Currently, few NLEB occur in the mountains since white-nose syndrome was confirmed in the state, which has resulted in a loss of about 70 percent of the NLEB's former hibernacula (SCDNR 2020c). Critical habitat has not been designated for this species.

During the winter months, the NLEB can be found hibernating in caves and mines. NLEB use various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer months (April 1 through November 15), NLEBs roost underneath bark, in cavities, or in crevices of both live trees and dead trees. Rarely, they have been found roosting in structures, like barns and sheds (SCDNR 2020c; SCDNR 2022a). Northern long-eared bats prefer mature, densely forested habitat with intermittent openings and seasonal pools for drinking water sources. Northern long-eared bats typically glean prey from the surface of vegetation but will also forage by aerial hawking (SC SWAP 2015). Five individuals were found in the Francis Marion National Forest (in Charleston and Berkeley Counties) in 2017, of which one of the five captured individuals was a lactating female (SCDNR 2017). No hibernacula or maternity trees are known to occur within or near the study area; however, potential day roosting habitat occurs in the study area, particularly within forested habitat along the proposed Laurel Hill Parkway.

The project would minimize effects on NLEB by conducting tree clearing during the inactive season (November 15 and March 31). Based on the rare occurrence of NLEB in the state, particularly the coastal

region, and best management practices (BMP) including a fall tree clearing schedule, the project may affect, but is not likely to adversely affect, the NLEB.

4.6.2.3 Frosted flatwood salamander

Populations have been identified in Berkeley, Charleston, and Jasper Counties, South Carolina (NatureServe 2021). USFWS critical habitat has been designated for the frosted flatwoods salamander. The frosted flatwoods salamander has been historically documented as occurring within a two-mile buffer of the study area within the Francis Marion National Forest (SCDNR 2022a). Suitable habitat is believed to occur adjacent to and potentially within the study area. A survey conducted within potential habitat in the study area on April 29, 2019 did not detect individuals or sign of the species. However, due to the presence of marginally suitable habitat and close proximity to known occurrences, there is a limited potential for the species to occur within the study area. Because impacts on wetlands are being avoided to the maximum extent possible, the project may affect but is unlikely to adversely affect the frosted flatwoods salamander.

4.6.2.4 Hawksbill sea turtle

The Hawksbill sea turtle is ESA listed as endangered throughout its range, which includes tropical waters of the Atlantic, Pacific, and Indian Oceans (NOAA 2022g). Degradation of coral reef habitat and overharvesting have led to the species' decline. Critical habitat has been designated in Puerto Rico but there is no critical habitat within the study area. Hawksbill sea turtles have not been documented nesting on nearby beaches, such as Folly Beach and Sullivan's Island, in the last 10 years (SCDNR 2022). The study area does not contain suitable nesting or foraging habitat for hawksbill sea turtles. If an individual occurs in the study area or nearby Wando River, project activities could result in behavioral changes from noise disturbances but no adverse effects on the species are expected to occur.

4.6.2.5 Kemp's Ridley sea turtle

The Kemp's Ridley sea turtle was listed as endangered in 1970. A recovery plan exists for this species and was issued in 1984 and updated in 1992 and 2011. This species is part of the NOAA-NMFS and USFWS five-year review initiated in 2012 for four species of sea turtles (77 Federal Register 61573–61574). NOAA-NMFS and USFWS published the five-year review for Kemp's ridley in July 2015, which concluded that the species remain classified as endangered. Critical habitat has been proposed for this species but does not occur in the project area.

The majority (95 percent) of Kemp's ridley nesting occurs on the beaches of the western Gulf of Mexico in the state of Tamaulipas, Mexico. Rare nesting has been documented on the beaches of North Carolina, South Carolina, Georgia, Florida, Alabama, and Texas (NOAA 2022h). The study area does not contain suitable nesting habitat for the Kemp's ridley sea turtle. If an individual occurs in the study area or nearby Wando River, project activities could result in behavioral changes from noise disturbances but no adverse effects on the species are expected to occur.

4.6.2.6 Loggerhead sea turtle

The Loggerhead sea turtle was listed as threatened in 1978 and a recovery plan was issued in 1984 and updated in 1991 and 2008. In 2011, a final rule was issued to list four DPS as endangered and five DPS as threatened. The listed threatened Northwest Atlantic Ocean DPS covers individuals that could occur along the coast adjacent to the project area. The nearest critical habitat is located about 15 miles southwest of the project area at Folly Beach (NOAA 2022j).

In the southeastern United States, female loggerheads reach reproductive maturity at 15 to 30 years. Loggerhead nesting has been well documented and averages over 100,000 nests per year in the United

States (SCDNR 2014). Their nesting range in the United States occurs from southern Florida to North Carolina (SCDNR 2020). In South Carolina, loggerheads nest on open sandy beaches above the high tide line. Primary nesting sites in South Carolina are beaches between North Inlet and Price Inlet, with moderate nesting activity occurring between Kiawah Island and Hilton Head Island (SCDNR 2020).

Adult loggerhead sea turtles are generally considered pelagic but often remain near shore in bays, estuaries, lagoons, creeks, and mouths of rivers. In the southeastern United States, some loggerhead sea turtles migrate north in the spring and south in the fall. Their diet is the most varied of the sea turtles, consisting of marine invertebrates, vegetation, and fish. The project area does not have suitable nesting habitat but does contain low quality foraging habitat. Although unlikely, individual(s) could occur in the lower reaches of the Wando River. If an individual occurs in the study area or nearby Wando River, project activities could result in behavioral changes from noise disturbances but no adverse effects on the species are expected to occur.

4.6.2.7 Eastern Black Rail

The eastern black rail was listed as a threatened species in 2020, and a recovery plan outline was released in early 2021, serving as an interim strategy guiding the conservation and recovery of the eastern black rail until a final recovery plan is completed.

In South Carolina, eastern black rails are primarily found in the outer coastal plain with scattered inland populations (USFWS 2014). Black rail nests are constructed in dense vegetation just a few inches above the ground surface (Harrison 1979). The black rail diet consists of aquatic plant seeds, insects, and isopods (Terres 1980). The species is known to occur in the South Carolina low country in late April to early July (Eddleman et al. 2020; USFWS. 2014). In South Carolina, there is only one confirmed nesting record from 1903 (SCDNR 2013).

Tidal marsh habitat exists within the study area associated with Horlbeck Creek, Mill Creek, and the Wando River. The tidal marshes in the study area are influenced by water levels fluctuating several feet between high and low tide. Black rail nesting habitat in the study area would be tightly restricted to the narrow high marsh transitional areas adjacent to uplands. The uplands in the study area consist primarily of residential development or forested uplands, of which neither represent suitable upland habitat. Therefore, black rails are unlikely to nest within the study area due to restricted wetland habitat and a lack of suitable uplands.

While construction could result in the disturbance and temporary displacement of a foraging black rail; project activities are not anticipated to result in adverse effects on individuals or nesting success due to a strategic construction schedule and impact mitigation techniques.

4.6.2.8 Red-Cockaded Woodpecker

The red-cockaded woodpecker (RCW) was listed as an endangered species in 1970. USFWS issued a recovery plan for this species in 2003 but has not designated critical habitat for this species.

The species' historic range extends from New Jersey to Texas and inland to Missouri, but its current range excludes New Jersey, Maryland, Missouri, and likely Tennessee. Populations have been identified in the Francis Marion National Forest in South Carolina, parts of which are located in both Charleston and Berkeley Counties (NatureServe 2021d). The South Carolina Department of Natural Resources (SCDNR) has documented the RCW in the Francis Marion National Forest within approximately two miles of study area (SCDNR 2022a; Appendix B-2, SCDNR Species Report). While the study area is not expected to support RCW nesting due to the lack of mature pine stands, foraging RCW individuals could occur within the study area throughout the year, particularly along the proposed Laurel Hill Parkway. Therefore, project

construction could result in the disturbance and temporary displacement of foraging individuals, but adverse effects on the species are not anticipated.

4.6.2.9 Wood stork

The wood stork was listed as an endangered species in 1984 and reclassified as threatened in 2014. The latest recovery plan was released in 1997. No critical habitat has been designated for this species.

Suitable habitats consist of cypress swamps, bottom-land hardwood forests, tidally influenced freshwater wetlands, narrow tidal creeks, and abandoned rice fields maintained for waterfowl, but the species also feeds in saltwater marshes (Ogden 1990). Wood storks feed more frequently in wetlands with a more open canopy (ponds and marshes) than in wetlands with a more closed canopy (swamps).

The wood stork's historic breeding range is from South Carolina and Florida to Mexico, Central America, Cuba, and Northern Argentina. Today's North American populations are increasing in South Carolina primarily due to migration from Florida as a result of decreasing habitat. SCDNR manages a wood stork monitoring program aimed at improving habitats and encouraging year-round residents as opposed to the transient populations that traditionally returned to Florida for breeding. The wood stork was reclassified to threatened in 2014 when an average of 6,000 nesting pairs were recorded and more than 1.5 chicks per year reached fledgling age over a three-year period (79 FR 37078; Rodgers et al. 2008). Continuing threats for the wood stork include loss of wetland habitat, water management, predation, and human disturbance.

Limited suitable foraging habitat for the wood stork occurs within and adjacent to the study area. Suitable habitat occurs along Mill Creek, Horlbeck Creek, and along the Wando River (Appendix C, Photographs 5, 14, and 15). A few areas contain bottomland hardwood forests with a semi-open canopy and water up to 12 inches deep. These areas are suitable for foraging but not breeding, and no roosts or rookeries were observed during the survey or are known to occur within the study area. Therefore, foraging wood storks could be temporarily displaced by construction, but the project is unlikely to adversely affect the species.

4.6.2.10 Atlantic sturgeon

The Atlantic sturgeon originating from the New York Bight, Chesapeake Bay, South Atlantic, and Carolina Distinct Population Segments (DPS) are listed as federally endangered. The Gulf of Maine DPS are listed as federally threatened (NOAA 2017).

The Atlantic sturgeon is a long-lived, late-maturing, estuarine dependent, anadromous species. Adults spend most of their life in the marine environment but migrate upriver in the spring/early summer to spawn (NOAA 2022b). Atlantic sturgeon spawning is believed to occur in flowing water between the salt front and fall line of large rivers, where optimal flows are 46–76 centimeters/second with depths of 11–27 meters. Spawning intervals range from one–five years for males and two–five years for females (NOAA 2022b). No spawning or juvenile populations, or necessary habitat for these life stages, have been identified in the Wando River, Ashley River, or Cooper River (NOAA 2017). Spawning has been documented in South Carolina within the Pee Dee, Edisto, Combahee, and Savannah Rivers and the Waccamaw River.

Based on the known locations of the Carolina DPS of Atlantic sturgeon, the potential exists for this species to occur in the Wando River. No spawning is known to occur within the Wando River, but adult Atlantic sturgeon could occur seasonally in the Wando River.

4.6.2.11 Shortnose sturgeon

The federally and state endangered shortnose sturgeon are anadromous species that live in rivers and coastal environments from Canada to Florida. They are similar to Atlantic sturgeon in that they are slow-

growing and late to reach reproductive maturity; however, compared to the Atlantic sturgeon, shortnose sturgeon spend relatively little time in the ocean, and typically remain in nearshore marine waters (NOAA 2022c).

Historically, shortnose sturgeon were found in coastal rivers and major estuaries throughout the East Coast. Currently, they are found in 41 bays and rivers, but their distribution is segmented, with a 250-mile gap separating the northern and mid-Atlantic metapopulations from the southern metapopulation (NOAA 2022c). The southern metapopulation, also known as the Carolinian Province, includes habitat in the Cooper River, the Ashley River, and potentially the Wando River in South Carolina.

Shortnose sturgeon habitat varies depending on their life stage. Adults spawn in freshwater and juvenile fish remain in their natal river, making trips to saltwater occasionally to feed on bottom-dwelling marine invertebrates, such as crustaceans, worms, and mollusks (NOAA 2022c). In the Carolinian Province population, spawning migrations typically occur from January to April (NOAA 2022c). Adult shortnose sturgeon are expected to remain in the deeper waters of the Wando River. Shortnose sturgeon have a potential to occur in the Wando River but are not expected to occur within the smaller tidal influenced tributaries (Horlbeck Creek and Mill Creek) crossed by the project due to the lack of water at low tides. Therefore, the occurrence of individual shortnose sturgeon would be transient or seasonal.

4.6.3 Mitigation

Due to the linear nature of the project, the need to widen SC 41, and the presence of wetlands on both sides of the roadway, total avoidance of estuarine resources was not feasible. Conservation measures to minimize the potential effects on species include the following: bridge construction access would occur from upland areas to the extent practicable, standard sediment and erosion control practices would be applied, equipment and materials used during the construction of bridges would not obstruct or impede passage through more than 50 percent of the channel, raw or live concrete would not come into contact with wetlands or open water until cured, only clean rip rap would be used if necessary, pollutants would be prevented from entering waterway or wetlands, no mechanized equipment would operate in wetlands or WOUS unless clearly identified and authorized in the approved plans, use of “slow starts” while pile driving would minimize disturbances, and siltation barriers would be made of materials in which a sea turtle cannot become entangled.

4.7 Essential Fish Habitat

In conformance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (as amended 1996) an assessment would need to be conducted to describe potential adverse effects on essential fish habitat (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. 1802, 50 CFR § 600.10). The Magnuson-Stevens Act requires that NOAA-NMFS work with federal and state agencies, regional fishery management councils, and the fishing community to protect, conserve, and enhance EFH. With regard to the study area, NOAA-NMFS works closely with the South Atlantic Fishery Management Council (SAFMC) to minimize adverse impacts to EFH in the southeast region of the U.S. The Magnuson-Stevens Act also mandates that consultation take place with the U.S. Secretary of Commerce on all proposed activities authorized, funded, or undertaken by a federal agency which may adversely affect EFH.

4.7.1 Impacts to Essential Fish Habitat

In a response to the Letter of Intent on August 18, 2017, NOAA-NMFS indicates that high quality tidal salt marsh with tidal creeks, oyster reef/shell, and tidal freshwater wetlands may be present in the study area. SAFMC designates these habitats as EFH within the fishery management plans for penaeid shrimp and

the snapper-grouper complex, which also includes oyster/shell habitat as a Habitat Area of Particular Concern (HAPC). The waters of the Wando River, Mill Creek, Horlbeck Creek, the tidal creeks connected to them, and the surrounding coastal marsh also serve as a nursery and forage habitat for other species, such as red drum, black drum, Atlantic menhaden, and blue crab. Many of these species are prey for fish managed under the Magnuson-Stevens Act, such as mackerels, snappers, groupers, billfish, and sharks. NOAA-NMFS recommends the project's environmental documentation address these species as well as those managed under the Magnuson-Stevens Act.

Permanent impacts resulting from cut, fill, and shading are anticipated to impact approximately 4.1 acres of EFH while temporary, direct impacts from BMPs are anticipated to impact up to 2.2 acres of EFH. Specifically, the project would result in impacts to approximately 3.0 acres in estuarine marsh habitat, 0.1 acre of fill in intertidal non-vegetated flats, 0.1 acre of fill in of tidal creek, and less than 0.1 acre of fill in oyster habitat. The proposed project would also result in an additional 0.9 acres of shading over EFH, including emergent marsh habitat (0.7 acre), tidal creeks (0.2 acre), and oyster habitat (less than 0.1 acre). Coordination with NMFS is required. The EFH Report is included in Appendix G.

4.7.2 Minimization and Mitigation

Due to the linear nature of the project, the need to widen and improve SC 41, and the presence of wetlands on both sides of the roadway, total avoidance of estuarine resources was not feasible. Bridges across Horlbeck Creek would be used to avoid and minimize impacts to marsh habitat. In addition, construction methods will use best management practices to minimize or avoid smothering marsh vegetation.

In addition to the iterative process by which the design has been established, the following avoidance and minimization measures will also be implemented:

- Bridge construction access will be from upland areas to the maximum extent practicable;
- Standard sediment and erosion control practices will be applied, including the following:
    - Avoidance and minimization of temporary impacts to waters and wetland vegetation for BMP control structures installation;
    - No permanent bank erosion or decreased stabilization;
    - To the maximum extent practicable, the project will be implemented in stages of development so that only areas that are in active construction are exposed. All other areas should have good cover of either temporary or permanent vegetation (using native seed mixtures), or bioengineering material;
    - Grading will be completed as soon as possible after it was commenced;
    - Runoff velocities will be kept as low as possible and retained on-site using sediment and erosion control BMPs; and
    - Appropriate sediment and erosion controls will be used and maintained in effective operating condition throughout the duration of the project;
- Raw or live concrete may not come into contact with wetlands or open water until cured;

- Siltation barriers will be made of material in which aquatic life cannot become entangled; barriers will be properly secured and regularly monitored to avoid protected species entrapment; and
- All steps would be taken to prevent pollutants from entering waterways or wetlands; and
- No mechanized equipment would operate in wetlands or WOUS unless clearly identified and authorized in the approved plans.

Impacts to EFH have been avoided and minimized to the maximum extent practicable for this project. Since there would be impacts to EFH, the contractor may develop an EFH Mitigation Plan and further consultation with NOAA-NMFS will occur as the project is finalized. The EFH Mitigation Plan may include mitigation measures such as purchasing mitigation credits from an approved mitigation bank or Permittee Responsible Mitigation (PRM) methods such as causeway removal, living shorelines, oyster bed restoration, or other methods of mitigating for EFH impacts. Charleston County will develop the mitigation plan in coordination with the appropriate resource agencies. The impacts to the critical area wetlands, including EFH, will be appropriately mitigated through the Section 401/404 Permitting Process.

4.8 Farmlands

The Farmland Protection Policy Act (FPPA) of 1981 requires evaluation of farmland conversions to nonagricultural uses. Farmland can be prime farmland, unique farmland, or farmland of statewide or local importance. Prime farmland soils are those that have characteristics favorable for economic production of sustained high yields of crops. These soils may not be presently used as cropland. Conversely, land that is presently used as cropland may or may not be prime farmland. Most of the prime agricultural land in the study area is currently used for residential purposes. Through the farmland classifications provided by the USDA NRCS, it has been determined that the project study area would involve lands protected under the FPPA (USDA 2019).

Table 4-3. Soils within the Study Area

Berkeley County			
Soils Unit	**Rating**	**Acres in study area**	**Percent of study area**
Capers association	Not prime farmland	3.5	0.2%
Goldsboro loamy sand, 0-2% slopes	All areas are prime farmland	10.6	0.7%
Lynchburg fine sandy loam, 0-2% slopes	Prime farmland if drained	5.1	0.3%
Meggett loam	Farmland of statewide importance	2.7	0.2%
Water	Not prime farmland	6.5	0.4%
Subtotals for Berkeley County		**28.3**	**1.8%**
	Total Prime Farmland in Berkeley County	**15.7**	**55.5%**
	Total Farmland of Statewide Importance in Berkeley County	**2.7**	**9.5%**
Charleston County			
Soils Unit	**Rating**	**Acres in study area**	**Percent of study area**
Capers silty clay loam	Not prime farmland	10.7	0.7%
Charleston loamy fine sand	All areas are prime farmland	116.5	7.6%
Chipley loamy fine sand	Not prime farmland	48.7	3.2%
Edisto loamy fine sand	Farmland of statewide importance	27.6	1.8%
Hockley loamy fine sand, 0-2% slopes	All areas are prime farmland	204.9	13.3%
Kiawah loamy fine sand	Farmland of statewide importance	1.7	0.1%
Lakeland sand, 0-6% slopes	Not prime farmland	43.7	2.8%
Mine pits and dumps	Not prime farmland	22.6	1.5%
Orangeburg loamy fine sand, 0-2% slopes	All areas are prime farmland	12.9	0.8%

Rutlege loamy fine sand	Not prime farmland	14.6	0.9%
Scranton loamy fine sand	Not prime farmland	4.0	0.3%
Seabrook loamy fine sand	Not prime farmland	14.0	0.9%
Stono fine sandy loam	Farmland of statewide importance	30.2	2.0%
Tidal marsh, soft	Not prime farmland	115.7	7.5%
Water	Not prime farmland	28.0	1.8%
Wadmalaw fine sandy loam	Farmland of statewide importance	114.2	7.4%
Wando loamy fine sand, 0-6% slopes	Not prime farmland	10.5	0.7%
Yonges loamy fine sand	Farmland of statewide importance	693.6	45.0%
Subtotals for Charleston County		**1,514.2**	**98.2%**
Totals for Study Area		**1,542.6**	**100.0%**
	Total Prime Farmland in Charleston County	**334.3**	**22.1%**
	Total Farmland of Statewide Importance in Charleston County	**867.3**	**57.3%**
	Total Prime Farmland in Study Area	**350.0**	**22.7%**
	Total Farmland of Statewide Importance in Study Area	**870.0**	**56.4%**

Source: USDA 2019

According to the 2010 Census Urban Area Map for Charleston, SC, the project study area is located in either a classified urban area or incorporated area. In addition, the majority of the undeveloped areas along the project study area are zoned/planned for future development. Per the FPPA, the project area is not subject to FPPA review if the impacted land is already in urban development and the project is considered in compliance with the FPPA.

4.9 Air Quality

4.9.1 Existing Air Quality

4.9.1.1 National Ambient Air Quality Standards

The National Ambient Air Quality Standards (NAAQS) were established by USEPA under the Clean Air Act (CAA), as amended, to protect public health, the environment, and the quality of life from the detrimental effects of air pollution. The NAAQS have been set for the following criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), and sulfur dioxide (SO_2).

The proposed project would be consistent with the South Carolina State Air Quality Implementation Plan (SIP) regarding the attainment of the NAAQS. Presently, Charleston County meets all air quality standards for the automobile related pollutants. The Bureau of Air Quality (BAQ) at the SCDHEC has determined that transportation control measures are not required to maintain the areas air quality. This project has been determined to generate minimal air quality impacts for criteria pollutants and has not been linked with any special Mobile Source Air Toxic (MSAT) concerns. A summary of the background concentrations and applicable air standards is in Table 4-4.

Table 4-4. Charleston County Air Quality

Charleston County Air Quality Background Concentrations							
Pollutant	Standard		Averaging Time	Ambient Air Monitor Site Name	County	Background Concentration	% Standard
	ppm	µg/m³					
SO_2	0.08	196	1-hour	Jenkins Ave Fire Station	Charleston	41.9	21
	0.5	1300	3-hour	Jenkins Ave Fire Station	Charleston	35.8	3
PM_{10}	-	150	24-hour	Jenkins Ave Fire Station	Charleston	49.0	33
$PM_{2.5}$	-	12	Annual	Charleston FAA Beacon	Charleston	8.4	70
	-	15	Annual	Charleston FAA Beacon	Charleston	8.4	56
	-	35	24-hour	Charleston FAA Beacon	Charleston	18.0	51
CO	35	40,000	1-hour	Parklane	Richland	1,450.3	4
	9	10,000	8-hour	Parklane	Richland	916.0	9
O_3	0.07	-	8-hour	Bushy Park	Berkeley	0.061	87
NO_X	0.05	100	Annual	Jenkins Ave Fire Station	Charleston	12.4	12
	0.1	188	1-hour	Jenkins Ave Fire Station	Charleston	72.1	38
Pb	-	0.15	Rolling 3 months	Jenkins Ave Fire Station	Charleston	0.0060	4

Notes: SO_2 = Sulfur Dioxide, PM_{10} = Coarse particulates, $PM_{2.5}$ = Fine particulates, CO = Carbon Monoxide, O_3 = Ozone, NO_X = Nitrogen Oxides, Pb = Lead

Ozone is the pollutant that is closest to approaching the NAAQS at 87 percent of the standard. Ozone is formed as a secondary pollutant and the precursor pollutants for ozone are oxides of nitrogen (NO_x) and volatile organic compounds (VOC), which are typically associated with transportation projects. Precursor pollutants typically associated with transportation projects are acrolein, benzene, 1,3-butidiene, diesel particulate matter (diesel PM) plus diesel exhaust organic gases, formaldehyde, naphthalene, and polycyclic organic matter.

USEPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. FHWA estimates that even if vehicle miles of travel (VMT) increase by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period (FHWA 2017a).

4.9.1.2 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are federal ambient air quality standards (AAQS), the USEPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, nonroad mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. The USEPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (USEPA 2018) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS). In addition, USEPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the

priority MSATs, the list is subject to change and may be adjusted in consideration of future USEPA rules. The 2007 USEPA rule mentioned above requires controls that would dramatically decrease MSAT emissions through cleaner fuels and cleaner engines.

Based on an FHWA analysis using USEPA's MOVES2014a model, as shown in Figure 4-7, even if VMT increases by 45 percent as assumed from 2010 to 2050, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period. Based on FHWA's analysis using MOVES2014a, the latest version of MOVES, diesel particulate matter (diesel PM) has become the dominant MSAT of concern.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

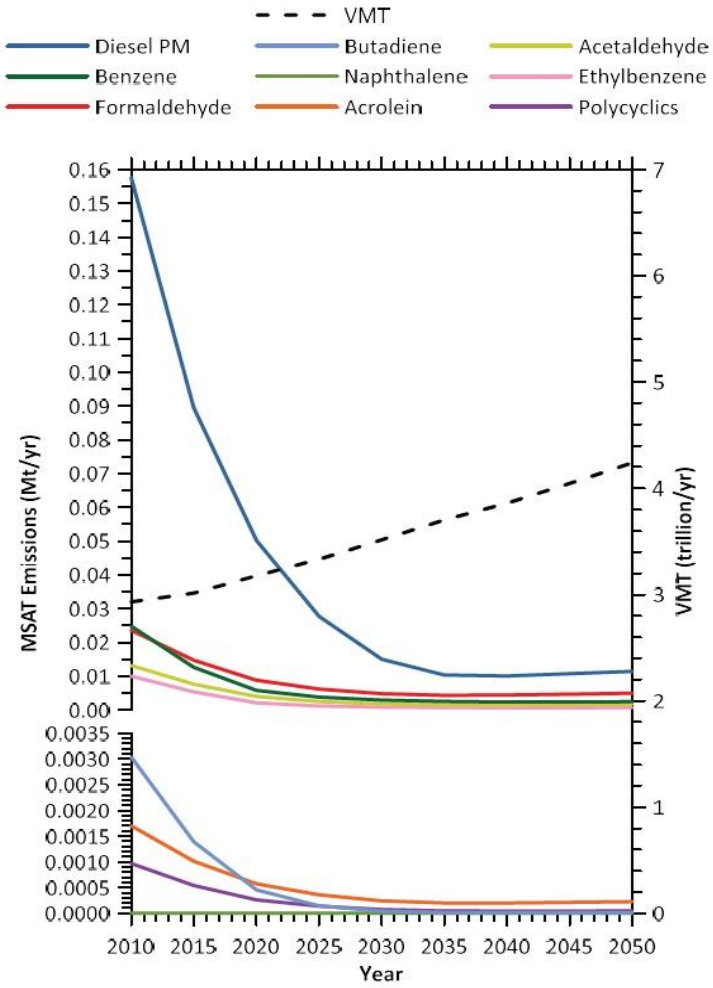

Figure 4-7. National MSAT emission trends 2010–2050 for vehicles operating on roadways using USEPA's MOVES2014a Model

Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, FHWA and SCDOT are duly expected by the public and other agencies to address MSAT impacts in their environmental documents. The FHWA, USEPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. FHWA will continue to monitor the developing research in this field. In October 2016, FHWA issued guidance to advise FHWA division offices as to when and how to analyze MSATs in the NEPA process for highways (FHWA 2017a). FHWA also provided an update on the status of scientific research on air toxics. This analysis follows the FHWA guidance.

4.9.2 Impacts to Air Quality

4.9.2.1 Impacts to National Ambient Air Quality Standards

Temporary air quality impacts could occur during construction and would be in the form of emissions from construction equipment, dust from construction embankment, and clearing of areas prior to paving or revegetation. During construction, slowed traffic through construction areas may produce additional emissions. Emissions from construction equipment are anticipated to have a minimal impact on air quality due to the amount of time it would take to construct the proposed roadway improvements.

4.9.2.2 Impacts to Mobile Source Air Toxics

On October 18, 2016, FHWA issued an interim guidance update regarding analyzing MSAT in NEPA documents for highway projects. Depending on the specific project circumstances, FHWA has identified three levels of analysis: (1) no analysis for project with no potential for meaningful MSAT effects; (2) qualitative analysis for projects with low potential MSAT effects, or (3) quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects. The proposed SC 41 Corridor Improvements project is anticipated as a minor widening project with new signalized intersections and would meet the second analysis category for qualitative analysis. Design year traffic projections are listed in Table 4-5. The emission effects of these types of projects are low and no appreciable effects in overall MSAT emissions are anticipated.

Table 4-5. Existing and Projected Traffic Conditions

Segment Description		2017 AADT	2040 AADT
SC 41	US 17 to Joe Rouse Rd	21,400	32,300
	Joe Rouse Rd to Dunes West Blvd	15,400	26,800
	Dunes West Blvd to Wando River	13,100	26,200
Bessemer Road	SC 41 to Park West Blvd (E–W)	4,200	6,400
Park West Boulevard	Bessemer Rd to Park West Blvd (N–S)	4,150	13,700
Dunes West Boulevard	Park West Blvd to SC 41	7,800	14,100

A qualitative analysis provides a basis for identifying and comparing potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2017b).

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 estimated for the RPA is 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 (Table 4-6). This increase in VMT would lead to higher MSAT emissions for the RPA 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 the USEPA's MOVES2014 model, emissions of all of the priority MSAT decrease as speed increases. Emissions will likely be lower under both the No-Build Alternative and the RPA than present levels in the design year as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050 (FHWA 2017a). 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 USEPA-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.

Table 4-6. VMT (daily) along SC 41

2040 No-Build VMT	2040 Compromise Alternative VMT
180,880	225,680

The additional travel lanes contemplated as part of the RPA will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under the RPA, there may be localized areas where ambient concentrations of MSAT could be higher than the No-Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built through the Phillips Community, the Park West and Dunes West communities, and along SC 41/US 17 intersection improvements with implementation of the RPA. However, the magnitude and the duration 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 RPA 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, USEPA'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.

4.9.2.3 Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The USEPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on

specific substances found in the environment and their potential to cause human health effects" (USEPA 2019a). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents*. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI 2007) or in the future as vehicle emissions substantially decrease (HEI 2010).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts, each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (HEI 2007). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The USEPA and the HEI have not established a basis for quantitative risk assessment of diesel PM in ambient settings (USEPA 2019b) (HEI 2015).

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the USEPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires USEPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld USEPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

4.9.3 Mitigation

Emissions from construction equipment will be short-term and temporary. Construction equipment would be maintained in satisfactory condition to meet minimum exhaust emission standards. The RPA is not expected to require any additional transportation control strategies to maintain the Counties' current attainment status, and the RPA is anticipated to be consistent with the State Air Quality Implementation Plan. The RPA will be continually evaluated throughout project development to ensure compliance with the most current air quality regulations and attainment status.

4.10 Noise

A noise analysis report (Appendix H) was prepared to assess noise impacts from the RPA. The project team used SCDOT policies and FHWA regulations to prepare the noise study because USACE does not have a noise analysis policy and these policies and regulations represent an accepted method of assessing noise impacts for transportation projects. The SCDOT Traffic Noise Abatement Policy constitutes the official SCDOT noise policy and procedures for the purpose of meeting the requirements of Title 23 of the CFR Part 772 and applicable state laws. This analysis conforms to FHWA Regulation 23 CFR 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise," and all applicable state laws (23 CFR Part 772 2010).

The FHWA Traffic Noise Model (TNM 2.5) was used to calculate existing noise levels and predict future design year noise levels for three distinct scenarios consisting of the current year (2022) Existing Alternative, design year (2045) No-Build Alternative, and RPA. Inputs to this model include noise sensitive receiver locations, existing and future roadway alignments. In addition, traffic volumes including vehicle mix and posted speeds were used. The noise analysis for this project was prepared in accordance with the SCDOT Traffic Noise Abatement Policy, dated August 2014 (effective September 1, 2014) to comply with the amended 23 CFR 772 which became effective July 2011. The following was assumed:

- Peak hour traffic volumes and truck percentages. Traffic data is included in Appendix A of the Noise Analysis Report.
- Worst-case vehicle speeds of 45 MPH on SC 41 and US 17.
- Ground elevations for inputs to the existing condition and flat for the build condition.
- Corresponding Noise Abatement Criteria (NAC) from SCDOT Traffic Noise Abatement Policy.

The traffic volume, vehicle mix and vehicle speeds were based on information collected provided by Stantec. For both the existing (2022) and the design year (2045), the maximum peak hourly traffic, along with posted speeds, were used as input data in the noise prediction model. The traffic parameters used in the noise model for prediction of future noise levels are presented in Appendix A of the Noise Analysis Report.

Existing land uses within the corridor are mainly residential (Category B) with various recreational (Category C), churches (Category D) and restaurant patios (Category E) land uses in the corridor. There are no

Category A land uses in the corridor and there were no unusual features observed that could significantly influence the noise propagation environment.

Existing traffic noise levels were measured in the field between September 19 and 21, 2017; May 2, 2018; and April 23, 2019, and then compared against TNM results to verify the accuracy of the traffic noise model. Each set of predicted and measured data was found to be within the acceptable plus or minus three dBA tolerance. Noise receptors in the project area within approximately 500 feet of the proposed centerline were identified through field reconnaissance and GIS parcel map information. One thousand ninety-eight (1,098) noise receptors were identified in the project area.

4.10.1 Noise Impacts

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 4-7), 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." Noise abatement measures must be considered for receivers that fall in either category.

Table 4-7. Noise Abatement Criteria: Hourly A-Weighted Sound Level (Decibels)

Hourly A-Weighted Sound Level – Decibels (dBA)				
Activity Category	Activity $L_{eq(h)}$[1] FHWA	Activity $L_{eq(h)}$[1] SCDOT	Evacuation Location	Description of Activity Category
A	57	56	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 intended purpose.
B[2]	67	66	Exterior	Residential
C[2]	67	66	Exterior	Active sports 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, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	51	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[2]	72	71	Exterior	Hotels, motels, offices, restaurants/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.

Notes: Based on Table 1 of 23 CFR Part 772.
[1] The $L_{eq(h)}$ Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.
[2] Includes undeveloped lands permitted for this activity category.

Based on the preliminary noise analysis for the 2022 “Existing” Alternative, noise levels would approach or exceed the NAC established in the SCDOT Traffic Noise Abatement Policy 37 out of 1,366 noise sensitive receivers. Noise levels for the existing condition ranged from 44.6 to 73.3 dBA

Based on the detailed noise analysis for the 2045 “No-Build” Alternative, noise levels would approach or exceed the NAC established in the *SCDOT Traffic Noise Abatement Policy* for 37 out of 1,366 noise sensitive receivers. Noise levels for the no-build condition ranged from 44.6 to 73.3 dBA, with an average increase of 0.3 dBA over the existing condition. Traffic noise levels resulting from the design year (2045) No-Build Alternative are expected to change between -2.0 to 4.7 dBA compared to the (2022) Existing Alternative.

Based on the detailed noise analysis for the 2045 Build Alternative, noise levels would approach or exceed the NAC established in the *SCDOT Traffic Noise Abatement Policy* for 41 out of 1,366 noise sensitive receivers, including 36 Category B receivers, one Category C receiver, and four Category E receivers. There are no impacts predicted due to a substantial increase in noise levels of at least 15 dB. Noise levels for the build condition ranged from 44.6 to 73.1 dBA. Traffic noise levels resulting from (2045) Build Alternative are expected to vary between -2.7 to 14.0 dBA compared to existing levels. Fluctuations in build traffic noise levels over existing traffic noise levels can occur due to changes in predicted traffic or shifts in alignment closer or away from receptors.

The majority of the impacts would be to NAC Category B (residences). Table 4-8 lists a summary of the noise impacts associated with the Existing, No-Build, and RPA.

Table 4-8. Modeled Noise Impacts along SC 41

Activity Category	Year 2022 Existing	Year 2045 Future No-Build	Year 2045 RPA
A	0	0	0
B	31	31	36
C	1	1	1
D	0	0	0
E	5	5	4
Total	**37**	**37**	**41**

4.10.2 Mitigation

Since there are receivers that would be impacted by the noise from the 2045 Design Year Build Alternative, abatement measures were considered for the proposed project. Based on the detailed noise analysis of 7 potential barriers to shield impacts in the Build Alternative, all of the barriers were found to be not feasible due to access and safety issues. Therefore, there are no noise barriers proposed to be carried forward to the construction phase. The noise analysis prepared for this project is included in Appendix H and includes the detailed analyses and findings supporting this determination.

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. Detailed specifications suggested for consideration for inclusion in the proposed project’s construction documents may consist of:

- Earth removal, grading, hauling, and paving activities should be limited to weekday daytime hours.

- If meeting the project schedule requires that earth removal, grading, hauling and/or paving must occur during evening, nighttime, and/or weekend hours in the vicinity of residential neighborhoods, the Contractor shall notify Charleston County and SCDOT as soon as possible. In such instance(s), all reasonable attempts shall be made to notify and to make appropriate arrangements for the abatement of the predicted construction noise impacts upon the affected property owners and/or residents.
- If construction noise activities must occur during context-sensitive hours in the vicinity of noise-sensitive areas, discrete construction noise abatement measures including, but not limited to, portable noise barriers and/or other equipment-quieting devices shall be considered.
- Some construction activities will create extreme noise impacts for nearby noise sensitive land uses. For example, pile-driving activities can create noise impacts for distances of up to a quarter mile. Considerations are recommended to be made for any nearby residences for all evening and/or nighttime periods (7:00 p.m.–7:00 a.m.), and for all weekend hours throughout which extremely loud construction activities might occur.

4.11 Hazardous Materials

Hazardous materials are generally defined as any material that has or will have, when combined with other materials, a harmful effect on humans or the natural environment. Hazardous materials may be in the form of a solid, sludge, liquid, or gas and are characterized as reactive, toxic, infectious, flammable, explosive, corrosive, or radioactive. A hazardous material that has been used and discarded is considered a hazardous waste.

4.11.1 Existing Hazardous Material Sites

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). Service/gas stations are one of the most common generators of potential hazardous material sites. As older underground storage tanks (USTs) deteriorate, they pose a threat to leak and contaminate surrounding soil and groundwater with gasoline and other petroleum products. The SCDHEC maintains a database of these potential contamination sites and regulates activities associated with the monitoring and/or remediation of a leaking underground storage tank (LUST). The SCDHEC may also issue a letter of “no further action” for sites that no longer show evidence of contaminants present at the site or that have been remediated in accordance with applicable laws.

A Phase I Environmental Site Assessment – Limited Environmental Records Review (ESA-LERR) was conducted using the American Society for Testing and Materials (ASTM) E 1527-13, Standard Practice for Environmental Site Assessments: Phase I ESA Process. The purpose of the Phase I ESA-LERR is to identify, pursuant to ASTM E 1527-13, recognized environmental conditions (RECs) in connection with the proposed project’s study area. ASTM defines a REC as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property due to release to the environment; under conditions that are indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment. RECs include, but are not limited to, possible sites involving the presence and/or past use of underground storage tanks (USTs), aboveground storage tanks (ASTs), and/or other hazardous materials within the project study area. The ESA-LERR included federal and state database research along with an on-site reconnaissance survey of the project study area.

A review of environmental records was conducted to determine if any sites with potential or existing environmental contamination were present within or directly adjacent to the project study area. Databases

included, but were not limited to, ASTs, USTs, LUSTs, dry cleaners, CERCLA sites, and landfill sites. Twenty RECs were identified within or adjacent to the project study area (Table 4-9). See Appendix I for the complete Phase I ESA-LERR.

Table 4-9. REC Findings

Site Type	Site Name	Site Address	Site Operations Relative to Hazmat Issues, Regulatory Listing	Data Source (1)	Risk Ranking L/M/H (2)
EDR History Cleaner	Shopping plaza (formerly Pelican Cleaners)	2700 Hwy 17 N Mount Pleasant, SC 29464	Historic dry cleaners	D	M
LUST	A B McConnell	2726 Hwy 17 N Mount Pleasant, SC 29464	Historic service station, pre-1970	R, H, D	M
EDR History Cleaner	M.P. Laundromat	2755 Hwy 17 N Mount Pleasant, SC 29464	Current dry cleaner	R, H	M
UST	Gregorie Ferry Tract	2792 Hwy 17 N Mount Pleasant, SC 29464	Current service station	D	H
LUST	Circle K 2720873 Exxon Service Station	2846 Hwy 17 N Mount Pleasant, SC 29464	Former service station, pre-1970	H, D	M
LUST	Former Fuels Bulk Plant	1131 Hwy 17 N Mount Pleasant, SC 29464	Former service station, pre-1970	H, D	H
UST	Sunoco 0310-6226 7-Eleven 40510	2978 Hwy 17 N Mount Pleasant, SC 29464	Current service station	R, H	M
EDR Hist Auto	State Farm Insurance Agent (former Fuel Express of Mt. Pleasant)	3044 Hwy 17 N Mount Pleasant, SC 29465	Former service station	D	L
UST	Refuel 15	3050 Ironclad Alley Mount Pleasant, SC 29465	Current service station	R, H, D	M
EDR Hist Auto	Mount Pleasant Auto Repair	1157 Hwy 41 Mount Pleasant, SC 29464	Current auto station	R, H	L
UST	Circle K #2723850	4020 Bessemer Road Mount Pleasant, SC 29464	Current service station	R, D, H	M
SPILL	Tack Oil	3001 Park West Blvd Mount Pleasant, SC 29465	Historic service station, pre-1970	D, H	H
UST	Harris Teeter #131 Fuel	2035 Hwy 41 Mount Pleasant, SC 29466	Current service station	R, D, H	L
UST	Lowe's Fuel Center of Mt. Pleasant	2110 Hwy 41 Mount Pleasant, SC 29466	Current service station	R, D	L
AST	Atlantic Marine, Inc (boat storage and AST)	2386 Hwy 41 Mount Pleasant, SC 29466	Aboveground tank	R, H	L
RCRA NONGEN	Detyens Shipyard – Wando	2383 Hwy 41 Mount Pleasant, SC 29466	Current boat repair and storage	R, H, D	M
LUST	Circle K #2720879 The Pantry #878/879	2390 Hwy 41 Wando, SC 29492	Former service station, pre-1970	D, H	H
BROWNFIELDS	O'Hare Point	546 Riverbend Trail Mount Pleasant, SC 29466	Former SHWS with recent (2020) Brownfields listing	D	H
LUST	Wando Grocery	2601 Hwy 41 Wando, SC 29492	Historic service station, pre-1970	H, D	M
UST	Spinx	2627 Hwy 41 Wando, SC 29492	Current service station	R, D	L

(1) Indicates primary information sources for listing: R=Reconnaissance, I=Interview, D=Database, H=Historical Source (Sanborns, historical aerial photographs, historical topographic maps)
(2) Risk of potential impacts onsite; Low/Moderate/High

4.11.2 Impacts on Hazardous Materials

The Limited Environmental Records Review (LERR) report identified seven High Risk sites, nine Moderate Risk sites, and five Low Risk sites, based on factors such as regulatory history, status of documented releases, and proximity to the study area. The LERR report considers the seven High-Risk sites as RECs that would require Phase II sampling and reporting to evaluate the potential of these sites to impact the project via the presence or potential presence of contaminants in soil and/or groundwater. It is recommended that construction contractors be instructed to immediately stop subsurface activities if potentially hazardous materials are encountered, a non-natural odor is identified, or significantly stained soil is visible. Contractors should be instructed to follow applicable regulations regarding discovery and response for hazardous materials encountered during the construction process.

4.11.3 Mitigation

It is the County's practice to avoid the acquisition of USTs and other hazardous waste materials, if possible. If soils that appear to be contaminated with petroleum products are encountered during construction, SCDHEC would be informed. Hazardous materials would be tested and removed and/or treated in accordance with the USEPA and SCDHEC requirements, if necessary.

4.12 Cultural Resources

The National Historic Preservation Act of 1966 requires federal agencies to review the effects of any proposed projects on historic properties. Historic resources include districts, buildings, sites, structures, or objects that are significant in American history, architecture, archaeology, engineering, and/or culture. Prior to undertaking a project, a federal agency must determine if any resources exist in the study area through detailed literature searches and field surveys. If resources exist, then the federal agency will consult with the State Historic Preservation Office (SHPO) to determine whether the resource is eligible for listing on the National Register of Historic Places (NRHP) and how the proposed project would impact the resource.

4.12.1 Existing Cultural Resources

The survey of the project included background research, archaeological and architectural survey, laboratory analyses, and NRHP assessment. These investigations were conducted to identify any historic properties that may be affected by the proposed project. See Appendix J for report and coordination.

4.12.1.1 Archaeological Survey

The archaeological survey entailed the systematic examination of the project following South Carolina Standards and Guidelines for Archaeological Investigations (COSCAPA et al. 2013). The archaeological survey was conducted from July 31 to August 9, 2017, and from March 4–8, 2019. For the most part, the archaeological survey universe extended 98 feet to either side of the existing ROW, excepting two areas east of SC 41 near the Phillips community and in and around the SC 41/US 17 intersection. The archaeological survey included pedestrian traverse (shovel testing and visual inspection) of all previously unsurveyed portions of the archaeological survey universe. Previous investigations identified six archaeological sites (38BK171, 38BK1621, 38BK1810, 38CH648,38CH649, and 38CH2405) in the archaeological survey universe. Sites 38BK1621 and 38BK1810 overlap and should be considered one archaeological site, 38BK1621/38BK1810. The current investigation identified 11 new archaeological sites (38CH2534–38CH2542,38CH2571, and 38CH2674) and four isolated artifact finds (Isolates 1–4).

4.12.1.2 Architectural Survey

From September 25–27, 2017, March 18–21, 2019, and January 24–31, 2022, an architectural historian conducted an intensive architectural survey of all aboveground cultural resources within the architectural survey universe to consider any possible visual effects of the proposed undertaking. The architectural survey universe extended 300 feet outside the archaeological survey universe. The survey was designed to identify, record, and evaluate all historic architectural resources (buildings, structures, objects, designed landscapes, and/or sites with aboveground components) in the project area. Field survey methods complied with the Survey Manual: South Carolina Statewide Survey of Historic Places and National Register Bulletin 24, Guidelines for Local Surveys: A Basis for Preservation Planning. In accordance with the scope of work and standard South Carolina Department of Archives and History (SCDAH) survey practice, the project architectural historian drove every street and road in the architectural survey universe and conducted a pedestrian inspection of all potential historic architectural resources.

The principal criterion used by the SCDAH to define historic architectural resources is a 50-year minimum age; however, that rule does not always allow for the recordation of all historically significant resources. This could include resources related to the civil rights movement, the Cold War, or the development of tourism in South Carolina. The architectural survey universe extends through one Historic District (the Phillips community), one Traditional Cultural Property ([TCP] the Sweetgrass Basket Corridor), and includes 100 individual, aboveground resources.

The 100 individual, aboveground resources include previously and newly recorded buildings, structures, and cultural landscape features. The SC 41 Bridge over the Wando River (Berkeley County Resource 6 and Charleston County Resource 560) is eligible for the NRHP but has been replaced by a new bridge; the adverse effect of that undertaking has been mitigated. Eleven of the previously recorded architectural resources are no longer extant. None of the 100 extant architectural resources in the architectural survey universe meet individual NRHP criteria for eligibility.

The Phillips community is an NRHP-eligible district located in the central portion of the study area. A previous study resulted in the identification of 28 individual, aboveground resources in the Phillips Community Landscape and Historic District (CL/HD). These individual resources are considered contributing elements of the Phillips CL/HD. Twenty of these 28 resources are in the architectural survey universe. The architectural historian recorded five sweetgrass basket/fruit stands and 24 cultural landscape features in the architectural survey universe that may contribute to the Phillips CL/HD. Additionally, two historic cemeteries (Site 38CH1752/SHPO Site No. 7923 and Site 38CH2675/SHPO Site No. 0563) are in the architectural survey universe and may also be contributing elements of the Phillips CL/HD. Furthermore, cemeteries are protected from desecration by South Carolina state law. For more details, please refer to the Phillips Community Cultural Landscape Technical Report (Appendix M).

The Seven Mile community is in close proximity to the Phillips community and the two share many historical and cultural characteristics between them. Seven Mile is located at the southern-most portion of the study area, including the intersection of US 17 and SC 41. While Seven Mile has not been specifically recognized by SC SHPO as historically eligible, several resources within the community have been recognized as historic. For more details, please refer to the Seven Mile Technical Report (Appendix N).

The project includes a portion of the Sweetgrass Basket Corridor TCP and 33 associated sweetgrass basket stands near the intersection of SC 41 and US 17. Of the 22 previously recorded sweetgrass basket stands located in the current study's architectural survey universe, six are no longer extant. The current

investigation recorded 17 newly identified sweetgrass basket stands. These 33 stands are contributing elements to the Sweetgrass Basket Corridor TCP.

4.12.2 Impacts on Existing Cultural Resources

The archaeological deposits in the archaeological survey universe associated with sites 38BK171, 38BK1621/38BK1810, 38CH648, 38CH649, 38CH2534–38CH2542, 38CH2571, and Isolates 1–4 are not eligible for the NRHP and require no additional management. Site 38CH2674 is recommended NRHP-eligible under Criterion A for its association with the Phillips CL/HD and under Criterion D for its potential to yield information important to understanding the Phillips community history.

The RPA may have an adverse effect on the Phillips CL/HD, the Sweetgrass Basket Corridor TCP, Site 38CH1752/SHPO Site No. 7923, Site 38CH2674, Site 38CH2675/SHPO Site No. 0563, and Site 38CH2405. If possible, these cultural resources should be avoided. However, if these cultural resources cannot be avoided, proposed improvements should be designed in such a way to minimize these adverse effects, in consultation with the South Carolina SHPO. Furthermore, cemeteries such as 38CH1752/Resource 7923 and Site 38CH2675/SHPO Site No. 0563 are protected from disturbance and desecration under South Carolina state law. Site 38CH1752/SHPO Site No. 7923 and Site 38CH2675/SHPO Site No. 0563 should be preserved in place using the proposed site boundaries as protective buffers. Charleston County is in consultation with the South Carolina SHPO on the NRHP eligibility determinations and findings of effect as a result of the current investigation.

4.12.3 Mitigation

The RPA may have an adverse effect on the Phillips CL/HD, the Sweetgrass Basket Corridor TCP, Site 38CH1752/SHPO Site No. 7923, Site 38CH2674, Site 38CH2675/SHPO Site No. 0563, and Site 38CH2405. If these cultural resources cannot be avoided, proposed improvements should be designed in such a way to minimize or mitigate these adverse effects, in consultation with the South Carolina SHPO. If the current proposed project design changes, additional surveys may be necessary. During construction, the contractor and subcontractor must notify their workers to watch for the presence of any prehistoric or historic remains, including but not limited to arrowheads, pottery, ceramics, flakes, bones, graves, gravestones, or brick concentration during the construction phase of the project, and if any such remains are encountered, the Charleston County Public Works Director will be immediately notified and all work in the vicinity of the discovered materials and site work shall cease until an archaeologist directs otherwise.

4.13 Communities and Socioeconomic Resources

The proposed project was evaluated to identify potential social and economic impacts of the RPA. Social impacts, or community impacts, can be defined as the “effects of a transportation action on a community and its quality of life.” This evaluation generally focuses on the various aspects that are important to the surrounding communities and people such as mobility, safety, employment, property impacts, fragmentation of communities, and other items important to the quality of life along the project areas. Social impacts are generally identified through public involvement and participation, along with an analysis of the how the proposed improvements may impact the various items that are important to the local communities.

Potential economic impacts are also considered and include how the project may benefit or harm the local businesses, local municipalities, and communities. The evaluation of potential economic impacts generally considered project costs, impacts to businesses, mobility/access, and employment potential.

4.13.1 Existing Communities and Socioeconomic Resources

Figure 4-8 shows the locations of major community resources in the study area. The study area is primarily located within six US census tracts, as shown on Figure 4-9. Census Tract (CT) 46.09, CT 46.15, CT 46.16, and 46.18 are in the Charleston County portion of the study area and encompass 4.6, 15.8, 31.9, and 40.8 percent of the study area, respectively. CT 204.04 and CT 204.05 are in the Berkeley County portion of the study area, and these overlap approximately 4.0 and 2.3 percent of the study area, respectively. The southwestern corner of the study area overlaps a small portion of an additional census tract, 46.10. As this tract constitutes only a small fraction (0.6 percent) of the study area, data associated with this census tract were not considered representative of the study area and, thus, were not assessed in this analysis.

The 12 communities in the study area were defined by the project team based on similarities in land use and context and by following U.S. Census Bureau (USCB) and Traffic Analysis Zone (TAZ) boundaries and visible features. The USCB CTs are used in the evaluation of demographics. While the TAZ boundaries align closely to the CT boundaries, they are not an exact match. Therefore, economics and growth trends within the study area are based on the TAZ boundaries but will be referred to by the CT numbers for consistency. Charleston County CT 46.09 contains TAZs 553–55 and 571–572. Charleston County CT 46.15 contains TAZs 548–549. Charleston County CT 46.16 contains TAZs 558, 560, and 561. Charleston County CT 46.18 contains TAZs 549, 558, and 559. Berkeley County CT 204.04 contains TAZs 1154–1157. Berkeley County CT 204.05 contains TAZs 1158–1160. Figure 4-10 presents a map showing the TAZ boundaries.

Table 4-10 shows the socioeconomic trends of the counties and census tracts and the demographic and economic data from the 2016–2020 American Community Survey (ACS) five-year estimates, referred to as “2020 ACS” (USCB 2022), presented in Table 4-11 and Table 4-12 include information related to race (non-white) and ethnicity (Hispanic or Latino), age, Limited-English Proficiency (LEP), zero-vehicle households, median household income, low-income populations, median home value and unemployment. The Black/African American population is the largest non-white population group in communities throughout the study area. In general, populations under the age of eighteen and over the age of sixty-five, zero-vehicle households and low-income populations are considered more reliant on public transportation and are therefore included in the demographic analysis in order to better evaluate the potential demand for public transportation services.

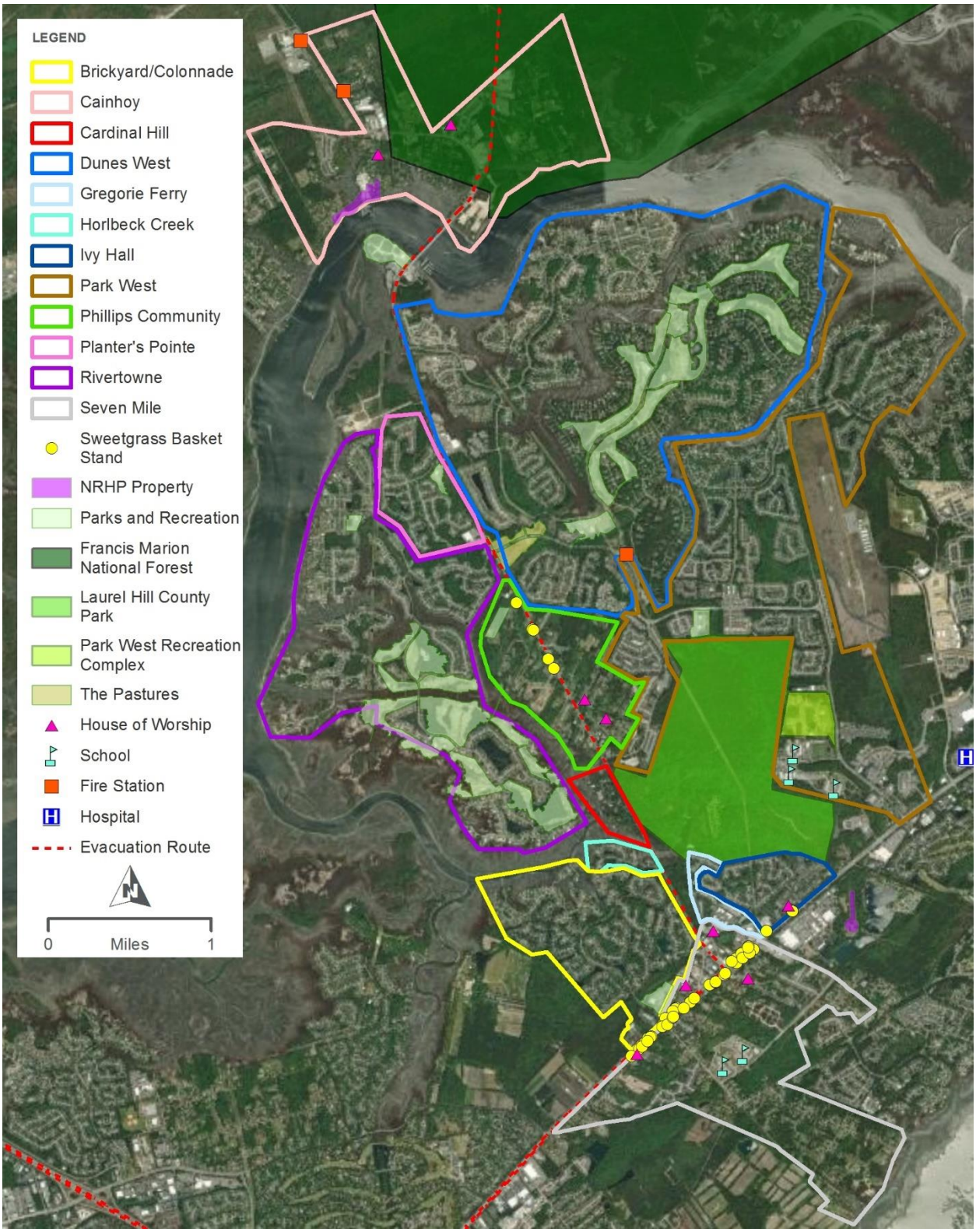

Figure 4-8. Major Community Resources

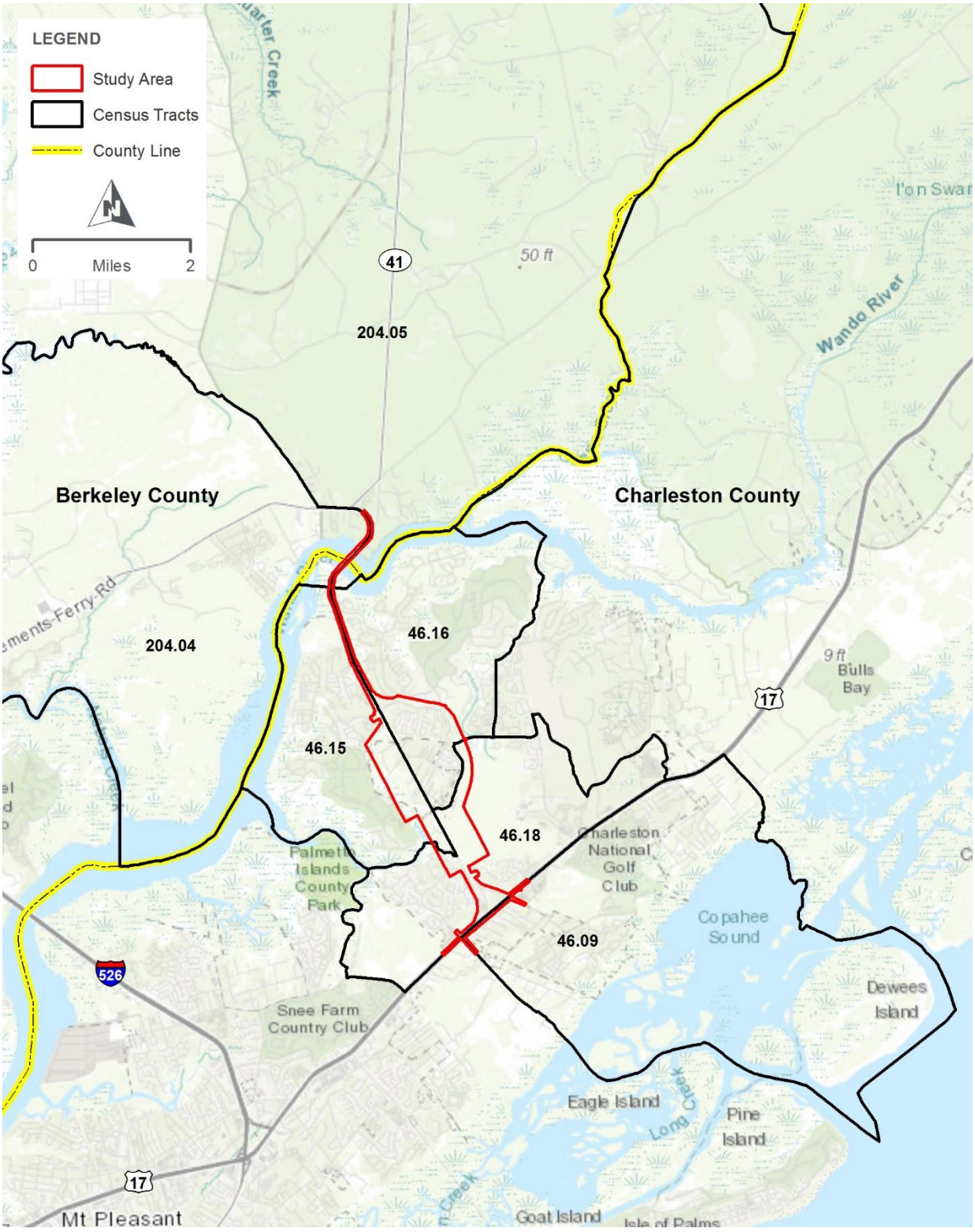

Figure 4-9. Census Tracts

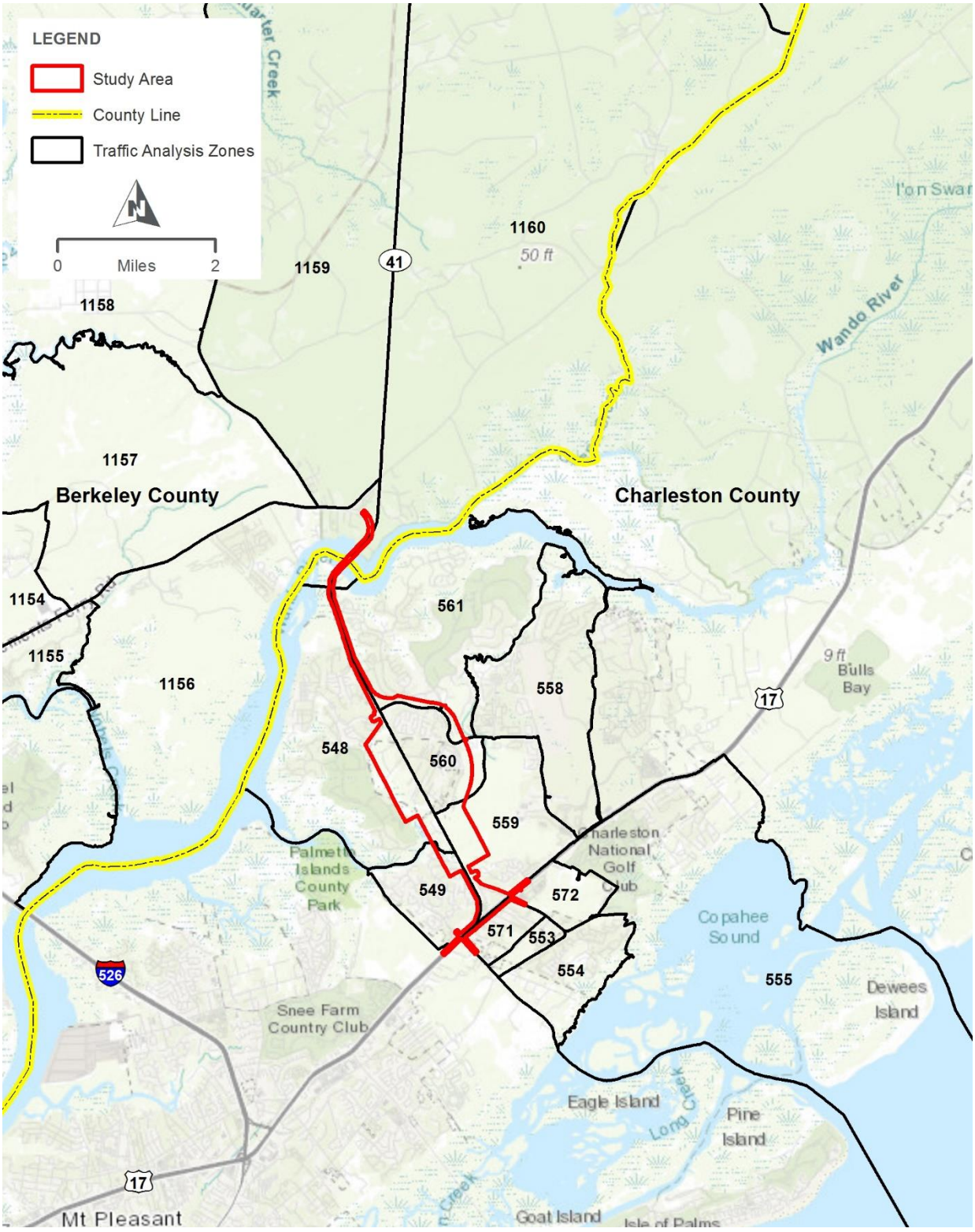

Figure 4-10. TAZ Boundaries

Table 4-10. Study Area Socioeconomic Trends

Geography	2015 Pop.	2040 Pop.	% Change	2015 House-holds	2040 House-holds	% Change	2015 Employment	2040 Employment	% Change
Charleston County	365,512	480,661	31.5%	160,496	206,799	28.8%	235,338	308,125	30.9%
46.08*	23,194	28,919	24.7%	8,130	10,310	26.8%	2,127	6,675	214%
46.09	6,914	9,087	31.4%	2,738	3,791	38.4%	1,900	2,743	44.4%
Berkeley County	167,509	359,311	114.5%	65,533	141,096	115.3%	71,650	125,335	74.9%
204.04	4,324	25.270	484.4%	1,755	10,051	472.7%	3,687	7,003	89.9%
204.05	2,853	4,982	74.6%	1,126	1,918	70.3%	1,874	2,213	18.1%

Sources: BCDCOG 2017a; 2020
* CT 46.08 was split into CTs 46.15, 46.16, and 46.18 for 2020 Census

Table 4-11. Study Area Demographic Profile

Geography	% Non-white	% Hispanic or Latino	% LEP Households	% Age: under 18 & 65 and over	% Zero Vehicle Households
Charleston County	35.4%	7.2%	3.0%	36.0%	6.5%
46.09	23.7%	4.2%	2.0%	39.9%	2.2%
46.15	12.0%	3.4%	0.0%	45.7%	0.0%
46.16	13.8%	3.8%	0.8%	52.2%	3.8%
46.18	14.6%	3.6%	0.0%	45.9%	1.3%
Berkeley County	40.0%	8.8%	2.9%	37.7%	4.0%
204.04	20.9%	4.6%	0.2%	29.8%	4.5%
204.05	57.9%	3.9%	0.0%	39.9%	9.8%
South Carolina	37.9%	6.9%	2.7%	39.5%	6.0%

Source: USCB 2022

Table 4-12. Study Area Economic Profile

Geography	Median household income	% Below Poverty Level	Median home value	% Unemployed
Charleston County	$67,182	12.8%	$334,600	3.7%
46.09	$66,604	5.6%	$387,500	8.5%
46.15	$230,306	0.0%	$471,300	1.2%
46.16	$103,912	1.0%	$522,600	0.0%
46.18	$108,454	3.2%	$374,600	0.0%
Berkeley County	$65,443	11.9%	$197,300	4.3%

204.04	$100,329	2.9%	$376,400	3.8%
204.05	$40,833	21.2%	$144,800	7.5%
South Carolina	$54,864	14.7%	$170,100	5.5%

Source: USCB 2022

According to the 2020 ACS, Charleston County CT 46.15 had the lowest percentage of non-whites in the study area (at 12.0 percent), while Berkeley County CT 204.05 had the highest percentage of non-whites (at 57.9 percent). Portions of the Cainhoy community in Berkeley County CT 204.05 were founded by freed African Americans after the Civil War, so the high percentage of non-whites in this area may be at least partly attributable to that historic development. All four Charleston County CTs had a lower percentage of non-whites when compared to Charleston County. Perhaps diluted in the Charleston County CT data is the presence of the Phillips Community (in CT 46.15 and 46.16) and the Seven Mile community (in CT 46.09 and 46.18), both of which were founded by freed African Americans after the Civil War, and both of which retain a high percentage of African Americans in their populations.

According to the 2020 ACS, three of the Charleston County CTs and Berkeley County CT 204.04 had much higher median household incomes and median home values than the counties and state. These CTs also had populations with much lower percentages living below the poverty level and unemployed than the counties and state. Charleston County CT 46.09 and Berkeley County CT 204.05 were the exceptions with much lower median household incomes and populations with higher unemployment percentages than the counties and state.

4.13.2 Impacts on Communities and Socioeconomic Resources

The RPA was analyzed for its potential social impacts in terms of residential and business relocations, alteration of transportation patterns, disruption of planned or established communities, disruption of development, and changes in employment. The RPA is located primarily along SC 41 and US 17; however, the project will require approximately 44.1 acres of new ROW. This ROW would be acquired from various land-uses (commercial and residential) immediately adjacent to the existing ROW. Since this is a proposed widening project, the improvements would not provide new access and are not anticipated to cause a direct change in adjacent land use.

The social impacts identified are largely associated with impacts to the residences and existing commercial establishments, mainly regarding changes in access to and from these homes and businesses during construction and once the project is complete. The increased traffic volume along US 17 is expected to increase commercial opportunities for sweetgrass basket stand owners and other business owners in the community, which could result in minor beneficial impacts.

The additional travel lanes and multi-use path would result in improved roadway operational efficiency, decreased traffic congestion, and safer driving conditions, which provide direct beneficial social impacts for commuters, pedestrians, and bicyclists.

4.13.3 Mitigation

Information on construction activities will be updated regularly in order to avoid and minimize the impacts to residents and local businesses during construction. The following strategies have been used on other projects, and would be utilized as necessary:

- Maintaining access to businesses during construction for customers and deliveries;

- Maintaining or relocating bus stops; and/or
- Maintaining parking lot access.

An attempt would be made to maintain access to all properties along the corridor. In the event that access could not be maintained, the SCDOT/Counties would negotiate these impacts during the ROW acquisition process.

4.14 Environmental Justice

The USEPA defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires federal agencies to identify community issues of concern during the NEPA planning process, particularly those issues relating to decisions that may have a disproportionate impact to low-income or minority populations.

4.14.1 Existing Environmental Justice Conditions

In evaluating demographic trends of the six CTs (46.09, 46.15, 46.16, 46.18, 204.04, 204.05) in the study area, patterns became apparent in the study area. Charleston County CT 46.15 had the lowest percentage of non-whites in the study area (at 12.0 percent), while Berkeley County CT 204.05 had the highest percentage of non-whites (at 57.9 percent). Portions of the Cainhoy community in Berkeley County CT 204.05 were founded by freed African Americans after the Civil War, so the high percentage of non-whites in this area may be at least partly attributable to that historic development. All four Charleston County CTs had a lower percentage of non-whites when compared to Charleston County. Perhaps diluted in the Charleston County CT data is the presence of the Phillips Community (in CT 46.15 and 46.16) and the Seven Mile community (in CT 46.09 and 46.18), both of which were founded by freed African Americans after the Civil War, and both of which retain a high percentage of African Americans in their populations.

USCB block group data were used to refine identification of environmental justice populations in the study area. Table 4-13 presents minority populations at the block group level, as compared with study area averages. While only one block group (CT 204.05 Block Group 2) exceeded the 50-percent threshold noted as significant in CEQ environmental justice guidance, several block groups had minority percentages that were greater than study area averages. CT 46.09 Block Group 4, which encompasses southern portions of the Gullah community of Seven Mile, CT 46.15 Block Group 3, which overlaps the western half of the Gullah African American Phillips Community, and CT 204.05 Block Groups 1 and 2, which overlap approximately half of Cainhoy, including portions of its Gullah community, had overall minority percentages that exceeded the study area average. In these four census geographies, African American was the most prominent minority race or ethnicity. These four census geographies are emboldened in Table 4-13 due to their potential higher vulnerability. Figure 4-11 shows minority population percentages at the block group level across the study area.

The presence of the Phillips Community, located within CT 46.15 Block Group 3 and CT 46.16 Block Group 2, is diluted within the block group data due to sharing CT 46.16 Block Group 2 with Dunes West and Park West, substantially larger and predominantly nonminority planned communities.

Table 4-13. Study Area Minority Populations at Block Group Level

Geography	% Minority	% African American	% American Indian / Alaska Native	% Asian	% Native Hawaiian / Other Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic
Study Area[1]	23.1	13.6	0.1	1.9	0.0	0.2	3.5	3.7
CT 46.09 BG 4	**30.6**	**22.2**	0.0	1.8	0.0	0.0	3.3	3.4
CT 46.15 BG 1	10.1	0.9	**0.2**	1.8	<0.1	0.1	**3.6**	3.5
CT 46.15 BG 2	9.9	1.1	<0.1	1.7	**0.2**	<0.1	3.4	3.3
CT 46.15 BG 3	**23.5**	**14.6**	**0.2**	1.3	0.0	0.2	3.5	3.5
CT 46.16 BG 1	11.4	1.8	<0.1	**2.3**	0.0	0.2	3.4	3.6
CT 46.16 BG 2	22.5	11.3	0.1	**3.6**	<0.1	**0.4**	**3.7**	3.4
CT 46.16 BG 3	10.7	0.9	<0.1	1.9	<0.1	0.1	3.5	**4.2**
CT 46.18 BG 1	11.5	2.3	**0.2**	**3.0**	0.0	0.2	3.1	2.8
CT 46.18 BG 2	16.6	4.5	**0.2**	**3.7**	0.0	**0.6**	**3.6**	**4.1**
CT 204.04 BG 2	15.2	3.3	**0.3**	1.3	<0.1	**0.6**	**4.9**	**4.7**
CT 204.05 BG 1	**48.1**	**39.4**	0.0	0.4	0.0	0.2	3.0	**5.2**
CT 204.05 BG 2	**66.5**	**60.6**	**0.3**	0.2	<0.1	**0.3**	2.4	2.8

Source: USCB 2022

[1] Study area percentages are averages of the Census Bureau block group data

Note: Emboldened geographies exceed the 50-percent threshold noted as significant in CEQ guidance or have higher minority percentages than the study area average. Emboldened ethnic percentages indicate those that are higher than the study area average.

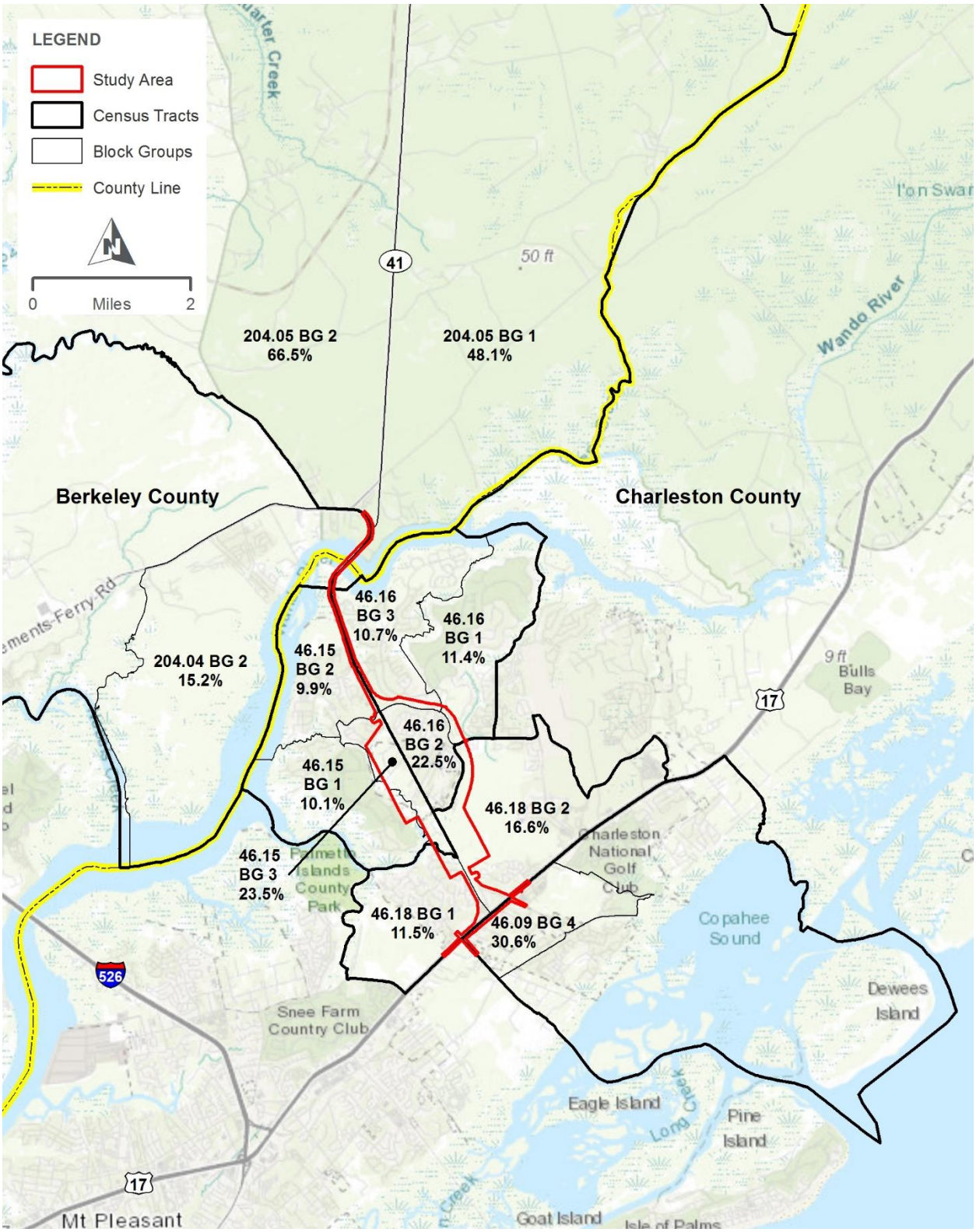

Figure 4-11. Minority Populations at Block Group Level

Table 4-14 presents per capita income rates at the block group level and poverty rates at the CT level, as compared with study area averages. According to the 2020 ACS, across the study area, the per capita income rate was $52,663, and the proportion of the population below poverty level was 5.0 percent. Seven block groups had per capita income rates that were lower than the study area as a whole, and two CTs that overlap portions of African American communities had poverty rates that exceeded the study area rate. None of the block groups had per capita income rates at or lower than the 2020 US poverty threshold for individuals ($13,171), as reported by the USCB (2021). Across the study area, poverty rates for all but one census geography were lower than the 2020 official US poverty rate (11.4 percent). CT 204.05, which overlaps portions of the Cainhoy community, had a poverty rate that exceeded the official US poverty rate threshold and had a per capita income rate lower than the rate across the study area. This census geography is emboldened in Table 4-14 due to its potential higher vulnerability. Figure 4-12 shows per capita income rates at the block group level across the study area.

Table 4-14. Study Area Low-Income Populations at Block Group Level

Geography	Per Capita Income	% Below Poverty Level[1]
Study Area[2]	$52,663	5.0
CT 46.09 BG 4	**$47,784**	**5.6**
CT 46.15 BG 1	$95,033	0.0
CT 46.15 BG 2	$123,513	0.0
CT 46.15 BG 3	**$33,958**	0.0
CT 46.16 BG 1	$67,137	1.0
CT 46.16 BG 2	**$19,486**	1.0
CT 46.16 BG 3	$55,238	1.0
CT 46.18 BG 1	**$35,489**	3.2
CT 46.18 BG 2	$54,756	3.2
CT 204.04 BG 2	**$45,764**	2.9
CT 204.05 BG 1	**$27,267**	**21.2**
CT 204.05 BG 2	**$26,525**	**21.2**

Source: USCB 2022

[1] Provided at the CT level due to availability

[2] Study area percentages are averages of the Census Bureau block group data

Note: Emboldened geographies indicate those that have lower per capita income rates than the study area average and exceed the official US poverty rate. Emboldened per capita incomes indicate those that are lower than the study area average. Emboldened poverty rate percentages indicate those that are higher than the study area average.

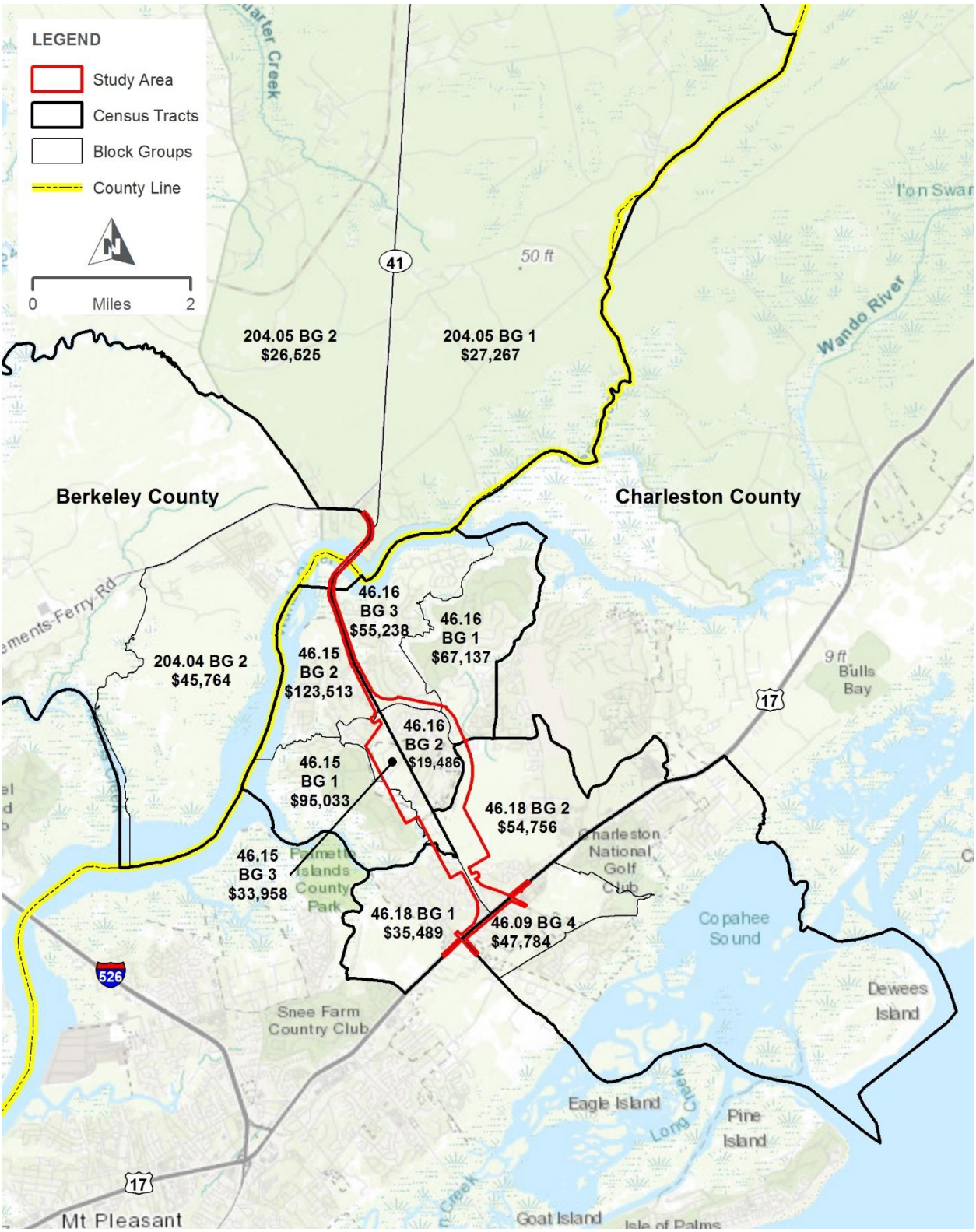

Figure 4-12. Per Capita Income Rates

4.14.2 Impacts on Environmental Justice Conditions

In the environmental justice-qualifying Phillips Community, the RPA would result in minor to moderate impacts to residential aspects of the community due to the effects to several individual residential parcels spread across the community. In environmental justice-qualifying Seven Mile, changes associated with the RPA would result in moderate impacts to social, cultural, and psychological aspects of the community. The impact severity ratings in Phillips would depend on whether an affected parcel contains a residence within close proximity to the proposed roadway and is legally considered heirs' property. These differences in the Phillips Community and the potential for cultural impacts in Seven Mile are due to their traditional cultural heritage as Gullah African American people.

The RPA would impact five individual residential parcels of the Phillips Community, four of which have existing residences. As these effects are more severe than in non-environmental justice communities in the study area, the RPA would result in disproportionately high and adverse effects to the environmental justice-qualifying Phillips Community. The changes associated with the RPA in Seven Mile are estimated to be minor to moderate and would affect approximately 12 residential parcels and 14 sweetgrass basket stands spread throughout the community.

4.14.3 Mitigation

Potential mitigation measures will be developed through data collected during public engagement opportunities and/or direct community contact, such as through phone and in-person meetings and/or focused interviews. Four primary methods to address direct impacts will be considered, including avoidance, minimization, mitigation, and enhancement. Project enhancements that would add a desirable or attractive feature and thus result in the project being more fitting with the community will also be considered and developed, as appropriate.

The RPA may have an adverse effect on the Sweetgrass Basket Corridor TCP. Sweetgrass basket stands that cannot be avoided would be relocated outside the proposed new ROW. Mitigation measures will be addressed in the community mitigation plan. Developing strategies for community mitigation will initially involve working with the project engineers to alter the design to avoid or minimize impacts and/or to identify enhancement opportunities to make the project fit better with existing communities. Once the design is finalized and the most affected communities are identified, the project community analysts will meet with representatives of the affected communities to identify avoidance and minimization options and to develop effective mitigation strategies to address adverse impacts.

4.15 Visual Resources

Visual resources are the observable physical features of a landscape (e.g., land, water, vegetation, animals, and structures) that make up the visual quality, character, or setting of an area.

4.15.1 Existing Visual Resources

The project study area is located primarily within an existing transportation corridor in a predominantly developed area. The most dominant visual resources within the immediate vicinity of the project study area include the existing roadways and associated traffic, residences, commercial and industrial buildings, parks/recreation/open space, and forested areas/marsh/wetlands.

4.15.2 Impacts on Visual Resources

The RPA is not expected to introduce substantially different visual elements, as the project is primarily proposed within an existing transportation corridor in a predominantly developed area. Increased visual impacts would occur in limited locations in Dunes West and Park West with implementation of the RPA,

which would result in a new five-lane roadway through the western portions of these communities that would sustain an increased volume of traffic compared with current conditions. In this portion of Dunes West, a community event area known as “the pastures,” and in Park West, several townhouse complexes are near the proposed new roadway associated with the RPA. These visual impacts associated with the RPA are expected to be minor to moderate, depending on the distance of developed portions of parcels to proposed changes.

While the RPA would widen existing SC 41 to three lanes, the RPA also provides a bypass of the Phillips Community to the east and, thus, would result in reduced traffic volume through the Phillips Community. Therefore, the RPA is not expected to result in substantial visual impacts in the Phillips Community.

In the Seven Mile community, improvements along US 17 are limited to lengthening of turn lanes and the addition of a second left turn lane from US 17 NB to Winnowing Way. No additional through lanes are being added to US 17. A large, landscaped island will be added on the SC 41 leg of the intersection with US 17. Due to the present existence of a large roadway through this community, the proposed visual changes along SC 41 and US 17 are expected to be minor. Overall, visual impacts associated with the RPA are expected to be minor, as they would impact limited portions of the community.

4.16 Right-of-Way, Relocation, and Displacements

The proposed improvements would be largely constructed within and/or immediately adjacent to the existing roadway. No residential or commercial relocations are anticipated; however, the acquisition of 44.1 acres of new ROW would be needed for the proposed project. Charleston County would acquire all new ROW in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq.). The purpose of these regulations is to ensure that owners of real property to be acquired for federal and federally assisted projects are treated fairly and consistently, to encourage and expedite acquisition by agreements with such owner, to minimize litigation and relieve congestion in the courts, and to promote public confidence in federal and federally assisted land acquisition programs. If additional residential or business relocations were identified during final design, those being relocated would receive the full benefits entitled under the Uniform Act. These benefits include fair market value compensation for the acquired property as well as equitable compensation normally associated with relocating.

4.17 Indirect and Cumulative Impacts

It is a federal agencies’ responsibility to consider direct, indirect, and cumulative impacts in the NEPA process as established in the Council on Environmental Quality (CEQ) Regulations for implementing the Procedural Provisions of NEPA. 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 (direct, indirect, and cumulative). The determination or estimation of reasonably foreseeable actions is essential to both indirect and cumulative impact analysis.

4.17.1 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 project study area. 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 degradation of natural habitat and/or water quality issues.

4.17.1.1 Land Use

The RPA could result in indirect impacts on land use by improving transportation along the corridor which could facilitate commercial and residential development in the area. A substantial portion of the land within the project study area is designated as prime farmland; however, the majority of this land is not currently being farmed, but rather is used for residential purposes. This is not anticipated to change and a significant portion of the land adjacent to the proposed improvements is already heavily developed; therefore, overall changes in land use patterns are expected to be minor.

4.17.1.2 Waters of the U.S.

The RPA would result in various unavoidable impacts to tidal and freshwater wetlands. Approximately 4.5 acres of tidal/critical area wetlands and 6.4 acres of freshwater wetlands would be impacted through the addition of permanent fill material to accommodate the proposed widening. These impacts would be adjacent to the existing roadway and are necessary to accommodate the roadway widening. These impacts would include fill impact for construction of the proposed roadway, along with clearing impacts to install and maintain erosional control measures during construction. The RPA is not anticipated to result in any indirect impacts to wetlands in the vicinity of the project study area.

4.17.1.3 Water Quality

The RPA would increase the capacity of the roadway by adding additional lanes, bicycle lanes, sidewalks, and/or multi-use paths. This widening would increase the impervious surfaces subject to stormwater runoff. The existing drainage systems would be improved and designed to accommodate the volume of stormwater associated with the RPA. The RPA is not anticipated to result in any indirect impacts to water quality in the vicinity of the project study area.

4.17.2 Cumulative Impacts

Cumulative impacts are impacts on the environment which results from incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions (RFFAs) regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. CEQ's guidance, *Considering Cumulative Effects under the National Environmental Policy Act* was used to analyze cumulative impacts during the NEPA process (CEQ 1997). Potential cumulative impacts were considered throughout the environmental process.

4.17.2.1 Identification of Other Actions

The past, present, and RFFAs were identified generally within a one-mile radius of the project study area and are listed in Table 4-15.

Table 4-15. Summary of other past, present, or reasonably foreseeable future actions in the vicinity of the project study area

Action	Description	Project Type
Aiden Fabrics	Aiden Fabrics retail facility with a parking lot along SC 41, within the project study area.	Past
Bessemer Park Community	44 detached single-family residential lots along Bessemer Rd, within the project study area.	Past

Action	Description	Project Type
Covington at Park West	51 detached single-family residential lots along Bessemer Rd, within the project study area.	Past
Go Store It Self Storage	Self-storage facility with an office and a parking lot along SC 41, within the project study area.	Past
Gregorie Ferry Landing	Mixed-use development, combining retail and residential (240 multi-family housing) along Winnowing Way, within the project study area.	Past
Kids R Kids	Kids R Kids Day Care facility with a playground and parking lot along Bessemer Rd, within the project study area.	Past
Wando River Bridge	A fixed span four-lane bridge that replaced an ailing swing span two-lane bridge in the northern portion of the project study area.	Past
Warrington Townhomes	21 townhouse units along Bessemer Rd, within the project study area.	Past
Park West Blvd Widening	Widening of Park West Blvd from Bessemer Rd to the entrance to the Mount Pleasant Recreation Complex (south of Turgot Ln) (two lanes to four lanes), adjacent to the eastern portion of the project study area.	Past
Refuel Carwash	Carwash facility along US 17, approximately 250 feet south of the project study area.	Past
Liberty Cottages at Park West	30 detached single-family residential lots, approximately 0.1 mile east of the project study area.	Past
Cambridge Square	Mixed-use development, combining retail and other commercial uses with both single-family and upscale multi-family housing (21 duplexes [42 dwellings], 27 single-family, 61 townhouse units) along Park West Blvd, approximately 0.2 mile east of the project study area.	Past
Richmond Cove (Phases 2A/2B)	46 detached single-family residential lots, approximately 0.5 mile east of the project study area.	Past
The Harbour (Phase 12)	43 detached single-family residential lots, approximately one mile east of the project study area.	Past
Clements Ferry Rd Widening (Phase 1)	Widening of Clements Ferry Rd from I-526 to Jack Primus Rd (three lanes to five lanes), approximately 4.5 miles west of the project study area.	Past
Clements Ferry Rd Widening (Phase 2)	Widening of Clements Ferry Rd from Jack Primus Rd to SC 41 (two lanes to four lanes), adjacent to the northern portion of the project study area.	Present
Emma Lane Townhouses	45 townhouse units and vehicular interconnection along Emma Lane, adjacent to the southeastern portion of the project study area.	Present
Marsh Cove (Dunes West)	47 detached single-family residential lots along SC 41, adjacent to the northeastern portion of the project study area.	Present
Phillips Creek Community	33 detached single-family residential lots along SC 41, adjacent to the western portion of the project study area.	Present
Rivers Bend	Retail Center that includes a Spinx gas station and other retail spaces such as a hardware store, bank, fast-food restaurant, garden center, etc along SC 41, adjacent to the northern portion of the project study area.	Present

Action	Description	Project Type
Riverview Dunes West	150 units (mix of single-family and townhouse units) and five ponds along SC 41, adjacent to the northeastern portion of the project study area.	Present
The Heritage at Dunes West (Phase 4)	26 townhouse units just north of Dunes West Blvd, adjacent to the eastern portion of the project study area.	Present
Wando Village	Mixed-use development, combining retail and other commercial uses with 416 units of various residential types along SC 41, adjacent to the northern portion of the project study area.	Present
Moore's Landing	55 detached single-family residential lots along Billy Swails Blvd, approximately 0.2 mile south of the project study area.	Present
Heartland Dental	Proposed dental office building with a parking lot along US 17, adjacent to the southwestern portion of the project study area.	RFFA
Springhill Suites	A proposed four-story, 121-room hotel along South Morgans Point Road, adjacent to the southern portion of the project study area.	RFFA
Rivertowne Daycare	A proposed day care facility with a swim school and parking lot along Rivertowne Parkway, adjacent to the western portion of the project study area.	RFFA
Joe Rouse Business Center	A proposed business center with a parking lot along Joe Rouse Rd, adjacent to the central portion of the project study area.	RFFA
Wando Waterfront Gateway	Proposed integrated district on either side of SC 41 just south of the Wando River Bridge, adjacent to the project study area, with a network of pedestrian paths and streetscapes, including walks along the waterfront, as well as boating and fishing opportunities.	RFFA
All-American Blvd Extension (Phases 1 and 2)	Proposed extension of All-American Blvd from its existing termini near Lexington Ave to Park West Blvd, approximately 0.2 mile east of the project study area.	RFFA
Highway 17 North Retail Village	Proposed retail center that would include retail businesses, restaurants, and a racquet club facility along US 17, approximately 0.2 mile east of the project study area.	RFFA

4.17.2.2 Cumulative Impacts by Resource

4.17.2.2.1 Land Use

The RFFAs would contribute to additional changes in land use from forested land to industrial in the area. Development of the RFFAs is compatible with current and future land use regulations. Local land uses would benefit from the proposed improvements through improved operating conditions. Therefore, the RPA, when considered with the past, present, and RFFAs, could have minor, cumulative impacts on land use in the area.

4.17.2.2.2 Waters of the U.S.

Past, present, and RFFAs, together with the RPA, would result in various unavoidable impacts to tidal and freshwater wetlands within the Wando River Watershed. Similar to the RPA, past, present, and RFFAs would also be subject to CWA jurisdiction, ensuring current and foreseeable wetland impacts are considered, permitted, and/or mitigated in accordance with wetland regulations. This regulatory oversight ensures maintenance of the chemical, biological, and physical integrity of the aquatic environment,

including wetlands, within the watershed for the long term. Cumulative impacts are considered in the CWA permitting process to ensure individual waterbody impacts do not collectively result in degradation to WOUS, including jurisdictional wetland and stream resources. Due to USACE oversight as well as implementation of BMPs and wetland mandates, the RPA is not anticipated to contribute to cumulative stream and wetland impacts at the watershed scale.

4.17.2.2.3 Water Quality

Past, present, and RFFAs, together with the RPA, would increase the impervious surfaces subject to stormwater runoff. These 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. This potential would be minimized through the use of erosion control BMPs and these projects would be subject to CWA permitting requirements. Therefore, the RPA, when considered with the past, present, and RFFAs, could have minor, cumulative impacts on water quality in the area.

4.17.2.2.4 Floodplains

Considering the activities and facilities described in Table 4-15, along with the RPA, cumulative impacts to floodplains and their natural and beneficial values would be minimal because development would be subject to local floodplain regulations, which, by design, would minimize adverse impacts.

4.17.2.2.5 Wildlife

Similar to the RPA, past, present, and RFFAs would be largely constructed within and/or immediately adjacent to existing transportation facilities. The potential loss of terrestrial habitat would be along the edge of the existing roadways, which would not create further fragmentation of the undeveloped land. Past, present, and RFFAs, together with the RPA, would result in the direct loss of WOUS. The areas of impact to these features would primarily occur immediately adjacent to existing roadways and have been previously altered from their historic state; however, they may provide suitable habitat for various aquatic species, including, but not limited to, aquatic macro-invertebrates, amphibians, reptiles, and fish. These impacts would be isolated along portions of the tributaries with additional suitable habitat provided upstream and/or downstream of the impacts. Therefore, the RPA, when considered with the past, present, and RFFAs, could have minor, cumulative impacts on wildlife in the area.

4.17.2.2.6 Threatened or Endangered Species

The review of the habitat requirements and previous records for the federally listed species for Berkeley and Charleston Counties, along with the field observations, conclude that there is low potential for the presence of any federally protected species along the project area. However, based on the scope of the work and limited available habitat, it was determined that the project “may effect, not likely to adversely affect” the following eleven species: West Indian manatee, Northern long-eared bat, frosted flatwoods salamander, Hawksbill sea turtle, Kemp’s Ridley sea turtle, Loggerhead sea turtle, Eastern black rail, red-cockaded woodpecker, wood stork, Atlantic sturgeon, and Shortnose sturgeon. In addition, it was determined that the project would have “no effect” on the remaining federally protected species listed for Berkeley and Charleston Counties. Past, present, and RFFAs and their associated direct and indirect impacts are reasonably certain to gradually degrade existing streams and threatened and endangered aquatic species in the vicinity of the project study area over the next several decades. Overall, because the impacts to federally listed species would be avoided or minimized in consultation with the USFWS, cumulative impacts to threatened or endangered species would be minor.

4.17.2.2.7 Essential Fish Habitat

High quality tidal salt marsh with tidal creeks, oyster reef/shell, and tidal freshwater wetlands may be present in the project study area. SAFMC designates these habitats as EFH within the fishery management plans for penaeid shrimp and the snapper-grouper complex, which also includes oyster/shell habitat as a Habitat Area of Particular Concern (HAPC). The waters of the Wando River, Mill Creek, Horlbeck Creek, the tidal creeks connected to them, and the surrounding coastal marsh also serve as a nursery and forage habitat for other species, such as red drum, black drum, Atlantic menhaden, and blue crab. Many of these species are prey for fish managed under the Magnuson-Stevens Act, such as mackerels, snappers, groupers, billfish, and sharks. Impacts to EFH have been avoided and minimized to the maximum extent practicable for the RPA. The past, present, and RFFAs would also have the potential to result in impacts to EFH. Similar to the RPA, past, present, and RFFAs would be subject to consultation with NOAA-NMFS. In addition, impacts to critical area wetlands, including EFH, would be appropriately mitigated through the Section 401/404 Permitting Process. Overall, because the impacts to EFH would be avoided or minimized in consultation with NOAA-NMFS, cumulative impacts to EFH would be minor.

4.17.2.2.8 Farmlands

Past, present, and RFFAs, together with the RPA, would remove prime farmland from potential agricultural use. However, the majority of the undeveloped areas in the vicinity of project study area are zoned/planned for future development. Per the FPPA, these areas are not subject to FPPA review if the impacted land is already in urban development and the project is considered in compliance with the FPAA. Therefore, the RPA, when considered with the past, present, and RFFAs, could have minor, cumulative impacts on farmlands in the area.

4.17.2.2.9 Air Quality

Past, present, and RFFAs, together with the RPA, would contribute to temporary increases in emissions from construction equipment, dust from construction embankment, and clearing of areas prior to paving or revegetation. During construction, slowed traffic through construction areas may produce additional emissions. Similar to the RPA, past, present, and RFFAs are expected to comply with applicable air quality requirements and permitting and would implement emissions reduction actions as part of construction activities (e.g., wetting of disturbed soils and other fugitive dust control measures). Therefore, the RPA, when considered with the past, present, and RFFAs, could have minor, cumulative impacts on air quality in the area.

4.17.2.2.10 Noise

Past, present, and RFFAs are expected to result in noise impacts in the project area. The majority of these actions are adjacent to the project study area; therefore, it is anticipated that activities associated with the RPA would result in minor, short-term cumulative impacts to noise receptors.

4.17.2.2.11 Hazardous Materials

Past, present, and RFFAs, together with the RPA, would create new waste streams within the area. Storage and use of liquid materials in the form of petroleum-based oils and fuels, and generation of liquid and solid wastes in the form of used oil, construction debris, packing materials, and general construction waste would also occur. Overall, the project effects, likely similar to the past, present, and RFFAs, would be mitigated through implementation of BMPs for waste and wastewater and hazardous material management plans. With proper planning and implementation of BMPs, adverse cumulative impacts from the project in relation to hazardous materials would not occur.

4.17.2.2.12 Cultural Resources

The RPA may have an adverse effect on the Phillips CL/HD, the Sweetgrass Basket Corridor TCP, Site 38CH1752/SHPO Site No. 7923, Site 38CH2674, and Site 38CH2675/SHPO Site No. 0563. If these cultural resources cannot be avoided, proposed improvements should be designed in such a way to minimize or mitigate these adverse effects, in consultation with the South Carolina SHPO. If the current proposed project design changes, additional surveys may be necessary. While the past, present, and RFFAs may have adverse effects on cultural resources, the project would not contribute to cumulative impacts if these cultural resources were avoided, minimized, or mitigated in consultation with the South Carolina SHPO.

4.17.2.2.13 Communities and Socioeconomics

The RFFAs would contribute to additional changes in access to and from existing residences and commercial establishments, primarily during construction. Since the RPA is a proposed widening project, the improvements would not provide new access and are not anticipated to cause a direct change in adjacent land use. The additional travel lanes and multi-use path would result in improved roadway operational efficiency, decreased traffic congestion, and safer driving conditions, which provide direct beneficial social impacts for commuters, pedestrians, and bicyclists.

The majority of the past, present, and RFFAs have increased or will increase the numbers of jobs in the area. Economic benefits of the RPA and the past, present, and RFFAs considered for this analysis include the purchase of materials, equipment, and services, and moderate short- to long-term increases in employment and income. These increases would be local or regional, depending on where the goods, services, and workers have been or are obtained. Overall, short- to long-term, moderate beneficial cumulative impacts to socioeconomics would result from implementation of the RPA in combination with the other actions considered in the area. Indirect, cumulative impacts to socioeconomics would also occur from the expenditure of wages earned by the workforce involved in construction activities and facility operations.

4.17.2.2.14 Environmental Justice

In the environmental justice-qualifying Phillips Community, the RPA would result in minor to moderate impacts to residential aspects of the community due to the effects to several individual residential parcels spread across the community. In environmental justice-qualifying Seven Mile, changes associated with the RPA would result in moderate impacts to social, cultural, and psychological aspects of the community. Demographic characteristics of the project area are expected to change temporarily in response to an increased construction workforce, but this change would not be significant. There is a potential that these communities would be indirectly impacted due to an increase in noise during construction activities of the RPA and RFFAs. Because these short-term actions may coincide, potential, indirect cumulative impacts may occur on a local basis. Such physical impacts associated with construction activities would be temporary and mitigated through BMPs. In addition, mitigation measures will be addressed in the community mitigation plan.

4.17.2.2.15 Visual Resources

The RPA is not expected to introduce substantially different visual elements, as the project is primarily proposed within an existing transportation corridor in a predominantly developed area. The majority of the past, present, and RFFAs are also within an existing transportation corridor in a predominantly developed area. Because the visual impacts of the past, present, and RFFAs, together with the RPA, would be comparatively low and localized, the RPA has little potential to result in adverse cumulative visual impacts.

5.0 Agency Coordination/Public Involvement

Charleston County has coordinated with various federal, state, and local agencies; local stakeholders; and the public to identify issues to consider in development of the project.

5.1 Agency Coordination

Charleston County sent a Letter of Intent (LOI) on July 10, 2017, which included a brief description of the proposed project, a location map, contact information, and a request for comments. Recipients included representatives of federal, state, and local agencies, shown below in Table 5-1. A copy of the LOI, distribution list, and the response letters are included in Appendix O.

Table 5-1. Federal, State, and Local Recipients of the LOI

Federal Agencies		
Catawba Indian Nation	NOAA National Marine Fisheries Service	U.S. Housing and Urban Development
Eastern Band of Cherokee Indians	U.S. Army Corps of Engineers	U.S. Coast Guard
Federal Highway Administration	U.S. Department of Agriculture NRCS	United Keetoowah Band of Cherokee
Gullah Geechee Cultural Heritage Corridor Commission	U.S. Environmental Protection Agency	
Muscogee Creek Nation	U.S. Fish and Wildlife Service	
State Agencies		
SC Department of Administration	SC Department of Natural Resources	SC Human Affairs Commission
SC Department of Agriculture	SC Department of Parks, Recreation, and Tourism	SC Institute of Archaeology and Anthropology
SC Department of Archives and History	SC Department of Transportation	SC Secretary of Commerce
SC Department of Health and Environmental Control	SC Forestry Commission	SC Wildlife Federation
Others		
African American Settlement Communities Historical Commission	East Cooper Land Trust	The National Wild Turkey Foundation
Charleston County Parks and Recreation Commission	Greater Goodwill AME Church	The Nature Conservancy
Charleston Moves	Lowcountry Land Trust	The Sierra Club
Coastal Conservation League	SC National Heritage Corridor	

5.1.1 Response Letter Summaries

5.1.1.1 African American Settlement Communities Historical Commission

Response expressed concerns about potential negative impacts to the Phillips Community.

5.1.1.2 Catawba Indian Nation

Response did not provide specific comments but expressed a desire to be kept involved with the project.

5.1.1.3 Charleston County Parks and Recreation Commission (CCPRC)

Response touched on several topics of concern. CCPRC is planning the future main entrance to Laurel Hill County Park across from SC 41 from Cardinal Hill Drive. A northbound deceleration lane and southbound middle turning lane will likely be necessary. CCPRC plans to incorporate improved bike and pedestrian access and develop a shared-use path in the park. The box culvert at Horlbeck Creek needs replacing, likely with a bridge which would allow paddlesport access on the Laurel Hill property.

5.1.1.4 Coastal Conservation League

Response recommended that the proposed improvements should not exceed the footprint of the existing ROW to minimize impacts to wetlands and traditional settlements, especially the Phillips Community. Response also stated that increasing capacity and improving multi-modal use along SC 41 is a significant need for the area.

5.1.1.5 Muscogee Creek Nation

Response stated that the Muscogee Creek Nation has no objections to the proposed project. If cultural material or human remains are encountered during construction activities, the Muscogee Creek Nation would like to be informed.

5.1.1.6 NOAA-NMFS

Response recommended conducting an essential fish habitat assessment and stated that compensatory mitigation may be necessary.

5.1.1.7 SCDHEC Bureau of Air Quality

Response stated South Carolina is currently attaining all of the NAAQS but may face non-attainment when designations for the new ozone standards are made; and that two criteria pollutants are of concern: Ozone and $PM_{2.5}$.

5.1.1.8 SCDNR

Response did not provide specific comments but expressed general comments regarding highway widening projects including a discussion of minimizing impacts to wetlands and to threatened and endangered species.

5.1.1.9 USACE

Response recommended conducting a wetland delineation and submitting a jurisdictional determination request.

5.1.1.10 USEPA

Response requested a website link to details specific to this project.

5.1.2 Meeting Summaries

5.1.2.1 CCPRC

HDR, Charleston County, and the CCPRC held a total of four meetings to discuss developments to take place regarding Laurel Hill County Park.

5.1.2.1.1 Meeting 1 (December 19, 2018)

CCPRC has a lease on Laurel Hill County Park for 100 years though an agreement with the property owner trust. The trust states that the land should remain a natural area. Alternatives 1, 5A, and 7A were discussed as well as improved access to Horlbeck Creek and a potential entrance across Cardinal Hill Drive. The

preference of CCPRC is to avoid and minimize impacts wherever possible, although improved access to Laurel Hill County Park would be beneficial. Better access would create the possibility of an event space in the park. Project-related road developments would be preferentially made along existing park boundaries or roadways. Alternative 5A is not preferential because it would bisect the park, impeding its intended use.

5.1.2.1.2 Meeting 2 (March 22, 2021)

Discussions took place in relation to public comments received regarding Alternative 1 as the Proposed Alternative, as well as the development of the Compromise Alternative, a hybrid of Alternative 1 and 7A. Though Laurel Hill County Park master plans are presently under development, concern was raised over the ways in which proposed access and future structures would be impacted by the project. For example, CCPRC has concerns regarding fragmentation of property, which could be difficult to manage. Access to any isolated areas could potentially be provided via a bridge over a tidal marsh with an access road underneath. The Compromise Alternative would likely impact one archaeological site within Laurel Hill County Park. Coordination with SHPO would result in the development of a memorandum of agreement (MOA) to mitigate impacts to the site. A Phase II recovery would likely be required.

5.1.2.1.3 Meeting 3 (April 21, 2021)

Improvements to Laurel Hill County Park are not anticipated within the next five years, though preliminary master plans show that the intended park entrance would be located across from the Cardinal Hill community. The Compromise Alternative demarcates this area as an intersection. A potential solution was discussed in connecting the Phillips Community to Laurel Hill County Park via this anticipated intersection and park entrance. The CCPRC had several requests regarding road improvement plans. These include minimizing the SC 41 slip lane to avoid impacts to Park West and Dunes West communities, the possibility of establishing Laurel Hill County Park's main entrance and curb cuts during construction, and the limitation of access to the multi-use path to the park's main entrance alone. In the future, CCPRC plans to use Laurel Hill County Park as a public event space accommodating 3,500 people and 200–300 cars. HDR also proposed the construction of a bridge over Horlbeck Creek replacing the box culvert presently in place.

5.1.2.1.4 Meeting 4 (September 29, 2021)

The Charleston County Council approved the Compromise Alternative to move into the NEPA and design phases. The original plans would require approximately 22 acres of property from Laurel Hill County Park, though an agreement was reached with the Bessemer Park neighborhood to push the parkway alignment approximately 150 feet from away from the park. The parkway now includes a multi-use path on the park side of the road, intersects with Park West Boulevard via a roundabout, and avoids a wetland. These project modifications would impact a total of 17 acres of Laurel Hill County Park land. A point of discussion centered around the location of the entrance to the park. CCPRC would prefer the entrance be located along SC 41 over the new Laurel Hill Parkway, the latter of which experiences significant traffic at its intersection with SC 41. If the entrance were to be placed along Laurel Hill Parkway, wetlands and archeological resources in the area would need to be avoided. The wetlands presently located along Laurel Hill Parkway will likely be bridged. The isolated land that may result from the Laurel Hill Parkway design is approximately 12.5–13 acres.

5.1.2.2 USACE

HDR and USACE conducted a total of nine meetings to discuss plans regarding the SC 41 Corridor Improvements Project.

5.1.2.2.1 Meeting 1 (July 10, 2018)

This meeting focused on comments from the Dunes West, Park West, and Arlington communities. Emphasis was placed on the importance of community engagement, especially in relation to the Phillips community, which may experience higher impacts due to the community's proximity to the project. The town of Mount Pleasant and County Councilman E. Summey submitted letters in opposition Alternative 7A while the Coastal Conservation League submitted a letter in support of Alternative 7A. The involvement of the Advisory Council of Historic Preservation was discussed and the delays that may take place under the Section 106 consultation process. Mitigation requirements may be necessary during which an MOA would be developed. Twelve overall alternatives were considered for the SC 41 Corridor Improvements Project and of these three were chosen as reasonable alternatives. Impacts to wetlands, streams, and floodplains were discussed, as well as mitigation and permitting requirements. Several reports including the wetland delineation, cultural resource report, and the Phillips Community report were discussed. A discussion of interim improvements between Billy Swails Boulevard and SC 41 were touched on, as well as the permits needed for these improvements. Steps regarding the Environmental Report were explored, and the necessity of additional meetings will be determined by USACE depending on public feedback. Upon submittal of design, the USACE will issue a public notice and statement of findings.

5.1.2.2.2 Meeting 2 (November 30, 2018)

During the meeting, HDR provided an overview of the project study area and status. The project has entered Phase II which includes an analysis of alternatives, identification of the preferred alternative, and the development of an Environmental Report draft. Further discussions centered around public involvement with the project. Approximately 1,200 comments were received, the majority were in opposition to Alternative 7 after a May 2018 meeting. Approximately 70 additional comments were submitted in opposition to Alternatives 5A and 7A after a meeting held on November 14, 2018. However, the Phillips community supports Alternatives 5A and 7A. Twelve total alternatives have been developed, each must be described and compared in the Environmental Report which is to be submitted to the USACE. As a part of this process four screening steps must be developed. These include identifying reasonable alternatives, refining, finalizing, and selecting the preferred alternative, though public opposition cannot eliminate an alternative. The cost and technology required of the project were also points of discussion. As part of the project, additional improvements must be evaluated including interim improvements and the connection of SC 41 with Billy Swails Boulevard. The best approach to securing a Nationwide Permit 14 and preliminary versus approved jurisdictional determinations were debated. The meeting adjourned with an anticipated project schedule and next steps in the process.

5.1.2.2.3 Meeting 3 (June 5, 2019)

This meeting focused on the role USACE is playing in the context of the project, a concern which was raised considering a recent news story from the Mount Pleasant Transportation Committee meeting. USACE wants to be represented as the agency that is responsible for reviewing and issuing permit decisions based on Charleston County's recommendation of the preferred alternative. An overview of project location and status was discussed emphasizing that the project has progressed to Phase II. Further conversations took place concerning public outreach, a review of purpose and need, and the alternative analysis to date. The alternatives were compared in the context of an environmental matrix draft review. The greatest variation between the alternatives comes down to the ROW impacts (acreage and number of parcels), freshwater wetland impacts, impacts to wetlands under restrictive covenant, Laurel Hill County Park, and utility relocation costs. Several parcels with restrictive covenants have been identified and HDR will use current delineations to determine which wetland impacts will require double mitigation. The current approach is to use mitigation bank credits for freshwater wetland impacts and to identify an appropriate site for tidal

wetland impacts. USACE agreed with this approach. Further agency coordination was also discussed including the timeline of reports. The project could be filed as a single and complete project under Nationwide Permit 14. A pre-construction notification would be scheduled for submittal in late Summer or early Fall 2019. Interim improvements will take place in as short-term solutions to alleviate traffic issues.

5.1.2.2.4 Meeting 4 (October 1, 2019)

This meeting focused on the overview of the project location and alternatives analysis, which have presently been narrowed down to Alternative 1 and 7A. From these, a Proposed Alternative will be derived. Charleston County plans to present a Proposed Alternative to the public during a meeting around mid-November/early December 2019. An estimate of wetland and stream impacts was also presented. Due to environmental constraints, Charleston County and HDR have agreed to pursue permittee-responsible mitigation for tidal wetland credit needs. Several potential mitigation sites have been explored and the Hermine Martin Site is a possibility, though it is not large enough to cover the impacts to the entirety of the project. Construction specificities and corresponding mitigation options were further discussed. USACE and USFS have an MOA on mitigation sites and a Conservation Land Use Agreement would have to be developed. Mitigation may take place as part of the project permit application or under a separate Nationwide Permit 27 for restoration activities. King Grant is the present owner of the salt marsh, and more information is required to determine whether ownership would influence mitigation plans. Section 106 consultation will take place once a permit application has been submitted and the project is on public notice.

5.1.2.2.5 Meeting 5 (July 30, 2020)

Based on the NEPA process for the project, Alternative 1 has been identified as the Proposed Alternative. This recommendation will be announced on August 13, 2020, via media release and virtual public meeting. Construction on interim improvements at the intersection of Joe Rouse Road and SC 41 is anticipated to begin in October 2020. No impacts to WOUS would happen during this time. A timeline was discussed, including the permit application and Environmental Report, both of which would be finalized in late 2020 after a 30-day public comment period regarding the Proposed Alternative. The County will subsequently submit these reports in early 2021. An in-person meeting is anticipated with Phillips Community leaders on August 10, 2020, to discuss Alternative 1. Newsletters will be sent to the environmental justice-qualifying communities of Phillips and Seven Mile. HDR has developed a Community Mitigation Plan that will be updated based on received input. Delineations of the mitigation properties have not yet been done due to the early stages of planning. Impacts to wetlands and waters would be avoided or minimized when designing these properties. This information will be included in a USACE permit application which will be linked to the project through a MOA or Programmatic Agreement with SHPO.

5.1.2.2.6 Meeting 6 (February 12, 2021)

USACE inquired about the development of the Compromise Alternative and its interaction with a Dominion transmission line easement. The project would avoid transmission lines and a pump station. Concern was raised regarding the ways in which future traffic volumes will affect pedestrians in the Phillips Community. Two street crossings will be designed in the Phillips Community. The final project design will also incorporate an intelligent transportation system to indicate whether drivers should take SC 41 or Dunes West/Park West Boulevard to avoid traffic. An MOA between Charleston County, USACE, and SHPO will be required for all alternatives due to potential impacts to the Seven Mile Community and the Sweetgrass Basket Corridor. NOAA-NMFS may have to be engaged regarding EFH impacts.

5.1.2.2.7 Meeting 7 (September 13, 2021)

Several outreach and stakeholder meetings took place from March to August 2021. The process of screening alternatives has resulted in the Compromise Alternative as the Recommended Preferred

Alternative. The highlights of the Compromise Alternative are that it minimizes impacts to the Phillips Community and the intersection of SC 41 and US 17. Design updates also stay within the existing ROW, and they eliminate property impacts to Seven Mile. Additionally, crosswalks will be provided in the Phillips Community, and alignment along Laurel Hill Parkway will be further from homes. Impacts to remnant Laurel Hill County Park parcels will be minimized and options are being discussed with the CCPRC. Though impacts to cultural resources have been decreased, the impacts to wetlands have increased. These will be avoided to the maximum extent possible prior to Section 404 permit submittal. Scheduled milestones discussed include a 30 percent design between September 2021 and June 2022, a submitted Environmental Report, Section 404 Permit, and 30-day Public Notice by February or March of 2022, approved ROW plans by October 2023, and construction is anticipated to begin in the summer of 2025.

5.1.2.2.8 Meeting 8 (December 15, 2021)

Updates to the project were discussed, including community and stakeholder engagement as well as the development of the Compromise Alternative. Further discussions took place concerning the environmental matrix.

5.1.2.2.9 Meeting 9 (August 3, 2022)

This meeting focused on reviewing updates to the 30 percent design plan of the Compromise Alternative. Some slight project delays took place due to design suggestions from the Seven Mile Community. Those are being examined carefully, though the design team does not believe it will change the current Compromise Alternative. Permit drawings and expectations were also discussed. The meeting was concluded by addressing next steps including Section 106 documentation and coordination.

5.2 Public Involvement

Public participation is a critical component of the SC 41 Corridor Improvements Project, and the project team made early and committed efforts to engage the public. A Public Involvement Plan (PIP) was developed and outlined the project's approach to public, agency, and stakeholder involvement. This included outreach to diverse groups, including environmental justice and historic communities, to improve project awareness and education on the NEPA process.

5.2.1 Goals and Objectives

Throughout the project, the SC 41 project team has proactively shared project information and sought input from the public, resource agencies, municipalities, and other stakeholders. The primary goal of public involvement efforts was to foster open communications between a diverse public, agencies, and the project team to gain productive input leading to better decisions that meet the community's needs. The primary objectives were to:

- Educate the public and stakeholders about the NEPA process and the development of an environmental documentation while accomplishing agency and public participation in accordance with USACE NEPA regulations and guidelines.
- Build awareness of the SC 41 Corridor Improvements Project through a clearly established brand that includes a project logo and informational materials distributed in a variety of media.
- Involve a diverse group of stakeholders, including residents of potentially affected areas, elected officials and community organizations.
- Promote an open and transparent public involvement process that inspires trust of the information that is presented. Participants should feel that their input is heard, considered, and understand how their comments will be used.

- Encourage area businesses, neighborhood associations, and civic and community organizations to represent the interests of their constituents and to promote direct participation by their constituents throughout the process. These community leaders can help to reach, or at least to represent, the interest of hard-to-reach groups including youth, the elderly, minorities and low-income residents.
- Provide a variety of options for receiving input from the general public and other stakeholders.
- Provide opportunities for following up on inquiries and requests.
- Document comments received and responses to inquiries and requests.
- Document the progress and effectiveness of these efforts.

5.2.2 Public Outreach

The outreach process was developed to reach key audiences, including:

- Residents, property owners and businesses potentially affected by the project
- The traveling public
- Neighborhood associations
- Special interest groups
- Environmental justice and special consideration groups and organizations, low-income populations, the elderly, and disabled
- Community leaders
- Community organizations
- Elected officials

The following tactics were utilized and delivered at key milestones:

- Agency Scoping Meeting
- Public Meetings and Online Meetings
- Stakeholder Working Group/Virtual Meetings
- HOA Leadership Meetings
- Business Owner Meetings
- Project Website
- Newsletters/E-Newsletters
- Direct Mailings
- Videos and Visualization
- Project Email
- Hotline
- Media
- Social Media
- Online Mapping Tool
- Project flyer

Table 5-2. Mailings and Email Distributions

Name	Date	Target Audience	Total Sent
Letter of Intent	7/10/2017	Stakeholders, Elected Officials, Agencies, Utilities	111
Field Data Collection Notice Postcard	7/27/2017	Property Owners, Businesses	8,193
Property Owner Letter	7/27/2017	Property Owners, Businesses	2,445
Stakeholder Notification Letter	10/27/2017	Stakeholders, Elected officials	154
E-Newsletter	10/27/2017	Public	264
Meeting Notification Postcard	10/30/2017	Public	2,450
Business Meeting Postcard	9/1/2017	Businesses	70

Meeting Notification Postcard	3/30/2018	Public, Businesses	2,449
E-Newsletter	3/30/2018	Public	326
Business Meeting Postcard	4/5/2018	Businesses	65
Newsletter	5/1/2018	Stakeholders, Public	2,449
Stakeholder Notification Letter	5/2/2018	Stakeholders, Elected officials	146
Meeting Notification Postcard	5/2/2018	Stakeholders, Public	2,449
E-Newsletter	5/2/2018	Public	348
E-Newsletter	11/16/2018	Public	1,048
E-Newsletter	2/7/2019	Public	1,222
Field Data Collection Notice Postcard	2/19/2019	Property Owners, Businesses	3,403
Business Meeting Postcard	2/21/2019	Businesses	199
E-Newsletter	6/10/2019	Public	1,395
Letter	8/19/2019	Elected Officials	37
Letter	8/19/2019	Stakeholders	32
E-Newsletter	8/19/2019	Public	1,416
Design Concept Postcard	8/22/2019	Property Owners, Stakeholders	10,835
E-Newsletter	8/11/2020	Stakeholders	26
Letter	8/13/2020	Directly Impacted Landowners	296
Newsletter	8/13/2020	Phillips Community	354
Newsletter	8/13/2020	Seven Mile Community	286
Postcard	8/13/2020	Property Owners, Stakeholders	10,835
E-Newsletter	8/18/2020	Stakeholders	26
Email	8/6/2021	Stakeholders	26
E-Newsletter	8/6/2021	Public	1,500

5.2.3 Public Meetings

Public open house meetings and online meetings were held at project milestones to best reach individuals affected by or interested in the project. Two public meetings were held in Phase I, Public Kickoff Meeting (Scoping) and Public Meeting for Alternatives, to provide information to the public and take input on the project. These meetings were held in open house format where individuals could drop in at their convenience, watch a video that provided an overview of the project and its status, and speak with members of the project team. The table below includes information on the public meetings including the locations, dates and times, format, and topics presented to the public. Following each meeting the project team developed a Meeting Report that describes the topics covered, comments received, materials used, and outreach deployed. The meeting reports have been included in Appendix O.

In order to reach a broader audience, an online meeting complementary to each public meeting was developed and made available through the project website. The content of the online meetings mirrored the in-person meeting presentations. The online meetings were available 24 hours a day, seven days a week for a 30-day comment period.

Table 5-3. Public Meetings

Type	Location	Date	Topic	Format	Attendees	Comments Received*
Public Meeting 1	Park West Gym, Mount Pleasant	11/13/2017	Introduce project, NEPA, purpose and need, schedule, next steps	Open house	134	141
Online Meeting 1	Project Website	11/13/2017–12/14/2017	Introduce project, NEPA, purpose and need, schedule, next steps		100	
Public Meeting 2	Park West Gym, Mount Pleasant	5/16/2018	Range of alternatives, screening process, environmental studies, next steps	Open house	283	1,248
Online Meeting 2	Project Website	5/16/2018–6/16/2018	Range of alternatives, screening process, environmental studies, next steps		1,911	
Online Meeting 3	Project Website	8/10/2020–9/13/2020	Proposed alternative, environmental review process, alternatives review process, intersection design		6,704	2,889

Notes: *Comments received during the 30-day comment period.

Several tactics were used to promote public meetings and increase public engagement. These tactics included legal advertisements placed in local newspapers, press releases distributed by Charleston County, printed and digital newsletters, community flyers, social media posts, website updates, updated hotline recordings, and more. Table 5-4 indicates the timeframe each outreach material was deployed prior to public meetings to engage the public and inform them of the upcoming meetings. Examples of these materials have been included below. Table 5-5 provides information on outreach for each public meeting.

Table 5-4. Outreach Overview

Outreach	Audience	Timing
Formal Notification Letter	Stakeholders	3 weeks prior to meeting
Direct Mail Invitation Postcard	Landowners	15 days prior to meeting
Community Flyers	General Public	2 weeks prior to meeting
Legal Advertisement	General Public	15 days prior to meeting
Newsletter/E-Newsletter	Landowners	Quarterly
Project website	General Public	2 weeks prior to meeting, as needed
Press release	General Public, Media	3 weeks prior

Table 5-5. Outreach Deployment

Public Meeting 1			
Outreach	**Audience**	**Date**	**Total Produced**
Stakeholder Notification Letter	Stakeholders, Elected officials	10/27/2017	154
E-Newsletter	Public	10/27/2017	264
Meeting Notification Postcard	Public, Businesses	10/30/2017	2,449
Press Release	Public	10/30/2017	1
Yard Signs	Public	11/1/2017	50
Flyers	Public	11/1/2017	22
Legal Advertisements	Public	10/30/2017–11/1/2017	2
Public Meeting 2			
Outreach	**Audience**	**Date**	**Total Produced**
Newsletter	Stakeholders, Public	5/1/2018	2,449
Stakeholder Notification Letter	Stakeholders, Elected officials	5/2/2018	146
Meeting Notification Postcard	Stakeholders, Public	5/2/2018	2,449
E-Newsletter	Public	5/2/2018	348
Press Release	Public	5/2/2018	1
Legal Advertisements	Public	5/2/2018–5/4/2018	2
Online Meeting 3			
Outreach	**Audience**	**Date**	**Total Produced**
E-Newsletter	Public	8/13/2020	1,500
Notification Letters	Phillips Community, Seven Mile Community	8/13/2020	638
Legal Advertisements	Public	8/13/2020	2
Social Media	Public	8/13/2020–9/13/2020	
Notification Postcards	Residents	8/13/2020	13,080
Landowner Letters	Landowners	8/13/2020	295
Press Release	Public	8/13/2020	2
Stakeholder Notification Letters	Stakeholders, Elected Officials	8/13/2020	
Meeting Invitation	Stakeholders	8/13/2020	

Table 5-6 includes meeting materials developed for each of the public meetings. Following each meeting, the materials were made available to the public on the project website, http://www.hwy41sc.com/.

Table 5-6. Meeting Materials

Public Meeting 1		
Display Boards	Project Area Maps	Project Handouts
Project Comment Forms	Project Sign-In Sheets	Noise Station
Video Station	Cultural Resource Information	NEPA Information
Public Meeting 2		
Interactive maps on smart-screen boards	Project Sign-In Sheets	Noise Station
Project Comment Forms	Cultural Resource Information	NEPA Information
Video Station	Right-of-Way Station	
GIS Station	Project Handouts	
Online Meeting 3		
Online meeting materials	Virtual corridor drive-through and interactive map	Visualization
Informational packets were mailed upon request		

5.2.4 Stakeholder Meetings

A Stakeholder Working Group (SWG) was created for the project team to present study progress and receive ongoing input from local communities and regional governments at quarterly meetings. Invitations to participate on the SWG were sent to agencies, elected officials, utilities, neighborhood representatives, community groups, and special interest groups. To date, five SWG meetings have taken place and are listed below. Meetings for each SWG were recorded and are available in Appendix O.

Table 5-7. Stakeholder Working Group Members

First Name	Last Name	Title	Organization
John	Wright	President	AASC Historical Commission
Les	Blankenship	Deputy County Supervisor/Operations	Berkeley County
Kathryn	Basha	Planning Director	Berkeley-Charleston-Dorchester Council of Governments
Dwayne	Cartwright	President and CEO	Berkeley Electric Cooperative
Herbert	Sass	Council Member	Charleston County Council
Dickie	Schweers	Council Member	Charleston County Council
Elliott	Summey	Council Member	Charleston County Council
Kristen	Salisbury	Deputy Clerk of Council	Charleston County Government
Gerrita	Postlewait	Superintendent	Charleston County School District
William	Scott	Executive Director of Transportation	Charleston County School District
Katie	Zimmerman	Executive Director	Charleston Moves
David	Bennett	Executive Director	Charleston County Parks & Recreation Commission
Russell	Huggins	Director of Engineering and Construction	Charleston Water Systems
Jason	Crowley	Program Director, Communities and Transportation	Coastal Conservation League

Heather	Hodges	Executive Director	Gullah Geechee Cultural Heritage Corridor Commission
Chris	Staubes	President	Mount Pleasant Chamber of Commerce
Jim	Glennon	Executive Director's alternate	Mount Pleasant Waterworks
Richard	Habersham	Community Representative	Phillips Community
Garrett	Nichols	Design Engineer	SCANA
Tim	Henderson	District Six Administrator	SCDOT
Yates	Jackson	Local Public Agency Engineer	SCDOT
Nancy	Mace	Representative	South Carolina House of Representatives
Christine	Barrett	Clerk of Council	Town of Mount Pleasant
Bob	Brimmer	Council Member	Town of Mount Pleasant
Will	Haynie	Mayor	Town of Mount Pleasant
Eric	DeMoura	Mt. Pleasant Town Administrator	Town of Mount Pleasant

Table 5-8. Stakeholder Working Group Meetings

	Location	Date	Topic	Attendees
Stakeholder Working Group Meeting 1	HDR Office, North Charleston	9/26/2017	Purpose of SWG, Project Goals, Schedule, NEPA	14
Stakeholder Working Group Meeting 2	Mt. Pleasant Library, Mount Pleasant	4/26/2018	Alternatives evaluation, environmental and traffic studies findings, introduce reasonable alternatives	15
Stakeholder Working Group Meeting 3	Mt. Pleasant Waterworks, Mount Pleasant	11/14/2018	Project updates, refined reasonable alternatives, proposed interim improvements	14
Stakeholder Working Group Meeting 4	Mt. Pleasant Waterworks, Mount Pleasant	3/6/2019	Interim improvement updates, environmental and alternatives development process status, Alternatives 1 and 7A	13
Stakeholder Working Group Meeting 5	Webex	8/12/2020	Project status, proposed alternative, intersection designs, Phillips Community pedestrian crosswalks, interim improvements, community mitigation	33

5.2.5 Community Meetings

The project team held meetings as needed to inform leadership from surrounding neighborhoods, businesses, and the local community and take input on the project. The meetings were held in advance of public meetings and also at key project milestones. The meetings are listed in the table below along with dates, locations, topics, and the number of attendees.

Table 5-9. Community Meetings

Community	Location	Date	Topic	Attendees
Phillips Community	Charleston County Transportation	8/3/2017	Key concerns, project development, traffic	2
Phillips Community	Charleston County Transportation	9/14/2017	Project development, community concerns, petition	4
Corridor Business Meeting 1	Greater Goodwill AME Church, Mount Pleasant	9/20/2017	Project kickoff and introduction, project study area, goals, schedule, NEPA, purpose and need	8
Park West	Park West Clubhouse, Mount Pleasant	9/20/2017	Project kickoff and introduction, project study area, goals, schedule, NEPA, purpose and need	6
Phillips Community	Greater Goodwill AME Church, Mount Pleasant	9/20/2017	Project kickoff and introduction, project study area, goals, schedule, NEPA, purpose and need	35
Planters Pointe	Planter's Pointe Clubhouse, Mount Pleasant	9/20/2017	Project kickoff and introduction, project study area, goals, schedule, NEPA, purpose and need	10
Rivertowne	1978 Sandy Point Ln, Mount Pleasant	9/21/2017	Project kickoff and introduction, project study area, goals, schedule, NEPA, purpose and need	5
Colonnade, Brickyard, The Landing	Brickyard Clubhouse, Mount Pleasant	9/21/2017	Project kickoff and introduction, project study area, goals, schedule, NEPA, purpose and need	8
Horlbeck Creek	1414 Black River Rd, Mount Pleasant	9/21/2017	Project kickoff and introduction, project study area, goals, schedule, NEPA, purpose and need	9
Dunes West	Dunes West Office, Mount Pleasant	9/22/2017	Project kickoff and introduction, project study area, goals, schedule, NEPA, purpose and need	13
HOA Leadership Meeting – Park West, Cardinal Hill, Phillips	Brickyard Clubhouse, Mount Pleasant	4/24/2018	Project update, reasonable alternatives	5
HOA Leadership Meeting – Horlbeck Creek	Brickyard Clubhouse, Mount Pleasant	4/24/2018	Project update, reasonable alternatives	4
Corridor Business Meeting 2	Brickyard Clubhouse, Mount Pleasant	4/24/2018	Project update, reasonable alternatives	6
HOA Leadership Meeting – Planters Pointe, Phillips, Brickyard, Park West	Brickyard Clubhouse, Mount Pleasant	4/25/2018	Project update, reasonable alternatives	6
Phillips Community representatives	Charleston County Transportation	7/9/2018	Project update request	2

Community	Location	Date	Topic	Attendees
Dunes West	Dunes West Club House, Mount Pleasant	1/3/2019	Project update request	50
Ivy Hall	Ivy Hall, Mount Pleasant	1/22/2019	Alternative 5A	8
Dunes West HOA	Dunes West, Mount Pleasant	2/26/2019	Project update	5
HOA Leadership Meeting – Park West, Phillips	Brickyard Clubhouse, Mount Pleasant	3/5/2019	Project update, NEPA process, alternatives, next steps, interim improvements	20
HOA Leadership Meeting –Phillips, Park West, Planters Pointe, Brickyard	Brickyard Clubhouse, Mount Pleasant	3/5/2019	Project update, NEPA process, alternatives, next steps, interim improvements	7
HOA Leadership Meeting – Dunes West, Horlbeck Creek, Park West, Brickyard, Phillips	Brickyard Clubhouse, Mount Pleasant	3/5/2019	Project update, NEPA process, alternatives, next steps, interim improvements	22
Corridor Business Meeting 3	Brickyard Clubhouse, Mount Pleasant	3/6/2019	Project update, NEPA process, alternatives, next steps, interim improvements	10
Brickyard Community	Palmetto Presbyterian Church	8/27/2019	Intersection Design Concept	228
Phillips Community	2834 Oliver Brown Rd, Mt. Pleasant	8/10/2020	Open-house update on proposed alternative	
Dunes West POA		8/25/2020	Project need and overview, proposed alternative, alternatives screening process	15
Brickyard Community		8/27/2020	Intersection design concepts, traffic flow, and safety	
Park West Community	Park West	9/2/2020	Project status, screening process, proposed alternative, intersection design	
Horlbeck Creek POA		9/4/2020	Project purpose and status, Alt 1, intersection design	18
Cardinal Hill Community		9/11/2020	Project update and status, proposed alternative, intersection design, community mitigation	13
Dunes West POA	Zoom	3/10/2021	Revised concept, goals, and timeframe	16
Park West Community	Zoom	3/11/2021	Revised concept, goals, and timeframe	20
Horlbeck Creek POA	Zoom	3/17/2021	Revised concept, goals, and timeframe	16
Phillips Community		3/23/2021		
Cardinal Hill Community	Zoom	4/14/2021	New alternative, concept	11

Community	Location	Date	Topic	Attendees
CAGE	Zoom	4/15/2021	Project status, alternatives	16
Rivertowne Community		5/12/2021		9
Colonnade	Zoom	5/17/2021	Proposed concept	11
Greater Goodwill AME Church	Zoom	5/27/2021	Church entrances and exits	15
CAGE		6/6/2021		6
CAGE				
Horlbeck Creek POA	Zoom	8/4/2021	Environmental and general impacts to Horlbeck Creek	12
Dunes West POA	Zoom	8/13/2021		
Bessemer Park HOA	Webex	8/31/2021		

5.2.6 Stakeholder and Elected Officials

On July 10, 2017, a Letter of Intent (LOI) was sent to 111 individuals, 40 of which were elected officials, to initiate the project. These individuals were elected officials, agencies, utilities, and project stakeholders. This letter notified recipients of the project, reasons for it, and solicited information relevant to the project team. This began the process of engaging stakeholders, agencies, and elected officials that has continued throughout the project. These individuals have been engaged throughout the project on the Stakeholder Working Group, included on all mailings and involved throughout project development through close coordination with the design process. Letters were mailed to elected officials prior to each public meeting and are listed in the tables below.

Table 5-10. Stakeholder Letters

Name	Date	Purpose	Total Sent
Letter of Intent	7/10/2017	Project introduction	111
Stakeholder Notification	10/27/2017	Project update, public information meeting announcement	154
Stakeholder Notification	5/2/2018	Project update, public information meeting announcement	146
Letter	8/19/2019	Notification of the intersection design concept	32
E-Newsletter	8/11/2020	Proposed alternative and meeting notification	

Table 5-11. Elected Official Letters

Name	Date	Purpose	Total Sent
Letter of Intent	7/10/2017	Project introduction	40
Stakeholder Notification	10/27/2017	Project update, public information meeting announcement	53
Stakeholder Notification	5/2/2018	Project update, public information meeting announcement	52

Letter	8/19/2019	Notification of the intersection design concept	37
Stakeholder Notification	8/11/2020	Notification of the proposed alternative	40
Stakeholder Notification	8/18/2020	Notification of the proposed alternative and virtual meeting	40

5.2.7 Public and Stakeholder Comments

To date, 7,049 comments have been recorded in the project database that cover a range of topics from safety to cost and the refined alternatives. The comments have been evaluated by the project team for inclusion in project development and have influenced the development of the alternatives. In addition to comments, contact information has also been recorded in the project database and is used to keep the public informed on relevant project information. The project database was used to record other project activities including meetings, mailings, and other outreach activities.

To collect greater feedback from the public, the project team developed several methods to submit comments including email, a fillable form on the project website, a dedicated project hotline, and an address to send mailed comments. All submitted comments were documented in the project database following a specific protocol to ensure all information was accurately recorded. Comments were submitted through any of the following methods:

- Letter
- Email
- Comment forms available at public meetings
- SC 41 website
- Project email
- Hotline calls
- Telephone calls to members of the project team
- Face-to-face conversations

The Communications & Comment Management Protocol documented in the PIP identified the policies and procedures for project correspondence. This protocol was managed by the Public Involvement Team and implemented by all project staff. Compliance was monitored, and the protocol was adjusted as necessary throughout the project.

A contact management team was identified to streamline tracking, integration and responses received from property owners, businesses, the public, and other stakeholders. HDR established a contact database for this project using the Zoho Customer Relationship Management platform to record and document all comments and communications throughout the project beginning July 2017. The protocol has been outlined in Figure 5-1.

Figure 5-1. Comment Management Process

The Database Manager (DbM) included the following information when logging comments into the database:

- Name of commenter
- Agency/organization
- Address
- Comment method (letter, email, etc.)
- Comment topics
- Other information, as appropriate

After entering the basic comment information, the DbM assigned issue codes based on the topics addressed in the comment. The Comment Codes used when recording comments were:

- Air quality
- Bike/Ped accommodations
- Construction feasibility
- Cost
- Endangered species
- Existing/Planned utilities
- Floodplains
- Hazardous materials
- Historic/Cultural/Architectural resources
- Intersections
- Mailing List
- New/Platted developments
- Noise
- Property Value
- Public Involvement
- Reasonable Alternatives
- Right-of-Way
- Schedule
- Stance
- Traffic/Safety
- Types of Land

The comments covered several topics relating to the project ranging from traffic and safety to preferences on the reasonable alternatives, concerns related to flooding and wetlands, and many more. The table below summarizes the top ten comment topics received.

Table 5-12. Top Ten Comment Topics

Topic	Comments Received
Alternative 1	3,616
Traffic/Safety	2,993
Residential Areas	2,830

Alternative 7/7A	2,571
Cost	1,402
Property Value	582
New/Platted Developments	565
ROW	400
Noise	387
Bike/Pedestrian Accommodations	353

5.2.8 Environmental Justice

Special consideration was made during the planning and development of public outreach efforts for Environmental Justice (EJ) communities within the study area. The project team developed materials specifically to reach these communities and encourage greater participation with the project. Flyers were developed and distributed to key locations within the study area to notify residents of these communities to upcoming public meetings and extra efforts were made to engage community representatives early and throughout the project. Mailing lists were developed to include these areas so that all postcards, letters, and other mailings would reach the residents. The project team held one-on-one meetings with community representatives throughout the project to keep them informed, collect feedback, and understand how to better engage the community. Additional meetings with EJ communities were held as part of the Community Impact Assessment (Appendix L) and Community Characterization Report (Appendix K).

Table 5-13. Environmental Justice Outreach

Outreach Item	Purpose	Date	Total
Field Data Collection Notice	Inform businesses and property owners along the corridor of field studies	7/27/2017	8,193
Property Owner Letter	Inform property owners along the corridor of the project	7/27/2017	2,445
Postcard	Invite businesses along the corridor to a meeting to discuss the project	9/1/2017	70
Stakeholder Notification	Inform stakeholders of the upcoming public meeting	10/27/2017	154
E-Newsletter	Inform the public of the upcoming public meeting	10/27/2017	264
Postcard	Inform the public of the upcoming public meeting	10/30/2017	2,450
Flyer	Inform the public of the upcoming public meeting	11/1/2017	22
Yard Signs	Inform the public of the upcoming public meeting	11/1/2017	50
Postcard	Project update	3/30/2018	2,449
E-Newsletter	Project update	3/30/2018	326
Postcard	Invite businesses along the corridor to a meeting to discuss the project	4/5/2018	65
Newsletter	Inform the public of the upcoming public meeting	5/1/2018	2,449
E-Newsletter	Inform the public of the upcoming public meeting	5/2/2018	348

Postcard	Inform the public of a date change for the upcoming public meeting	5/2/2018	2,449
Stakeholder Notification	Inform the public of a date change for the upcoming public meeting	5/2/2018	146
Flyer	Inform the public of the upcoming public meeting	5/2/2018	22
E-Newsletter	Provide a project update, information on interim improvements and next steps	11/16/2018	1,048
E-Newsletter	Provide an update on the alternatives and information on Alternative 5A	2/7/2019	1,222
Field Data Collection Notice	Alert businesses and property owners along the corridor of field studies	2/19/2019	3,403
Postcard	Invite businesses along the corridor to a meeting to discuss the project	2/21/2019	199
E-Newsletter	Provide a project update and introduce a new mapping tool on the project website	6/10/2019	1,395

Table 5-14. Flyer Distribution Locations

Name	Type	Address	
Garden of Prayer Pentecostal	Church	2537 N Hwy 17	Mt. Pleasant
Greater Goodwill AME Church	Church	2818 N Hwy 17	Mt. Pleasant
Kingdom Hall of Jehovah's Witnesses	Church	1142 Dingle Rd	Mt. Pleasant
Lighthouse Church Worship Center	Church	1177 Gregorie Ferry Rd	Mt. Pleasant
US Post Office	Government	3008 N Hwy 17	Mt. Pleasant
St Peter's Church	Church	1307 Porchers Bluff Rd	Mt. Pleasant
Walmart	Business	3000 Proprietors Pl	Mt. Pleasant
Eastbridge Presbyterian Church	Church	1250 Lexington Dr	Mt. Pleasant
The Church at LifePark	Church	1151 George Browder Blvd	Mt. Pleasant
Publix	Business	1125 Park West Blvd	Mt. Pleasant
Park West Activity Building	Rec Center	1251 Park West Blvd	Mt. Pleasant
Point Hope United Methodist Church	Church	3404 Turgot Ln	Mt. Pleasant
Circle K	Business	4020 Bessemer Rd	Mt. Pleasant
Disciples for Christ Deliverance Ministries	Church	2962 Alonzo Rouse Ln	Mt. Pleasant
Times of Refreshing Intercessory	Church	2829 Bennett Charles Rd	Mt. Pleasant
Harris Teeter	Business	2035 Hwy 41	Mt. Pleasant
Starbucks	Business	2035 Hwy 41	Mt. Pleasant
Planter's Pointe Clubhouse	Neighborhood	2801 Planters Pointe Blvd	Mt. Pleasant

Dollar General	Business	1096 Clements Ferry Rd	Charleston
Wando Baptist Church	Church	1081 Reflectance Rd	Wando
St. Benedict Catholic Church	Church	1110 Bennington Dr	Charleston
St. Paul Pentecostal Holiness	Church	Hwy 33	Wando

Table 5-15. Environmental Justice One-on-One Meetings

Names	Known Affiliation(s)	Location	Date	Topic
Richard Habersham	Phillips Community, Greater Goodwill AME Church	Charleston County Transportation	8/3/2017	Key concerns, project development, traffic
		Charleston County Transportation	9/14/2017	Project development, community concerns, petition
		Phone Call	4/12/2018	Project update, schedule
		Phone Call	4/16/2018	Project update, community concerns
		Phone Call	4/17/2018	Project update, community concerns
		Phone Call	4/20/2018	Project update, community concerns
		Charleston County Transportation	7/9/2018	Project update, public comment, funding, ROW, community concerns
		Phone Call	5/23/2019	Project update, community concerns
		In-Person	5/31/2019	Project update, community concerns
		Phone Call	6/14/2019	Project update, community concerns
Norman Vanderhorst	Phillips Community	Greater Goodwill AME Church	8/18/2017	Key concerns, project development, traffic
		Charleston County Transportation	9/14/2017	Project development, community concerns, petition
Rev. A.R. Kollock	Phillips Community, Greater Goodwill AME Church	Phone Call	8/18/2017	Phillips Community, project development
		Charleston County Transportation	9/14/2017	Project development, community concerns, petition
John Ford	Phillips Community	Phone Call	4/17/2018	Project update, community concerns
Fred Smalls	Phillips Community	Greater Goodwill AME Church	9/20/2017	Project Kickoff and introduction, project study area, goals, schedule, NEPA, purpose and need
		Charleston County Transportation	7/9/2018	Project update, public comment, funding, ROW, community concerns
Phillips Community		Email/Phone Call	10/16/2017	Stakeholder Working Group, Phillips Community
		Brickyard Clubhouse	4/25/2018	Project update, reasonable alternatives
		Charleston County Transportation	7/9/2018	Project update request
		Brickyard Clubhouse	3/5/2019	Project update, NEPA process, alternatives, next steps, interim improvements

		In-Person	5/31/2019	Project corridor, update, community concerns
		Email	6/24/2019	History of African American communities in the project area
		2834 Oliver Brown Rd	8/10/2020	Proposed alternative update
Charles Washington	Phillips Community	Phone Call	12/12/2017	Project development, community concerns, petition
George Freeman	CAGE		8/19/2019	City Council
		Greater Goodwill AME Church	8/29/2019	Intersection design concept and its impact on surrounding areas
			5/25/2021	

6.0 References

23 CFR Part 772. 2010. *Procedures for Abatement of Highway Traffic Noise and Construction Noise.* Retrieved from https://www.ecfr.gov/cgi-bin/text-idx?SID=534c5f0cb79ff78d3e87040510299e58&mc=true&node=pt23.1.772&rgn=div5.

Berkeley-Charleston-Dorchester Council of Governments (BCDCOG). 2014. *Advanced Project Planning Report for Proposed Improvements to SC 41 from US 17 to Wando River Bridge.* Charleston/Berkeley Counties: CHATS and SCDOT.

_____. 2017a. *BCDCOG Travel Demand Model for the SC 41 Highway Corridor Improvements Project.* North Charleston: Stantec.

_____. 2017b. *Documents of Walk+Bike BCD.* Retrieved from https://www.walkbikebcd.com/documents.html.

_____. 2018a. *CHATS 2040 Long Range Transportation Plan: Appendices.* Retrieved from https://bcdcog.com/wp-content/uploads/2015/12/07-Appendices-FinalDraft.pdf.

_____. 2018b. *CHATS 2040 Long Range Transportation Plan.* Retrieved from https://bcdcog.com/long-range-transportation-plan/.

_____. 2018c. *Regional Transit Framework Plan*. Retrieved from https://bcdcog.com/transportation-planning/framework/.

_____. 2020. Updates to BCDCOG Travel Demand Model for the SC Highway 41 Corridor Improvements Project. Prepared by Stantec, North Charleston.

Berkeley County. 2010. *Berkeley County Comprehensive Plan.* Retrieved from https://berkeleycountysc.gov/dept/planning/comprehensive-plan/.

Brooks, B. 2007. *U.S. Fish and Wildlife Service 5-Year Review of Mycteria Americana.* Jacksonville, FL: U.S. Fish and Wildlife Service Southeast Region, Jacksonville Ecological Services Field Office.

Charleston County. 2018. *Charleston County Comprehensive Plan.* Retrieved from https://www.charlestoncounty.org/departments/zoning-planning/files/comp/2017-2018%20Comprehensive%20Plan.pdf?v=253.

Charleston County Park and Recreation Commission (CCPRC). 2017a. *Laurel Hill County Park*. Retrieved from https://ccprc.com/2005/Laurel-Hill-County-Park.

_____. 2017b. *People 2 Parks*. Comprehensive Plans. Retrieved from https://ccprc.com/1207/Comprehensive-Plans.

Council on Environmental Quality (CEQ). 1997. *Considering Cumulative Effects under the National Environmental Policy Act.* Retrieved from https://energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf.

Council of South Carolina Professional Archaeologists (COSCAPA) et al. 2013. *South Carolina Standards and Guidelines for Archaeological Investigations.* Retrieved from https://www.coscapa.org/standards-and-guidelines.

Federal Emergency Management Agency (FEMA). 2007. *Definitions of NFIP Terms.* 44 CFR Section 59.1. Retrieved from https://www.fema.gov/pdf/floodplain/nfip_sg_appendix_e.pdf.

Federal Highway Administration (FHWA). 2017a. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents.* Federal Highway Administration Transportation & Toxic Air Pollutants. Retrieved from https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/.

_____. 2017b. *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*. Retrieved from https://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm.

Health Effects Institute (HEI). 2007. *Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects.* Special Report 16. Retrieved from https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects.

_____. 2010. *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects.* Special Report 17. Retrieved from https://www.healtheffects.org/publication/traffic-related-air-pollution-critical-review-literature-emissions-exposure-and-health.

_____. 2015. *Diesel Emissions and Lung Cancer: An Evaluation of Recent Epidemiological Evidence for Quantitative Risk Assessment.* Special Report 19. Retrieved from https://www.healtheffects.org/publication/diesel-emissions-and-lung-cancer-evaluation-recent-epidemiological-evidence-quantitative.

National Oceanic and Atmospheric Administration (NOAA). 1998. National Marine Fisheries Service. *Final Recovery Plan for the Shortnose Sturgeon.* U.S Department of Commerce.

_____. 2018. *GIS Layer: Atlantic Sturgeon Critical Habitat.*

NatureServe. 2021. NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Retrieved from http://explorer.natureserve.org.

Rodgers et al. 2008. Productivity of Wood Storks (Myceteria Americana) in North and Central Florida. In *Waterbirds 31 (Special Publication 1)* (pp. 25-34).

South Carolina Department of Health and Environmental Control (SCDHEC). 2012a. *Regulation 61-69, Classified Waters*. Retrieved from https://www.scdhec.gov/sites/default/files/media/document/R.61-69.pdf.

_____. 2012b. *Regulation 61-68, Water Classifications and Standards*. Retrieved from https://www.scdhec.gov/sites/default/files/media/document/R.61-68.pdf.

_____. 2017. *Wando River Watershed.* Retrieved from https://scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/03050201-04.pdf.

_____. 2018. *2018 303(d) List of Impaired Waters.* Retrieved from https://scdhec.gov/sites/default/files/media/document/IR_Part_I_Final_Submittal_2018.pdf.

_____. 2019. *Approved TMDLs*. Retrieved from http://www.scdhec.gov/HomeAndEnvironment/Water/ImpairedWaters/ApprovedTMDLs/.

South Carolina Department of Natural Resources (SCDNR). 2020a. *South Carolina's Bald Eagles - Biology*. Retrieved from http://www.dnr.sc.gov/wildlife/baldeagle/biology.html.

_____. 2020b. *South Carolina's Bald Eagles - Nest Locations*. Retrieved from http://www.dnr.sc.gov/wildlife/baldeagle/locations.html.

South Carolina Department of Transportation (SCDOT). 2018. *Road S-33 (Clements Ferry Road) Widening Project: Jack Primus Road to SC 41 Environmental Assessment.* Retrieved from https://berkeleycountysc.gov/wp-content/uploads/sites/9/2018/04/CFR-EA-Body-040518.pdf.

South Carolina Emergency Management Division (SCEMD). 2020a. *Annex C - Evacuation Zones and Clearance Timing.* Hurricane Plan. Retrieved from https://www.scemd.org/media/1332/annex-c-evacuation-zones-and-clearance-timing.pdf.

_____. 2020b. *Annex F - Traffic Management.* Hurricane Plan. Retrieved from https://www.scemd.org/media/1320/annex-f-traffic-management.pdf.

The Post and Courier. 2016. *Stay tuned for some really big developments*. Retrieved from https://www.postandcourier.com/archives/stay-tuned-for-some-really-big-developments/article_b403a9d3-ba9c-5ef3-9f89-d7c03eb1847a.html.

Town of Mount Pleasant. 2018. *All-American Boulevard Extension Public Information Meeting Handout.* Retrieved from https://www.tompsc.com/DocumentCenter/View/28448/All-American---PIM-Handout.

_____. 2020. *Mount Pleasant Comprehensive Plan 2019-2029.* Town of Mount Pleasant Comprehensive Plan. Retrieved from https://www.tompsc.com/565/Comprehensive-Plan.

U.S. Census Bureau (USCB). 2022. *Explore Census Data*. [Online Database]. Retrieved from https://data.census.gov/cedsci/.

U.S. Department of Agriculture (USDA). 2019. *Web Soil Survey Farmland Classification.* NRCS.

U.S. Environmental Protection Agency (USEPA). 2018. *Final Rule for Control of Hazardous Air Pollutants from Mobile Sources.* Federal Register, Vol. 72, No. 37. Retrieved from https://www.epa.gov/mobile-source-pollution/final-rule-control-hazardous-air-pollutants-mobile-sources.

_____. 2019a. *Integrated Risk Information System*. Retrieved from https://www.epa.gov/iris.

_____. 2019b. *Risk Assessment*. Retrieved from https://www.epa.gov/risk#g.

U.S. Fish and Wildlife Service (USFWS). 1990. *Habitat Management Guidelines for the Wood Stork in the Southeast Region.* Wildlife Research Everglades National Park.

_____. 2007. *Wood Stork (Mycteria Americana), 5 Year Review: Summary and Evaluation.* Jacksonville, FL: U.S. Fish and Wildlife Service Southeast Region, Jacksonville Ecological Services Field Office.

_____. 2014. *Endangered and Threatened Wildlife and Plants; Reclassification of the U.S. Breeding Population of the Wood Stork from Endangered to Threatened.* Department of the Interior.

_____. 2016. *Bachman's Warbler.* Retrieved from https://www.fws.gov/verobeach/MSRPPDFs/Bachmanswarbler.pdf.

_____. 2017. GIS Layer: Frosted flatwoods salamander critical habitat.

This page intentionally left blank.

Appendix A – Purpose and Need Report

Appendix B – Alternatives Screening Report

Appendix C – Traffic Analysis Report

Appendix D – Preliminary Jurisdictional Determination

Appendix E – USFWS Biological Assessment

Appendix F – NMFS Biological Assessment

Appendix G – Essential Fish Habitat Assessment

Appendix H – Noise Analysis Report

Appendix I – Limited Environmental Records Review

Appendix J – Cultural Resources Study

Appendix K – Community Characterization Report

Appendix L – Community Impact Assessment

Appendix M – Phillips Community Cultural Landscape Technical Report

Appendix N – Seven Mile Community Technical Report

Appendix O – Agency Coordination

Appendix P – Public Involvement