U.S. Department of Transportation
Federal Highway Administration

South Carolina

1835 Assembly Street, Suite 1270
Columbia, South Carolina 29201
803-765-5411
803-253-3989

September 19, 2016

In Reply Refer To:
HDA-SC

Ms. Heather Robbins
Director Environmental Services Office
South Carolina Department of Transportation (SCDOT)
955 Park Street, P.O. Box 191
Columbia, South Carolina 29202

Dear Ms. Robbins:

The Federal Highway Administration (FHWA) has reviewed the Environmental Assessment (EA) and Programmatic Section 4(f) Evaluation for the Proposed U.S. Route 21 Bridge Replacement over the Harbor River (Federal Project No P027114) in Beaufort County, South Carolina and finds that it adequately addresses the potential impacts of the proposal. Based on the analysis provided in the EA and supporting documents we have determined that an Environmental Impact Statement (EIS) is not required. The EA is approved and acceptable for public availability and comment. The EA shall be made available for public review for a minimum of thirty (30) days before FHWA makes its final determination. The public availability shall be announced by a notice similar to a public hearing notice. Also, please provide Notice of Availability of the EA to the affected units of government, and to the State intergovernmental review contacts as specified in 23 CFR 771.119(d).

All project commitments documented in the EA are mandatory and the SCDOT will need to ensure that they are ultimately carried out. The public hearing may be scheduled fifteen (15) days after the document is made available for public review. Enclosed is a copy of the signed document. Please address any questions you may have concerning this project to Mr. J. Shane Belcher at 803-253-3187 or jeffrey.belcher@dot.gov.

Sincerely,

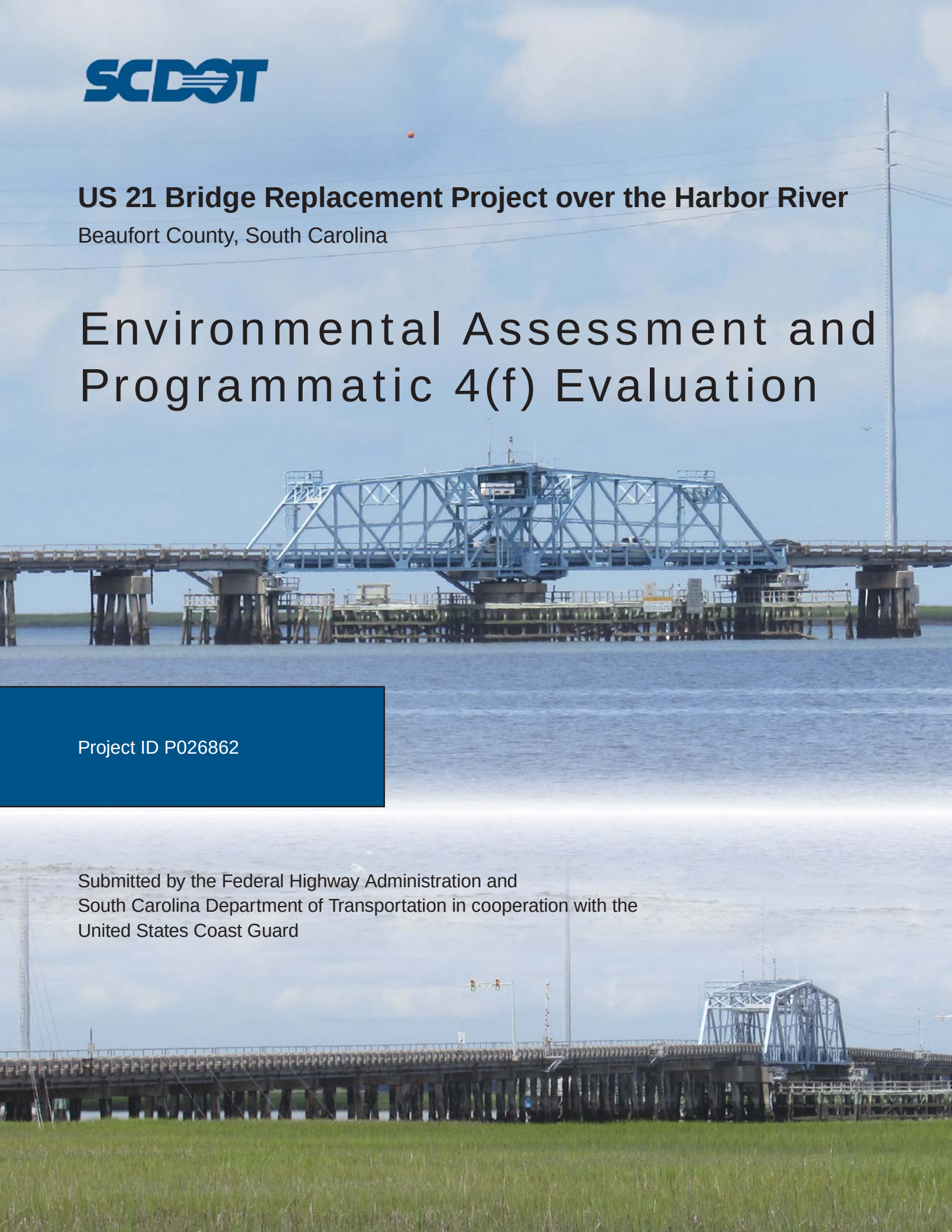
J. Shane Belcher

(for)Emily O. Lawton
Division Administrator

RECEIVED
SEP 21 2016
Environmental Management
SCDOT

Enclosure

ec: Mr. Chad Long, SCDOT NEPA Division Manager



SCDOT

US 21 Bridge Replacement Project over the Harbor River

Beaufort County, South Carolina

Environmental Assessment and Programmatic 4(f) Evaluation

Project ID P026862

Submitted by the Federal Highway Administration and
South Carolina Department of Transportation in cooperation with the
United States Coast Guard

US 21 Bridge Replacement Project over the Harbor River
Beaufort County, South Carolina

ENVIRONMENTAL ASSESSMENT AND PROGRAMMATIC 4(f) EVALUATION

Submitted by the
US Department of Transportation
Federal Highway Administration
and
S.C. Department of Transportation

In cooperation with
United States Coast Guard

9-19-16
Date of Approval

Chad Long
S.C. Department of Transportation

9/19/2016
Date of Approval

J. Shane Belcher
Federal Highway Administration

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

Mr. J. Shane Belcher
Environmental Coordinator
Federal Highway Administration
1835 Assembly Street, Suite 1270
Columbia, SC 29201
(803) 253-3187

Mr. William "Tyke" Redfearn, III, P.E.
Program Manager
S.C. Department of Transporation
PO Box 191
Columbia, SC 29202-0191
(803) 737-1430

Project ID P026862

Date: 08/09/16	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	

Project ID : P026862 | County : Beaufort | District : District 6 | Doc Type: EA | Total # of Commitments: 20

Project Name: US 21 Bridge Replacement Project over the Harbor River

The Environmental Commitment **Contractor Responsible** measures listed below **are to be included in the contract and must be implemented**. It is the responsibility of the Program Manager to make sure the Environmental Commitment **SCDOT Responsible** measures are adhered to. If there are questions regarding the commitments listed please contact:

CONTACT NAME: Chad Long **PHONE #:** (803) 737-1396

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Water Quality Responsibility: CONTRACTOR

The contractor will be required to minimize possible water quality impacts through implementation of construction BMPs, reflecting policies contained in 23 CFR 650B and the Department's Supplemental Specifications on Seeding and Erosion Control Measures (Latest Edition). Other measures including seeding, silt fences, sediment basins, etc., as appropriate, will be implemented during construction to minimize impacts to Water Quality. See Section 5.3 of Environmental Assessment (EA).

Stormwater Responsibility: CONTRACTOR

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 MS4 Permit. The selected contractor would be required to minimize potential stormwater impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's Supplemental Specifications on Seed and Erosion Control Measures (latest edition). See Section 5.3 of EA.

Floodplains Responsibility: CONTRACTOR

The selected contractor will send a set of final plans and request for floodplain management compliance to the local County Floodplain Administrator. See Section 5.6 of EA.

Project ID : P026862	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Migratory Bird Treaty Act (all bridge and box culvert projects)	Responsibility:	SCDOT

The Department will comply with the Migratory Bird Treaty Act of 1918 in regard to the avoidance of taking of individual migratory birds and the destruction of their active nests. At least four (4) weeks prior to construction/demolition of the bridges, the Resident Construction Engineer (RCE) will coordinate with SCDOT Environmental Services Compliance Office to determine if there are any active nests on the bridge. After this coordination, it will be determined whether construction/demolition can begin. After construction/demolition has begun, measures can be taken to prevent birds from nesting, such as screens, noise producers, and deterrents etc. If during construction or demolition a nest is observed on the bridge that was not discovered during the biological surveys, the contractor will cease work and immediately notify the RCE, who will contact SCDOT Environmental Services Compliance Office. SCDOT biologists will determine whether the nest is active and the species utilizing the nest. After this coordination, it will be determined whether construction/demolition can resume or whether a temporary moratorium will be put into effect. All costs for determining the need for, the placing of deterrents, and applying of all special actions including, but not limited to, removing nests and any costs associated with conducting work in compliance with the Migratory Bird Treaty Act as stated herein will not be paid for separately but will be considered to have been included with other items of work. See Section 5.8 of EA.

Individual Permit	Responsibility:	SCDOT

Impacts to jurisdictional waters will be permitted under a Department of the Army Section 404 permit from the U.S. Army Corps of Engineers. Based on preliminary design, it is anticipated that the proposed project would be permitted under an Individual Army Corps of Engineers Permit (IP). SCDOT will provide the Army Corps with information regarding any proposed demolition activities during the Section 404 permitting process. The required mitigation for this project will be determined through consultation with the USACE and other resource agencies. See Section 5.5 of EA.

Noise	Responsibility:	SCDOT

SCDOT will inform local planning officials of future, generalized noise levels expected to occur in the project vicinity after FHWA has made a final decision on the Environmental document. See Section 5.14 of EA.

Project ID : P026862	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

USTs/Hazardous Materials	Responsibility:	SCDOT

If avoidance of hazardous materials is not a viable alternative and soils that appear to be contaminated are encountered during construction, the South Carolina Department of Health and Environmental Control (SCDHEC) will be informed. Hazardous materials will be tested and removed and/or treated in accordance with the United States Environmental Protection Agency and the SCDHEC requirements, if necessary. See Section 5.15 of EA.

Cultural Resources	Responsibility:	CONTRACTOR

The contractor and subcontractors 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 concentrations during the construction phase of the project, if any such remains are encountered, the Resident Construction Engineer (RCE) will be immediately notified and all work in the vicinity of the discovered materials and site work shall cease until the SCDOT Archaeologist directs otherwise. See Section 5.16 of EA.

Displacements	Responsibility:	SCDOT

The SCDOT will acquire all of new right-of-way and process relocations in compliance with the Uniform Relocation Assistance and Real Property Acquisition policies Act of 1970, as amended (42 U.S. C. 460 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 be minimize litigation and relieve congestion in the courts, and to promote public confidence in Federal and federally-assisted land acquisition programs. See Section 5.18 of EA.

Project ID : P026862	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Essential Fish Habitat — Responsibility: CONTRACTOR

The selected contractor will be required to minimize impacts of siltation and erosion through implementation of Best Management Practices (BMPs). The contractor would develop an EFH Mitigation Plan during the Section 404 phase of the project. SCDOT will require the contractor to reduce the amount of permanent fill in salt marsh habitat from the currently proposed 3.032 acres. SCDOT will require the contractor to remove some portion of the existing causeway and grade the removal areas to match elevations in adjacent marsh where marsh vegetation occurs. SCDOT commits to mitigating for the unavoidable impacts to EFH (shellfish habitat) by implementing a mitigation plan that would restore at least 0.1 acre of oyster habitat. SCDOT will coordinate the mitigation plan and final design changes with FHWA and NOAA-NMFS. See Section 5.11 of EA.

Non-standard Commitment — Responsibility: SCDOT

Other Environmental Permits

The SCDOT will obtain authorization for the project construction activities under the SCDHEC National Pollutant Discharge Elimination System (NPDES) program, pursuant to Section 402 of the Clean Water Act. The NPDES permit application will include a Stormwater Pollution Prevention Plan.

The construction of the proposed Harbor River Bridge will require a USCG Bridge Permit in compliance with Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. Permit coordination will be carried out with the U.S. Coast Guard for the design and construction of the Harbor River Bridge. See Section 5.5 of EA.

Non-standard Commitment — Responsibility: SCDOT

Bald Eagle

Qualified personnel hired by contractor would monitor the nest located approximately 150 feet east of the US 21 and Harbor Drive intersection monthly between October 1 - May 15 (bald eagle nesting season). Construction personnel would be qualified to identify eagles and nests, and instructed to report any sightings of potential nests not previously identified. If the nest on US 21 becomes active or a bald eagle nest is identified within 660 feet of the project prior to or during construction, SCDOT would re-initiate consultation with the USFWS in accordance with the BGEPA and MBTA and would adhere to the USFWS *National Bald Eagle Management Guidelines*. The contractor will work with the SCDOT and USFWS to develop a Bald Eagle Zone Management Plan that would restrict construction work within 660 feet of the active nest during the nesting season, where practicable, and require the contractor to minimize noise, lighting, and night time work within the management zone. See Section 5.9 of EA.

Project ID : P026862	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	SCDOT ENVIRONMENTAL SERVICES

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Non-standard Commitment	Responsibility:	CONTRACTOR

Stormwater runoff

Stormwater runoff from the proposed bridge and roadway would be treated prior to discharge into the waters surrounding Harbor River. Untreated stormwater runoff would not be discharged within 1,000 feet of a shellfish bed. SCDOT would submit a drainage plan to SCDHEC and OCRM prior to finalizing construction plans. See Section 5.3 of EA.

Non-standard Commitment	Responsibility:	CONTRACTOR

Section 4(f)

If construction, including materials staging or stockpiling, would result in partial or full temporary closure of the boat ramp, the contractor would be responsible for coordinating the 4(f) use with the SCDOT, FHWA, and Beaufort County. See Section 5.17 of EA.

Non-standard Commitment	Responsibility:	CONTRACTOR

Threatened and Endangered Species

Equipment and materials used during the construction of the bridge would not obstruct or impede passage through more than 50 percent of the channel. During construction, the potential effect of in-water noise impacts would be minimized through the use of vibratory hammers, where practicable, and “slow starts”, where pile-driving ramps up slowly in an effort to deter marine species from the work area. The contractor would stop in-water work at night for a minimum of 8 hours.

If explosives are used for demolition, the contractor would be required to hire qualified personnel to evaluate the potential effect on protected species to submit to SCDOT. SCDOT would be responsible for re-initiating consultation with USFWS and NOAA-NMFS. The contractor would develop a blasting plan to include a marine wildlife watch plan to submit to SCDOT. See Section 5.10 of EA.

Project ID : P026862	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	SCDOT ENVIRONMENTAL SERVICES

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Non-Standard Commitment | Responsibility: CONTRACTOR

Threatened and Endangered Species - Sea Turtles

The contractor would implement NOAA-NMFS *Sea Turtle and Smalltooth Sawfish Construction Conditions*. These conditions can be found in Appendix H of the EA. All environmental commitments, guidelines, and conditions will be outlined in Design Build contract. The proposed bridge would not contain permanent roadway lighting. During the sea turtle nesting season (May 1 through October 31), the contractor would restrict in-water work at night to the maximum extent practicable. Nighttime is defined as 30-minutes after sunset to 30-minutes before sunrise.

Between May 1st and October 31st (turtle nesting season), the contractor would use the minimum number and lowest wattage of lights that are necessary for construction. Lights would be positioned to focus on the work area to minimize the amount of light on the water surface. The contractor would turn off all lights when not needed during construction. See Section 5.10 of EA.

Non-Standard Commitment | Responsibility: CONTRACTOR

Threatened and Endangered Species - West Indian (Florida) Manatees

The contractor would adhere to the established USFWS *Manatee Protection Guidelines*. See Section 5.10 of EA and Appendix G of EA. All environmental commitments, guidelines, and conditions will be outlined in Design Build contract.

Non-Standard Commitment | Responsibility: CONTRACTOR

A Memorandum of Agreement (MOA) has been executed between FHWA, SCDOT, SHPO, and South Carolina Department of Parks, Recreation, and Tourism (SCPRT). See Section 5.16 of EA and Appendix M. FHWA and SCDOT will ensure that the following stipulations are implemented:

- To mitigate adverse effects to the Harbor River Bridge, SCDOT will work with the SHPO, SCPRT, and the Hunting Island State Park manager to develop and fund a public interpretation plan related to the impact of Depression-era work programs on Hunting Island State Park and its associated landscape. The interpretation plan should include elements that relate to the construction of the US 21 roadway and bridge over Harbor River as well as the history of the Civilian Conservation Corps at Hunting Island State Park.
- The draft public interpretation plan shall be developed within 6 months after the execution of the MOA. Copies of the draft interpretation plan shall be provided to the FHWA, SHPO, and Hunting Island State Park Manager for review and comment. A final public interpretation plan that incorporates comments received from FHWA, SHPO, and the Hunting Island State Park Manager shall be developed within 60 days after receipt of comments.
- The components of the interpretation plan shall be developed and installed at the Hunting Island State Park within one year of the production of the final interpretation plan.
- Bridge Placard: SCDOT will remove the existing bridge placard on the US 21 Bridge and provide it to SCPRT to be used as part of the interpretive plan developed for the park.
- SCDOT will consider options for reuse of the bridge through advertisement, relocation, or salvaging a section of the bridge for display within Hunting Island State Park.

Project ID : P026862	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	SCDOT ENVIRONMENTAL SERVICES

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Non-Standard Commitment	Responsibility:	CONTRACTOR

Marine Mammals (Bottlenose Dolphins and West Indian Manatees)

The contractor would adhere to the established USFWS *Manatee Protection Guidelines*. Guidelines can be found in Appendix G of EA. All environmental commitments, guidelines, and conditions will be outlined in Design Build contract. Equipment and materials used during the construction of the bridge would not obstruct or impede passage through more than 50 percent of the channel. During construction, the potential effect of in-water noise impacts would be minimized through the use of vibratory hammers, where practicable, and “slow starts”, where pile-driving ramps up slowly in an effect to deter marine species from the work area. The contractor would stop in-water work at night for a minimum of 8 hours. If explosives are used for demolition, the contractor would be required to hire qualified personnel to evaluate the potential effect on protected species to submit to SCDOT. SCDOT would be responsible for re-initiating consultation with USFWS and NOAA-NMFS. The contractor would develop a blasting plan to include a marine wildlife watch plan to submit to SCDOT. See Section 5.12 of EA.

Non-Standard Commitment	Responsibility:	CONTRACTOR

Hazardous Materials

A survey for asbestos containing materials (ACM) and lead-based pain (LBP) will be conducted on the US 21 bridge over the Harbor River. Survey findings and the potential removal of ACM or LBP would be coordinated with the SCDHEC Bureau of Air Quality, Asbestos Section prior to demolition of existing bridge. See Section 5.15 of EA.

	Responsibility:	

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List of Acronyms

Acronym	Definition
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos Containing Materials
ADT	Average Daily Traffic
AST	Above ground storage tanks
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practices
CAA	Clean Air Act
CCC/WPA	Civilian Conservation Corps/Works Progress Administration
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CFV	Commercial Fishing Village
CPO	Cultural Protection Overlay
CT	Census Tract
CWA	Clean Water Act
dB	decibel
dBA	A-weighted Levels
EA	Environmental Assessment
EDR	Environmental Data Resources Inc.
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	US Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration

List of Acronyms (con't)

Acronym	Definition
FIPSD	Fripp Island Public Service District
FIRM	Flood Insurance Rates Map
FMP	Fishery Management Plans
FOIA	Freedom of Information Act
FPPA	Farmland Protection Policy Act
FWC	Florida Fish and Wildlife Conservation Commission
GGCHC	Gullah Geechee Cultural Heritage Corridor
GIS	Geographic Information System
HAPC	Habitat Area of Particular Concern
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Conservation
LBP	Lead-based Paint
LOI	Letter of Intent
MBTA	Migratory Bird Treaty Act
MHW	Mean High Water
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MOVES	Motor Vehicle Emissions Simulator
mph	Miles Per Hour
MSATs	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAVD88	North American Vertical Datum of 1988
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NGSSCES	Northern Georgia/Southern South Carolina Estuarine System
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O&M	operations and maintenance
OCRM	Ocean and Coastal Resource Management
ORW	Outstanding Resource Water
OSHA	Occupational Safety and Health Administration
PIM	Public Information Meeting
PM	Particulate Matter
RCE	Resident Construction Engineer
RCRA	Resource Conservation and Recovery Act
RMS	Root Mean Square
SAFMC	South Atlantic Fishery Management Council
SARA	Superfund Amendments and Reauthorization Act

List of Acronyms (con't)

Acronym	Definition
SCDAH	South Carolina Department of Archives and History
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCDOT	South Carolina Department of Transportation
SCE&G	South Carolina Electric and Gas
SCORE	South Carolina Oyster Restoration and Enhancement Program
SCPRT	South Carolina Department of Parks, Recreations, and Tourism
SFH	Shellfish Harvesting Waters
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
STIP	Statewide Transportation Improvement Program
STP	Shovel Test Pit
SWPPP	Stormwater Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
USACE	US Army Corps of Engineers
USC	United States Code
USCG	US Coast Guard
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife Service
UST	Underground Storage Tanks

1.0 Introduction

The South Carolina Department of Transportation (SCDOT) proposes to replace the existing US Route 21 (US 21) (Sea Island Parkway) bridge over the Harbor River, located in Beaufort County, South Carolina. The Federal Highway Administration (FHWA) is the lead federal agency for the project; the US Coast Guard (USCG) is a cooperating agency (Appendix A). As federal agencies, FHWA and the USCG must consider a project's potential impacts to the human and natural environment to comply with the National Environmental Policy Act of 1969 (NEPA), as amended.

The project, as proposed, would result in certain modifications to the human and natural environment. SCDOT has not identified impacts that would require the preparation of an Environmental Impact Statement (EIS). Therefore, the project meets the criteria under 23 Code of Federal Regulations (CFR) § 771.115(c) for processing as an Environmental Assessment. This Environmental Assessment was prepared to comply with the NEPA in accordance with Council on Environmental Quality (CEQ) regulations 40 CFR §§ 1500–1508, FHWA regulations 23 CFR § 771, § 772, and § 774, USCG Commandant Instruction M16475.1D, as well as related, current FHWA guidance.

Specific studies were conducted in the early stages of project development to inform decision makers about the environmental consequences associated with the proposed project. These studies are either appended or incorporated by reference to this document.

2.0 Purpose of and Need for the Project

The proposed project consists of the replacement and realignment of an approximately ½-mile-long bridge on US 21 over the Harbor River in Beaufort County. The study area consists of a corridor that is approximately 2 miles long and 1,200 feet wide, centered on the existing US 21 between St. Helena Island and Harbor Island (Figure 2-1). The study area begins 150 feet west of Gay Fish County Road on US 21, extends east across the bridge to Harbor Island, and ends 150 feet past the intersection of US 21 and Harbor Drive. The project involves the replacement of the US 21 bridge, as well as the construction of new approach roadways.

2.1 What is the purpose of the project?

The purpose of the project is to correct structural and functional deficiencies of the US 21 bridge over the Harbor River and to upgrade the bridge and its approaches to current design standards.

2.2 Why is the project needed?

Based on recent inspections by SCDOT the proposed project is needed because the existing US 21 bridge is structurally deficient and functionally obsolete. The existing US 21 bridge is 77 years old and includes a steel truss swing-span that provides for navigation along the Harbor River.

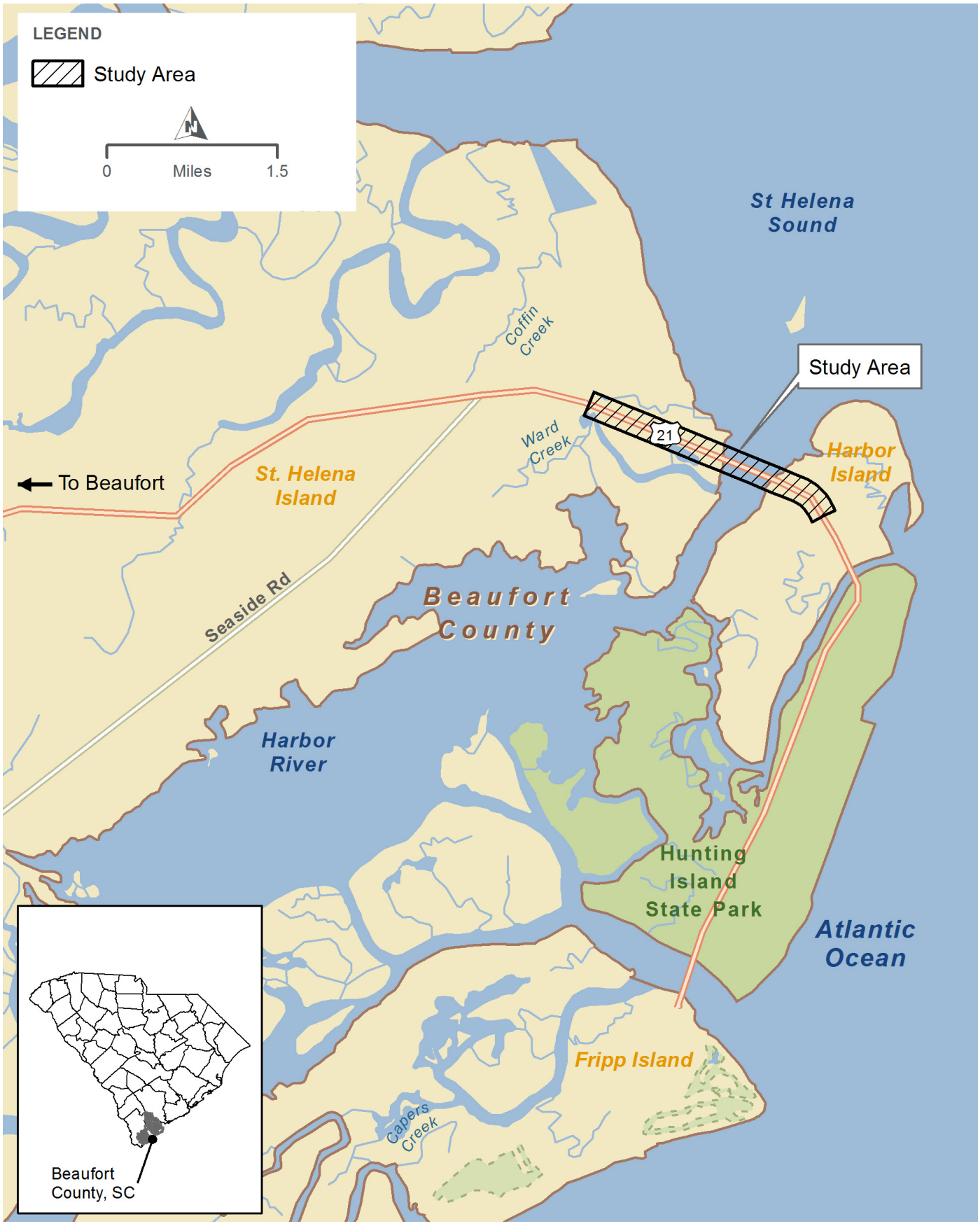

Figure 2-1 Project location map

There is a need to replace the US 21 bridge over the Harbor River to address the deteriorating physical condition of the existing structure and maintain the important linkage for Beaufort County. US 21 provides the only vehicle access between mainland Beaufort County and Harbor Island, Hunting Island, and Fripp Island. US 21 also serves as a designated hurricane evacuation route for coastal Beaufort County. SCDOT's maintenance efforts are on-going and will continue until the proposed bridge is completed and the existing bridge is no longer needed for transportation.

2.2.1 Structural deficiencies

A bridge is classified as structurally deficient when the structure has deteriorated conditions and/or reduced load carrying capacity. Conditions of the bridge deck, superstructure, and substructure are rated on a scale of 0 to 9 (Failed to Excellent) (FHWA 1995). The Structure Inventory and Appraisal Report (Appendix B) indicates that the bridge superstructure is in poor condition (4). The supporting structure and bridge deck are in fair condition (5). The existing bridge is currently load restricted to a maximum of 26 tons gross vehicle weight.

2.2.2 Functionally obsolete

A bridge is classified as functionally obsolete if it does not meet current design standards. In the Structural Inventory and Appraisal Report (Appendix B), the existing bridge deck geometry is rated as Condition 2, which is considered "intolerable" and in high priority of replacement. The existing bridge deck consists of two 10-foot-wide travel lanes, one in each direction, with a 1-foot-wide curb and railing. The existing bridge section does not meet current design standards for rural arterial roads, which require 12-foot-wide travel lanes and 10-foot-wide shoulders. Based on comments from the Public Information Meeting (PIM), drivers of large vehicles—such as recreational vehicles traveling to Hunting Island State Park—are concerned about the safety of the existing lane widths.

2.2.3 Sufficiency rating

FHWA uses sufficiency rating as a method of evaluating a bridge's sufficiency to remain in service. The rating considers the structural adequacy, functionality, level of service, and whether the bridge is essential for public use. The rating is a percentage in which 100 represents an entirely sufficient bridge and 0 represents an entirely insufficient or deficient bridge. The existing US 21 bridge has been inspected by SCDOT and received a sufficiency rating of 44.2 (Appendix B).

2.3 How would the project be funded?

The bridge replacement is listed in the 2014-2019 Statewide Transportation Improvement Program (STIP). The project would be funded by FHWA Bridge Replacement and Rehabilitation Program, which provides funding for projects that address structurally deficient or functionally obsolete bridges on the federal-aid system. The STIP allocates $4,340,000 for engineering design and environmental analysis in fiscal year 2014 and $56,134,000 for construction in fiscal year 2017.

2.4 What is the proposed schedule?

If the NEPA review phase is completed as planned and if the preferred alternative described in this document is selected, SCDOT expects the project to follow the following schedule:

- 2014 to present - Preliminary Engineering and NEPA Review
- Early 2017 to Late 2017 - Design-Build Procurement
- Late 2017 to Late 2018 - Final Engineering and Permitting
- Mid 2018 to Late 2020 - Construction

2.5 Existing bridge

US 21 is a two-lane roadway with earthen shoulders on a causeway connecting St. Helena Island with Harbor Island, Hunting Island, and Fripp Island. US 21 provides an important transportation link for the residents and visitors of the islands in meeting daily transportation needs. US 21 is also designated as a hurricane evacuation route for coastal Beaufort County. Average daily traffic (ADT) on US 21 within the study area was 4,100 vehicles per day in 2014. Based on comments received during the PIM (Section 6.1), traffic is greater within the study area during summer months, particularly on weekends, because of visitors traveling to Harbor Island, Hunting Island State Park, and Fripp Island.

Existing land use within the study area is primarily tidal wetlands, with small areas of residential and commercial development. Gay Fish Company and its associated docks are located on Ward Creek in the western portion of the study area. A Beaufort County boat landing is located on Butches Road, south of the causeway between St. Helena Island and the US 21 bridge over Harbor River. The Harbor Island and Harbor Key residential communities are located east of the existing bridge and north of the causeway. Open Land Trust (a private, nonprofit organization) maintains a conservation easement in the eastern portion of the study area that protects salt marsh surrounding the causeway and Harbor Key. The easement is located to the north and south of the existing causeway and present SCDOT right-of-way. See Section 5.1 for more information on the Open Land Trust conservation easement.

The bridge over the Harbor River was constructed in 1939 consisting of 40-foot-long concrete approach spans with a 170-foot-long steel through-truss swing-span over the main channel (Figure 2-2). The total bridge length is 2,851 feet. The vertical navigational clearance is 15 feet when the swing-span is closed. The horizontal navigational clearance is 60 feet.

Figure 2-2 Existing US 21 bridge over Harbor River

The existing bridge deck consists of two 10-foot-wide travel lanes, one in each direction, with a 1-foot-wide curb and railing. The posted speed limit for the existing US 21 roadway is 55 miles per hour (mph) and decreases to 45 mph east of the bridge on Harbor Island. No dedicated bicycle or pedestrian facilities are on the bridge or causeway within the study area. During storms, the runoff from the existing bridge flows through deck drains directly into the Harbor River and its adjacent salt marshes. Surface runoff from the causeway drains over the grass shoulder and embankment and into the adjacent salt marsh or roadside ditches.

Present SCDOT right-of-way varies along US 21. The present right-of-way on the western causeway is 100 feet wide, while the present right-of-way on the eastern causeway is 50 feet wide. The open water of the Harbor River is considered public land so SCDOT's right-of-way limits are based on areas required for operation and maintenance. The present right-of-way surrounding the Butches Road Boat Landing is 250 feet wide.

2.5.1 Utilities

A South Carolina Electric and Gas (SCE&G) powerline is located on steel poles approximately 120 feet south of the existing bridge (Figure 2-3). The powerlines are elevated approximately 110 feet over Harbor River at mean high water. Except for high voltage qualified personnel, contractors are prohibited from working within ten feet of the energized SCE&G powerlines. The steel poles also carry telecommunications lines over the river. The powerline is supported on wooden poles to the north of the US 21 causeway in the rest of the study area.

Fripp Island Public Service District (FIPSD) owns and maintains a 10-inch-diameter waterline that is attached to the south side of the existing bridge with a subaqueous (underwater) portion in the swing-span area. An abandoned water line is located north of the existing bridge below Harbor River.

2.5.2 State Scenic Highway

US 21 from the city of Beaufort to Hunting Island State Park was designated as a State Scenic Highway by Act 73 of 1979. US 21, also known as the Sea Island Scenic Highway, is a 19-mile-long byway with intrinsic scenic qualities, including expansive vistas and natural beauty (SCDOT 2016).

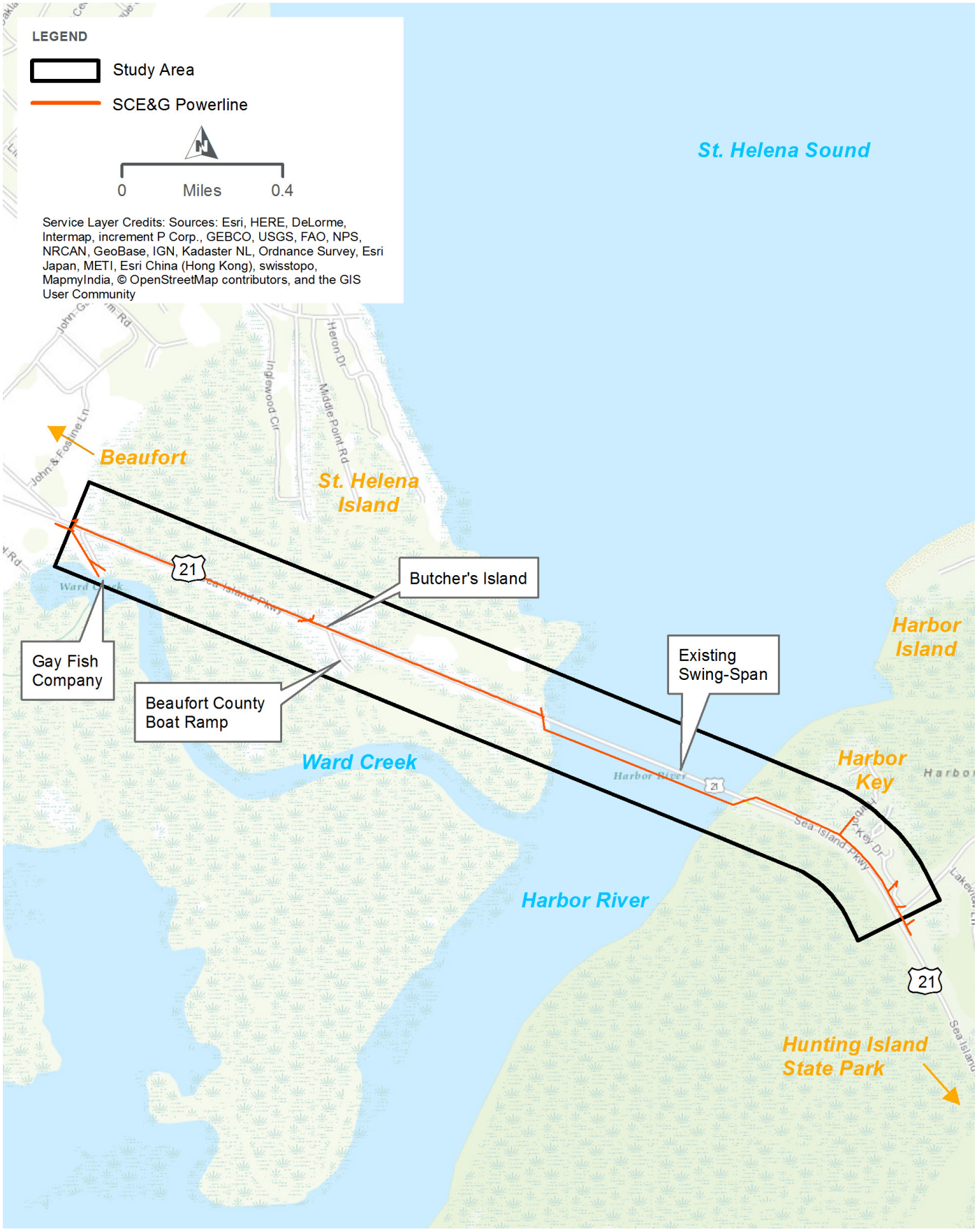

Figure 2-3 Study area

3.0 Alternatives

The following section provides an analysis of five reasonable "build" alternatives that include shifting the US 21 bridge to the north or south side of the existing route, as well as a summary of alternatives considered but eliminated from further review. The "No-build" alternative, which consists of SCDOT making no improvements, was considered as a baseline for comparison.

3.1 No-build alternative

The No-build alternative consists of SCDOT making no improvements to the existing bridge. The existing bridge, built in 1939, is structurally deficient and functionally obsolete, and the No-build alternative would not improve the design and/or structural characteristics of the bridge and roadway system. The bridge would remain structurally deficient and load restricted to 26 tons gross vehicle weight. Repairs or continued maintenance may prolong the existing condition of the bridge; however, the bridge would eventually have to be replaced since it provides the only vehicle access to Harbor, Hunting, and Fripp Islands and cannot be closed. The No-build alternative is not considered acceptable because the bridge would continue to be structurally deficient and functionally obsolete, which would not meet the purpose and need of the project.

3.2 What alternatives were considered but eliminated from further review?

SCDOT considered location and design alternatives in the process of developing the reasonable "build" alternatives. During project development, SCDOT considered several alternatives that were eliminated from further review during the environmental assessment (EA). Appendix C provides a technical memorandum with details about the considered but eliminated alternatives, determination of whether the alternative addressed the project's purpose and need, and reason for elimination from further analysis. Alternatives considered but eliminated from further review include the following:

- closing the bridge;
- rehabilitation of the existing bridge;
- replacing the bridge at its current location and using a temporary bridge for vehicle access;
- replacing the existing causeway and bridge;
- constructing a new bridge to Hunting or Fripp Island;
- constructing a tunnel between the existing causeway and Harbor Island.

SCDOT also considered replacing the existing swing-span bridge with a similar bridge including a movable main-span. Constructing a movable-span bridge was eliminated from further review because of the higher construction, operations and maintenance (O&M) costs, and potential constructibility issues.

3.3 What are the reasonable build alternatives?

SCDOT has identified five reasonable build alternatives that involved constructing US 21 with a new fixed-span bridge on parallel alignments to the existing bridge. All of the reasonable build alternatives would shift the proposed bridge to either the north or south and would be constructed nearly parallel to the existing bridge. During construction, all of the reasonable build alternatives would allow the existing bridge to remain open to vehicles and the existing swing-span to operate for boats. During the initial alternatives development, three reasonable build alternatives were identified:

- Alternative 1, located approximately 122 feet to the north
- Alternative 2, located approximately 200 feet to the south
- Alternative 3, located approximately 65 feet to the south

These alternatives were presented at the PIM on September 15, 2015 (see Section 6.1). During the meeting, the Harbor Key community expressed concern about increased noise and visual impacts with Alternative 1, because the bridge would be constructed closer to their houses than the existing bridge. Based on these concerns, Alternative 1 was modified into Alternative 1A and 1B to minimize potential impacts on the Harbor Key community.

Studies were also conducted during the alternatives development process that identified environmentally sensitive areas, including essential fish habitat (EFH) and a tidal creek on the southeast side of the existing bridge. After reviewing these studies, Alternative 2 was refined into two alternatives (Alternative 2A and 2B) to shift the proposed bridge and minimize potential impacts to these resources. Based on these modifications, five reasonable build alternatives were identified and are considered in this analysis (Figure 3-1). Table 3-1 provides a summary of the reasonable build alternative dimensions.

Table 3-1 Proposed build alternative dimensions, in feet

	No-build	Alternative 1A	Alternative 1B	Alternative 2A	Alternative 2B	Alternative 3
Offset from the existing bridge	0	122 (North)	65 (North)	168 (South)	311 (South)	65 (South)
New bridge and roadway length	N/A	7,206	7,198	8,556	8,928	7,398
Bridge length	2,851	3,625	3,602	3,546	3,622	3,654
Bridge cross-section width	21	47	47	47	47	47

3.4 Alternatives Analysis

The five reasonable build alternatives consist of two parallel alignments to the north and three parallel alignments to the south, all at varying offsets to the existing alignment. The effects of each reasonable build alternative were evaluated using a bridge height of 65 feet above Mean High Water (MHW) (see Section 4.0 for additional information on navigational clearances). Table 3-2 provides an environmental matrix to compare the No-build and reasonable build alternatives' effects on the surrounding human and natural environment. Figure 3-1 shows the reasonable build alternatives and environmental constraints.

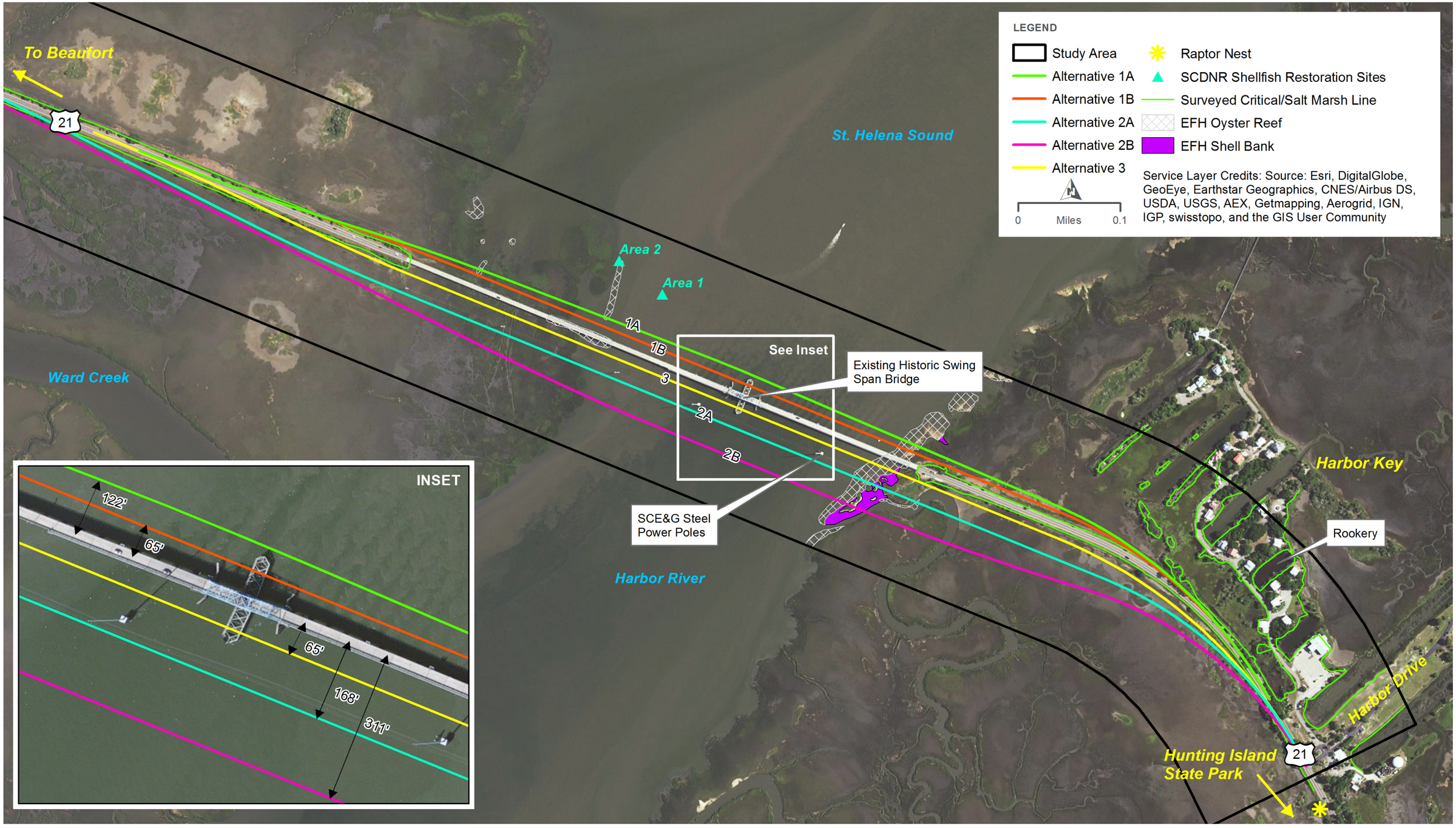

Figure 3-1 Reasonable build alternatives and environmental constraints

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3.4.1 Alternative 1A

Alternative 1A involves construction of a new bridge approximately 122 feet north of the existing alignment (Figure 3-1). Alternative 1A was presented as Alternative 1 to the public during a PIM on September 15, 2015. During the PIM, the Harbor Key community expressed concern about increased noise and visual impacts with Alternative 1, because the bridge would be constructed closer to their houses than the existing bridge. Alternative 1A would be the closest alternative to the Harbor Key community and would result in a visual effect, but would not result in traffic-related noise impacts.

The length of the proposed bridge and roadway for Alternative 1A is 7,206 feet. Alternative 1A could be constructed using standard construction methods, including barges and cranes. Alternative 1A would impact 6.2 acres of salt marsh and EFH, which are greater than those proposed under Alternative 1B, but less than Alternatives 2A, 2B, and 3. Alternative 1A would impact the southern portion of a South Carolina Department of Natural Resources' (SCDNR) Shellfish Restoration Area.

3.4.2 Alternative 1B

Alternative 1B involves construction of a new bridge approximately 65 feet north of the existing alignment (Figure 3-1), which is closer to the existing bridge and farther from the Harbor Key community compared to Alternative 1A. Alternative 1B was suggested by the USACE during an Agency Coordination Effort meeting on September 10, 2015 as a potential alternative to reduce salt marsh impacts. This alternative was developed after the PIM to minimize potential effects on the Harbor Key community. Under Alternative 1B, the proposed bridge would be located closer to the Harbor Key community compared to the existing bridge, but would not have traffic-related noise impacts. The proposed bridge would have a visual effect on the community.

The length of the proposed bridge and roadway for Alternative 1B is 7,198 feet. Alternative 1B could be constructed using standard construction methods, including barges and cranes. Alternative 1B has the least amount (5.9 acres) of salt marsh impacts and EFH impacts as compared to the other build alternatives.

3.4.3 Alternative 2A

Alternative 2A involves construction of a new bridge approximately 168 feet south of the existing alignment (Figure 3-1). Alternative 2A was developed to minimize direct impacts from bridge pilings in EFH and a tidal creek on the southeast side of the existing bridge. The new bridge would be constructed south of the existing SCE&G powerlines.

Under Alternative 2A, the proposed bridge would be shifted to the south of the existing bridge, farther from the Harbor Key community. Alternative 2A would not result in traffic-related noise impacts. While the Alternative 2A would be farther from the Harbor Key community, the proposed bridge would have a visual effect on the community and may block views to the south of Harbor River.

The length of the proposed bridge and roadway for Alternative 2A is 8,556 feet. Alternative 2A could be constructed using standard construction methods, including barges and cranes. Alternative 2A would impact 13.9 acres of salt marsh and EFH, which is greater than Alternatives 1A, 1B, and 3.

3.4.4 Alternative 2B

Alternative 2B involves construction of a new bridge approximately 311 feet south of the existing alignment (Figure 3-1). Alternative 2B was developed to minimize direct impacts from bridge pilings in EFH and a tidal creek on the southeast side of the existing bridge. The new bridge would be constructed south of the existing SCE&G powerlines.

Under Alternative 2B, the proposed bridge would be shifted to the south of the existing bridge, the farthest from the Harbor Key community. Alternative 2B would not result in traffic-related noise impacts. While the Alternative 2B would be the farthest from the Harbor Key community, the proposed bridge would have a visual effect on the community and may block views to the south of Harbor River.

The length of the proposed bridge and roadway for Alternative 2B is 8,928 feet. Alternative 2B could be constructed using standard construction methods, including barges and cranes. Alternative 2B would impact 15.5 acres of salt marsh and EFH, which is the most acreage of all the build alternatives. Conceptual designs of Alternative 2B have minimized the impacts of the proposed bridge on a tidal creek and shell bank located south of the existing US 21 bridge; however, Alternative 2B would still likely have an adverse effect on these resources.

Alternative 2B would also likely require the partial closure of the Butcher's Island boat ramp during construction. Alternative 2B is also expected to be the most expensive to construct, with an expected construction cost of $49.7 million.

3.4.5 Alternative 3

Alternative 3 involves construction of a new bridge approximately 65 feet south of the existing alignment (Figure 3-1). The new bridge would be constructed between the existing bridge and SCE&G powerlines.

Under Alternative 3, the proposed bridge would be shifted slightly to the south of the existing bridge, farther from the Harbor Key community. Alternative 3 would not result in traffic-related noise impacts. While the Alternative 3 would be slightly farther from the Harbor Key community, the proposed bridge would have a visual impact on the community.

The length of the proposed bridge and roadway for Alternative 3 is 7,398 feet. Based on a constructibility review (Appendix E), construction of Alternative 3 would be constrained by its proximity between the existing bridge and SCE&G powerlines. During construction, the crane boom would be within a few feet or directly under the existing SCE&G powerlines. The construction of Alternative 3 would require either relocation of the SCE&G powerlines at the SCDOT's expense, or the use of nonstandard construction methods. Nonstandard construction methods may include top-down construction or girder launching, which are also typically more expensive than standard methods. Alternative 3 would result in greater impacts (7.6 acres) to salt marsh and EFH compared to Alternative 1A and 1B. Conceptual designs of Alternative 3 have minimized the impacts of the proposed bridge on a tidal creek and shell bank located south of the existing US 21 bridge; however, Alternative 3 would still likely have an adverse effect on these resources.

3.5 How do the reasonable build alternatives compare?

Table 3-2 provides an environmental matrix to compare the No-build and reasonable build alternatives' effects on the surrounding human and natural environment. Based on the conceptual designs and typical construction methods, each reasonable build alternative would have no effect on the following resources: relocation of homes or businesses, hazardous materials sites, archaeological sites, noise levels, or farmlands. Each build alternative would also require the same permits, including a USACE Individual Permit and a USCG Bridge Permit.

The reasonable build alternatives would have the same or similar effect on the following resources: floodplains, protected species, indirect salt marsh shading, visual resources, and the historic swing-span bridge.

The reasonable build alternatives vary in their effects on critical area (salt marsh), EFH, shellfish restoration areas, utilities, and estimated cost. The reasonable alternatives also vary in their effects on right-of-way. SCDOT considered the alternatives' potential impact on the Open Land Trust conservation easement as part of the right-of-way effects. As a private conservation easement, this area does not receive federal or state protection and is not considered a Section 4(f) resource. Because the easement is located on both sides of the existing causeway, the easement would be impacted by all reasonable alternatives. Therefore, effects specific to the conservation easement were not a deciding factor of the alternatives analysis.

Table 3-2 Environmental matrix

	No-build	Alternative 1A	Alternative 1B	Alternative 2A	Alternative 2B	Alternative 3
Offset from the existing bridge (feet)	0	122 (North)	65 (North)	168 (South)	311 (South)	65 (South)
Right-of-way acquisition (acres)	0	5.1	4.2	7.9	6.3	5.7
Farmland	None	None				
Fill in salt marsh/ critical area (acres)	0	6.2	5.9	13.9	15.5	7.6
Permits	0	USACE Individual Permit; OCRM[1] Critical Area Permit; SCDHEC[2] 401 Water Quality Certification; USCG Bridge Permit				
Floodplains	No effect	Yes, No Adverse Effect Anticipated				
Protected species	No effect	May affect, Not likely to adversely affect, Atlantic and shortnose sturgeon; West Indian (Florida) manatee; green, Kemp's ridley, and loggerhead sea turtles; piping plover; wood storks; red knots; and bald eagles.				
Essential Fish Habitat (Direct Impacts, in Acres)[3]	0	4.0	3.7	8.5	9.7	4.9
SCDNR shellfish restoration areas	0	Impact to Area 2	0	0	0	0
Impacted noise receivers	0	0				
Hazardous materials sites	0	0				
Archaeological site 38BU113	No effect	No Effect				
Historic Harbor River bridge	Continued disrepair	Adverse Effect; see Programmatic 4(f) Evaluation and Section 106 MOA[4] in Section 7.0				
Beaufort County boat ramp	No effect	No adverse effect				
Relocations	0	0				
Viewshed	No effect	Visual Effect on Harbor Key Community (see Section 5.20)				
Project cost ($ millions)						
Preliminary engineering (10% of construction costs)		4.65	4.59	4.84	4.97	4.73
Right-of-way		0.12	0.10	0.15	0.14	0.11
Construction		46.5	45.9	48.4	49.7	47.3
CE&I (10% of construction costs)		4.65	4.59	4.84	4.97	4.73
SCE&G powerline relocation (approx)						1.00
Total		55.92	55.18	58.23	59.78	57.87

Notes:
1. Ocean and Coastal Resource Management
2. South Carolina Department of Health and Environmental Control
3. See Section 5.11 for impacts to specific EFH habitats
4. Memorandum of Agreement

3.6 What is the preferred alternative?

The preferred alternative would be to construct the proposed bridge 65 feet to the north of the existing bridge (Alternative 1B). Alternative 1B was selected to minimize impacts to the surrounding tidal marsh, creeks, EFH, and the Harbor Key community. Under Alternative 1B, the proposed bridge would be located 65 feet closer to the Harbor Key community compared to the existing bridge and would have a visual effect on the community. However, all of the reasonable build alternatives would have a visual effect on the surrounding communities. Efforts to minimize visual effects to the Harbor Key community were undertaken by shifting Alternative 1 closer to the existing bridge and away from Harbor Key to develop Alternative 1B. Alternative 1B would be constructed using standard construction methods. Alternative 1B would result in the fewest acres of right-of-way acquisition, including the fewest acres of Open Land Trust conservation easement. The preferred alternative has the lowest estimated construction cost of $45.9 million. Regulatory and resource agencies have indicated support for Alternative 1B as the preferred alternative (Appendix A) based on the minimization of environmental impacts.

3.7 Proposed bridge

The following section describes preliminary design and construction methods for the proposed project. The design and proposed posted speed limit of the proposed bridge and roadway is 55 mph, which would decrease to the existing 45 mph near Harbor Drive. US 21 is classified as a rural principal arterial roadway; therefore, the SCDOT Highway Design Manual requires 12-foot-wide travel lanes (one in each direction). Projected ADT in 2040 is approximately 5,810 vehicles per day. Future traffic volumes do not warrant additional travel lanes on the proposed bridge.

The proposed bridge would be constructed of reinforced concrete and would have one 12-foot-wide travel lane in each direction, and a 10-foot-wide shoulder in each direction of travel (Figure 3-2). The proposed bridge would have a 42-inch-high barrier on the outside of each shoulder, which is the minimum barrier height for roadways with cyclists in accordance with the SCDOT Bridge Design Memorandum DM0113. The lower portion of the barrier would be constructed of concrete, while the upper portion would be a metal rail. The width of the proposed bridge would be approximately 47 feet. No permanent lighting would be installed on the proposed bridge roadway because lighting is not justified per Section 28.7 of the SCDOT Highway Design Manual. The proposed bridge would contain navigational lights in accordance with 33 CFR § 118 and as approved by the USCG.

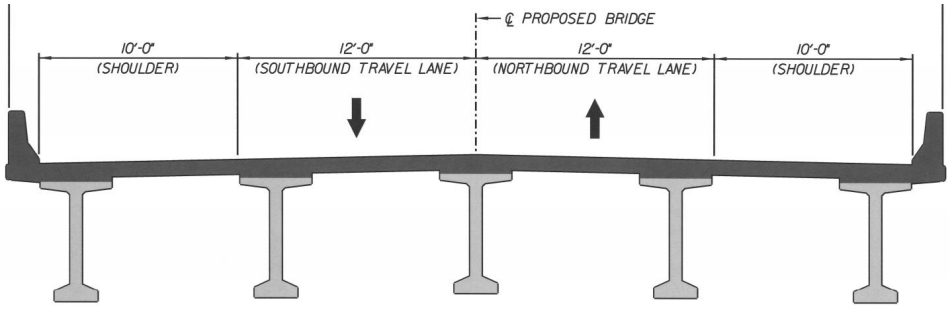

Figure 3-2 Typical section of proposed bridge

The proposed roadway approaches would have 4-foot-wide paved shoulders to match the existing roadway conditions on US 21 (Figure 3-3). An exception to this typical section occurs on US 21 southbound between the proposed bridge and Harbor Drive. A 10-foot-wide paved shoulder is proposed in this area, which matches the proposed bridge shoulder and would provide emergency access.

Portions of the existing upland causeway may remain because it could be used to install stormwater management features. Once the new roadway approaches and bridge are constructed, the removal, transport, and disposal of all the existing fill materials may be costly and impractical.

The proposed right-of-way on the western side of the bridge would match the present right-of-way of 100 feet. On the eastern side of the bridge, the proposed right-of-way would taper from 100 feet, to encompass the new causeway, to the existing 50-foot-wide right-of-way near Harbor Drive.

3.7.1 How would the proposed bridge be constructed?

Construction is expected to occur between mid-2018 and mid-2020. Construction methods cannot be finalized because the project would be constructed through Design Build procurement, where a single entity is contracted to deliver the final design and construction of the bridge.

Once conceptual designs were complete, the proposed project was reviewed by bridge construction engineers to identify potential construction constraints. The bridge construction would likely require two 250-ton cranes with approximately 200-foot booms. The cranes would float in the Harbor River on barges 40 feet wide or greater.

During construction, the existing bridge would remain open to vehicles and the swing-span would continue to operate for boats.

The distance between the existing roadway and new bridge would be sufficient enough that staged construction of the bridge would not be required. Construction would likely include a combination of drilling shafts and pile driving for the bridge support structures. Work in deep water habitats is likely to occur from barges. Temporary work trestles may be installed over the tidal marsh using pile driving. Timber mats and/or barges may be used over salt marsh areas. Temporary lighting would be used during construction. The existing bridge would be demolished upon completion of construction of the proposed bridge using standard practices to remove the existing piers and swing span. Concrete bridge decks and the existing swing span would likely be placed on barges and transported off site for disposal and/or recycling. Standard deconstruction practices may include using vibratory methods to remove existing pilings.

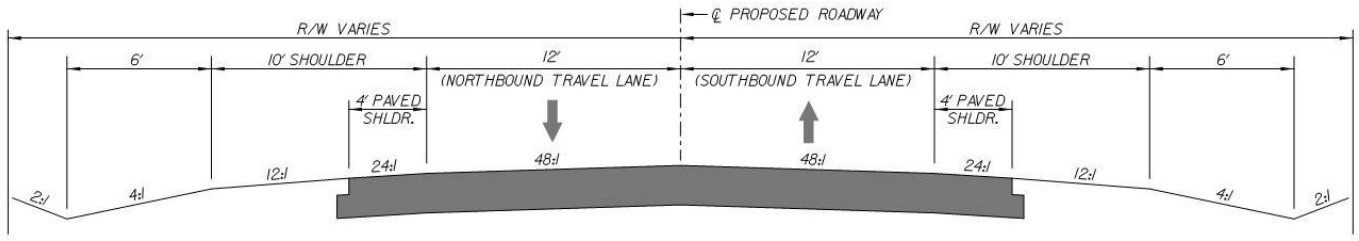

Figure 3-3 Typical section of proposed roadway

3.7.2 How would pedestrians and cyclists be affected?

The proposed bridge would not include dedicated bicycle or pedestrian facilities, but would have a 10-foot-wide shoulder for use as an emergency lane. The proposed bridge would have a 42-inch-high barrier on the outside of each shoulder, which is the minimum barrier height for roadways with cyclists in accordance with the SCDOT Bridge Design Memorandum DM0113. The lower portion of the barrier would be constructed of concrete, while the upper portion would be a metal rail. While dedicated bicycle and pedestrian facilities would not be included in the proposed project, cyclists and pedestrians would be able to use the 10-foot-wide shoulder on the new bridge.

Several local plans identify US 21 between the City of Beaufort and Hunting Island State Park as a priority bicycle route, including the Lowcountry Long-Range Regional Transportation Plan (2007) and Beaufort County Comprehensive Plan (2010). The Beaufort County Trails and Blueways Master Plan, which is part of the County's 2010 Comprehensive Plan, proposes US 21 within the study area as a Spine Trail. Spine Trails are major corridors within the County that are envisioned for bicycling use by residents and tourists. These plans recommend the use of wide shoulders or bike lanes on priority routes. The Beaufort County Chamber of Commerce also identifies US 21 within the study area as a route for experienced bicyclists.

During and after the PIM on September 15, 2015 (Section 6.1), eight comments were received pertaining to bicycle and pedestrian options. Five comments recommended that the proposed project contain a walkway or bicycle trail so cyclists and pedestrians may safely travel over the bridge. Comments also suggested a bicycle and pedestrian trail on Hunting Island, a separated walkway, and a statement of general interest for bicycle and pedestrian accommodations.

US 21 within the study area consists of two travel lanes and 4-foot-wide paved shoulders. No dedicated bicycle or pedestrian facilities are currently on the bridge or causeway within the study area. The rural nature of the study area likely limits pedestrian use of US 21 to Harbor Island or Hunting Island State Park visitors. Bicyclists have been observed riding on the US 21 shoulder within the project area. The dedicated bicycle lane on US 21 terminates on the eastern end of St. Helena Island, approximately 8 miles from the proposed project. No plans have been identified to connect the existing bicycle facility with the proposed study area.

4.0 Navigation

The USCG Bridge Program ensures marine safety, security, and stewardship and has the authority to approve the location and plans of all new bridges, modifications of existing bridges, international bridges, and causeways in or over navigable waterways of the United States. Determining the vertical and horizontal clearance of the structure spanning the navigation channel is the focal point of the USCG permitting process. USCG authority for the permitting process is found in 33 United States Code (USC) §§ 401, 491, 525-533, the International Bridge Act of 1972 and various acts of Congress. The USCG cannot permit a structure to be built over Navigable Waters of the United States which does not provide for the reasonable needs of current and foreseeable future navigation.

4.1 What coordination has occurred with the USCG?

USCG coordination is included in Appendix A. A Letter of Intent (LOI) was emailed on June 23, 2015 to the USCG's Seventh Coast Guard District Bridge Office in Miami, Florida to notify the USCG of the commencement of the proposed project. The USCG District Bridge Office responded to the LOI on July 7, 2015 stating that the proposed bridge replacement would require a USCG Bridge Permit and that NEPA environmental documentation must be completed prior to issuance of the permit. On July 14, 2015, the USCG recommended that a navigation study and Bridge Project Questionnaire be completed in the early stages of the project to determine what type of structure the USCG would consider reasonably permittable.

The FHWA, in coordination with the USCG, determined that an USCG Bridge Permit would be required for the proposed project. On August 13, 2015, FHWA sent a letter to the USCG District Bridge Office inviting the USCG to become a cooperating agency for the Environmental Assessment of the proposed project. The USCG accepted the invitation to be a cooperating agency in a letter dated August 17, 2015.

On September 22, 2015, representatives from the FHWA, SCDOT, and USCG participated in a conference call to discuss the navigation study. Project schedule and methods of data collection were discussed. The USCG agreed their agency would review the navigation study and provide concurrence on the minimum proposed bridge height for the waterway. Representatives from the USCG also participated in an agency site visit on April 19, 2016.

4.2 What are the clearances of the existing bridge?

The Harbor River is a saltwater river that experiences a 6.1-foot tidal range. Figure 4-1 shows the National Oceanic and Atmospheric Administration (NOAA) navigation chart and approximate water depths for the waterways surrounding the study area. Based on a bathymetric survey of the Harbor River in the study area, the waterway at the existing swing span is approximately 33.8 feet deep and 1,835 feet wide at mean high water North American Vertical Datum of 1988 (NAVD88). The waterway narrows to approximately 27.1 feet deep and 1,415 feet wide at mean low water. The existing structure over the Harbor River is a swing-span bridge with a vertical clearance of approximately 15 feet when the swing span is closed. The horizontal navigational clearance is 60 feet between fenders.

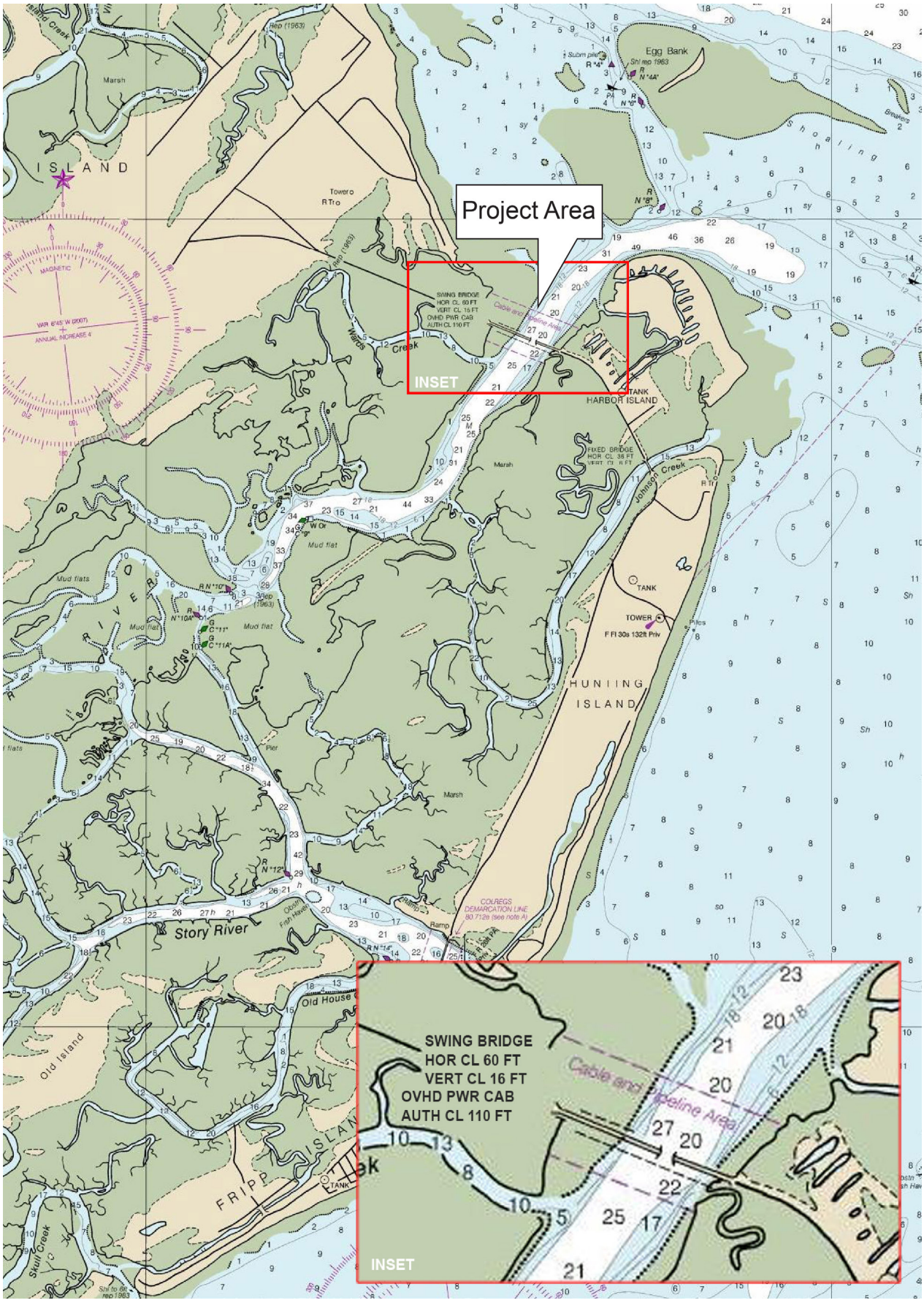

Figure 4-1 NOAA navigation chart

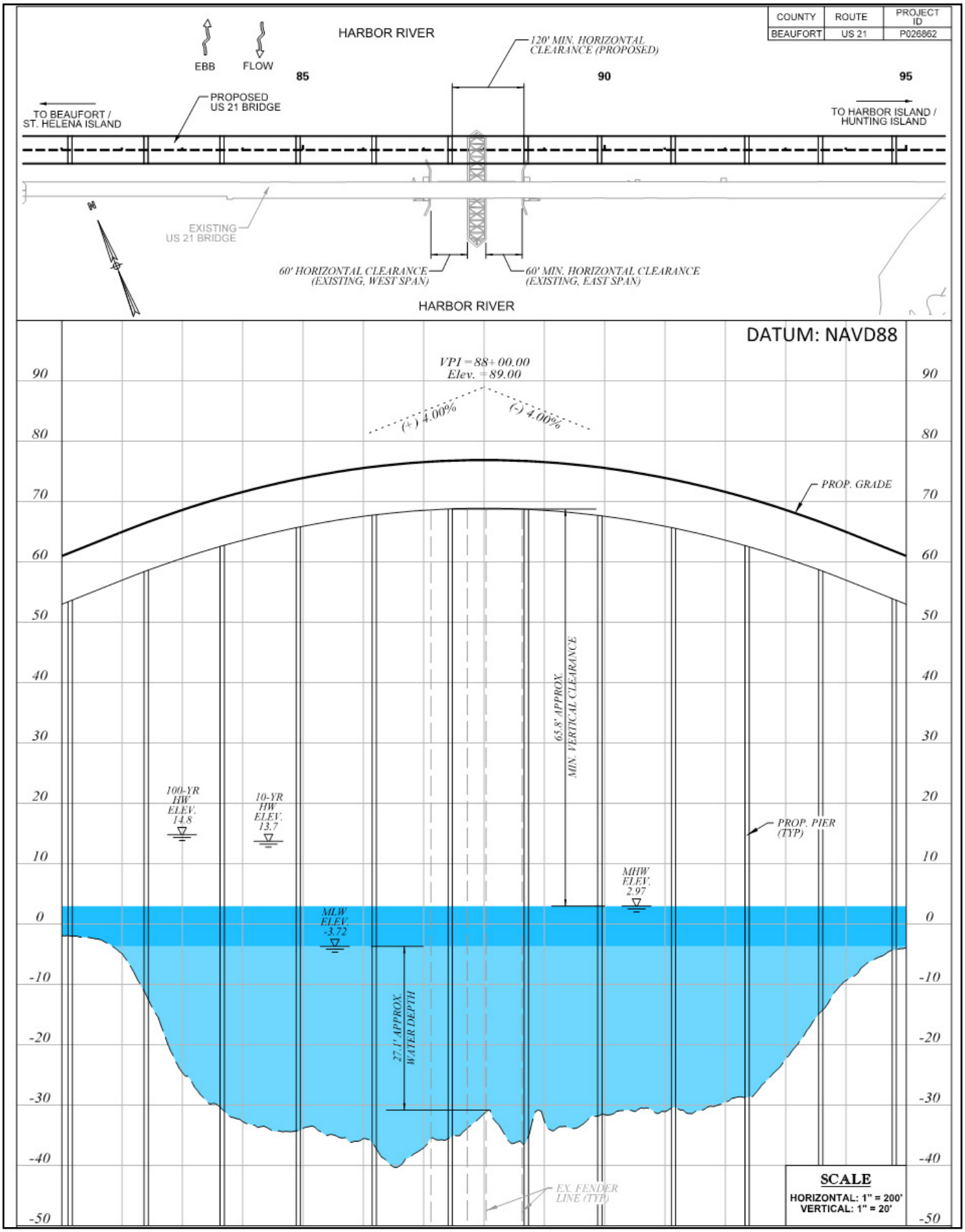

Figure 4-2 Proposed navigation clearance

4.3 What are the clearances of the proposed bridge?

The proposed bridge would provide a 65-foot vertical clearance through the main span at MHW. The proposed bridge would provide a 120-foot horizontal clearance between the piers through the main span, with a proposed 90-foot horizontal clearance between the fenders (Figure 4-2).

4.4 What were the results of the Navigation Study?

SCDOT and FHWA developed the proposed bridge clearances through coordination with the USCG. A Navigation Study (Appendix D) was prepared to evaluate the current and prospective navigation on the Harbor River at US 21. The Navigation Study was prepared in accordance with the USCG *Bridge Program Manual*, *Bridge Permit Application Guide*, and the *Reasonable Needs of Navigation* white paper (USCG 2012). The Navigation Study considered current and reasonably foreseeable future navigation. The Navigation Study and its recommendations were based on current facts and circumstances and may be amended if facts and circumstances surrounding the project change over time, or are discovered during the USCG permit application and public notice process.

The primary goal of the Navigation Study was to determine the types of navigational activities supported by the waterway near the proposed bridge project. The Navigation Study considers the waterway characteristics and limitations, nearby obstructions, waterway usage by commercial and recreational vessels, and navigation safety. The following data were used to determine current waterway usage on the Harbor River:

- Location of local marinas, boat ramps, and marine-dependent businesses
- US 21 Harbor River bridge opening logs (July 2014–December 2015)
- Completed questionnaires received from 44 residential dock owners, commercial vessels, and marinas and yacht clubs.
- Telephone interviews with local shrimping companies, sea rescue, marinas, and dock builders.

In addition, a camera system was installed between October 19, 2015 and November 30, 2015 that documented bridge openings on US 21 over the Harbor River. The on-site camera was calibrated by surveyed field measurements to estimate the approximate vessel height, as well as the estimated waterline elevation at the time of vessel crossing.

Figure 4-3 Shrimp boats on Ward Creek

The existing bridge opens frequently during the spring, summer, and fall months. Based on the data gathered above, shrimp boats are the primary vessel that require greater than 15-foot vertical clearance and the existing bridge to open (Figure 4-3). Except for winter months, shrimp boats use the Harbor River daily to access Saint Helena Sound and the Atlantic Ocean. Many of

the shrimp boats are docked at Gay Fish Company on Ward Creek or Dopson Seafood on Village Creek. The height of shrimp boats using the Harbor River varies between approximately 25 and 75 feet. These shrimp docks are zoned as Rural and Commercial Fishing Village Overlays by Beaufort County (see Section 5.1), which limits their current and future use to marine-related establishments that may require similar vertical clearances.

The study was provided to the USCG Bridge Program on January 26, 2016 to assist with determining the reasonable navigational clearance on Harbor River. The USCG Bridge Program responded on February 8, 2016, indicating that the USCG has no objections to SCDOT developing alternatives using the proposed navigation clearances determined by the Navigation Study.

4.5 What federal navigation permits would be required?

The construction of the proposed Harbor River Bridge would require a USCG Bridge Permit in compliance with Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. The USCG Bridge Permit application would be completed during final design of the proposed project. In addition to USCG permit conditions, the following stipulations would be followed:

- Timely notice of any and all events that may affect navigation shall be given to the USCG District Commander during construction of the proposed project.
- Upon completion of design and finalization of the location, the USCG shall be contacted regarding approval of lights and other signals that may be required under 33 CFR § 118. Approval of said lighting or waiver shall be obtained prior to construction.
- Upon completion of construction, SCDOT shall submit “as-built” drawings (8½ “ x 11”) showing clearances through the bridge and sufficient data to assist the USCG to prepare a completion report. This report would be used for USCG and other mariner publications.

4.6 What state navigation permits would be required?

A permit for construction in navigable waters, issued by the South Carolina Department of Health and Environmental Control (SCDHEC), is required for activities occurring in or above state navigable waters. State navigable waters include waters that may be navigated by small pleasure or fishing boats. The permits required by Sections 404 and 401 of the Clean Water Act (CWA) would serve as the state navigable waters permit and no separate application would be required.

4.7 How would bridge construction affect navigation on the Harbor River?

During construction of the new bridge, SCDOT would ensure that there would be no unreasonable interference with navigation. The vertical and horizontal clearance of the new bridge over the river’s channel would remain sufficient to maintain river navigation by vessels during construction. The location of each alternative was selected so that the existing swing span could remain in service during the construction.

Upon completion of the new bridge and the shifting of traffic onto the new bridge, the existing bridge would be removed in its entirety. The piers and substructures of the existing bridge would be removed to the natural river bottom in accordance with SCDOT standard specifications (Section 202.4.2.4).

Based on all of the information presented herein and in the Navigation Study, SCDOT determined that the project design would meet the reasonable needs of navigation for this section of the Harbor River.

5.0 Probable Impacts of the Project on the Environment

This section includes a discussion on the probable beneficial and adverse social, economic, and environmental effects of the preferred alternative on the surrounding human and natural environment and describes the measures proposed to mitigate potential adverse impacts. Environmental studies conducted on these alternatives indicate the absence of any significant impacts by the project on the surrounding environment. More in-depth discussions can be found in the enclosed environmental and technical studies in the Appendices. The following paragraphs provide a brief overview of environmental findings by topic.

5.1 Land Use

The study area consists of 338 acres bordering US 21, which connects St. Helena Island to Harbor Island in Beaufort County. The area surrounding the existing highway is predominantly marsh, creeks, shallows, and mudflats (USGS 1979). Developments in the study area include a commercial fishing and shrimping dock on St. Helena Island owned by the Gay Fish Company, a boat ramp with parking on Butcher's Road owned and maintained by Beaufort County, and the entrance to the Harbor Island and Harbor Key communities on Harbor Drive. Power lines owned by SCE&G run parallel to US 21 on the northern side of the causeway, crossing US 21 to the south adjacent to the existing bridge (Beaufort County 2015). The entrance to Hunting Island State Park is located approximately 0.8 mile east of the study area. Open Land Trust is a private, nonprofit organization aimed at preserving, protecting, and enhancing properties in Beaufort County. The Open Land Trust maintains conservation easements in the eastern portion of the study area on property owned by Harbor Island Owners Association (Figure 5-1), further protecting the tidal marsh surrounding the causeway and Harbor Key. As a private conservation easement, this area does not receive federal or state protection and is not considered a Section 4(f) resource. This easement is not part of the Beaufort County Rural and Critical Lands program.

5.1.1 How do planning documents define the growth boundary near the study area?

Beaufort County's 2010 Comprehensive Plan provides a vision for future land use and growth management policies in the county. Beaufort County's Community Development Code (or zoning code) guides development in accordance with the existing and future needs of the County and its Comprehensive Plan (Beaufort County 2016). The study area is included in the 2007 Northern Beaufort County Regional Plan, which delineates a future growth boundary that focuses new growth in well-defined areas, preserving rural land uses. The growth boundary generally includes the city of Beaufort, US Marine Corps Air Station Beaufort, town of Port Royal, Parris Island Marine Recruit Depot, and Lady's Island (Beaufort County 2007).

5.1.2 What is the existing land use and zoning?

The eastern section of the study area near the entrance to the Harbor Island and Harbor Key communities is zoned as existing planned unit development and designated in the County's land use maps as Neighborhood Mixed-use (Beaufort County 2010). Neighborhood mixed-use areas, like on Harbor Island and Harbor Key, encourage new development to be pedestrian-friendly and have a mix of housing types. Beaufort County (2010) does not envision these neighborhood residential areas expanding beyond their current boundaries.

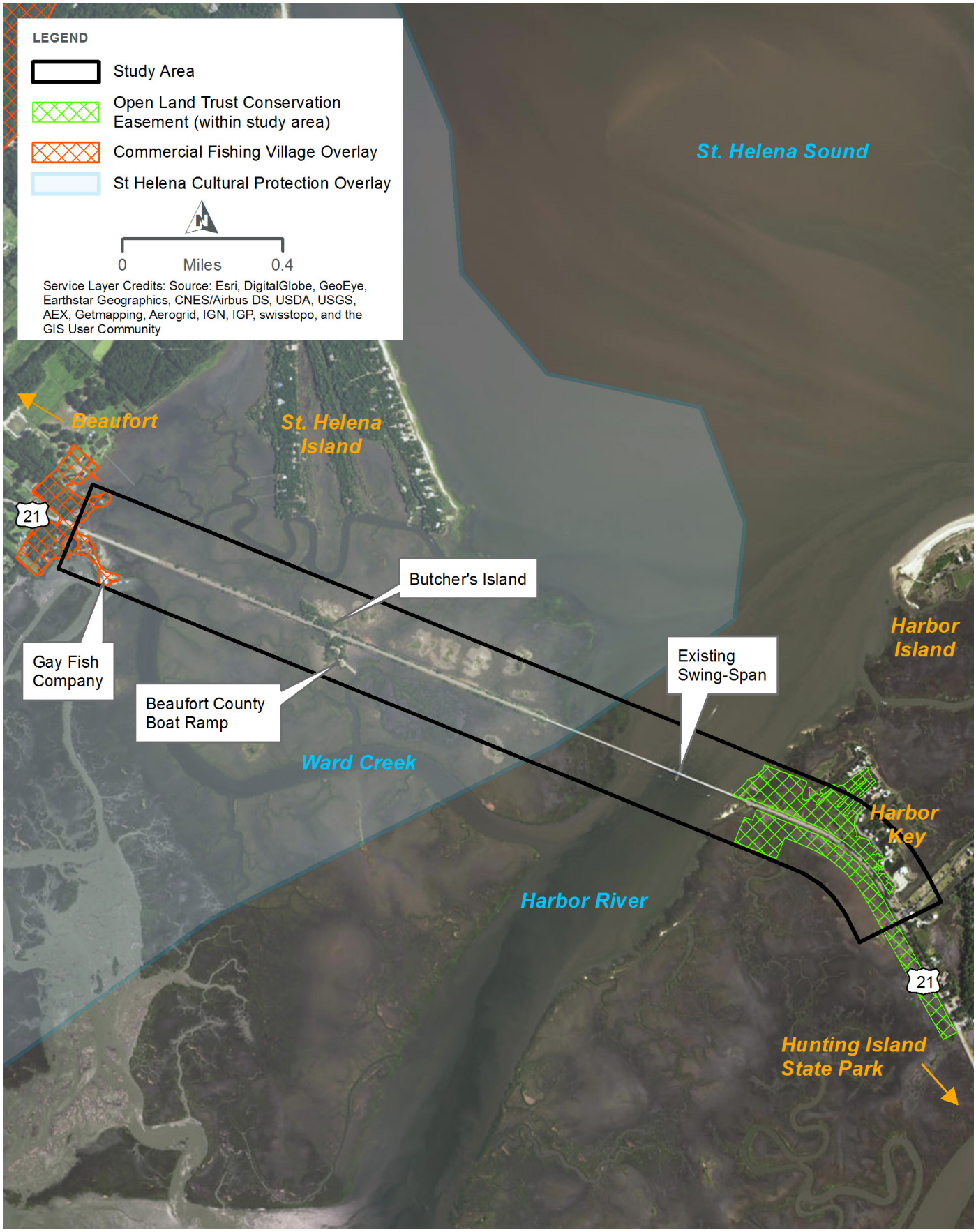

Figure 5-1 Land use

St. Helena Island in the western portion of the study area is zoned as rural (Beaufort County 2010). Public infrastructure development should only be considered in rural designations where there is "a documented health, safety, and/or welfare condition" (Beaufort County 2010). Beaufort County has also designated St. Helena Island part of a Cultural Protection Overlay (CPO) District (Figure 5-1) because of its traditional cultural landscape, rural characteristics, and notable concentration of Gullah culture. The CPO District was established to protect natural and cultural resources on St. Helena Island from encroaching development pressures (Beaufort County 2016). Development of gated communities, golf courses, and/or resort properties is discouraged within the CPO District (Beaufort County 2016).

Gay Fish Company is located in the western portion of the study area on St. Helena Island and on properties zoned by Beaufort County as a Commercial Fishing Village (CFV) Overlay District (Figure 5-1). Permitted uses within the CFV Overlay District include marine retail or service establishments, restaurants, marine-related educational facilities, commercial docks, fish houses, boat charters, and boat landings. Conditional and special uses in the CFV Overlay District include marine storage and repair facilities, ice houses, large wholesale fish houses, fuel storage facilities, marine construction facilities, and jellyfish processing facilities (Beaufort County 2016).

The study area has a low potential for growth and development because of the extensive tidal wetlands, floodplains, and zoning designations. St. Helena Island, Harbor Island, Fripp Island, and Hunting Island are located outside of the growth boundary for Northern Beaufort County (Beaufort County 2010).

5.1.3 How would the project affect land use within the study area?

The proposed project would require acquisition of surrounding property for right-of-way; however, these right-of-way acquisitions would not impact the County's future land use considerations. The current bridge would remain in place and operational until completion of the project regardless of the selected alternative. The proposed project would benefit surrounding land uses by providing a connection between St. Helena Island and Harbor Island that meets SCDOT design standards.

The proposed project is compatible with existing zoning, overlay districts, and future land use.

The proposed bridge would not include additional travel lanes and would not promote development that conflicts with the rural, neighborhood existing mixed-use, or CPO Districts. The project is also compatible with the Beaufort County CFV Overlay District because the proposed 65-foot bridge height would accommodate a variety of marine uses on the designated properties. If Gay Fish Company were sold, the bridge height would accommodate most uses allowed under the CFV Overlay District's development guidelines.

The proposed bridge replacement would impact approximately 4.1 acres that is under an Open Land Trust conservation easement. SCDOT coordinated with Open Land Trust during the LOI to obtain a copy of the conservation easement. Impacts to the easement would be processed during right-of-way acquisitions in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 USC § 4601 et seq.) (see Section 5.18).

5.2 Farmlands

5.2.1 How is farmland protected?

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 or 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.

5.2.2 What are the types and the amounts of protected farmland soils in the study area?

The proposed bridge replacement would not involve any farmland being converted to nonagricultural use. Through the farmland classifications provided by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), it has been determined that the study area would not involve lands protected under the FPPA.

The study area does not include lands protected under the Farmland Protection Policy Act.

Table 5-1 Soils within the study area

Soils unit	Rating	Acres within study area	Percentage of study area
Bohicket	Not prime farmland	0.3	0.1
Capers	Not prime farmland	227.7	67.5
Fripp-Baratari	Prime farmland if irrigated and drained	18.5	5.5
Ridgeland	Prime farmland if irrigated	3.0	0.9
Water	Not prime farmland	88.1	26.1

Source: USDA NRCS 2015.

5.3 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 waterbodies 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 US Environmental Protection Agency (EPA) 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.

5.3.1 What drainage basin is the study area located within?

The study area is located in the Salkehatchie River Basin and the Salkehatchie Coastal Frontage watershed, designated by the US Geological Survey as Hydrologic Unit Code (HUC) 03050210-01. The Salkehatchie Coastal Frontage watershed encompasses 73 square miles that flow through the Coastal Zone region of Beaufort County (SCDHEC 2016a). The watershed consists of the Harbor River and a series of inlets that drain directly into the Atlantic Ocean. The majority of the watershed includes a collection of sea islands and Hunting Island State Park.

5.3.2 What existing surface waters are located in the study area?

Surface waters in the study area include Harbor River and Ward Creek. Harbor River between St. Helena Sound and Fripp Inlet is classified by SCDHEC as an Outstanding Resource Water (ORW) (SCDHEC 2012). Class ORW includes saltwaters that constitute an outstanding recreational or ecological resource.

St. Helena Sound and Ward Creek are classified by SCDHEC as Shellfish Harvesting Waters (SFH), which are tidal saltwaters protected for shellfish harvesting. SFH waters are suitable for recreation, crabbing, and fishing, as well as the survival and propagation of a balanced native aquatic community of marine fauna and flora (SCDHEC 2014a). However, SCDHEC may designate prohibited areas where shellfish harvesting for market purposes or human consumption shall not be allowed. Additional information about shellfish beds within the study area can be found in Section 5.11.2.

5.3.3 What is the existing water quality of the surface waters in the study area?

In addition to determining water quality classifications and standards, SCDHEC develops a priority list of waterbodies that do not currently meet State water quality standards pursuant to Section 303(d) of the CWA and 40 CFR § 130.7. It is commonly referred to as the 303(d) List of Impaired Waters and can be obtained from SCDHEC, Bureau of Water.

SCDHEC monitors the Harbor River water quality at a shellfish monitoring station (16B-06) and an ambient water quality monitoring site (RO-11310) located approximately 2 miles south, or upstream of the US 21 bridge over Harbor River (SCDHEC 2016b). Station RT-09099 is located in Ward Creek, just upstream of the Beaufort County boat ramp. Station RO-01163, located in St. Helena Sound, is the water quality station closest to the US 21 bridge over Harbor River (Figure 5-2).

The SCDHEC water quality monitoring stations within Harbor River and Ward Creek are not listed for impairments. Station RO-01163 in St. Helena Sound was listed in the 2014 edition of the 303(d) list for turbidity impairments that affect aquatic life use (SCDHEC 2014b).

5.3.4 Are there Wild and Scenic Rivers in the study area?

None of the waterbodies in the study area are federally listed as wild and scenic rivers or part of the SCDNR State Scenic River Program.

5.3.5 How would the project affect water resources and water quality?

The Harbor River is considered an ORW and is not listed for water quality impairments. The proposed bridge replacement project is not expected to adversely affect water quality in the Harbor River, or exacerbate turbidity impairments in St. Helena Sound.

Temporary Construction Impacts

Siltation and turbidity may occur in the river and creek beds as sediments are disturbed during construction of the bridge pilings. However, this increase would be temporary and would likely dissipate within a few hours of completion of each piling. There is also the potential for erosion of soils from the construction of the new bridge approaches. In addition, the following impacts to surface water resources could result from the construction activities:

- Increased nutrient loading during construction via runoff from exposed areas
- Increased concentrations of toxic compounds from roadway runoff
- Increased potential for release of toxic compounds such as fuel and oil from construction equipment and other vehicles

Figure 5-2 Salkehatchie watershed

Direct impacts to water quality as a result of project construction would be limited to the area within the construction limits. The contractor would be required to minimize impacts to water quality through implementation of construction best management practices (BMPs) reflecting policies contained in 23 CFR § 650 B and SCDOT's *Supplemental Specifications on Seeding and Erosion Control Measures* (November 11, 2008).

The proposed project may have temporary impacts on water quality during construction. BMPs and erosion and sediment control would minimize temporary impacts.

Long-Term Impacts

Under the No-build alternative, stormwater runoff on the existing bridge would continue to drain directly into the Harbor River.

The proposed project would not impact water quality in the Harbor River. Direct impacts to deep water habitats, such as those found in the Harbor River, would be limited to the construction of bridge support structures, such as drilled shafts and concrete columns. The proposed bridge would be wider and longer than the existing bridge to meet current design standards, which would result in an increase in impervious surface in the study area. An increase in stormwater runoff volume may occur because of the proposed wider roadway. However, traffic capacity is not expected to increase over the "No-build" alternative because the purpose of the project is to replace the existing two-lane bridge with another two-lane bridge. Vehicle-related contaminants in the runoff should not increase as a result of the build alternatives.

Stormwater on the existing bridge flows through deck drains into the Harbor River and surrounding waters. To minimize the potential for water quality impacts, SCDOT is proposing to treat stormwater runoff from the proposed bridge and roadway prior to discharge into waters surrounding Harbor River. Stormwater would not be discharged within 1,000 feet of a shellfish bed. During final design of the proposed bridge, SCDOT would submit a drainage plan to SCDHEC and SCDHEC Ocean & Coastal Resource Management (OCRM) prior to finalizing construction plans.

Stormwater runoff would be treated prior to discharge into the surrounding waters.

Through the use of required BMPs, erosion control methods, the use of SCDOT designated seeding requirements, and by treating stormwater runoff, the proposed bridge replacement is not anticipated to adversely affect water quality in the study area.

5.4 Wetlands and Waters of the US

5.4.1 What are wetlands?

The study area crosses the Harbor River, as well as extensive tidal salt marsh. Wetlands are described by 33 CFR § 328.3(b) [1986] as:

> *Those areas that are inundated or saturated by groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.*

Wetlands generally include swamps, marshes, and similar areas. USACE utilizes specific hydrologic, soil, and vegetation criteria in defining the boundary of wetlands. Tidal wetlands and waters are regulated as "Critical Area" by SCDHEC-OCRM. Tidal wetlands and waters are also considered waters of the United States (herein, waters of the US). Tidal waters of the US are regulated by USACE under Section 10 of the Rivers and Harbors Act of 1899, which permits certain activities within navigable waters, including those subject to the ebb and flow of the tide.

5.4.2 What wetlands are located within the study area?

Jurisdictional areas within the study area were delineated on June 11, 12, and 18, 2015. The delineation was reviewed in the field by the SCDHEC-OCRM. SCDHEC-OCRM signed a survey plat of the wetland and waters boundaries on February 22, 2016. The USACE Charleston District verified the delineation (SAC-2015-00964) on March 15, 2016 (Appendix A).

No freshwater wetlands were identified within the study area; all the wetlands and waters of the US within the study area are considered Critical Area by SCDHEC-OCRM and Section 10 Waters by USACE. The study area contains tidal marsh and tidal open waters, which includes Harbor River, Ward Creek, unnamed tidal creeks, and tidal ponds. In the eastern portion of the study area, tidal open water or marsh areas appear to have been created as a result of excavation during the development of the Harbor Key community. These areas are now saltwater or brackish ponds that are connected to the adjacent tidal marsh through culverts or berm breaches.

The tidal creeks and salt marshes are of high value, but are relatively abundant surrounding the study area and in coastal areas of South Carolina. The saltwater or brackish ponds on Harbor Key, while man-made, provide high value to wildlife.

5.4.3 What kind of impacts would occur to wetlands as a result of the proposed project?

Replacement of the bridge and approaches would cross tidal wetlands, therefore permanent and temporary impacts to wetlands are unavoidable. All of the proposed build alternatives would impact salt marsh. The preferred alternative would result in direct impacts to approximately 5.9 acres of salt marsh wetlands. This estimate includes permanent and temporary impacts to the proposed ROW boundary. Wetland impacts would be refined during final design.

Fill used to construct the new bridge approaches would directly impact the salt marsh. Existing, disturbed causeway would be used to the greatest extent practicable to minimize impacts to the salt marsh. The marsh would also be adversely affected by construction of columns used to support the bridge. Nine-foot diameter columns were used for the purpose of estimating direct wetland impacts. Fill associated with the proposed project would not directly impact tidal open waters; Harbor River and its tidal creek tributaries would be spanned by the proposed bridge.

The proposed project would fill approximately 5.9 acres of salt marsh. Temporary impacts may occur to provide construction access and install erosion and sediment control.

Temporary impacts to tidal wetlands would also occur during construction. Temporary work trestles supported by 24-inch diameter steel piles may be installed over the tidal marsh. Temporary clearing and disturbance within the salt marsh to install erosion and sediment control measures, such as silt fence may occur. Timber mats and/or barges may cause temporary impacts to salt marsh during construction.

5.4.4 How would wetland impacts be avoided and minimized?

The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's Waters. Toward achievement of this goal, the CWA prohibits the discharge of fill material into waters of the US unless a permit issued by USACE authorizes such a discharge (see Section 5.5). The 1990 Memorandum of Agreement (MOA) between EPA and USACE established a three-step process to (1) avoid, (2) minimize, and (3) mitigate impacts to wetlands and waters of the US. Wetlands were given special consideration during development and evaluation of this project.

Avoidance

Wetlands would be adversely affected by the addition of fill at the bridge approaches and construction of the bridge support structures. There are no practicable alternatives to the proposed new construction in these wetland areas; therefore, the proposed action would include all practicable measures to minimize harm to wetlands that may result from construction. In addition, SCDOT would comply with Executive Order 11990 regarding protection of wetlands by continuing to minimize impacts as the design becomes more complete.

Minimization

The proposed project would be constructed through Design Build procurement, which encourages the contractors to avoid and minimize wetlands impacts to reduce mitigation costs. The project would utilize, to the extent practicable, the existing causeway fill to minimize the taking of wetlands throughout the project. Proposed causeway may be partially replaced by flat slab to reduce fill in the wetlands. Implementing erosion control measures, which include seeding of slopes, silt fences, and sediment basins as appropriate, would also minimize impact to adjacent wetlands. Additional BMPs would be required of the contractor, as needed, to ensure compliance with policies reflected in 23 CFR § 650 B and SCDOT's *Supplemental Specifications on Seeding and Erosion Control Measures*. Reclamation of wetland areas temporarily lost through construction activities would involve returning disturbed areas to their original elevations to the extent practicable and allowing adjacent vegetation to naturally reclaim the area.

Wetland impacts would be minimized and mitigated during final design.

Mitigation

Compensatory mitigation is the third step in a sequence of actions that must be followed to offset impacts to aquatic resources. Adverse impacts to waters of the US typically require compensatory mitigation, including purchase of credits from mitigation banks, on-site and off-site permitee-responsible mitigation, and in-lieu fee mitigation.

USACE is responsible for determining the appropriate form and amount of compensatory mitigation required. Salt marsh is the only wetland type that would be adversely affected by the proposed project. Based on 5.9 acres of wetland impact associated with the proposed project, approximately 80 salt marsh credits would be required as compensatory mitigation for the proposed project. The required number of wetland mitigation credits is based on the USACE's Required Wetland Mitigation Credit Worksheet, which accounts for the type, priority, and condition of impacted wetlands, duration of impact, type of impact, and cumulative impact.

Multiple mitigation banks are available to provide mitigation services to the project; however, it is unknown whether these mitigation banks would have the capacity to provide 80 salt marsh credits during Section 404 permitting. At this time, SCDOT would deduct the salt marsh mitigation credits from their Huspa Creek Mitigation Bank, located in Beaufort County. Specific details of compensatory mitigation would be coordinated with USACE during the permitting process. If Huspa Creek Mitigation Bank does not have available mitigation credits at the time of Section 404 permitting, mitigation may need to be obtained from privately-owned salt marsh mitigation banks and/or generated through a permittee-responsible mitigation plan.

5.5 Environmental Permits

5.5.1 What federal environmental permits would be required for the proposed project?

Section 404 Permit

The proposed project would require a USACE Section 404 Individual Permit. Section 404 of the CWA authorizes USACE to issue permits regulating the discharge of dredge or fill material into waters of the US. The Section 404 permit along with the concurrent Section 401 Water Quality Certification, issued by SCDHEC Bureau of Water, and the Coastal Zone Consistency Determination, issued by SCDHEC-OCRM, would be addressed through a joint application process with USACE as the lead agency.

EPA 404(b)1 Guidelines

EPA established guidelines, known as the 404(b)1 guidelines, that establish criteria used to evaluate activities regulated under Section 404 of the CWA. According to the 404(b)1 guidelines, fill material cannot be permitted in wetlands or waters of the US if a practicable alternative would have less adverse impact on the aquatic ecosystem, as long as the alternative does not have other significant adverse environmental consequences. The preferred alternative would impact the fewest acres of wetlands compared to the other build alternatives; therefore, the proposed bridge replacement would comply with EPA's 404(b)1 guidelines.

Public Interest Review Factors

USACE considers many factors when evaluating a Section 404 permit application, including probable impacts on the public interest (33 CFR § 320.4). The benefits and disadvantages of a project are weighed during the permit application review. The preferred alternative would have negligible or no effect on land use, floodplains, fish and wildlife values, recreation, shore erosion and accretion, energy needs, mineral needs, or food and fiber production. The preferred alternative is expected to have an overall beneficial effect on economics, navigation, water quality, safety, and the needs and welfare of people. Replacing the bridge would impact conservation areas (easements), wetlands, the historic bridge, and aesthetics.

US Coast Guard Bridge Permit

The construction of the proposed Harbor River Bridge would require a USCG Bridge Permit in compliance with Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946.

A Clean Water Act Section 404 Permit and USCG Bridge Permit are required for this project.

5.5.2 What state environmental permits would be required for the proposed project?

Section 401 Water Quality Certification

The proposed project would require CWA Section 401 Water Quality Certification. Water quality standards are an effective tool available to states to protect the overall health of wetlands resources and the valuable functions they provide including shoreline stabilization, nonpoint source runoff filtration, wildlife habitat, and erosion control, which directly benefit adjacent and downstream waters. SCDHEC Bureau of Water administers the Water Quality Certification program, pursuant to Section 401 of the Federal Water Pollution Control Act of 1972 as amended by the CWA Act of 1977 and the Water Quality Act of 1987. Certification is required for activities permitted by USACE

for construction occurring in navigable waters or discharge of dredged or fill material into the state's waters. This certification assures the project would comply with state water quality standards.

Critical Area Permit and Coastal Zone Consistency Determination

SCDHEC-OCRM is responsible for protecting the state's coastal zone and critical areas. The coastal zone includes all lands and waters in the eight coastal counties of South Carolina. The critical areas are the coastal waters, tidelands, beaches and beach/dune systems. The proposed project is located in a coastal county and is expected to involve impacts to critical areas. Therefore, SCDHEC-OCRM must provide a Critical Area Permit and coastal consistency determination to ensure the project would be consistent with the local management program.

NPDES Construction General Permit

A NPDES permit pursuant to Section 402 of the CWA would be required for construction activities. Section 402 of the CWA formed NPDES, which regulates pollutant discharges, including stormwater, into waters of the US. An NPDES permit sets specific discharge limits for point-source pollutants into waters of the US and outlines special conditions and requirements for a particular project to reduce impacts on water quality. NPDES permits require that the project be designed to protect waters of the US, that erosion control BMPs be implemented, and that a Stormwater Pollution Prevention Plan (SWPPP) be prepared for construction activities exceeding 1 acre of ground disturbance. SCDHEC is responsible for managing the NPDES program to ensure stormwater runoff during construction would not have an adverse effect on water quality.

5.6 Floodplains

5.6.1 What is a floodplain?

The 100-year floodplain is defined and regulated by the Federal Emergency Management Agency (FEMA) as the area adjacent to any particular waterway that would be inundated by the base flood, an event that has a 1-percent chance of occurring in any given year. Development within the floodplain must meet requirements set forth by FEMA for the National Flood Insurance Program (NFIP).

5.6.2 Is the study area within a floodplain?

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 Harbor River. The study area is located in FIRM panels 4500250135E and 4500250162E (both dated November 4, 1992) in Beaufort County. The entire study area is located within a FEMA 100-year floodplain where base flood elevations and flood hazard factors have been determined.

5.6.3 What floodplain designations are present in the study area?

The special flood hazard areas inundated by the 100-year flood have different designations depending on the flood hazard posed and the type of direct impact conducted to determine the flood elevations. The western portion of the study area near Gay Fish Company Road and Butchers Island is in Zone A9 with a base flood elevation between 14 and 16 feet. The eastern portion of the study area near Harbor Road is in Zone A10 and A11 with a base flood elevation between 15 and 16 feet.

The FEMA FIRM's designate the Harbor River and portions of Ward Creek as Zone V12, or areas of 100-year coastal flood with velocity (wave action). Base flood elevations in these zones are between 16 and 18 feet.

Because base flood elevations have been established for the floodplains in the study area, FEMA requirements limit encroachment in the 100-year floodplain to activities that do not increase the base flood elevation by more than one-tenth foot, rounded to the nearest one-tenth foot, or “no-rise”.

5.6.4 How will the proposed bridge affect floodplains and flood elevations?

Preliminary hydraulic analyses were conducted for each alternative to determine potential water surface elevations during coastal floods (Appendix F). The project was designed so the proposed bridge low chord would be at least 2 feet above the 10-year wave height elevation.

The proposed bridge would be longer than the existing bridge, which would further minimize potential impacts to the floodplain. The project is not expected to be a significant longitudinal encroachment as defined under the Code of Federal Regulations for the Location and Hydraulic Design of Encroachments on Floodplains (23 CFR § 650A).

The proposed project would not cause a rise in water surface elevations or adversely effect the surrounding floodplain.

The proposed project has also been developed in accordance with Executive Order 11988 for Floodplain Management, which states that agencies will minimize the potential impacts of flooding and restore and preserve the natural and beneficial values served by floodplains when implementing federally assisted construction and improvements.

The proposed bridge is not anticipated to cause a rise in water surface elevations or adversely affect the base floodplain elevation. Final hydraulic design will be completed in accordance with SCDOT guidance and FEMA regulations during final design of the project. Final hydraulic reports will be coordinated with the Beaufort County floodplain administrator. A copy of the Bridge Replacement Scoping Trip Risk Assessment Form is located in Appendix F.

Figure 5-3 Salt marsh communities adjacent to US 21 bridge over Harbor River

5.7 Wildlife and Plant Communities

5.7.1 What wildlife and plant communities exist within the study area?

The study area crosses the Harbor River, as well as extensive tidal creeks, flats, and salt marsh wetlands (Figure 5-3). Salt marsh vegetation includes bushy seaside tansy (*Borrichia frutescens*), smooth cordgrass (*Spartina alterniflora*), glasswort (*Salicornia virginica*) and black needlerush (*Juncus roemerieanus*). Man-made tidal and brackish ponds are located in the eastern portion of the study area on Harbor Island. The tidal creeks and deepwater habitats of the Harbor River include many species of fish, turtles, and other water dependent animals, including bottlenose dolphins.

Terrestrial or upland habitats adjacent to the salt marsh primarily consist of the US 21 causeways, Butcher's Island, and property surrounding Gay Fish Company. In the eastern portion of the study area, the Harbor Key residential community comprises most of the upland area. Butcher's Island and small islands near Harbor Key have characteristics of hammock islands, which are small islands surrounded by salt marsh that are typically found behind sea islands (SCDNR 2005a). Vegetation observed on the uplands includes eastern baccharis (*Baccharis halimifolia*), red cedar (*Juniperus virginiana*), live oak (*Quercus virginiana*), and saw palmetto (*Serenoa repens*) (Figure 5-4). Mammals such as white-tailed deer, American mink, red fox, and raccoons may occupy these upland areas.

Figure 5-4 Upland areas

Traveling eastbound on US 21 in the study area, a sign alerts motorists to the presence of diamondback terrapins (*Malaclemys terrapin*) (Figure 5-5). This small, long-lived reptile occupies both terrestrial and tidal marsh habitats. Terrapins nest on land and require access to dry soft sand/soil to deposit their eggs (SCDNR 2005b). Terrapins are not federally or state-listed species; however, the status of most diamondback terrapin populations is unknown or declining (Seigel and Gibbons 1995). Terrapin mortality is accelerated by the loss or degradation of nesting habitat resulting from coastal development. Vehicle inflicted mortality of females during the nesting season is common where a highway separates nesting sites from tidal creeks. Mortality is also associated with mowing of causeway shoulders (SCDNR 2005b).

Figure 5-5 Terrapin crossing

5.7.2 How would the project impact wildlife and plant communities?

Fragmentation and loss of wildlife habitat is an unavoidable consequence of highway development. The salt marsh and tidal creeks surrounding Harbor River have been partially fragmented due to the construction of the original US 21 causeway and bridge. Based on a review of available aerial photography and field observations, the existing US 21 causeway is the only

significant break in the salt marsh habitat for miles upstream and downstream from US 21. The proposed bridge would be longer than the existing bridge, which would minimize existing habitat fragmentation in the study area.

The proposed project is not expected to result in significant adverse impacts to terrestrial or aquatic wildlife. The project would not add travel lanes to the roadway or widen the existing roadway. Temporary, short-term displacement of local wildlife, including diamondback terrapins, would likely occur during initial construction. Most local species are habituated to human disturbances from the existing roadway and are expected to move back into the vicinity of the construction area upon project completion.

The proposed project avoids upland hammocks found on Butcher's Island and near Harbor Key. The proposed project would impact an upland area on the northeastern side of US 21 that contains live oaks and saw palmettos. Direct impacts to marsh communities are expected to be limited to areas of fill to construct the new bridge approaches. Existing, disturbed causeway would be used to the greatest extent practicable to minimize impacts to the salt marsh.

The proposed project would impact salt marsh and upland hammock vegetation communities. Upland hammocks on Butchers Island and Harbor Key would be avoided.

5.8 Migratory Birds

5.8.1 How are migratory birds protected?

The Migratory Bird Treaty Act (MBTA) makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. The migratory bird species protected by the MBTA are listed in 50 CFR § 10.13. The United States Fish and Wildlife Service (USFWS) has statutory authority and responsibility for enforcing the MBTA (16 USC § 703–712). Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by USFWS.

5.8.2 What migratory birds exist within the study area?

The USFWS Information for Planning and Conservation (IPaC) report was used to identify potential migratory birds within the study area. USFWS IPac identifies 42 species of migratory birds that may occur within the study area. The Biological Assessment for USFWS (Appendix G) includes the iPaC report and provides a detailed analysis of potential impacts to migratory birds.

The National Audubon Society designated several Beaufort County barrier islands, including Harbor Island (within the study area), as an Important Bird Area. The National Audubon Society's Important Bird Area program is a global effort to identify areas that are most important for maintaining bird populations, and focus conservation efforts at protecting these sites. This designation is intended to identify and protect habitat for resident and migrating birds (Nahmias 2010).

Nests

A raptor nest was identified in the eastern portion of the study area, on the southern side of US 21 near Harbor Drive (Figure 5-6); see Section 5.9 for additional details about this nest. A nest platform is located on Butchers Island, north of US 21 near the Fripp Island pump station. The metal pole and platform appears to have been constructed for use by osprey (*Pandion haliaetus*), which typically use these elevated, exposed structures to locate fish and protect their eggs from terrestrial

predators (Center for Conservation Biology 2016). No nesting activity has been observed at this platform.

Bridge piers can provide suitable nesting areas for barn swallows (*Hirundo rustica*). In September 2014, biologists reviewed underneath the existing US 21 bridge to determine if bird nests were present. No nests or barn swallows were observed during this field visit.

Waterbird Colonies

The SCDNR Heritage Trust Inventory of Rare, Threatened and Endangered Species identifies a waterbird colony and egg bank near the confluence of Harbor River and St. Helena Sound, just north of the study area (SCDNR 2016). The egg bank is a sandbar that supports colonies of waterbirds, including Black Skimmers, Royal Terns, Brown Pelicans, Least Terns, and Laughing Gulls. Least Terns are designated State Threatened by SCDNR, while Brown Pelicans (*Pelecanus occidentalis*) are considered a rare, imperiled species by SCDNR.

A waterbird rookery is located within the study area on Harbor Key. The man-made brackish pond is surrounded by houses, but shrubs and trees support a diverse nesting area for egrets and herons.

The proposed project would not directly impact the rookery at Harbor Key.

5.8.3 How would the project avoid impacts to migratory birds?

The proposed project would not impact the nest near Harbor Drive, the nest platform on Butcher's Island, the waterbird colony and egg bank in Saint Helena Sound, or the rookery on Harbor Key. During construction, SCDOT would comply with the MBTA of 1918 in regard to the avoidance of taking of individual migratory birds and the destruction of their active nests. Prior to construction/demolition of the bridges, the Resident Construction Engineer (RCE) would coordinate with SCDOT Environmental Services Compliance Office to determine if any active nests are on the bridge. After this coordination, it would be determined whether construction/demolition could begin. After construction/demolition has begun, measures can be taken to prevent birds from nesting, such as screens, noise producers, and deterrents. If during construction or demolition a nest is observed on the bridge that was not discovered during the biological surveys, the contractor would cease work at the nest location and immediately notify the RCE, who would contact SCDOT Environmental Services Compliance Office. SCDOT biologists would determine whether the nest is active and the species using the nest. After this coordination, it would be determined whether construction/demolition could resume or whether a temporary moratorium would be put into effect.

5.9 Bald Eagle

Bald eagles (*Haliaeetus leucocephalus*) were removed from the endangered species list in August 2007 because their populations recovered sufficiently from extinction threats. Bald eagles are now protected under the MBTA and the Bald and Golden Eagle Protection Act (BGEPA). Bald eagle nests are generally close to waterbodies and coastal marshes, which provide foraging habitat. Nests may be used year after year or may be alternated with another nest in successive years. Bald eagles have been observed at Harbor Island and Hunting Island State Park (Ebird 2016).

A raptor nest was identified in the eastern portion of the study area, on the southern side of US 21 near Harbor Drive (Figure 5-6). The large nest, located in a pine tree, was a suitable size for a bald eagle. The nest was monitored monthly for activity from September 2014 to May 2015, and from September 2015 to December 2015, which corresponds to the bald eagle nesting season in South

Carolina. No activity was observed. During a site visit on April 19, 2016, the nest had deteriorated and was no longer present. During a site visit on May 20, 2016, the nest was partially rebuilt.

The proposed project would not impact any bald eagle nests; however, the proposed construction would affect tidal waters and marshes that provide foraging habitat for bald eagles in the area.

The contractor would conduct surveys for migratory bird nests and bald eagle nests prior to construction.

Qualified personnel hired by the contractor would monitor the nest located approximately 150 east of US 21 and Harbor Drive monthly between October 1 and May 15 (bald eagle nesting season). Construction personnel would be qualified to identify eagles and nests, and instructed to report any sightings of potential nests not previously identified. If the nest on US 21 becomes active or a bald eagle nest is identified within 660 feet of the project prior to or during construction, SCDOT would re-initiate consultation with the USFWS in accordance with the BGEPA and MBTA and would adhere to the USFWS *National Bald Eagle Management Guidelines*. The contractor would work with the SCDOT and USFWS to develop a *Bald Eagle Zone Management Plan* that would restrict construction work within 660 feet of the active nest during the nesting season, where practicable, and require the contractor to minimize noise, lighting, and night time work within the management zone.

5.10 Threatened and Endangered Species

Federally threatened and endangered species were evaluated in accordance with the legal requirements set forth under the Endangered Species Act (ESA) of 1973 (16 USC § 1536). An “endangered species” is defined as any species in danger of extinction throughout all or a significant portion of its range. A “threatened species” is defined as any species likely to become an endangered species in the foreseeable future. Under the ESA, documentation is required to demonstrate that actions undertaken, funded, and/or permitted or licensed by a federal agency, such as FHWA, would not adversely affect the existence of any federally threatened or endangered species. Section 7 of the ESA sets forth the guidelines for the consultation process with USFWS and NOAA National Marine Fisheries Service (NMFS) Protected Resources Division. Through these processes, Section 7 of the ESA ensures 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.

Coordination with USFWS and NOAA-NMFS is located in Appendix A. Biological Assessments submitted to USFWS and NOAA-NMFS can be found in Appendices G and H, respectively. The West Indian (Florida) manatee is also protected under the Marine Mammal Protection Act (MMPA) as discussed in Section 5.12.

5.10.1 What federal- and state-protected species may occur within the study area?

Table 5-2 provides a list of the federal- and state-listed threatened and endangered species that may occur within the study area. The list of federally-protected species within the study area was obtained from the USFWS IPaC website. SCDNR’s list of Rare, Threatened, and Endangered Species and Communities Known to Occur in Beaufort County, SC (dated June 11, 2014) also was consulted.

Biological Assessments (Appendix G and H) were conducted to determine whether the proposed project would affect any of the threatened or endangered species listed under the jurisdiction of the USFWS and NOAA-NMFS occurring within or in proximity to the study area. Prior to field surveys,

SCDNR's Geographic Information Systems (GIS) occurrence data were reviewed for documented sightings of federally-listed species near the study area. A field study was conducted on September 19, 2014 to identify potential suitable habitat for federally protected species within the study area.

Table 5-2 Federal- and state-listed threatened and endangered species

Common name	Scientific name	Federal ESA designation	State designation	Federal agency jurisdiction	USFWS or NOAA-NMFS Critical habitat designated	Suitable habitat in study area	Effect determination
Atlantic sturgeon	*Acipenser oxyrinchus*	Endangered		NOAA-NMFS	No	Yes	May Affect, Not likely to Adversely Effect
American chaffseed	*Schwalbea americana*	Endangered		USFWS	No	No	No effect
Bald eagle[1]	*Haliaeetus leucocephalus*	BGEPA	Threatened	USFWS	No	Yes	May Affect, Not likely to Adversely Effect
Canby's dropwort	*Oxypolis canbyi*	Endangered		USFWS	No	No	No effect
Frosted flatwoods salamander	*Ambystoma cingulatum*	Threatened	Endangered	USFWS	Yes	No	No effect
Green sea turtle	*Chelonia mydas*	Threatened		USFWS & NOAA-NMFS	Yes	Yes	May Affect, Not likely to Adversely Effect
Kirtland's warbler	*Setophaga kirtlandii*	Endangered		USFWS	No	No	No effect
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered		USFWS & NOAA-NMFS	No	Yes	May Affect, Not likely to Adversely Effect
Least tern	*Sterna antillarum*		Threatened		N/A	Yes	
Leatherback sea turtle	*Dermochelys coriacea*	Endangered		USFWS & NOAA-NMFS	Yes	No	No effect
Loggerhead sea turtle	*Caretta caretta*	Threatened	Threatened	USFWS & NOAA-NMFS	Yes	Yes	May Affect, Not likely to Adversely Effect
Piping plover	*Charadrius melodus*	Threatened		USFWS	Yes	Yes	May Affect, Not likely to Adversely Effect
Pondberry	*Lindera melissifolia*	Endangered		USFWS	No	No	No effect
Red-cockaded woodpecker	*Picoides borealis*	Endangered	Endangered	USFWS	No	No	No effect

Common name	Scientific name	Federal ESA designation	State designation	Federal agency jurisdiction	USFWS or NOAA-NMFS Critical habitat designated	Suitable habitat in study area	Effect determination
Rufa red knot	*Calidris canutus rufa*	Threatened		USFWS	No	Yes	May Affect, Not likely to Adversely Effect
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered	Endangered	NOAA-NMFS	No	Yes	May Affect, Not likely to Adversely Effect
West Indian manatee	*Trichechus manatus*	Endangered[2]	Endangered	USFWS	Yes	Yes	May Affect, Not likely to Adversely Effect
Wood stork	*Mycteria americana*	Threatened	Endangered	USFWS	No	Yes	May Affect, Not likely to Adversely Effect

[1] The bald eagle (*Haliaeetus leucocephalus*) was delisted by USFWS in 2007. Refer to Section 5.9 *Bald Eagle* for information on this species.

[2] On January 8, 2016, USFWS proposed to reclassify the manatee from federally endangered to threatened.

5.10.2 Federal-Listed Species

No candidate species or USFWS or NOAA-NMFS designated critical habitat for federally listed species exists in the study area. Critical habitat for loggerhead sea turtle and piping plover occurs close to the study area (Figure 5-6). The coastal environment within the study area does not provide suitable habitat for American chaffseed, Canby's dropwort, Frosted flatwood salamander, Kirtland's warbler, pondberry, leatherback sea turtle, and red-cockaded woodpecker. **The proposed project would have no effect on these species**. These species rely on specific habitat types that do not exist within or near the study area.

Suitable habitat was identified for Atlantic sturgeon; shortnose sturgeon; West Indian (Florida) manatee; green, Kemp's ridley, and loggerhead sea turtles; piping plover; wood storks; red knots; and bald eagles. The proposed project may affect but is not likely to adversely affect these species. The USFWS and NOAA-NMFS has concurred with these findings on species within their jurisdiction (Appendix A). During final design and permitting, SCDOT would coordinate with the USFWS and NOAA-NMFS regarding design changes that would alter the effect determination and the implementation of environmental commitments. The following section provides a summary of the proposed project's effect for each species with suitable habitat within the study area. Detailed species information can be found in the Biological Assessments (Appendix G and H).

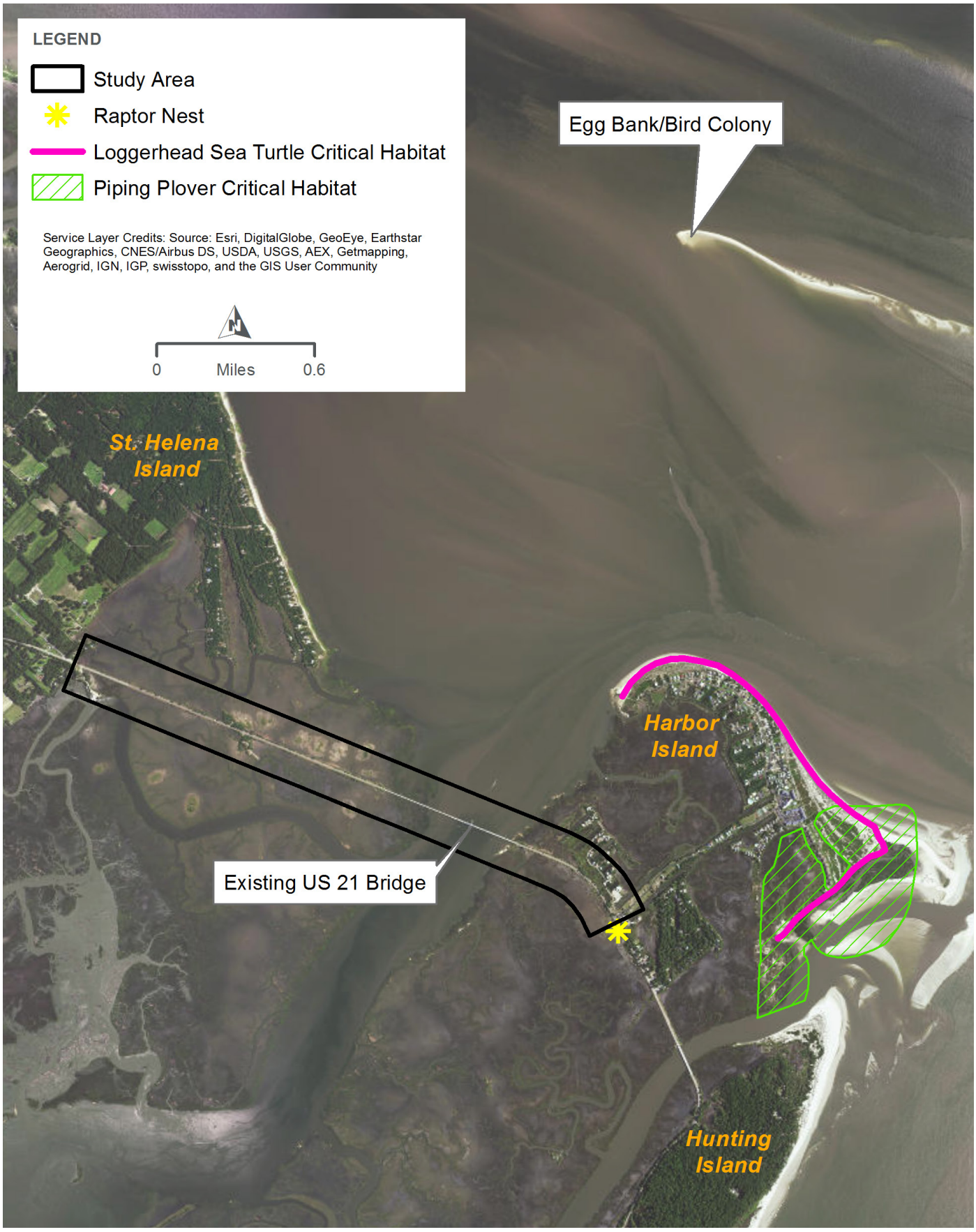

Figure 5-6 Critical habitat

Atlantic and shortnose sturgeon

Atlantic and shortnose sturgeon are large fish that spawn in freshwater rivers and streams but return to marine waters outside of their spawning season. The spawning migration typically occurs in South Carolina between February and April. No suitable freshwater spawning areas are upstream of the study area on the Harbor River; therefore, it is unlikely that sturgeon would migrate through the Harbor River to reach freshwater spawning areas. Suitable foraging habitat for the Atlantic and shortnose sturgeon may occur in the Harbor River and its associated tidal creeks.

If sturgeon were present within the study area, potential impacts to sturgeon could result from direct strikes by construction equipment (piles, work barges) and from increases in noise levels and turbidity during construction. Construction could disturb fish by generating a temporary increase in underwater noise. Construction methods are not expected to exceed acoustic injury thresholds for sturgeon; however, a behavioral disturbance may occur. While there are no suitable freshwater spawning areas upstream (or south) of the study area, there is a minimal possibility that sturgeon may be present in the study area during certain times of the year. **Therefore, the proposed project may affect, but is not likely to adversely affect the Atlantic and shortnose sturgeon**.

The proposed project may affect but is not likely to adversely affect the Atlantic and shortnose sturgeon; green, Kemp's ridley, and loggerhead sea turtles; red knot; piping plover; West Indian manatee; bald eagle; and the wood stork.

Green, Kemp's Ridley, and Loggerhead Sea Turtles

Sea turtles are highly migratory, long-lived reptiles that occur throughout the open ocean and coastal regions of the world, generally within tropical to subtropical areas. In South Carolina, sea turtle nesting and hatching generally occurs on beaches between early May and late October (USFWS 2016). The Harbor River and its associated tidal creeks provide suitable foraging habitat for sea turtles.

No critical habitat for the green sea turtle is located in or near the study area. Critical habitat has not been designated by USFWS or NOAA-NMFS for the Kemp's ridley sea turtle. Critical habitat for the loggerhead sea turtle is not located within the study area; however, critical habitat for loggerhead sea turtles is located approximately ½ mile from the study area on the beaches of Harbor Island (Figure 5-6). Loggerhead sea turtles have been documented nesting on the sandy beaches of Harbor Island (SCDNR 2014; SCDNR 2015a).

No loss of nesting habitat is anticipated. Construction of the drilled shafts and temporary trestle would likely use vibratory hammers that are not expected to exceed acoustic injury thresholds for sea turtles; however, a behavioral disturbance may occur. Turbidity from pile driving may temporarily decrease water quality and the foraging efficacy of sea turtles, which are visual predators. The increased turbidity is expected to dissipate over a matter of hours and would not permanently degrade water quality or sea turtles' ability to forage. **Therefore, the proposed project may affect, but is not likely to adversely affect these species**.

Piping Plover

The piping plover is a small, mostly white shorebird that creates nests on beaches in small depressions in sand. The USFWS has identified critical habitat for this species on the eastern side of Harbor Island, approximately ½ mile from the study area (Figure 5-6). Intertidal flats and shell banks along Harbor River provide suitable foraging habitat for the piping plover. The study area does not contain suitable nesting habitat for piping plovers.

Intertidal flats may be affected by the placement of fill material and construction of the bridge columns. Temporary impacts to foraging habitat may occur from the placement of timber mats. If foraging piping plovers were in the area, the birds would likely avoid the construction area due to the increased activity and noise. An abundance of similar habitat types in the immediate vicinity outside of the study area provide suitable alternative foraging areas. **Therefore, the proposed project may affect, but is not likely to adversely affect piping plovers**.

Red Knot

The red knot is a shorebird with a mottled pattern of black, gray, and rose colored feathers on its back and a rose underbelly. Overwintering populations have been observed on sandy beaches and in mud flats on the South Carolina coast, including Harbor Island (Ebird 2016). Intertidal flats and shell banks along Harbor River provide suitable foraging habitat for the red knot.

Unvegetated intertidal flats would be affected by the placement of fill material and construction of the bridge columns. Temporary impacts to foraging habitat may occur from the placement of timber mats. If foraging red knots were in the area, the birds would likely avoid the construction area given the increased activity and noise. An abundance of similar habitat types in the immediate vicinity outside of the study area provide suitable alternative foraging areas. **Therefore, the proposed project may affect, but is not likely to adversely affect red knots.**

West Indian (Florida) Manatee

The West Indian (Florida) manatee (*Trichechus manatus latirostris*), a subspecies of the West Indian manatee, are slow-moving, herbivorous mammals found in coastal habitats. Harbor River and its associated tidal creeks within the study area may provide suitable habitat for West Indian manatees between May and October.

The proposed construction may directly affect manatees by causing behavioral disturbances from pile driving noise or physical injuries caused by direct strikes during construction. Loud levels of intermittent or continuous construction noise could harm manatees if they were close to the noise source for prolonged periods. Possible indirect effects may include decreased water quality. Adverse effects on manatees are not expected to occur within the project area because construction operations would follow the USFWS *Manatee Protection Guidelines* (Appendix G). Furthermore, manatees would likely avoid the construction area given the increased vessel traffic and noise. **Therefore, the proposed project may affect, but is not likely to adversely affect West Indian (Florida) manatees.**

Wood Stork

Adult wood storks are one of the largest wading birds in North America; they are all white in color except for the black primary and secondary wing and tail feathers, and a long thick black bill. Harbor River and its associated salt marsh and tidal creeks provide suitable foraging habitat for wood storks.

While impacts to foraging habitat would be minimized, areas of tidal wetlands may be filled as the new bridge connects to the existing causeway. Timber mats and/or barges may cause temporary impacts to salt marsh grasses during construction. Foraging wood storks would likely avoid the construction area due to the increased activity and noise. However, the study area is located in a large expanse of salt marsh and network of tidal creeks, which provide alternate feeding habitats nearby. **Therefore the proposed project may affect, but is not likely to adversely affect wood storks**.

5.10.3 State-Listed Species

State of South Carolina endangered species are "wildlife whose prospects of survival or recruitment within the state are in jeopardy or are likely within the foreseeable future to become so" (South Carolina Code of Laws Section 50-15-10). State threatened species are "likely to become endangered and in need of management".

Many of the state-listed threatened or endangered species are also designated as federally protected species and managed by USFWS and/or NOAA-NMFS. In addition to the federally listed species in Table 5-2, the least tern (*Sterna antillarum*), the smallest member of the gull and tern family and is considered threatened by SCDNR. Least terns have been identified on an egg bank near the confluence of Harbor River and St. Helena Sound, outside of the study area (Figure 5-6). The project may affect least tern foraging habitat directly through potential habitat loss. Construction noise also may temporarily deter the birds from the area. The effects from construction noise would be temporary as least terns would return to the area to forage once construction activities were complete.

5.10.4 What would be done to avoid and minimize impacts to federally protected species on this project?

SCDOT would implement the conservation measures, or actions, to minimize or compensate for effects to each species shown in Table 5-3. In general, the contractor would follow SCDOT BMPs, such as seeding slopes, installing silt fences, and creating sediment basins, during construction to avoid potential turbidity impacts within the Harbor River. Stormwater runoff from bridges would be treated prior to discharging into the waters surrounding Harbor River. A NPDES permit pursuant to Section 402 of the CWA would be required for construction activities. The NPDES permit application would include a SWPPP, which would be implemented by the contractor.

Equipment and materials used during the construction of the bridge would not obstruct or impede passage through more than 50 percent of the channel. Noise from vibratory hammers or impact pile driving would be intermittent; installation typically takes 1 to 2 hours per pile, following several hours or days of work to complete the drilled shaft, trestle span, or flat slab bridge. During construction, the potential effect of noise impacts on sturgeon, sea turtles, and manatees would be minimized through the use of "slow starts", where pile driving ramps up slowly in an effort to deter marine species from the work area. The contractor would also stop in-water work at night for a minimum of 8 hours, which creates a daily lapse of in-water noise and provides time for sturgeon, turtles, and manatees to navigate through the construction area during ambient noise levels.

At the direction of SCDOT, the contractor would commit to several conservation measures and best management practices to minimize impacts on protected species.

The bridge would be demolished using standard practices to remove the existing piers and swing span. If explosives are used for demolition, the contractor would be required to hire qualified personnel for evaluating the potential effect on protected species to submit to SCDOT. SCDOT would be responsible for reinitiating consultation with the USFWS and NOAA-NMFS. Future separate consultation on blasting would be required if the contractor would plan to use explosives. The contractor be required to develop a blasting plan to include a marine wildlife watch plan to submit to the SCDOT. SCDOT would then reinitiate consultation with the USFWS and NOAA-NMFS to evaluate impacts as a result of the plan.

Sea Turtles

At the direction of SCDOT, the contractor would commit to following the NOAA-NMFS *Sea Turtle and Smalltooth Sawfish Construction Conditions* to minimize potential impacts to sea turtles.

To avoid vessel strikes, construction vessel personnel would operate at low speeds within the construction area. The contractor would follow NOAA-NMFS *Sea Turtle and Smalltooth Sawfish Construction Conditions* (see NOAA-NMFS Biological Assessment in Appendix H), ensuring that construction personnel are aware of the potential presence of sea turtles in the area and would monitor for sea turtles in the water during pile driving or drilled shaft installation. Moving equipment would be stopped if a sea turtle is observed within 50 feet of the equipment. Upon locating a dead, injured, or sick sea turtle, SCDOT would notify the NOAA-NMFS Protected Resources Division, the USFWS South Carolina Field Office, and Harbor Island Sea Turtle Conservation Program immediately.

If siltation barriers are used during construction, the barrier would be made of material in which a sea turtle cannot become entangled, properly secured, and regularly monitored to avoid protected species entrapment.

In an effort to avoid or minimize potential indirect impacts of bridge lighting to the movements of sea turtles and their prey, no permanent lighting would be installed on the proposed bridge roadway. During the sea turtle nesting season (May 1 through October 31), the contractor would use the minimum number and lowest wattage of lights that are necessary for construction. Lights would be positioned to focus on the work area to minimize the amount of light on the water surface. The contractor would turn off all lights when not needed during construction.

Table 5-3 Conservation measure summary

Common name	Scientific name	Effect	Environmental commitment
Atlantic sturgeon	*Acipenser oxyrinchus*	May Affect, Not Likely to Adversely Affect	Follow SCDOT BMPs during construction Obtain NPDES permit and prepare and follow a SWPPP Treat stormwater prior to discharge into waters Maintain 50 percent of Harbor River channel width during construction Use vibratory hammers, where practicable Use "slow starts" Reinitiate consultation with USFWS and NOAA-NMFS and prepare marine wildlife watch plan if explosives are used for demolition. No in-water work would be conducted at night for a minimum of 8 hours.
Piping plover	*Charadrius melodus*	May Affect, Not Likely to Adversely Affect	
Rufa red knot	*Calidris canutus rufa*	May Affect, Not Likely to Adversely Affect	
Shortnose sturgeon	*Acipenser brevirostrum*	May Affect, Not Likely to Adversely Affect	
Wood stork	*Mycteria americana*	May Affect, Not Likely to Adversely Affect	
Specific environmental commitments (in addition to those listed above)			
Green sea turtle	*Chelonia mydas*	May Affect, Not Likely to Adversely Affect	Follow NOAA-NMFS *Sea Turtle and Smalltooth Sawfish Construction Conditions*. No permanent roadway lighting. Reduced or shielded construction lighting during nesting season (May 1 through October 31). Restricting in-water work during nighttime between May and October to the maximum extent practicable.
Kemp's ridley sea turtle	*Lepidochelys kempii*	May Affect, Not Likely to Adversely Affect	
Loggerhead sea turtle	*Caretta caretta*	May Affect, Not Likely to Adversely Affect	
West Indian (Florida) Manatee	*Trichechus manatus*	May Affect, Not Likely to Adversely Affect	Follow USFWS *Manatee Protection Guidelines*. Operate construction vessels at safe, slow speeds (no-wake or idle) in the study area and in waters with less than a 4-foot clearance from the bottom sediments. Use a trained spotter between May 15 and October 15. Halt in-water moving equipment if a manatee is spotted within 50 feet of the in-water construction area. Report any collision, injury, or mortality to manatees to the USFWS South Carolina Field Office.

West Indian Manatee (Florida Manatee)

Vessel Strikes

The contractor would commit to following the USFWS *Manatee Protection Guidelines* to minimize potential impacts to manatees.

To avoid striking manatees, construction vessels would operate at safe, slow speeds (no-wake or idle) in the study area and in waters with less than a 4-foot clearance from the bottom sediments. In accordance with USFWS *Manatee Protection Guidelines*, the contractor would use a trained spotter between May 15 and October 15 to protect manatees from collisions. The contractor would be restricted from in-water work for a minimum of 8 hours each night, when visibility is low. The use of in-water moving equipment would be halted if a manatee is spotted within 50 feet of the in-water construction area. Any collision, injury, or mortality to manatees will be reported immediately to the USFWS South Carolina Field Office.

Turbidity

In general, the contractor would follow SCDOT BMPs during construction to avoid potential turbidity impacts within the Harbor River. If siltation or turbidity barriers are used, they would be made of material in which manatees or other marine mammals cannot become entangled, would be properly secured, and would be regularly monitored to avoid marine mammal entanglement or entrapment. Stormwater runoff from bridges would be contained and filtered prior to discharging into the waters surrounding Harbor River. A NPDES permit pursuant to Section 402 of the CWA would be required for construction activities. The NPDES permit application will include a SWPPP.

Noise

Underwater noise impacts would be minimized through the use of "slow starts", where pile-driving ramps up slowly in an effort to deter manatees from the work area. An 8-hour night time in-water work moratorium would provide a daily lapse in underwater noise. In accordance with USFWS *Manatee Protection Guidelines*, if manatees are observed within 50 feet of active construction equipment, that equipment would be shut down. If explosives are used for the bridge demolition, qualified personnel hired by the contractor would be responsible for evaluating the potential effect on protected species and SCDOT would reinitiate consultation with USFWS and NOAA-NMFS. Future separate consultation on blasting would be required if the contractor would plan to use explosives. The contractor and SCDOT would reinitiate consultation to examine blasting and develop a blasting plan, which would include a marine wildlife watch plan.

If SCDOT or the contractor discovers an injured, sick, or dead marine mammal, NOAA-NMFS will be notified immediately by contacting the NOAA-NMFS Stranding Coordinator for the Southeast Region. NOAA-NMFS would be provided with the species or description of the animal(s), the condition of the animal (carcass condition if deceased stranding), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

5.11 Essential Fish Habitat

5.11.1 What is EFH?

As defined by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) of 1976, as amended in 1996, EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 USC 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 US. The Magnuson-Stevens Act also mandates that consultation take place with the US Secretary of Commerce on all proposed activities authorized, funded, or undertaken by a federal agency, such as FHWA or USCG, which may adversely affect EFH.

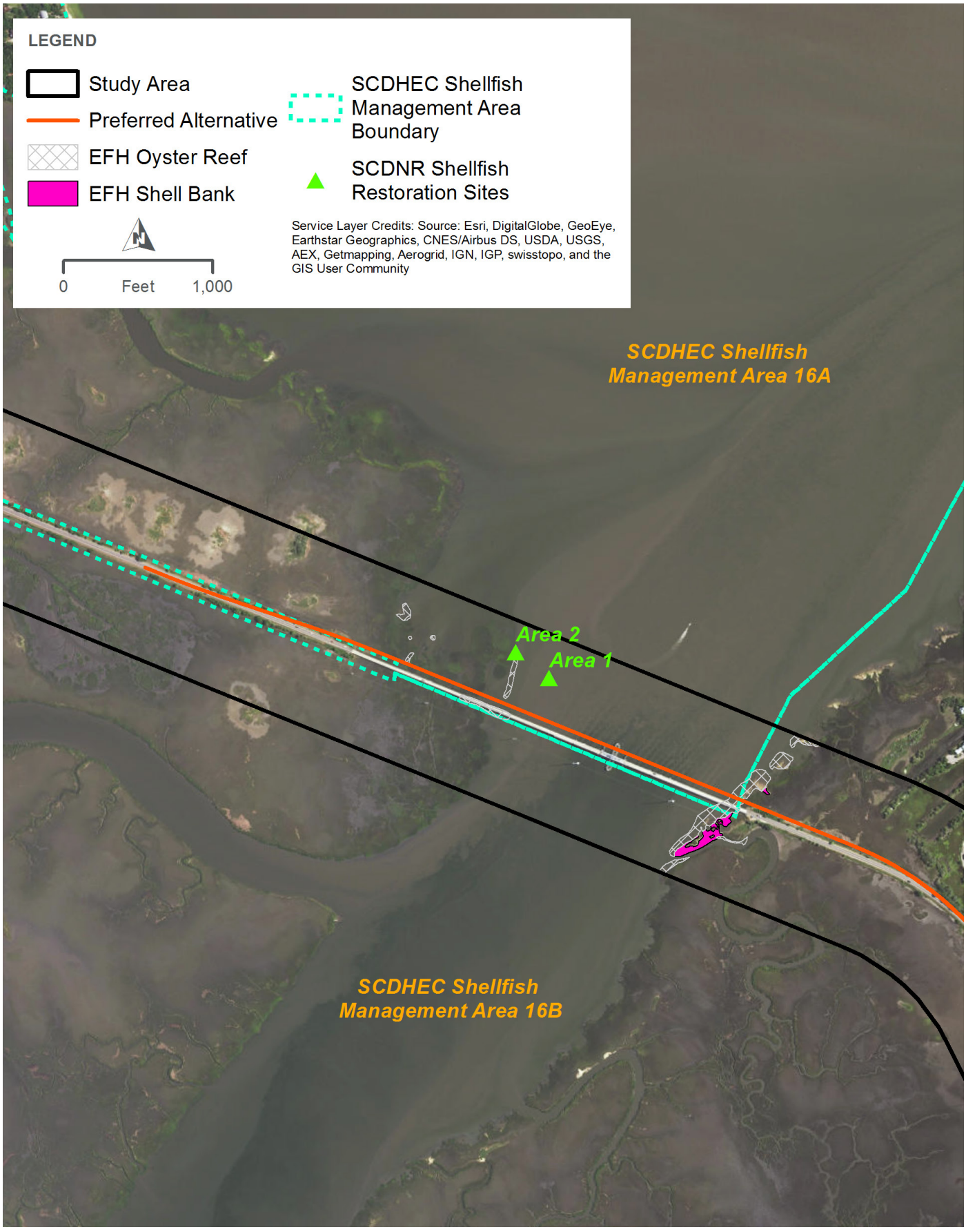

Figure 5-7 Shellfish management area 16A and 16B

5.11.2 What EFH is located within the study area?

On July 13, 2015, representatives from NOAA-NMFS and SCDOT visited the study area to identify EFH. Based on the site visit and a NOAA-NMFS letter dated August 7, 2015 (Appendix A), the study area includes the following EFH:

- high quality tidal salt marsh habitat, specifically estuarine emergent wetlands
- intertidal non-vegetated flats
- tidal creeks
- oyster reef and shell bank
- unconsolidated bottom

The fishery management plans (FMPs) from SAFMC with EFH designations most applicable to this project are the following: Shrimp FMP for the South Atlantic Region and the FMP for the Snapper-Grouper Complex of the South Atlantic Region. The Snapper-Grouper Complex FMP includes oyster/shell habitat as a Habitat Area of Particular Concern (HAPC). HAPCs are a subset of EFH that are either rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. An EFH assessment was prepared for the proposed project and is located in Appendix I.

Shellfish Beds

Shellfish beds are considered part of the oyster reef and shell bank EFH. SCDHEC monitors the conditions of shellfish beds and shellfish growing waters in 25 management areas along the South Carolina coast. The study area is located in SCDHEC Shellfish Management Area 16A and 16B (SCDHEC 2015) (Figure 5-7). US 21 forms the boundary between these management areas.

Management Area 16A is located to the north and west of the existing bridge and consists of approximately 26,608 acres of shellfish growing habitat (SCDHEC 2015). Area 16A includes the St. Helena Sound, Morgan River, and their tributaries.

Management Area 16B is located to the south of the existing bridge and consists of 31,516 acres of shellfish growing area habitat (SCDHEC 2015). The area includes the Harbor River and Trenchards Inlet, and their tributaries, between Hunting Island, Fripp Island and St. Helena Island.

SCDNR manages state and recreational shellfish grounds within the SCDHEC Management Areas. State Shellfish Grounds S105, S127, and S108 are located within the study area. Shellfish harvesting is prohibited near Gay Fish Company on Ward Creek; all other shellfish areas within the study area are approved by SCDHEC for harvesting. No commercial culture, grant or mariculture permits, or recreational shellfish grounds are within the study area (SCDNR 2015b).

Shellfish Restoration Areas

Global oyster populations are declining because of over-harvesting, declining water quality, loss of habitat, increased runoff, and erosion (SCDNR 2013). In South Carolina, SCDNR manages, restores, and enhances oyster habitat to prevent such declines. SCDNR conducts both large-scale and small-scale, community-based oyster restoration using recycled oyster shell. SCDNR

The proposed project would result in permanent and temporary impacts to EFH.

has constructed two shellfish restoration areas within the study area to the north of the US 21 bridge. Area 1 was constructed of bagged oyster shells in 2013, is approximately 320 feet north of the existing bridge, and is 387 square feet in size. Area 2 was constructed of loose oyster shells between 2013 and 2014, is approximately 100 feet from the existing bridge, and is 6,404 square feet in size. SCDNR has indicated that no new restoration area is currently planned within the study area (Hadley 2016).

5.11.3 How would the project affect EFH?

Adverse effects are those impacts that reduce the quality and/or quantity of EFH. For the purposes of estimating project impacts on EFH, SCDOT developed a construction scenario that is detailed in the EFH Assessment in Appendix I. The construction scenario may change during final design by the selected contractor. The addition of fill at the bridge approaches and construction of the bridge support structures would result in direct, permanent impacts to EFH, including estuarine emergent wetlands, intertidal flats, and unconsolidated bottom. The proposed project would indirectly impact estuarine emergent wetland by shading salt marsh grasses underneath the proposed bridge (see Section 5.21.1). Temporary impacts to EFH would occur during construction. Temporary work trestles may be installed over EFH to support cranes during the drilled shaft construction and load/unload barges in the Harbor River. Temporary clearing within the estuarine emergent wetlands would result from the installation of erosion and sediment control measures. Timber mats and/or barges may cause temporary impacts to salt marsh grasses during construction.

The proposed project would result in a direct, permanent impact to approximately 3.3 acres of EFH. The preferred alternative would avoid the tidal creek and shell bank located to the southeast of the existing bridge. The preferred alternative would also avoid SCDNR shellfish restoration areas.

Table 5-4 Estimated quantities of temporary and preferred EFH impacts

Habitat Type	Temporary Clearing (Acres)	Temporary Fill (Acres)	Existing Indirect (to be removed) (Acres)	Proposed Permanent Indirect (Acres)	Net Permanent Indirect (Acres)	Proposed Permanent Direct (Acres)
Estuarine emergent wetlands	0.470	0.025*	0.45	1.41	0.96	3.032
Intertidal flats	0		None	None	None	0.059
Oyster reef	0		None	None	None	0.092
Shell bank	0	0	None	None	None	None
Tidal creek	0	0	None	None	None	0.036
Unconsolidated bottom	0	0.002	None	None	None	0.036
Total	**0.470**	**0.027**	**0.45**	**1.4**	**0.96**	**3.254**

* Design for the temporary work trestle will not be completed until the project is awarded to a Design-Build contractor; therefore, impacts to estuarine emergent wetland, intertidal non-vegetated flats, and oyster reefs could not be separated.

The proposed project would have, at most, minimal effects on EFH or aquatic species managed by SAFMC. The contractor would amend the EFH Assessment during final design of the proposed bridge and would coordinate the findings between the FHWA, SCDOT, and NOAA-NMFS.

5.11.4 What coordination has occurred with NOAA-NMFS?

NOAA-NMFS received the LOI and attended a site visit on July 13, 2015. NOAA-NMFS provided a response to the LOI with a list of onsite EFH on August 7, 2015. NOAA-NMFS attended an agency site visit on April 19, 2016. SCDOT submitted the EFH Assessment to NOAA-NMFS on May 19, 2016. NOAA-NMFS responded on June 6, 2016, providing recommendations for additional minimization and conservation measures. SCDOT responded on June 23, 2016, indicating the limitations to commit to minimization and conservation measures in a Design-Build project. NOAA-NMFS responded via email on August 25, 2016 with questions to SCDOT regarding the potential for additional environmental commitments as part of the Design-Build contract. SCDOT responded on August 25, 2016 with additional environmental commitments to satisfy NOAA-NMFS EFH conservation recommendations. Copies of this correspondence are included in Appendix A.

5.11.5 What has been done to avoid and minimize impacts to EFH on this project?

During final design, the Design-build Contractor may further minimize impacts to EFH by steepening side slopes on the new bridge approaches, removing causeway fill, or replacing the proposed fill with flat slab bridge approaches. Design-build procurement methods generally encourage further avoidance and minimization of EFH impacts so the contractor can avoid additional mitigation costs and permitting delays. NOAA-NMFS will have another opportunity for project review during final design and 404/401 permitting.

Since there will be impacts to the EFH, and possibly aquatic species managed by the SAFMC, an EFH Mitigation Plan would be established. The contractor would develop the EFH Mitigation Plan during the Section 404 permitting phase of the project. As part of the EFH Mitigation Plan, SCDOT commits to the following mitigation measures:

- SCDOT will require the contractor to reduce the amount of permanent fill in salt marsh habitat from the currently proposed 3.032 acres.
- SCDOT will require the contractor to remove some portion of the existing causeway and grade the removal areas to match elevations in adjacent marsh where marsh vegetation occurs.
- SCDOT commits to mitigating for the unavoidable impacts to EFH (shellfish habitat) by implementing a mitigation plan that would restore at least 0.1 acre of oyster habitat.

SCDOT plans to work with the SCDNR South Carolina Oyster Restoration and Enhancement Program (SCORE) program on the oyster habitat mitigation. The contractor would develop the plan in coordination with the SCDOT and NOAA-NMFS.

5.12 Marine Mammals

5.12.1 How are marine mammals protected?

Marine mammals are protected under the MMPA. The MMPA prohibits the “take” of marine mammals, with certain exceptions, in waters of the US. “Take” is defined by the MMPA as “harass, hunt, capture, kill, or collect, or attempt to harass, hunt, capture, kill, or collect”. In the 1994 amendments to the MMPA, two levels of “harassment” were defined.

- Level A Harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild;

- Level B harassment is any act that has the potential to disturb a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including, migration, breathing, nursing, breeding, feeding, or sheltering.

5.12.2 What marine mammals could be found in the study area?

Two marine mammals, the common bottlenose dolphin (*Tursiops truncatus*) and West Indian manatee – Florida subspecies (*Trichechus manatus latirostris*), may occur within the study area. Bottlenose dolphins are found in most coastal areas in temperate and tropical regions of the world (NOAA-NMFS 2015a). Bottlenose dolphins have been observed in the Harbor River.

5.12.3 How would the project affect marine mammals?

An assessment was conducted to determine the potential effects on the marine mammals present within the study area (see Technical Memorandum in Appendix J). For the purposes of estimating the potential project impacts on marine mammals, SCDOT developed a construction scenario that is detailed in Appendix J. The construction scenario may change during final design by the selected contractor. The contractor would coordinate major design changes that would affect marine mammals with SCDOT; SCDOT would coordinate any necessary changes with NOAA and FHWA prior to approval.

Vessel Strikes

Construction activities may have a direct effect on marine mammals if a vessel (such as a barge or tug boat) strikes a dolphin or manatee. Because of the manatee's slow movements, vessel strikes are the most significant threat faced by manatees (USFWS 2001, FWC 2007). The likelihood of direct strikes from vessels on bottlenose dolphins is low due to their high maneuverability coupled with the slow speeds at which the construction vessels would operate. Individual bottlenose dolphins would be able to avoid collisions.

Turbidity

Construction may indirectly affect marine mammals through a temporary increase in turbidity during placement of bridge pilings. However, this increase would be temporary and localized and would likely dissipate and settle within a few hours. Marine mammals and/or their prey may temporarily avoid the construction area. The temporary increase in turbidity would not permanently change habitat conditions.

Noise

Marine mammals have the potential to be affected by noise traveling through the waterway during construction of the proposed bridge. Dolphins emit sound waves to detect and locate prey, and both dolphins and manatees rely on their hearing to avoid boats.

Marine mammals experience an auditory injury after a permanent shift in hearing range. Behavioral disturbance include noise levels or other activities that might potentially cause marine mammals to alter normal biological behavior. Behavioral changes in response to vessel presence include avoidance reactions, alarm/startle responses, and other behavioral and stress-related changes.

Pile driving is not expected to exceed injury thresholds for bottlenose dolphins or West Indian (Florida) manatees.

Noise levels are generally higher if impact pile driving is used, as compared to vibratory hammer driving or extraction. Impact pile driving creates an impulsive sound, while vibratory hammers generate a continuous, low-level noise that is generally considered nonimpulsive. Injury thresholds for bottlenose dolphins for these activities are provided in the MMPA Technical Memorandum in Appendix J.

Construction of the drilled shafts and temporary trestle would likely use vibratory hammers that are not expected to produce sound levels that would exceed injury thresholds for bottlenose dolphins. The proposed impact hammer activities associated with constructing flat slab approaches would not produce sound levels that would exceed peak or SEL injury thresholds for bottlenose dolphins. Construction of the drilled shafts, flat slab approaches, and temporary trestle may exceed behavioral disturbance thresholds for bottlenose dolphins.

The proposed project is not expected to harm or injure bottlenose dolphins or West Indian (Florida) manatees. The proposed project would not result in a "take" of marine mammals under the MMPA.

5.12.4 What would be done to avoid and minimize impacts to marine mammals on this project?

SCDOT would implement the following conservation measures, or commitments, to minimize the potential for harm or "take" of marine mammals. The following commitments mimic those proposed for federally threatened and endangered species (see Section 5.10 of the EA).

Vessel Strikes

Equipment and materials used during the construction of the bridge would not obstruct or impede passage through more than 50 percent of the channel. SCDOT also commits to following the USFWS Manatee Protection Guidelines, which will minimize potential project effects on manatees and bottlenose dolphins. To avoid striking manatees, construction vessels would operate at safe, slow speeds (no-wake or idle) in the study area and in waters with less than a 4-foot clearance from the bottom sediments. In accordance with USFWS *Manatee Protection Guidelines*, the contractor would use a trained spotter between May 15 and October 15 to protect manatees from collisions. The contractor would be restricted from in-water work for a minimum of 8 hours each night, when visibility is low. The use of in-water moving equipment would be halted if a manatee is spotted within 50 feet of the in-water construction area.

Turbidity

In general, the contractor would follow SCDOT Best Management Practices (BMPs), such as seeding slopes, installing silt fences, and creating sediment basins, during construction to avoid potential turbidity impacts within the Harbor River. If siltation or turbidity barriers are used, they would be made of material in which manatees or other marine mammals cannot become entangled, would be properly secured, and would be regularly monitored to avoid marine mammal entanglement or entrapment. Stormwater runoff from bridges would be treated prior to discharging into the waters surrounding Harbor River. A National Pollutant Discharge Elimination System (NPDES) permit pursuant to Section 402 of the CWA would be required for construction activities. The NPDES permit application would include a Stormwater Pollution Prevention Plan (SWPPP), which would be implemented by the contractor.

Noise

During construction, the potential effect of noise impacts on marine mammals would be minimized through the use of “slow starts”, where pile driving ramps up slowly in an effort to deter marine species from the work area. The contractor would also stop in-water work at night for a minimum of 8 hours, which creates a daily lapse of in-water noise and provides time for marine species to navigate through the construction area during ambient noise levels.

If explosives are used for demolition, the contractor would be required to hire qualified personnel for evaluating the potential effect on protected species to submit to SCDOT. SCDOT would be responsible for reinitiating consultation with the USFWS and NOAA-NMFS. Future separate consultation on blasting would be required if the contractor would plan to use explosives. The contractor may be required to develop a blasting plan to include a marine wildlife watch plan to submit to the SCDOT. SCDOT would then reinitiate consultation with the USFWS and NOAA-NMFS to evaluate impacts as a result of the plan.

Reporting

If SCDOT or the contractor discovers an injured, sick, or dead marine mammal, NOAA-NMFS will be notified immediately by contacting the NOAA-NMFS Stranding Coordinator for the Southeast Region. NOAA-NMFS would be provided with the species or description of the animal(s), the condition of the animal (carcass condition if deceased stranding), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available). Any collision, injury, or mortality to manatees will also be reported immediately to the USFWS South Carolina Field Office.

5.13 Air Quality

5.13.1 Why is air quality being considered for this project?

The 1990 Clean Air Act (CAA) amendments and guidelines, issued by the EPA, set forth guidelines for attainment of the National Ambient Air Quality Standards (NAAQS). The CAA section 176(c) requires that federal transportation projects be consistent with state air quality goals found in the State Implementation Plan (SIP). The process to ensure this consistency is called Transportation Conformity and means that transportation activities will not cause new violations of the NAAQS, worsen existing violations of the standard, or delay timely attainment of the standard.

On August 1, 2016, CEQ issued a final guidance for the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews. The proposed project would not increase the capacity of US 21 or promote development in the surrounding area; therefore, the project would not result in an increase in greenhouse gas emissions.

5.13.2 What pollutants were examined?

The NAAQS have been established for air pollutants that have been identified by the EPA as being of concern nationwide, called criteria pollutants. The criteria pollutants examined are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter ($PM_{2.5}$), ozone (O_3), and sulfur dioxide (SO_2). The sources of these pollutants, effects on human health and the nation’s welfare, and occurrence in the atmosphere vary considerably. The EPA also regulates mobile source air toxics (MSATs). Due to their association with roadway transportation sources, CO, O_3, $PM_{2.5}$, and MSATs are typically reviewed for potential effects on nearby receptors with respect to roadway projects.

The bridge replacement along US 21 over Harbor River is located in the ozone attainment area. The area is also classified as an attainment area for $PM_{2.5}$. Because the region is in attainment with the NAAQS, Transportation Conformity does not apply to the proposed action. South Carolina does not have any areas that are considered nonattainment for CO. No analysis is required for this project to determine impacts to CO concentrations.

The study area is in attainment with the National Ambient Air Quality Standards.

5.13.3 What is FHWA's guidance for MSATs?

On December 6, 2012, the 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 project falls within the first analysis category (no analysis for projects with no potential for meaningful MSAT effects) because bridge projects are exempt from conformity and the project would have no or negligible traffic impacts (no additional capacity).

The purpose of this project is to correct structural and functional deficiencies of the US 21 bridge over the Harbor River and to upgrade the bridge and its approaches to current design standards by replacing and realigning the existing bridge. This project has been determined to generate minimal air quality impacts for Clean Air Act Amendments criteria pollutants and has not been linked with any special MSAT concerns. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the project from that of the No-build alternative.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's Motor Vehicle Emissions Simulator (MOVES) model forecasts a combined reduction of over 80 percent in the total annual emission rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by over 100 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project (FHWA 2012).

5.13.4 How does the project impact air quality?

It is anticipated that the project would have no appreciable impact on regional MSAT levels. The project may result in increased exposure to MSAT emissions in certain locations. Construction-related effects of the project would be limited to short-term localized increased fugitive dust and mobile-source emissions during construction. State and local regulations regarding dust control and other air quality emission controls shall be followed.

The proposed project would have no appreciable impact on Mobile Source Air Toxic levels.

5.14 Noise

5.14.1 What is noise and how is it measured?

Sound is created when an object moves, causing vibrations or waves in air molecules. When vibrations reach our ears we hear sounds. Noise is defined as unwanted or excessive sounds. It

is an undesirable by-product of our modern way of life. Highway traffic noise sources include tire pavement interaction, as well as the engines and exhaust systems of vehicles. The impacts from noise are defined by the amount of interference the sound levels have with everyday human activity.

Sound levels are measured in units called decibels (dB). Adjustment for the high and low pitched sounds an average person can hear is called "A-weighted levels" or dBA. Highway traffic noise is assessed using dBA measurements. Noise is further described by its average level over time. A noise impact occurs if the projected future noise level at a receptor either approaches (within 1 dBA) or exceeds the Noise Abatement Criteria (NAC) as seen in Table 5-5 or if the predicted future noise levels for a receptor exceed existing levels by more than 15 dBA (defined as a substantial increase).

5.14.2 How were noise conditions studied in the study area?

A traffic noise analysis is required for proposed federal-aid highway projects on new location or that physically alter an existing highway, that will significantly change the horizontal or vertical alignment of the road, or will increase the number of through-traffic lanes in accordance with 23 CFR § 772; Procedures for Noise Abatement of Highway Traffic Noise and Construction Noise and SCDOT's *2014 Noise Abatement Policy*. The project would alter the horizontal and vertical alignment of the US 21 bridge; therefore, a preliminary noise analysis (Appendix K) was conducted to determine potential future traffic noise impacts from each proposed build alternative. The purpose of the preliminary noise analysis was to compare noise impacts from the five build alternatives to noise-sensitive land use within the study area.

The FHWA Traffic Noise Model (TNM version 2.5) was used to calculate existing noise levels and predict future design year noise levels. Inputs to this model include noise-sensitive receiver locations, existing and future roadway alignments, and traffic volumes and posted speeds.

Table 5-5 Noise abatement criteria for land use activities in the study area

Activity category	dBA	Typical activity description	Properties within study area
B	67 dBA	Residences	Single family homes
E	72 dBA	Hotels, motels, offices, restaurants/bars, and other developed lands commercial activities	Restaurant; realty office
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	Gay Fish Company; vacant general store

Source: 23 CFR Part 772

Field measurements were gathered from four SCDOT approved locations within the study area on September 3, 2015 (Figure 5-8). Traffic volumes recorded during the field study were utilized to validate the TNM 2.5 model.

Receivers within the study area were modeled to determine the predicted noise levels associated with each build alternative. A total of 23 receivers, including single-family homes, a restaurant, realty office, and Gay Fish Company, were analyzed in the preliminary noise analysis (Figure 5-8).

5.14.3 How would the project affect noise levels?

The proposed project would result in no traffic-related noise impacts. A temporary increase in noise levels may occur during construction.

Based on the noise analysis, the proposed project would result in no traffic-related noise impacts. No receivers would have noise levels that meet/exceed the NAC or have a substantial increase with any of the build alternatives. Given the relatively low traffic volumes on US 21 within the study area, as well as the location of noise receivers compared to the proposed bridge replacement, there would be no appreciable difference in noise levels among the build alternatives (Appendix K). A Detailed Noise Analysis has been conducted for the preferred alternative (Alternative 1B) based on the most current design and traffic information available (Appendix K).

5.14.4 What noise impacts occur from construction?

The major construction elements of this project are expected to be placement of fill, hauling, grading, paving, and pile driving. General construction noise impacts, such as temporary speech interference for passers-by and those individuals living or working near the project, can be expected particularly from pile driving, paving operations, and earth-moving equipment during construction. However, considering the relatively short-term nature of construction noise and the likely limitation of construction to daytime hours, these impacts are not expected to be substantial. The contractor would be required to comply with applicable local noise ordinances and Occupational Safety and Health Administration (OSHA) regulations concerning noise attenuation devices on construction equipment

Table 5-6 Project effects on noise receivers

				Existing	No build (2037)					Build (2037)		
Receiver #	Receptors	Land use / NAC	Exterior use?	NAC category	Leq dBA	Noise impact type	Leq dBA	Difference from existing	Noise impact type	Leq dBA	Difference from existing	Noise impact type
Receiver 1	1	Gay Fish Company	Yes	F	46.6	----	47.8	1.2	----	51.6	5.0	----
Receiver 2	1	Restaurant	Yes	E	46.6	----	47.8	1.2	----	51.9	5.3	----
Receiver 3	1	Single-Family	Yes	B	45.4	----	46.6	1.2	----	50.4	5.0	----
Receiver 4	1	Single-Family	Yes	B	42.9	----	44.1	1.2	----	44.5	1.6	----
Receiver 5	1	Single-Family	Yes	B	43.6	----	44.7	1.1	----	45.2	1.6	----
Receiver 6	1	Single-Family	Yes	B	43.5	----	44.7	1.2	----	45.2	1.7	----
Receiver 7	1	Single-Family	Yes	B	43.5	----	44.7	1.2	----	45.2	1.7	----
Receiver 8	1	Single-Family	Yes	B	44.4	----	45.6	1.2	----	46.2	1.8	----
Receiver 9	1	Single-Family	Yes	B	44.4	----	45.6	1.2	----	46.0	1.6	----
Receiver 10	1	Single-Family	Yes	B	45.4	----	46.6	1.2	----	47.2	1.8	----
Receiver 11	1	Single-Family	Yes	B	47.5	----	48.6	1.1	----	49.9	2.4	----
Receiver 12	1	Single-Family	Yes	B	48.7	----	49.8	1.1	----	51.0	2.3	----
Receiver 13	1	Single-Family	Yes	B	51.2	----	52.4	1.2	----	53.6	2.4	----
Receiver 14	1	Single-Family	Yes	B	50.0	----	51.1	1.1	----	52.0	2.0	----
Receiver 15	1	Single-Family	Yes	B	50.4	----	51.6	1.2	----	52.2	1.8	----
Receiver 16	1	Single-Family	Yes	B	45.2	----	46.4	1.2	----	47.2	2.0	----
Receiver 17	1	Single-Family	Yes	B	46.4	----	47.6	1.2	----	48.3	1.9	----
Receiver 18	1	Single-Family	Yes	B	49.7	----	50.9	1.2	----	51.2	1.5	----
Receiver 19	1	Single-Family	Yes	B	51.3	----	52.4	1.1	----	52.9	1.6	----
Receiver 20	1	Single-Family	Yes	B	52.5	----	53.7	1.2	----	53.9	1.4	----
Receiver 21	1	Single-Family	Yes	B	56.0	----	57.2	1.2	----	57.6	1.6	----
Receiver 22	1	General Store (vacant)	Yes	F	51.3	----	52.5	1.2	----	52.6	1.3	----
Receiver 23	1	Realty Office	Yes	E	58.2	----	59.4	1.2	----	60.2	2.0	----

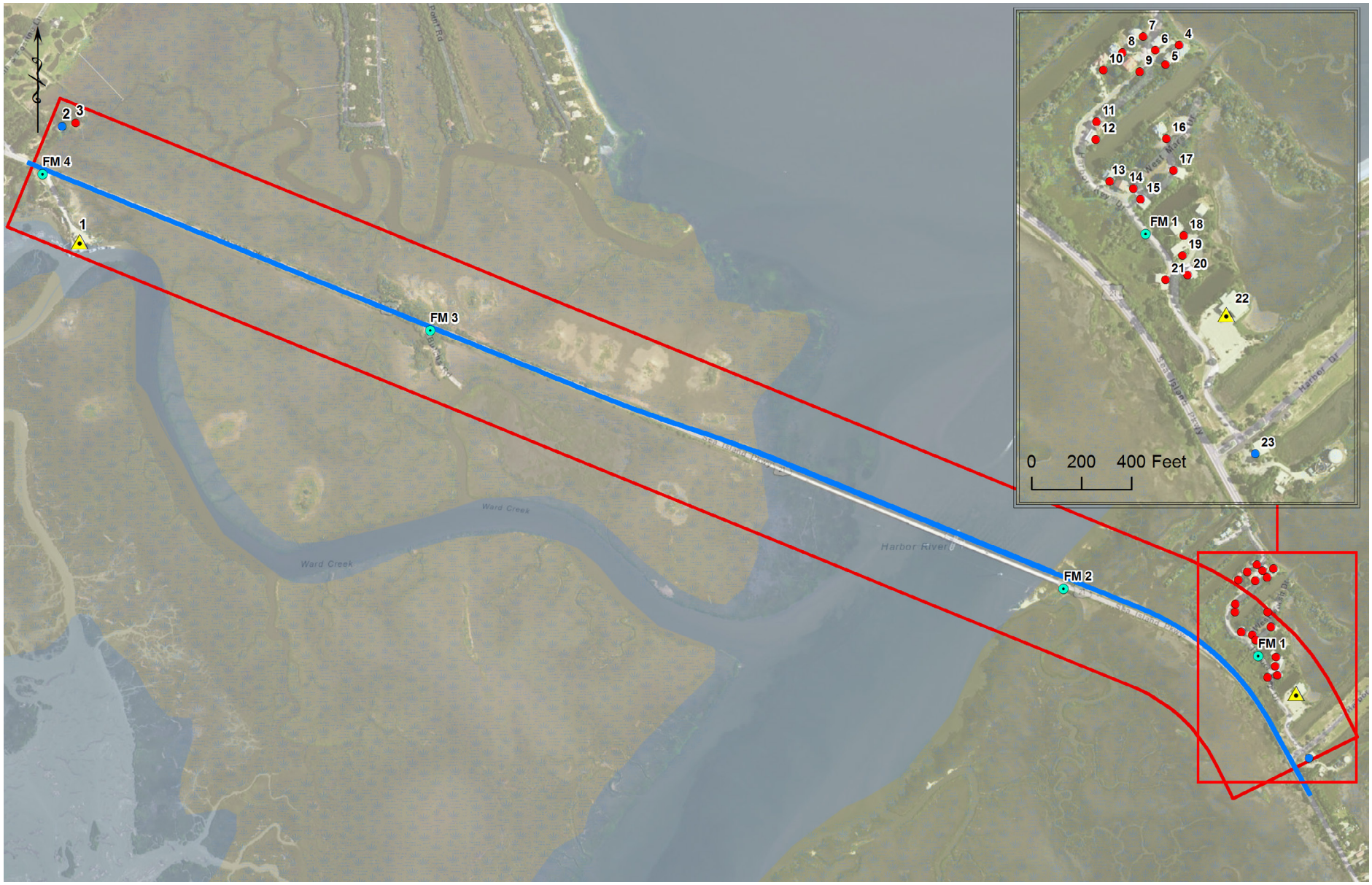

Figure 5-8 Location of noise receivers and field measurement locations

5.15 Hazardous Waste and Underground Storage Tanks

5.15.1 What are hazardous waste 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). A Limited Environmental Records Research (Appendix L) was prepared for the study area to identify possible sites involving the presence and/or past use of underground storage tanks (USTs), above ground storage tanks (ASTs), and/or other hazardous materials within the study area. Available information regarding the potential contamination on properties within the study area was obtained utilizing reports from Environmental Data Resources Inc. (EDR) and by submitting Freedom of Information Act (FOIA) requests to SCDHEC.

5.15.2 What are the existing hazardous materials sites in the study area?

No potential environmental concerns were identified within the study area. The Harbor Island Sewer Treatment Plant, owned by Harbor Island Utilities, is located in the eastern termini of the project, approximately 500 feet north of US Highway 21. SCDHEC FOIA responses did not identify compliance or enforcement concerns with the plant. Materials from the plant do not outfall into the surrounding marsh or other properties.

The Limited Environmental Records Research identified one site within the study area that contains ASTs. No USTs were identified within the study area. The ASTs are located at Gay Fish Company near the western termini of the study area. According to the EDR report, there are four ASTs of varying capacity at Gay Fish Company with a total capacity of 47,000 gallons.

5.15.3 How would the project impact hazardous materials sites?

The proposed project would have no effect on hazardous materials sites. Asbestos and lead-based paint surveys would be conducted on the existing bridge prior to demolition.

None of the proposed build alternatives would impact the Harbor Island Sewer Treatment Plant or Gay Fish Company or require the acquisition of right-of-way from these properties. Therefore, the proposed project would have no effect on hazardous material sites.

It is SCDOT's policy to avoid the acquisition of USTs and other hazardous materials, if possible. If avoidance is not a viable alternative, tanks and other hazardous materials will be tested and removed and/or treated in accordance with EPA and SCDHEC requirements. Cost of necessary remedial actions would be considered during the right-of-way appraisal and acquisition process.

A survey for asbestos containing materials (ACM) and lead-based paint (LBP) will be conducted on the US 21 bridge over the Harbor River. Survey findings and the potential removal of ACM or LBP would be coordinated with the SCDHEC Bureau of Air Quality, Asbestos Section prior to demolition of the existing bridge.

5.16 Cultural Resources

5.16.1 What are cultural resources and historic properties?

Cultural resources are properties and places that illustrate aspects of prehistory or history or have long-standing cultural associations with established communities and/or social groups. Cultural resources can include archaeological sites, structures such as bridges, buildings, and groups of any of these resources, among others.

Historic properties are cultural resources listed or eligible for listing in the National Register of Historic Places (NRHP). To be eligible for listing in the NRHP, cultural resources must typically be at least 50 years of age, possess historic integrity, and embody at least one of four criteria, per 36 CFR § 60:

A) association with events that have made a significant contribution to the broad patterns of our history;

B) association with the lives of persons significant in our past;

C) embodiment of the distinctive characteristics of a type, period, or method of construction; representative of the work of a master; possessing high artistic values; or representative of a significant and distinguishable entity whose components may lack individual distinction; or

D) cultural resources that have yielded, or may be likely to yield, information important to prehistory or history.

5.16.2 Why are cultural resources being considered for this project?

SCDOT is receiving federal funding from FHWA; as a federal agency, FHWA is required by the National Historic Preservation Act of 1966 (NHPA), as amended (54 USC § 300101 et seq.), and NEPA, as amended, to consider the effects of the proposed project on historic properties.

Throughout this process, FHWA must consult with the appropriate State Historic Preservation Officer (SHPO), federally recognized American Indian tribes, and other parties with an interest in the undertaking.

5.16.3 What cultural resources and historic properties exist in the study area and how would they be affected by the proposed project?

The cultural resources assessment was conducted in accordance with Section 106 of the NHPA (36 CFR § 800), which requires the identification of historic properties within the study area, assessment of adverse effects, and resolution of adverse effects, if any. Research was conducted at the South Carolina Institute of Archaeology and Anthropology and the South Carolina Department of Archives and History (SCDAH). In June and September 2015, the study area was researched and investigated to identify cultural resources that may be affected by the project.

The study area is located within the Gullah Geechee Cultural Heritage Corridor.

The study area is entirely within the Gullah Geechee Cultural Heritage Corridor (GGCHC), the linguistic and cultural area of the descendants of people historically transported from west and central Africa to labor on coastal plantations from North Carolina to Florida (Gullah Geechee Cultural Heritage Corridor 2012). As discussed in Section 5.1, the study area is partially within the CPO District and one of the CFV Overlay Districts (Figure 5-1).

Intensive field investigations involved the excavation of shovel test pits (STPs) in undisturbed, natural areas in the study area. The following provides a summary of cultural resources and historic properties within the study area; a detailed cultural resources report is located in Appendix M.

Archaeological Site 38BU113

Cultural materials were recovered during STPs at site 38BU113, a precontact (Middle to Late Woodland) shell midden and ceramic scatter composing uplands north of US 21 and west of the Harbor River. Due to retaining integrity, the probability of containing cultural features, and its artifact density, site 38BU113 is recommended eligible for listing in the NRHP under Criterion D and is considered a historic property. The project would not adversely affect site 38BU113 due to the proposed project being located outside of the boundaries of site 38BU113.

Archaeological Site 38BU147

STPs excavated at site 38BU147 did not recover cultural materials, and a comparison of 1939 and 1950s aerial photography suggests that the site resulted from shell material redeposited during the early-1940s construction of US 21 or displaced from the postconstruction road bed during storms. As such, site 38BU147 does not possess significance and is recommended not eligible for listing in the NRHP.

Resource 5070 (Harbor River Bridge)

The Harbor River Bridge (Resource 5070), a modified Warren through-truss swing-span bridge, was built in the late 1930s by the Virginia Bridge Company (SCDOT 2013). The bridge provides access to Hunting Island State Park, developed by the Civilian Conservation Corps/Works Progress Administration (CCC/WPA) between 1938 and 1940. The Harbor River Bridge was previously determined eligible for listing in the NRHP by SCDOT under Criterion A due to its association with Depression-era work relief programs and the development of South Carolina's network of state parks; it is considered a historic property. The project would result in an adverse effect to the Harbor River Bridge, as this historic property would be removed or demolished during the project.

Resource 5071 (Gay Fish Company)

The Gay Fish Company (Resource 5071) is a circa 1952 concrete-block commercial building with an associated wooden dock used for seafood unloading, processing, and distribution. The resource is on the north bank of Ward Creek, within the protection of a CFV District. Due to its association with the state's important mid-twentieth century commercial fishing industry and because it retains historic integrity, the Gay Fish Company is recommended eligible for the NRHP under Criterion A and is considered a historic property. The project would not adversely affect the character or use of the Gay Fish Company.

5.16.4 How would impacts to the historic bridge be mitigated?

Mitigation of the adverse effect to the historic bridge has been developed in consultation with FHWA, SCDOT, SC SHPO, and the Advisory Council on Historic Preservation (ACHP) and is documented in a signed MOA (Appendix A). SCDOT agrees to and commits to fulfill the recommendations of the SHPO that the following actions be taken to mitigate the removal of the US 21 bridge over Harbor River.

SCDOT would work with the SHPO, SCPRT, and the Hunting Island State Park manager to develop and fund a public interpretation plan related to the impact of Depression-era work programs on Hunting Island State Park and its associated landscape.

The plan would include elements that relate to the construction of the US 21 roadway and bridge over Harbor River, as well as the history of the CCC/WPA at Hunting Island State Park. The draft plan would be developed within 6 months of execution of the MOA, with components of the interpretation plan constructed at Hunting Island State Park within 1 year of finalizing the plan. SCDOT would also remove the placard from the existing US 21 bridge and provide it to SCPRT for use in the interpretive plan.

5.16.5 What coordination with agencies and consulting parties has occurred?

A LOI was distributed on June 23, 2015 via email to stakeholders, including the SCDAH, SHPO, SCPRT, and National Park Service Gullah Geechee Cultural Heritage Corridor Coordinator. The *Cultural Resources Survey of the US 21 Harbor River Bridge Replacement Project* (Appendix M) was submitted to SHPO on March 17, 2016. SHPO concurred with Cultural Resources Survey on May 4, 2016 (Appendix A). The MOA was signed by FHWA, SCDOT, SHPO, and SCPRT and is included in Appendix A. In an email dated March 17, 2016 (Appendix A), the USCG indicated they would not provide input on the MOA and would adopt the MOA as developed.

On May 12, 2016, FHWA provided an adverse effect notification and copies of the survey and MOA to the ACHP. On May 27, 2016, ACHP responded and waived the invitation to participate in the project (Appendix A). A copy of the signed MOA has been filed with ACHP. SCDOT has also coordinated with Hunting Island State Park and SCPRT regarding the MOA and proposed mitigation. Representatives from Hunting Island State Park attended the PIM and agency site visit. SCDOT coordinated with SCPRT to finalize the MOA (Appendix A).

To determine whether the project may affect any Gullah Geechee issues, resources, or traditions, the executive director of the GGCHC, J. Herman Blake, Ph.D., was consulted, and he, in turn, consulted several other Gullah Geechee people (Appendix A). Blake indicated that, because the project would be located on an existing roadway and would not result in access restrictions, he and the others he consulted had no concerns with the project.

5.16.6 How have Native American tribes been involved in the project?

The June 23, 2015, LOI was also sent via email to the Tribal Historic Preservation Officers (THPO) for the Catawba Indian Nation, Eastern Band of Cherokee Indians, and United Keetoowah Band of Cherokee. The Catawba Indian Nation responded via letter on July 14, 2015 indicating no immediate concerns of traditional cultural properties, sacred sites, or Native American archaeological sites within the proposed study area. The Catawba Indian Nation and Eastern Shawnee were provided copies of the *Cultural Resources Survey of the US 21 Harbor River Bridge Replacement Project* on March 17, 2016. The Catawba Indian Nation THPO concurred on April 4, 2016 with the adverse effect determination. Copies of the LOI and Catawba Indian Nation coordination are found in Appendix A.

5.17 Section 4(f)/6(f) Resources

5.17.1 What are Section 4(f) Resources?

The US Department of Transportation Act of 1966 included a special provision, Section 4(f), which established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. FHWA's regulations for complying with Section 4(f) are in 23 CFR § 774, and the coordination requirements are detailed in 23 CFR § 774.5. Section 4(f) applies to projects that receive funding from an agency of the US Department of Transportation. FHWA and SCDOT cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

1) There is no prudent and feasible alternative to using that land; and,

2) The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

A Section 4(f) "use" occurs when property from a Section 4(f) site is permanently acquired and incorporated into a transportation project. A "constructive use" of Section 4(f) property occurs when the proximity of a transportation project to a Section 4(f) resource, even without any acquisition of property, results in substantial impairment of the Section 4(f) property's features and attributes.

The following section identifies and analyzes potential impacts to Section 4(f) properties within, or in proximity to, the study area. This section also analyzes potential visual effects on Section 4(f) properties.

5.17.2 What Section 4(f) resources exist within the study area?

No wildlife refuges are located within the study area. There are no Beaufort County Rural and Critical Lands within the study area.

Four 4(f) resources related to public/ recreational resources and historic sites are within, or in proximity to, the study area: Hunting Island State Park, Beaufort County Boat Ramp, Gay Fish Company, and Harbor River Bridge.

Hunting Island State Park

Hunting Island State Park is considered a Section 4(f) resource and is located approximately 0.8 mile east of the study area. No state park lands are located within the study area. The park includes an overlook on the western side of US 21, located approximately 2 ½ miles away from the existing bridge. Park visitors view Johnson Creek and its associated salt marsh, with the existing bridge in the distance.

Beaufort County Boat Ramp

- Beaufort County owns and operates a public boat ramp on Butchers Island, south of US 21 and west of the existing bridge. The boat ramp is considered a Section 4(f) resource.

- Beaufort County also owns property at the eastern base of the existing bridge. Beaufort County's property description defines the property as a boat landing. However, the property is not designated as a boat landing or boat ramp on the Beaufort County GIS database. The property is currently used by SCDOT personnel parking; public parking is prohibited, as confirmed by Beaufort County (Appendix A). The property is not currently used as a boat landing or ramp and there are no plans to use the property for public recreation. Therefore, this resource is not considered a Section 4(f) resource and would not require a Section 4(f) evaluation.

Historic Sites

Historic sites are cultural resources listed or considered eligible for listing in the NRHP. Two historic properties were identified in the study area and are discussed in detail in Section 5.16: Gay Fish Company and Harbor River bridge.

5.17.3 Would the project impact Section 4(f) resources?

Hunting Island State Park

While Hunting Island State Park is a Section 4(f) resource, the proposed project would not directly impact park property or the overlook on US 21. The proposed project would not affect access to the park. The proposed bridge would be located in the distant background when viewed from the overlook and would not obstruct views of the surrounding tidal creeks or marshes. Overlook visitors are not likely to be sensitive to the change from a swing-span to a higher, fixed bridge. While the park is a Section 4(f) resource, the proposed project would not impact the park, and because of the overlook's distance from the bridge, the change in views would not substantially impair any of the park's features. The proposed bridge would have beneficial effects on the state park by providing a connection between St. Helena Island and Hunting Island that meets SCDOT design standards.

Beaufort County Boat Ramp

The proposed project would not permanently close the boat ramp. The preferred alternative would not require partial or temporary closure during construction. If construction, including materials staging or stockpiling, would result in partial or full temporary closure of the boat ramp, the contractor would be responsible for coordinating the 4(f) use with SCDOT, FHWA, and Beaufort County.

The proposed project would not affect the Beaufort County Boat Ramp or Hunting Island State Park.

Historic Sites

As discussed in Section 5.16.3, the project would also not adversely affect the Gay Fish Company. The project would result in an adverse effect to the Harbor River Bridge, as this historic property would be removed or demolished during the project. The bridge has been determined to no longer meet the State's safety and design requirements for its transportation system, and would be replaced 65-feet north of its existing alignment. Replacement of the existing bridge is deemed the only feasible and prudent alternative to continue providing a safe and efficient transportation network. Proposed impacts to the existing bridge meets the applicability requirements for Programmatic Section 4(f) Evaluation and Approval, established by FHWA. A Programmatic Section 4(f) Evaluation has been prepared in accordance with 23 CFR 774 to address the potential impacts and mitigation measures for the Harbor River bridge (Section 7.0).

5.17.4 What are Section 6(f) Resources and are any located within the study area?

Section 6(f) resources are places such as public parks, trails, courts, and other recreational areas that were purchased in part through federal grants from the Land and Water Conservation Fund Act of 1965 and are protected from conversion to non-public recreational uses. No Section 6(f) properties are located within the study area and thus there are no anticipated impacts to these resources.

5.18 Displacements

5.18.1 Would the project require relocation of homes or businesses?

The project would not displace any residences or commercial businesses.

No residences or businesses would be displaced by the project.

5.18.2 Would the project require acquisition of new right-of-way?

The proposed project would require 4.2 acres of right-of-way acquisition to construct the new approaches and along the new bridge. SCDOT would process any new right-of-way acquisitions and relocations in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 USC § 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.

5.19 Social and Economic Conditions

5.19.1 What are the socioeconomic conditions of Beaufort County?

The US Census data was evaluated to determine the demographics of the proposed study area and the anticipated population growth of Beaufort County. As of 2010, Beaufort County has an estimated resident population of 162,233, making it the tenth most populous county in South Carolina (US Census Bureau 2010a). Beaufort County had a 34 percent growth rate between 2000 and 2010. This population growth trend is expected to continue with a 56 percent increase until 2030 when the population is projected to be 215,300 (Table 5-7).

Table 5-7 Estimated and projected population, Beaufort County

2000 Census	2010 Census	2015 Projection	2020 Projection	2025 Projection	2030 Projection	% Growth 2000-2030
120,937	162,233	175,900	189,500	202,400	215,300	56.2

Source: US Census Bureau. 2010a.

The study area includes portions of three census tracts (CTs): CT 11.01, CT 11.02, and CT 12. Socioeconomic data was obtained for these tracts from the 2010 Census, including population, race, income, age, education level, and housing characteristics (see Table 5-8).

Table 5-8 Select socioeconomic characteristics of study area

Attribute	Census Tract 11.01	Census Tract 11.02	Census Tract 12	Beaufort County	South Carolina
	POPULATION AND RACE (BY PERCENTAGE)				
Population (total number)	3,862	4,901	718	162,233	4,625,364
White	56.7	20.6	97.5	71.9	66.2
Black	39.9	74.5	1.0	19.3	27.9
American Indian and Alaskan Native	0.1	0.2	0.3	0.3	0.4
Asian	0.4	0.1	0.1	1.2	1.3
Native Hawaiian and Other Pacific Islander	0.3	0.0	0.0	0.1	0.1
Other	1.0	3.0	0.0	5.2	2.5
Two or More Races	1.6	1.5	1.1	2.1	1.7
	AGE, HOUSEHOLD SIZE, AND INCOME				
Median Age	56.1	40.3	65.9	40.6	37.9
Average Household Size	2.22	2.58	1.88	2.42	2.49
Median Household Income	$63,696	$33,011	$79,000	$57,316	$44,779
Below poverty Level	9.2%	27.9%	1.4%	12.5%	18.1%
	EDUCATION LEVELS OF POPULATION 25+ YEARS IN AGE (BY PERCENTAGE)				
Up to 12th Grade, No Diploma	6.0	19.6	0.6	12.1	23.7
High School Diploma or Equivalent	26.4	34.8	17.4	24.2	30.0
Some College, No Degree	16.6	16.0	20.0	23.5	19.3
Associate Degree	7.0	9.6	6.7	6.9	6.7
Bachelor's Degree	20.6	8.2	33.5	21.6	13.5
Graduate or Professional	23.4	11.9	21.9	11.7	6.9
	HOUSING CHARACTERISTICS				
Median home value (owner occupied; in dollars)	347,900	102,600	496,300	275,500	137,400
Number of housing units	2,284	2,593	2,087	93,023	2,137,683
Owner Occupied	65.8	57.3	17.3	49.3	58.4
Renter Occupied	10.3	15.6	0.91	20.5	25.9
Vacant (percentage)	23.8	27.1	81.7	30.2	15.7

Source: US Census Bureau, 2010b; US Census Bureau, 2010c; US Census Bureau 2010d

The proposed project would not result in any adverse effect to local population, employment, schools, or communities in the study area. Economic benefits should result from the proposed project because of continued access and efficient movement of tourists, and local motorists and goods in the area. The project would not change neighborhood or community cohesion, school districts, or minority or social groups and would not permanently affect existing travel patterns and accessibility.

5.19.2 Would the project affect low income or minority communities?

EPA's Office of Environmental Justice defines Environment Justice as follows:

> "*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. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies."

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations directs federal agencies to analyze "the environmental effects, including human health, economic and social effects, of federal actions, including effects on minority communities and low income communities" when doing a NEPA analysis. The environmental effects of the proposed project on low-income and minority populations was also assessed following the FHWA Environmental Justice Reference Guide (FHWA 2015a).

The 2010 US Census Data from the study area was gathered and the EPA's EJScreen tool was searched to identify communities that were either minority or low-income (Table 5-8). The population within the referenced CTs ranges from 97.5 percent white (CT 12), which is higher than Beaufort County (72 percent) and South Carolina (66 percent) to 20.6 percent white (CT 11.02), which is lower than the county and state percentages. The median age for the CTs ranges from 40.3 to 65.9, which on average is higher than the median age for Beaufort County (40.6) and South Carolina (37.9). The median household income for the CTs ranges from $33,011 (CT 11.01), which is lower than the county ($57,316) and the state ($44,779) to $79,000 (CT 12), which is higher than the county and state. The median income for all CTs in the study area are greater than the $15,930 (household size of 2.0) poverty guideline of 2015, as established by the US Department of Health and Human Services (HHS 2015). The percentage of individuals living below the poverty level in the CTs ranges from 1.4 percent (CT 12), which is lower than the county (12.5 percent) and state (18.1 percent), to 27.9 percent (CT 11.01), which is higher than the county and state percentages.

The proposed project is located within a low-income and high minority community (CT 11.02), and within a higher income and low minority population community (CT 12). Based on the need to correct structural and functional deficiencies of the US 21 bridge over the Harbor River and to upgrade the bridge and its approaches to current design standards, the proposed project would not specifically benefit or harm any social group or result in disproportionate impacts to Environmental Justice populations, including low-income, or minority populations. The proposed project would result in an improved and structurally safer and more modern transportation facility for the county and community residents.

The proposed project would not have a disproportionately high and adverse impact on low-income or high-minority communities.

5.20 Visual Resources

Visual resources are components of the natural, cultural, or project environments which are capable of being seen (FHWA 2015b). Natural visual resources may include the land, water, and vegetation which compose the natural environment. Cultural visual resources include buildings and structures which were constructed by people. Project visual resources for transportation projects include the type, dimensions, and materials of the proposed structure.

5.20.1 What is the existing visual character of the study area?

As noted in Section 2.5.2, US 21 from Beaufort to Hunting Island is designated as the Sea Island Scenic Highway because of its expansive vistas and natural beauty. The natural environment includes the Harbor River, as well as extensive tidal creeks, flats, and salt marsh wetlands. Salt marsh grasses vegetate most of the study area. Trees, including live oaks, are found on upland areas, including the Beaufort County boat landing and small upland hammocks near Harbor Island. The land is relatively flat, with the salt marsh approximately 3 feet above mean sea level.

The cultural (or man-made) environment includes the US 21 causeway that approaches the Harbor River bridge from the east and west. The causeway is a relatively uniform embankment across the salt marsh. US 21 along the causeway consists of two travel lanes, one in each direction, with a 4-foot paved shoulder and mowed grass slopes. Shrubs are located along portions of the causeway, partially obstructing views of the surrounding salt marsh while driving on US 21.

The metal, through-truss swing-span on the existing bridge is considered historic (Section 5.16) and also contributes to the visual character of the study area. The existing bridge contains USCG navigational lights and stop lights at safety gates. Vehicle head lights and tail lights on the existing bridge are likely visible at night from surrounding communities.

Islands surrounding the project also contribute to the natural and cultural visual character of the study area. Harbor Island is a private 1,400-acre barrier island located at the eastern termini of the study area. Harbor Island, and the associated Harbor Key community, contains single-family houses, condominiums, and supporting recreational facilities. Many of the houses are elevated, with living quarters on upper levels. Houses and condominiums are used primarily by seasonal or vacation residents, with a smaller percentage of year-round residents. Beaches, intertidal flats, salt marsh, tidal creeks, and ponds surround Harbor Island and Harbor Key (Beaufort County Regional Chamber of Commerce 2016). Several small businesses and a restaurant are located along US 21 on Harbor Island.

St. Helena Island is located on the western termini of the study area and is predominantly rural and agricultural land. Single-family houses with docks to tidal creeks are located along the Harbor River marshes and St. Helena Sound. Beaufort County has designated St. Helena Island as part of a CPO because of its role in Gullah Geechee culture and “traditional cultural landscape and its physical setting” (Beaufort County 2010). Shrimp docks at Gay Fish Company and a restaurant, located in the western portion of the study area, are part of Beaufort County’s CFV Overlay, which recognizes the importance of the cultural contributions of the seafood industry.

Hunting Island is located approximately 0.8 mile from the eastern end of the study area and is South Carolina’s most popular state park. The island contains thousands of acres of marsh and maritime forest. Hunting Island State Park includes an overlook on the western side of US 21, located approximately 2 ½ miles away from the existing bridge. Park visitors view tidal creeks and salt marsh, with the existing bridge in the distance.

5.20.2 What do people like and dislike about the existing visual character of the study area?

Residents of Harbor Island and Harbor Key value the natural environment surrounding their houses. Commenters during the PIM mentioned the “beautiful nighttime skies” and “peace and serenity” as reasons for living and visiting Harbor Island. The trees and shrubs between Harbor Key and US 21 are also important to residents because of the buffer they provide between their houses and the highway.

5.20.3 How do federal, state, or local regulations or plans address visual resources for this project?

Federal Requirements

NEPA, as amended, was established, in part, to "assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings" Sec. 101 [42 USC § 4331]. FHWA, in its implementation of NEPA (USC § 109[h]), directs that final decisions regarding projects are to be made according to the best overall public interest, taking into account adverse environmental impacts, including, among other items, the destruction or disruption of aesthetic values. FHWA released the *Guidelines for the Visual Impact Assessment of Highway Projects* in January 2015. As noted in Section 5.5.1, federal Section 404 CWA permit decisions are based, in part, on how a project would affect public resources, including aesthetics (33 CFR § 320.4)

State Plans and Requirements

The South Carolina Coastal Zone Management Act considers the aesthetic value of tidelands and coastal waters, stating that tourism is, in part, supported by the aesthetic pleasures of undisturbed tideland areas (Regulation 30-1B5).

As noted above, US 21 within the study area is designated as Sea Island Scenic Highway, a South Carolina state scenic highway. While this designation recognizes scenic qualities, there are no state regulations or requirements for projects on state scenic highways.

Local Plans and Policies

The Beaufort County Comprehensive Plan identifies the protection of scenic view corridors and the County's community aesthetics in their common land use goals. The County also attributes the aesthetics of waterways and marshes to residents' quality of life and tourism. Beaufort County's CPO and CFV Overlay recognize the cultural contributions of the Gullah Geechee community and seafood industry, respectively. As discussed in Section 5.1.2, these overlays restrict certain types of development to help protect the character of these areas. Homeowners associations on Harbor Island and Harbor Key also abide by covenants and restrictions on signage and tree clearing, among others, that influence the visual character of their communities.

5.20.4 What is the project's visual character?

SCDOT would replace the existing swing-span bridge with a fixed-span bridge. The project's visual effects were evaluated using conceptual design of the proposed bridge. Specifics of bridge aesthetics and dimensions are subject to change during final design. The proposed bridge would be 65 feet to the north of the existing swing-span and would rise 65 feet above the MHW of the Harbor River. The proposed bridge would be approximately 3,602 feet long and 47 feet wide and would have a 42-inch-high barrier on the outside of each shoulder. The lower portion of the barrier would be constructed of concrete, while the upper portion would be a metal rail. Upon completion of the proposed bridge, the existing bridge and swing-span would be demolished.

No permanent lighting would be installed on the proposed bridge roadway. The proposed bridge would contain red and green navigational lights under the bridge in accordance with 33 CFR § 118 and as approved by the USCG.

5.20.5 How would the project impact visual resources?

The existing bridge is visible from some houses on Harbor Island and St. Helena Island. The view of the proposed bridge would be substantially different for a fixed-span bridge. With a clearance of 65 feet above MHW the fixed-span bridge would be silhouetted against the sky at day, night, dawn, and dusk to a much greater extent than the existing movable bridge. The fixed-span bridge would become a permanent part of the skyline of the area which is mostly dominated by the existing swing-span bridge, marshes, and trees. Vehicle head lights and tail lights on the proposed bridge would be visible at night from surrounding communities.

In particular, the proposed bridge would affect the views from some houses located on Harbor Key, which is the closest community to the existing bridge. Houses on Harbor Island and Harbor Key are elevated; therefore, many houses have views of the existing bridge and waterways above the trees and shrubs. Based on comments received during the PIM, homeowners on Harbor Key are sensitive to the project's visual effects on their surrounding natural environment and property.

Conceptual designs of Alternatives 1A and 2B were modeled to evaluate the potential visual effects on the Harbor Key community. Alternative 1A is the closest alternative to the Harbor Key community, while Alternative 2B is the farthest away. Renderings of the proposed bridge were prepared using a viewpoint from a rear deck of a house on Harbor Key (Figure 5-9).

All of the proposed build alternatives would have a visual effect on the surrounding communities. As compared to Alternative 1A, Alternative 2B has a longer approach and obstructs more of the river and salt marsh views from the viewpoint on Harbor Key (Figure 5-10 and 5-11).

A rendering of the preferred alternative was prepared using the same viewpoint from the rear deck of a house on Harbor Key (Figure 5-12). In the preferred alternative, the proposed bridge would be located 65 feet closer to the Harbor Key community compared to the existing bridge and would have a visual effect on the community. Some of the trees and shrubs on the north side of US 21 would be removed during construction.

Figure 5-9 Location of Rendering Photograph

Figure 5-10 Rendering of Alternative 1A

Figure 5-11 Rendering of Alternative 2B

Figure 5-12 Rendering of Preferred Alternative

The proposed bridge would have a beneficial effect on views for those driving on US 21. The proposed bridge would have a 42-inch-high solid concrete barrier on the outside of each shoulder. Assumed average driver eye height for passenger cars is approximately 42 inches above the ground (AASHTO 2011). Motorists would be able to see over the barrier because the vehicle travel lanes are situated on the crown of roadway and the perspective of the barrier would be lower than the assumed average driver eye height. From the top of the bridge, motorists would notice a substantial increase in their viewing distance for the fixed-span bridge compared to the existing bridge due to the difference in elevations. Motorists on the fixed-span bridge would have a more expansive view both up and down the Harbor River and surrounding marshes compared to a movable bridge. Motorists would also be able to see the Hunting Island Lighthouse at the state park. Motorists would initially be sensitive to the expansion of their views, but would likely become accustomed to the change over time. The proposed project would also have a beneficial effect on views for mariners on the Harbor River. The higher fixed-span bridge would facilitate a greater view through the bridge and from one side to the other.

5.20.6 How would impacts to views be minimized or mitigated?

Alternative 1, which was located 122 feet north of the existing bridge, was proposed at the PIM in September 2015. Members of the Harbor Key community expressed concern about the potential visual impacts of Alternative 1, since the bridge would be shifted closer to their houses. Visual effects were minimized by shifting Alternative 1 closer to the existing bridge and away from Harbor Key to develop Alternative 1B, the preferred alternative.

The proposed project would have visual effects on the Harbor Key community.

5.21 Indirect and Cumulative Impacts

The FHWA and other federal agencies' responsibility to address and consider direct, indirect, and cumulative impacts in the NEPA process was established in the CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR § 1500-1508). The CEQ regulations define the impacts and effects that must be addressed and considered by federal agencies in satisfying the requirements of the NEPA process. The CEQ regulations note three impact categories; namely, direct, indirect, and cumulative. According to FHWA guidance, the determination or estimation of future impacts is essential to both indirect and cumulative impact analysis. Direct impacts are discussed in previous Sections 5.1 to 5.20.

5.21.1 Indirect Impacts

What are indirect impacts?

Transportation projects have a wide range of effects on the environments in which they are located. While some effects are directly related to the project's design or function, other effects on the natural or human environment are more indirectly attributable to a transportation project. According to CEQ, indirect impacts are caused by the action or project and occur later or farther away (off site) but are still reasonably foreseeable (40 CFR § 1508.8). Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

How are indirect effects of a proposed transportation project analyzed?

Indirect impacts were analyzed using the eight-step process outlined in National Cooperative Highway Research Program (NCHRP) Report 466: *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects*. Steps in the framework are as follows:

- Step 1: Initial Scoping for Indirect Effects Analysis
- Step 2: Identify the Study Area's Direction and Goals
- Step 3: Inventory Notable Features
- Step 4: Identify Impact-Causing Activities of Proposed Action and Alternatives
- Step 5: Identify Potentially Significant Indirect Effects for Analysis
- Step 6: Analyze Indirect Effects
- Step 7: Evaluate Analysis Results
- Step 8: Assess Consequences and Develop Mitigation

What is the general approach and study area for the indirect effects analysis?

According to the NCHRP Report 466, projects that do not provide additional capacity are unlikely to change accessibility and therefore require a lower level of analysis that can be qualitative in nature. The proposed bridge would have the same number of travel lanes as the existing bridge. As a bridge replacement project, the project's purpose and design features do not have an explicit economic development purpose or conflict with local plans. The project is located in a rural setting where development pressure is relatively low. Based on the factors mentioned above, SCDOT conducted a qualitative indirect effects analysis for the proposed project.

The study area for potential indirect impacts varies for each resource. In general, the study area for considering direct impacts is approximately 2 miles long and 1,200 feet wide, centered on the existing US 21 between Gay Fish County Road on St. Helena Island and Harbor Drive on Harbor Island. While this study area is sufficient for most resources, potential indirect impacts on waterbodies, wetlands, and floodplains may extend beyond this boundary. The study area for these resources includes the Salkehatchie Coastal Frontage watershed (Figure 5-2).

What are the growth trends and goals within the study area?

As discussed in Section 5.1, there is a low potential for growth and development within the study area because of the extensive tidal wetlands, floodplains, and zoning designations. St. Helena Island, Harbor Island, Fripp Island, and Hunting Island are located outside of the Growth Boundary for Northern Beaufort County (Beaufort County 2010). Neighborhood mixed-use developments, such as Harbor Island, Harbor Key, and Fripp Island, are not expected to expand beyond their current boundaries (Beaufort County 2010). Hunting Island is protected as a state park. St. Helena Island to the west is zoned rural and occurs within a CPO District that discourages development of gated communities, golf courses, and/or resort properties. There are no existing plans for construction of other bridges or crossings to Harbor, Hunting, or Fripp Islands.

What are the notable features within the study area?

Notable features with the potential for indirect project impacts include:

- Water resources
    - Salt marsh
    - Tidal rivers and creeks
- Biological resources
    - Suitable habitat for federally protected species
    - Rookery on Harbor Key
- Surrounding communities

What are the proposed activities that would impact resource?

Table 5-9 provides an overview of the impact-causing activities associated with the proposed project. Impact causing activities include all of the activities involved in the project from clearing to maintenance of vegetation once the project is finished. The proposed project would involve replacing the existing US 21 swing-span bridge with a 65-foot fixed-span bridge. Construction access would be provided which may cause some temporary impact. New fill would be placed in the salt marsh. The existing swing-span bridge would be removed.

Table 5-9 Impact-causing activities

Type of project activity[1]	Project specific activity	Relevant details
Modification of Regime	Modification of Habitat	Salt marsh habitat would be permanently shaded under the new bridge.
Modification of Regime	Modification of Habitat	Salt marsh habitat and tidal river would be temporarily adversely affected for construction access.
Modification of Regime	Alteration of Ground Cover	Ground cover will be temporarily disturbed. BMPs will be in place to control soil erosion. When construction is complete, ground cover will be reestablished with a similar species composition to that currently present.
Land Alteration	Wetland Fill	New fill would be placed in the salt marsh to construct the bridge approaches.
Land Transformation and Construction	New Transportation Facility	The existing swing-span bridge has a 15-foot vertical clearance over the Harbor River. The proposed bridge would have a 65-foot vertical clearance. The existing bridge has two 10-foot travel lanes with 1-foot shoulders; The proposed bridge would have two 12-foot travel lanes with 10-foot shoulders.

[1] Definition of impact-causing activities, as identified in NCHRP Report 466:
Modification of regime – alteration of habitat, flora, hydrology, etc.
Land transformation and construction – construction methods and design features
Land alteration – erosion control, landscaping, fill

What are the potential indirect effects of the proposed project?

Both qualitative and quantitative methods were used to identify and analyze the potential indirect effects to notable features within the study area. Conceptual design drawings, GIS, technical reports, Beaufort County Comprehensive Plans, and public involvement information were used to evaluate potential indirect effects of the proposed bridge replacement.

The analysis compares the list of project impact-causing actions (Step 4) with the lists of goals (Step 2) and notable features (Step 3) to establish which indirect effects are potentially substantial and need detailed analysis (or, which effects are not potentially substantial and require no further assessment). The context of the study area and the intensity of the impact were considered when determining if an impact may be substantial.

Encroachment-Alteration Effects

Encroachment-alteration effects are those effects that alter the behavior and function of the physical environment and are related to project design but are indirect in nature because they can be separated from the project in time or distance.

- Tidal Creeks and Rivers: The proposed project would indirectly affect tidal creeks and rivers in the Salkehatchie Coastal Frontage watershed by producing turbidity during construction. However, this indirect impact would not be significant because increased turbidity would be temporary and localized to the construction area. In addition, the contractor would be required to minimize potential indirect impacts to water resources through implementation of construction BMPs, reflecting policies contained in 23 CFR § 650 B and SCDOT's *Supplemental Specifications on Seeding and Erosion Control Measures*. The project would have a beneficial indirect effect on water resources by containing and filtering stormwater runoff from the proposed bridge.

The proposed project would have indirect effects on tidal water bodies, salt marsh, biological resources, the Beaufort County boat ramp, and surrounding communities.

- Salt Marsh: The proposed project would indirectly affect salt marsh by shading salt marsh grasses underneath the new bridge. Vegetation within the salt marsh vegetation includes bushy seaside tansy (*Borrichia frutescens*), smooth cordgrass (*Spartina alterniflora*), glasswort (*Salicornia virginica*) and black needlerush (*Juncus roemerieanus*). The proposed bridge would shade salt marsh vegetation, potentially resulting in areas of sparse vegetation or vegetation dying off. The extent of adverse impact is dependent on several factors, including the proposed bridge orientation and height to width ratio. Impacts to salt marsh vegetation generally occur when the bridge height to bridge width ratio is less than 0.70 (SCDOT 2015; Broome 2005). SCDOT estimated the acreage of potential salt marsh vegetation impacts for each build alternative. The proposed bridge width is 46.5 feet; based on the 0.70 bridge height to bridge width ratio, indirect impacts to vegetated salt marsh may occur in areas where the bridge height is 33 feet or lower. Salt marsh vegetation may become sparse in these areas, with the greatest percentage of die-off as the bridge lowers to connect to the existing causeway. The preferred alternative would shade approximately 1.4 acres of salt marsh. The existing bridge is approximately 21 feet wide and 12 to 15 feet above the salt marsh. With an existing bridge height to width ratio of 0.6, the existing bridge shades approximately 0.4 acre of salt marsh vegetation. Sparse areas of salt marsh vegetation underneath the existing bridge would likely revegetate once the bridge is removed.

- Biological Resources: The proposed project would indirectly affect suitable habitat for protected species, and the Harbor Key rookery within the study area watershed by producing turbidity, noise, and additional lighting during construction. Birds and marine species may be deterred from the study area by an increase in construction noise. However, these indirect impacts would be temporary and localized to the construction area.

- Community Resources: The proposed project has the potential to indirectly affect communities on surrounding islands of Harbor Key, Harbor Island, and St. Helena Island. The proposed project may indirectly affect community characteristics and aesthetics during construction because of increased construction traffic and noise. However, these indirect impacts would not be temporary and localized to the residences near the construction area.

Project-Influenced Induced Growth

Project-induced growth is changes in capacity, traffic patterns, or accessibility that can influence the location of residential and commercial growth in the study area. The proposed bridge replacement project would not add travel lanes or increase capacity of US 21. The new bridge would not provide any new access to St. Helena, Harbor, Hunting, or Fripp Islands. The proposed project would not serve a specific land development, and is not expected to stimulate complementary development or influence intraregional land development. Harbor Island and Fripp Island have limited land area and are mostly built out; therefore, the proposed project is unlikely to stimulate land development in these areas. The proposed project would not induce development or facilitate a change in the pattern of land use within the study area.

What is the result of the indirect effects analysis and what mitigation is proposed?

Table 5-10 summarizes the potential indirect effects of identified notable resources; federal, state, or local reviews or permitting of these resources; and proposed mitigation measures. None of the potential indirect effects are considered to be unacceptable or significant. Assumptions were made about the low potential for growth in the study area based on Beaufort County zoning designations and planning documents. Unforeseen changes in public and/or private land use patterns could affect the characteristics of the area in the future. The extent of indirect impacts on water quality and biological resources is uncertain; however, precautions and mitigation outlined in Table 5-10 would minimize the potential for greater indirect effects on these resources. The indirect effect of salt marsh shading was estimated using a SCDOT 2015 case study on salt marsh shading and North Carolina Broome 2005 study; however, the actual extent of vegetation loss remains uncertain. Vegetation loss would be offset by removing the existing bridge and allowing natural reestablishment of salt marsh vegetation in that area.

Table 5-10 Indirect effect summary

Notable resource	Potential indirect effect	Federal, state, or local review or permitting	Proposed mitigation measures for indirect effects
Water resources: salt marsh, tidal rivers and creeks	• Temporary construction impacts • Temporary and localized increased turbidity during construction • Long-term beneficial indirect effect by containing and filtering stormwater runoff from the proposed bridge • Permanent shading of salt marsh grasses beneath new bridge	• USACE Section 404 Individual Permit • SCDHEC Section 401 Water Quality Certification • SCDHEC-OCRM Critical Area Permit • SCDHEC NPDES Land Disturbance Permit	• Follow SCDOT BMPs during construction reflecting policies contained in 23 CFR § 650 B and SCDOT's *Supplemental Specifications on Seeding and Erosion Control Measures*. • Contain and filter stormwater runoff from bridges • Obtain NPDES permit and prepare a SWPPP • Remove existing bridge and allow salt marsh grasses to revegetate
Biological resources: protected species habitat, rookery on Harbor Key	• Temporary and localized increase in turbidity, noise, and additional lighting during construction • Birds and marine species may be deterred from the study area by an increase in construction noise	Consultation with USFWS and NOAA-NMFS	• Follow SCDOT BMPs during construction • Ensure equipment does not obstruct or impede passage through more than 50 percent of the river. • Use "slow starts" • Use vibratory hammers, where practicable • Follow USFWS *Manatee Protection Guidelines* • Follow NOAA-NMFS *Sea Turtle Construction Conditions* • Reduce or shield construction lighting during sea turtle nesting season (May 1 through October 31) • No in-water work at night for a minimum of 8 hours.
Surrounding communities	Indirect effect on community characteristics and aesthetics because of increased construction traffic and noise	None applicable	Contractor would comply with applicable local noise ordinances and OSHA regulations concerning noise attenuation devices on construction equipment

5.21.2 Cumulative Impacts

What are cumulative impacts?

According to the CEQ definition (40 CFR § 1508.7), cumulative impacts are defined as impacts on the environment that result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

How were cumulative impacts evaluated?

CEQ's guidance, *Considering Cumulative Effects under the National Environmental Policy Act* (1997), and the CalTrans' *Guidance for Preparers of Cumulative Impact Analysis* (2012) were used to analyze cumulative effects during the NEPA process. Potential cumulative impacts were considered throughout the environmental process.

Similar to the indirect effects analysis, an eight-step process was used to identify and assess cumulative impacts.

- Step 1 – Identify the Resources to Consider in the Analysis
- Step 2 – Define the Study Area for Each Resource
- Step 3 – Describe the Current Health and Historical Context for Each Resource
- Step 4 – Identify Direct and/or Indirect Impacts of the Proposed Project that Might Contribute to a Cumulative Impact
- Step 5 – Identify Other Reasonably Foreseeable Actions that May Affect Each Resource
- Step 6 – Assess Potential Cumulative Impacts to Each Resource
- Step 7 – Report the Results
- Step 8 – Assess and Discuss Mitigation Issues for all Adverse Impacts

What resources were considered in the analysis?

Cumulative impacts analysis is resource specific and generally performed for the environmental resources directly and indirectly negatively affected by the proposed project. Therefore, if the proposed project would not directly or indirectly impact a particular resource, it was not included in the cumulative impacts analysis. The analysis focuses on resources currently in poor or declining health or at risk even if project impacts are relatively small. The proposed bridge replacement project may have potential direct and/or indirect impacts (not significant) on the following resources.

- Salt marsh and tidal creeks
- Federally threatened and endangered species
- Historic metal truss and swing-span bridges

The following sections identify a resource study area (Step 2), provide an overview of the current health and historical context of each resource (Step 3), potential impacts associated with the proposed bridge (Step 4), reasonably foreseeable future projects that could affect the resource (Step 5), and assessment of the potential cumulative impact (Step 6). Each section also discusses the mitigation proposed for each resource, if applicable.

What are the potential cumulative impacts on salt marsh and tidal creeks?

Potential cumulative impacts to salt marsh and tidal creeks were evaluated in the Salkehatchie Coastal Frontage watershed (Figure 5-2). Of the 46,481 acres in this basin, salt marsh comprises approximately 7,682.7 estuarine acres (SCDHEC 2016a). The current health of the salt marsh and tidal creeks is demonstrated by the lack of water quality impairments and ORW designation. Past impacts to the salt marsh and tidal creeks has been limited to the construction of the US 21 causeway in the 1930s and the development of the Fripp Island, Harbor Island, and Harbor Key communities. Salt marsh was excavated or filled to build the US 21 causeway. A tidal creek historically flowed to the west of Butcher's Island; the US 21 causeway filled and bisected the creek. Construction of the Harbor Island and Harbor Key communities in the 1970s adversely affected salt marsh and tidal creeks due to the construction of developable land and causeways.

Under the preferred alternative, the proposed bridge would directly impact 5.9 acres of salt marsh through permanent fill, which is 0.08 percent of the 7,682.7 estuarine acres within the basin. The preferred alternative would indirectly impact approximately 1.4 acres of salt marsh through shading. However, the existing bridge currently shades approximately 0.4 acre of salt marsh, which would be exposed when the bridge is removed. SCDOT would provide compensatory salt marsh mitigation from an approved mitigation bank for the proposed shading impact.

Future foreseeable impacts to salt marsh and tidal creeks are limited because of the low potential for development in the Salkahatchie Coastal Frontage watershed. Future plans for a bicycle route on US 21 between the city of Beaufort and Hunting Island State Park (Beaufort County 2010) would likely require a wider shoulder on US 21, which may result in minor salt marsh impacts. Docks or marina expansions have the potential to shade small areas of salt marsh. Projects that impact salt marsh or tidal creeks would be required to obtain a USACE Section 404 and SCDHEC-OCRM Critical Area permit, as well as provide compensatory salt marsh mitigation. Therefore, the proposed project is not expected to contribute to cumulative impacts to salt marsh and tidal creeks.

The proposed project would impact a very small percentage of salt marsh in the watershed. Cumulative impacts to salt marsh and tidal creeks are not expected as a result of this project.

What are the potential cumulative impacts on federally protected species?

Obstructions, such as the construction of the US 21 causeway in the 1930s, may have adversely affected protected species habitat. Past impacts to habitat may have occurred during the development of the Fripp Island, Harbor Island, and Harbor Key communities. Past impacts to habitats near the proposed project include shoreline development, beach maintenance and nourishment, and artificial structures such as jetties and groins. In 1970, Fripp Island installed a series of groins along the beach, of which several are still intact at the south end of the beach (FIPSD 2008). In 1974, the Fripp Island developer completed a 2,000-foot concrete seawall and rock groin along Fripp Inlet to protect the Ocean Point Golf Course and New Haven Villas. Several rock revetments have also been constructed on Fripp Island to control beach erosion and protect properties. Groins are also located on Hunting Island.

Cumulative impacts to protected species are not expected. Alternative habitats are present nearby, and future projects would be coordinated with USFWS and NOAA-NMFS.

Project related impacts to suitable habitats include direct construction impacts (fills, columns, in-water noise) and indirect impacts (increased turbidity, noise). An abundance of similar habitat types in the immediate vicinity outside of the study area provide suitable alternative foraging areas.

Future foreseeable impacts to habitats are limited because of the low potential for growth near the proposed project. Future foreseeable actions near the study area that may affect habitat include a sand scraping project on Harbor Island and nourishment on Hunting Island. The Harbor Island Owners Association proposes a sand scraping project on the beaches of Harbor Island to add sand to its eroding beaches. The proposed project is located approximately ½ mile from the existing US 21 bridge (USACE 2015). The proposed project on Hunting Island includes dredging, beach nourishment, and construction of two sheet pile groins (USACE 2016). The purpose of the project is erosion control and beach restoration, as well as providing beach habitat for shorebirds and turtles where none currently exists.

Bald eagle, West Indian (Florida) manatee, and wood storks have recovering populations, as indicated by their removal from the ESA or improved classification. SCDOT's consultation with USFWS and NOAA-NMFS has resulted in conservation measures that would minimize the potential for cumulative impacts. Because of the recovering populations, project commitments, nearby expanse of habitat, and low potential for future impacts, the proposed project is not expected to contribute to cumulative impacts to federally protected species.

What are the potential cumulative impacts on historic bridges?

SCDOT maintains a list of historic bridges that are eligible and ineligible for the NRHP within the state of South Carolina. Currently, 26 bridges are eligible for the NRHP, including through-truss, pony-truss, deck-truss, bascule, and swing-span bridges. Five of the twenty-six eligible bridges are moveable spans located in coastal counties of South Carolina, including the US 21 bridge over Harbor River. Twelve historic metal truss bridges are ineligible for the NRHP; none of these bridges are moveable spans or are located in coastal counties.

Historic metal truss and moveable bridges have been replaced over the years because of structural deficiencies and maintenance. Seven of the twenty-six eligible bridges have been removed or replaced, or are proposed for removal, including the US 21 bridge over Harbor River. The metal through-truss swing-span bridge on SC 703 (Ben Sawyer Boulevard) in Charleston County was replaced with a new through-truss swing-span bridge. Under the preferred alternative, the US 21 through-truss, swing-span bridge would be replaced with a 65-foot-high fixed-span bridge, which would have an adverse effect on the historic bridge. Three historic moveable-span bridges would remain in the coastal counties of South Carolina: two swing-span bridges in Horry County and a double bascule bridge in Charleston County. The adverse effects of removing the historic US 21 bridge would be mitigated by offering the historic bridge for an alternative use and developing interpretive signs at Hunting Island State Park about the bridge's construction. Comparable mitigation efforts have been conducted during past historic bridge removals or replacements. Therefore, the replacement of the US 21 bridge over Harbor River would not have a cumulative impact on historic bridges.

Three historic moveable-span bridges would remain in coastal South Carolina. Efforts are being made to mitigate the loss of historic bridges.

6.0 Agency Coordination and Public Involvement

6.1 How have the regulatory and resource agencies been involved in the project?

A LOI was distributed on June 23, 2015 via email to stakeholders to notify them of the commencement of the proposed project. The LOI provided general project information and requested comments on potential environmental issues and concerns within the study area. Agency responses to the LOI can be found in Appendix A.

On September 10, 2015, an agency coordination effort meeting was held to introduce and discuss the proposed project. SCDOT presented a project update during an agency coordination effort web meeting on January 14, 2016. SCDOT discussed the results of the PIM, particularly the concerns of the Harbor Island and Harbor Key residents about Alternative 1.

An agency site visit was held on April 19, 2016 with representatives from SCDOT, USACE, USFWS, NOAA-NMFS, USCG, SCDNR, DHEC-OCRM, and Beaufort County. During the site visit, the agencies reviewed the study area and discussed the range of alternatives, reasonable alternatives, and the recommended preferred alternative. Meeting minutes are located in Appendix A.

6.2 What information was shared during the Public Information Meeting?

SCDOT conducted a PIM on September 15, 2015, at St. Helena Elementary School in St. Helena Island with approximately 121 individuals in attendance. SCDOT gave a presentation summarizing the existing bridge conditions, proposed alternatives, typical section, NEPA process and considerations, and schedule and cost. The bridge alternatives and typical section were also presented on display boards. At the time of the PIM, SCDOT presented three bridge alternatives (Alternative 1, 2, and 3).

A public information meeting was held on September 15, 2015. A total of 121 people attended.

6.3 What were the public's comments during the public notice and Public Information Meeting?

During the meeting and two week response period, SCDOT received 44 comment forms and emails. Table 6-1 reflects a tabulation of comments by subject matter.

The majority of comments received during the PIM and response period concerned the proposed alternative bridge locations. Many individuals expressed concern with Alternative 1, particularly with the potential visual and noise effects for property owners in the Harbor Key community. A number of commenters also suggested a left-turn lane from US 21 onto Harbor Drive because of congestion that occurs at the Harbor Island gate house during summer months.

Table 6-1 Public information meeting comment summary

Comment topics	Number of comments
Alternatives	22
Increased noise	9
Reduced property values	8
Bicycle/pedestrian access	8
Views/aesthetics	9
Bridge height	9

Commenters also expressed concern about reduced property values and increased noise from the proposed bridge. In most cases, these two concerns were relayed in comments that also expressed concern for Alternative 1. Many expressed that under Alternative 1 the bridge would be constructed closer to their property, resulting in increased noise, impacts to views, and reduced property values. None of the comments from the PIM favored Alternative 1. Nine commenters were in favor of Alternative 2 and three were in favor of Alternative 3 as a second option to Alternative 2.

Eight comments pertained to bicycle and pedestrian access. Five comments recommended that the proposed project contain a walkway or bicycle trail so cyclists and pedestrians may safely travel over the bridge. Comments also suggested a bicycle and pedestrian trail on Hunting Island, a separated walkway, and a statement of general interest for bicycle and pedestrian accommodations.

Safety was also identified as a concern. Commenters expressed concern about the safety of the existing bridge and the reliability of emergency management access. Several comments requested a reduced speed limit on the proposed bridge and/or better enforcement of speed limits. Other general comments included air quality, wetlands, wildlife, construction, and congestion in the summer during peak travel time.

6.4 What other public involvement occurred?

FHWA and SCDOT hosted a community meeting on Friday, May 20th, 2016 to introduce and discuss Alternative 1B with the Harbor Island and Harbor Key communities. The drop-in, “open house” format meeting was held at Harbor Island Owners Association meeting room from 1 to 3 p.m. The meeting was advertised to the Harbor Island and Harbor Key communities through emails and fliers posted by the Harbor Island Owners Association manager. The Fripp Island property manager was also invited to attend.

Forty-one people attended the meeting and fourteen comments were received. During the meeting, project team members provided “tours” of the displays to groups no larger than four. Displays showed the proposed typical section, considered alternatives, environmental considerations matrix, and rendering of the preferred alternative. Project team members explained how SCDOT had developed the three alternatives presented at the PIM into five alternatives to address community and agency concerns. The tour also included a discussion of how none of the alternatives would result in a noise impact to receivers on Harbor Key. Attendees with additional comments and questions were then invited to speak with FHWA and SCDOT representatives and complete a comment form.

Attendees generally supported Alternative 1B as the preferred alternative, particularly after discussing the results of the noise study and viewing the rendering. Of the 14 comments received, 5 expressed support for Alternative 1B. No comments expressed support for other alternatives or

opposition to Alternative 1B. Continued concerns expressed by the Harbor Island and Harbor Key community include the proposed 55 mph speed limit and adding a turn lane into Harbor Drive.

6.5 How were agency and public comments incorporated into the project?

In developing the proposed project, SCDOT has attempted to balance the concerns of the surrounding communities and regulatory and resource agencies, as well as the navigational considerations of the USCG.

During the PIM, the Harbor Key community generally opposed Alternative 1 because the bridge would be constructed approximately 122 feet closer to their houses. The community expressed concern about the potential for increased noise and impacts on their scenic views. In response to the PIM, Alternative 1B was developed to shift the proposed bridge away from the Harbor Key community and closer to the existing bridge. Alternative 1B, the preferred alternative, would be constructed 65 feet to the north of the existing swing-span bridge.

A preliminary noise analysis was conducted for the reasonable build alternatives. As discussed in Section 5.14, the proposed project would result in no traffic-related noise impacts.

As discussed in Section 5.20, visual effects on the Harbor Key community were also evaluated by preparing renderings of the proposed bridge. While the visual effect of Alternative 1A and 1B may differ compared to Alternatives 2A, 2B, and 3, which shift to the south of the existing bridge and away from Harbor Key, all of the proposed build alternatives would have a visual effect on the surrounding communities. The visual effects of the proposed bridge was minimized by shifting Alternative 1 closer to the existing bridge and away from Harbor Key to develop Alternative 1B, the preferred alternative.

During agency coordination, several agencies recommended that the proposed bridge be constructed to the north of the existing swing-span bridge. NOAA-NMFS stated a preference for Alternative 1 to avoid a tidal creek and shell bank on the southeastern side of Harbor River. During an agency coordination effort meeting, USACE requested SCDOT evaluate a northern alternative closer to the existing roadway, which supported the development of Alternative 1B.

At the community meeting on May 20, 2016, Harbor Island and Harbor Key community continued to express concerns about the proposed 55 mph speed limit and adding a turn lane into Harbor Drive. SCDOT collected turning movement on Saturday July 9, 2016, from 1pm to 8pm, during check-in and check-out at Harbor Island. The results of the traffic study do not warrant a turn lane at Harbor Drive.

6.6 Are there future opportunities for public input?

SCDOT will advertise and conduct a public hearing to give local governmental officials and citizens of Beaufort County the opportunity to review and comment on the project. The EA will be made available to the public for review at SCDOT Headquarters in Columbia, SC, SCDOT District Office, FHWA Office, and SCDOT website 15 days prior to the public hearing date.

7.0 Programmatic Section 4f Evaluation for the Harbor River Bridge

7.1 Applicability

7.1.1 Introduction

SCDOT proposes to replace the existing US 21 (Sea Island Parkway) bridge over the Harbor River in Beaufort County, South Carolina. The existing bridge is structurally deficient and eligible for replacement. Resource 5070, the 1938-1939 US 21 bridge over the Harbor River, is historically significant under Criterion A and is eligible for listing in the NRHP. The bridge is associated with the CCC/WPA work relief programs that developed South Carolina's state park system, including Hunting Island State Park. It is eligible under the statewide contexts of Depression-era work relief programs and development of the state's network of state parks. The bridge therefore meets the requirements of being a Section 4(f) resource and is such protected by the *Department of Transportation Act of 1966*.

SCDOT has applied the criteria of the FHWA's "Final Nationwide Section 4(f) Evaluation and Approval for Federally-aided Highway Projects that Necessitate the Use of Historic Bridges" with the conclusion that this one step provides conformity with 49 USC § 303(c). The project's overall social, economic, and environmental effects have been fully documented in the EA.

7.1.2 Description of Proposed Action

SCDOT proposes to replace the existing US 21 bridge over the Harbor River with a new fixed-span bridge. The existing bridge consists of 40-foot-long concrete approach spans with a 172-foot-long modified Warren steel through-truss swing-span over the main channel. The total bridge length is 2,851 feet. In addition to being structurally deficient, the existing bridge is classified as functionally obsolete because it does not meet current design standards. The existing bridge deck geometry is rated as "intolerable" and in high priority of replacement; rehabilitation of the existing bridge is not feasible.

The proposed bridge would be constructed of reinforced concrete and would have one 12-foot-wide travel lane in each direction. The proposed bridge would not include designated bicycle or pedestrian facilities. The bridge would have a 10-foot-wide shoulder and 42-inch-high concrete barrier on the outside of each shoulder. The width of the proposed bridge would be approximately 47 feet.

Shrimp boats are the primary vessel that require greater than 15-foot vertical clearance and the existing bridge to open. Except for winter months, shrimp boats use the Harbor River daily to access St. Helena Sound and the Atlantic Ocean. The height of shrimp boats currently using the Harbor River varies between approximately 25 and 75 feet. These shrimp docks are zoned as Rural and CFV Overlays by Beaufort County, which limits their current and future use to marine-related establishments that may require similar vertical clearances. The proposed bridge would provide a 65-foot vertical clearance through the main span at MHW. The proposed bridge would provide a 120-foot horizontal clearance between the piers through the main span, with a proposed 90-foot horizontal clearance between the fenders.

The proposed roadway would have 4-foot-wide paved shoulders to match the existing roadway conditions on US 21. An exception to this typical section occurs on US 21 southbound between the proposed bridge and Harbor Drive. A 10-foot-wide paved shoulder is proposed in this area, which matches the bridge shoulder and would provide emergency access. The proposed right-of-way on the western side of the bridge would match the current right-of-way of 100 feet. On the eastern side of the bridge, the proposed right-of-way would taper from 100 feet, to encompass the new causeway, to the existing 50-foot-wide right-of-way near Harbor Drive.

7.1.3 Historic Properties

In accordance with 36 CFR § 800.4, archaeological and architectural surveys were conducted in coordination with the SHPO. The existing US 21 bridge over the Harbor River in Beaufort County has been determined eligible for listing in the NRHP (Resource 5070). Constructed in 1938-1939, the bridge is considered eligible for the NRHP under Criterion A. The bridge is associated with the CCC/WPA work relief programs that developed South Carolina's state park system, including Hunting Island State Park. It is eligible under the statewide contexts of Depression-era work relief programs and development of the state's network of state parks. The proposed bridge replacement project would result in the demolition of the historic property and would thus be an adverse effect to the resource.

7.2 Alternatives and Findings

Various alternatives were considered to avoid impacting this section 4(f) property. Section 3.0 provides details on the alternatives analysis and Appendix C provides details on the alternatives considered but eliminated. The "do nothing", or No-build alternative, is considered neither feasible nor prudent because it ignores the fact that the present structure is structurally deficient and functionally obsolete. The superstructure of the existing bridge is in poor condition (condition rating = 4) and the substructure has been evaluated as being in fair condition (condition rating = 5). The bridge has a sufficiency rating of 30.5 percent, where 100 percent represents an entirely sufficient bridge. If not replaced, the bridge would have to be closed to traffic in the future. Closing the bridge is not feasible because approximately 4,100 vehicles per day currently use the bridge as the only connection between Harbor Island, Hunting Island, Fripp Island and mainland Beaufort County. US 21 is also designated as a hurricane evacuation route for coastal Beaufort County. The historic swing-span bridge must also remain operational to allow for continued navigation on the Harbor River.

Preservation of the existing bridge is neither feasible nor prudent for several reasons. Rehabilitation would include measures that address the structural condition of the bridge to maintain the carrying capacity rating. This would require extensive inspections, maintenance, and repairs to allow the bridge to be structurally sufficient without posting a vehicle weight limit. Rehabilitation would likely require temporary closures of the bridge, which is not feasible since the bridge provides the only link between mainland Beaufort County and the islands. The rehabilitation measures would also not address the substandard geometry of the bridge deck, including the width of travel lanes and shoulders.

SCDOT also considered new location alternatives that would avoid impacting the historic bridge, including a tunnel and a new bridge to the south connecting to Hunting or Fripp Island. If a new ridge or tunnel was constructed in a new location, the existing swing-span bridge would continue to require maintenance to ensure that it remains open for navigation on the Harbor River. In addition,

new location alternatives are neither feasible nor prudent because they would substantially increase costs, and would substantially increase adverse historical, social, economic, or environmental impacts. These additional costs and impacts would be of extraordinary magnitude when compared to the plan to replace the bridge parallel to the existing bridge.

As detailed in Section 3.0, SCDOT is considering five reasonable "build" alternatives, all of which would shift the proposed bridge to either the north or south and would be constructed nearly parallel to the existing bridge. The swing-span bridge would be replaced with a fixed-span bridge with a 65-foot vertical clearance over MHW. All of the reasonable build alternatives would result in the removal of the historic bridge.

Assuming the future construction and use of one of the reasonable build alternatives, the existing bridge cannot remain in its current location because it must be opened in order for taller boats to pass through the channel. The historic bridge cannot be left in place because it would hinder the current and future navigation along the Harbor River and would not meet permitting requirements by the USCG. Preservation through removal was considered and is discussed below.

In view of the above, there appears to be no prudent or feasible alternative to the removal of this historic bridge.

7.3 Measures to Minimize Harm

The historic bridge was offered through advertisement in January and February 2016 (Appendix A) to potential recipients, who were required to agree to move the structure, preserve the bridge and its historic features, and assume all legal and financial responsibilities for the bridge subsequent to its removal from its current location. There were no acceptances of this offer.

SCDOT has determined that the replacement of the US 21 bridge over the Harbor River would have an adverse effect on the 1938-1939 bridge. As documented in the attached MOA, the SHPO has concurred with the proposed measures to resolve adverse effects to the historic property in accordance with 36 CFR § 800.6. FHWA and SCDOT will ensure that the following stipulations are implemented to mitigate the removal of the bridge:

- To mitigate adverse effects to the Harbor River Bridge, SCDOT will work with the SHPO, SCPRT, and the Hunting Island State Park Manager to develop and fund a public interpretation plan related to the impact of Depression-era Work Programs on the Hunting Island State Park and its associated landscape. The interpretation plan should include elements that relate to the construction of the US 21 roadway and bridge over Harbor River as well as the history of the CCC/WPA at Hunting Island State Park.
- The draft public interpretation plan shall be developed within 6 months after the execution of the MOA. Copies of the draft interpretation plan shall be provided to the FHWA, SHPO, and Hunting Island State Park Manager for review and comment. A final public interpretation plan that incorporates comments received from the FHWA, SHPO, and the Hunting Island State Park Manager shall be developed within 60 days after receipt of the comments.
- The components of the interpretation plan shall be developed and installed at the Hunting Island State Park within one year of the production of the final interpretation plan.

- SCDOT will remove the existing bridge placard on the US 21 bridge and provide it to the SCPRT to be used as part of the interpretive plan developed for the park.

7.4 Coordination

As documented in the attached MOA, the SHPO and the ACHP has concurred with the proposed measures to resolve adverse effects to the historic property in accordance with 36 CFR 800.6. Coordination with ACHP, SHPO, and SCPRT is located in Appendix A.

Section 106 consultation with the SHPO and SCDOT is final with regard to the projected impact and plan to mitigate for the removal of the bridge as included in this document.

SCDOT will advertise and conduct a public hearing to again afford local governmental and planning public officials and citizens of Beaufort County the opportunity to review the proposal. The EA will be made available to the public for review at SCDOT Headquarters in Columbia, SC, SCDOT District Office, FHWA Office, and SCDOT website 15 days prior to the public hearing date.

The relevant information in the record as well as the above factors and considerations, establish that there is not a feasible and prudent alternative to the taking of the Section 4(f) property. Therefore, this highway proposal includes all planning to minimize harm resulting from such use.

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A

Appendix A - Agency Coordination

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Appendix A-1

US Coast Guard

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Appendix A-2

US Army Corps of Engineers

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Appendix A-3

National Oceanic and Atmospheric Administration National Marine Fisheries – EFH Coordination

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National Oceanic and Atmospheric Administration National Marine Fisheries – Protected Resources Division

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Appendix A-5

US Fish and Wildlife Service

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Appendix A-6

SC Department of Health and Environmental Control

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Appendix A-7

SC State Historic Preservation Office

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Appendix A-8

Advisory Council on Historic Preservation

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Appendix A-9

Gullah Geechee Heritage Corridor

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Appendix A-10

Tribal Coordination

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Appendix A-11

Beaufort County

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Appendix A-12

City of Beaufort

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Appendix A-13

Non-Governmental Organizations

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Appendix A-14

Agency Site Visit

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Appendix B - Structure Inventory and Appraisal Report

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Appendix C - Alternatives Considered but Eliminated Technical Memorandum

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D

Appendix D - Navigation Study

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E

Appendix E - Constructability Technical Memorandum

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Appendix F - Bridge Replacement Scoping Trip Risk Assessment Form & Preliminary Stormwater Management Design Study

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Appendix G - USFWS Biological Assessment

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Appendix H - NOAA-NMFS Biological Assessment

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Appendix I - EFH Assessment

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Appendix J - Marine Mammal Protection Act Technical Memorandum

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Appendix K - Preliminary and Detailed Noise Analysis Reports

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L

Appendix L - Limited Environmental Record Research

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M

Appendix M - Cultural Resources Report and MOA

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