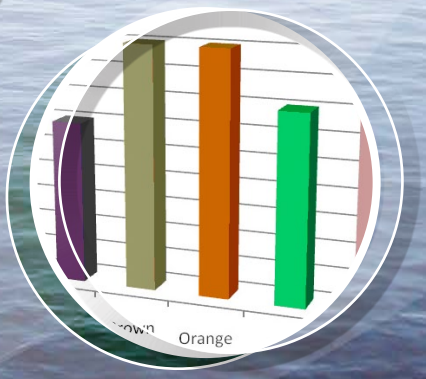
St. Johns River Crossing

FINAL ENVIRONMENTAL IMPACT STATEMENT

August 2013

Prepared for:
Federal Highway Administration



FHWA-FL-EIS-09-02-F
Federal Highway Administration
Florida Division

ADMINISTRATIVE ACTION
FINAL ENVIRONMENTAL IMPACT STATEMENT

U.S. Department of Transportation,
Federal Highway Administration and
Florida Department of Transportation

FEDERAL AID PROJECT NO.: SFTL 264 R
FINANCIAL PROJECT NO.: 208225-3

A limited access roadway connecting the proposed SR 21/SR 23 Interchange in Clay County, eastward across the St. Johns River to I-95 in St. Johns County.

CLAY AND ST. JOHNS COUNTIES, FLORIDA

Submitted Pursuant To 42 U.S.C. 4332(2) (c) And 49 U.S.C. 303 by the U.S. Department of Transportation, Federal Highway Administration and the Florida Department of Transportation, District 2, in Cooperation with the U.S. Army Corps of Engineers and U.S. Coast Guard.

8-29-13
Date

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Comments on this FEIS should be postmarked by _____
and submitted to Mr. William Henderson, at the address above.

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LIST OF EXHIBITS (cont.)

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ACRONYMS & ABBREVIATIONS

AADT	Average Annual Daily Traffic
AN	Advanced Notification
APE	Area of Potential Effect
BCA	Bayard Conservation Area
BEBR	Bureau of Economic and Business Research
BFE	Base Flood Elevation
BMP	Best Management Practices
BTU	British Thermal Units
CAA	Clean Air Act
CALTRANS	California Transportation Department
CEI	Construction, Engineering and Inspection
CAR	Contamination Assessment Report
CEQ	Council on Environmental Quality
CFA	Core Foraging Area
CR	County Road
CSE	Contamination Screening Evaluation
CSRP	Conceptual Stage Relocation Plan
dBA	Decibel, A-weighted
DRI	Development of Regional Impact
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
ESA	Endangered Species Act
ETDM	Efficient Transportation Decision Making
FCOB	First Coast Outer Beltway
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FFA	Florida Forever Act
FHWA	Federal Highway Administration
FMSF	Florida Master Site File
FNAI	Florida Natural Areas Inventory
FPPA	Farmland Protection Policy Act
FUDS	Formerly Used Defense Sites
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic Information System
HAP	Hazardous Air Pollutant

HEI	Health Effects Institute
HOV	High-Occupancy Vehicle
I	Interstate
ITS	Intelligent Transportation Systems
JEA	Jacksonville Electric Authority
LCAR	Limited Contamination Assessment Report
LEP	Limited English Proficiency
LOS	Level of Service
LRST	Leaking Regulated Storage Tank
LRTP	Long Range Transportation Plan
mpg	Miles Per Gallon
MOE	Measures of Effectiveness
MSAT	Mobile Source Air Toxics
MSF	Million Square Feet
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NERPM	Northeast Florida Regional Planning Model
NFTPO	North Florida Transportation Planning Organization
NMFS	National Marine Fisheries Service
NPL/ROD	National Priorities List/Record of Decision
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OFW	Outstanding Florida Waters
PIP	Public Involvement Program
P3	Public / Private Partnership
PSWADT	Peak Season Weekday Average Daily Traffic
PUD	Planned Unit Development
RCRA	Resource Conservation and Recovery Act
ROC	Region of Comparison
ROD	Record of Decision
RSA	Resource Study Area
RST	Regulated Storage Tank
SAV	Submerged Aquatic Vegetation
SF	Square Feet
SHPO	State Historic Preservation Officer
SJRWMD	St. Johns River Water Management District
SR	State Road
TMDL	Total Maximum Daily Loads

TNM	Traffic Noise Model
TMSCA	Twelve Mile Swamp Conservation Area
TSD	Treatment, Storage and Disposal
TSM	Transportation Systems Management
TTI	Texas Transportation Institute
US	United States (when referring to a roadway)
U.S.	United States (when referring to the country)
USACE	United States Army Corps of Engineers
USCB	United States Census Bureau
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
V/C	Volume-to-Capacity
VMT	Vehicle Miles Traveled
WMA	Wildlife Management Area
UMAM	Uniform Mitigation Assessment Methodology
USFWS	United States Fish and Wildlife Service
USCG	United States Coast Guard

LIST OF TECHNICAL DISCIPLINE REPORTS (located on enclosed CD)

Agency Coordination Memorandum

Air Quality Technical Memorandum

Client First Coast Outer Beltway Preliminary Traffic and Revenue Analysis

Climate Change Technical Memorandum

Conceptual State Relocation Plan

Contamination Level 1 Screening Report

Cultural Resource Overview Survey Technical Memorandum

Cultural Resource Assessment Survey Technical Memorandum Update

Economics and Land Use Discipline Report

Endangered Species Biological Assessment

Energy Technical Memorandum

Environmental Justice Discipline Report

Essential Fish Habitat Discipline Report

Evacuation Analysis Report

Geology and Soils Technical Memorandum

Indirect and Cumulative Effects Discipline Report

Location Hydraulic Report

Navigable Waterways Discipline Report

Noise Study Report

Public Involvement Program Discipline Report

Public Services and Utilities Discipline Report

Section 4(f) Evaluation and *De Minimis* Finding Report

Social Impacts Discipline Report

St. Johns River Crossing Traffic Analysis Report

Stormwater and Water Quality Technical Memorandum

Transportation Technical Memorandum

Visual Quality Discipline Report

Wetlands Evaluation Report

Wildlife and Habitat Discipline Report

EXECUTIVE SUMMARY

ES.1 WHAT IS THE ST. JOHNS RIVER CROSSING PROJECT AND WHERE IS IT LOCATED?

The Florida Department of Transportation (FDOT) identified the need for an improved highway corridor and bridge crossing the St. Johns River between Clay and St. Johns Counties, Florida. The proposed St. Johns River Crossing Project is an effort to identify the best solution to address that need, while trying to minimize the effects the project might have on the local communities and environment.

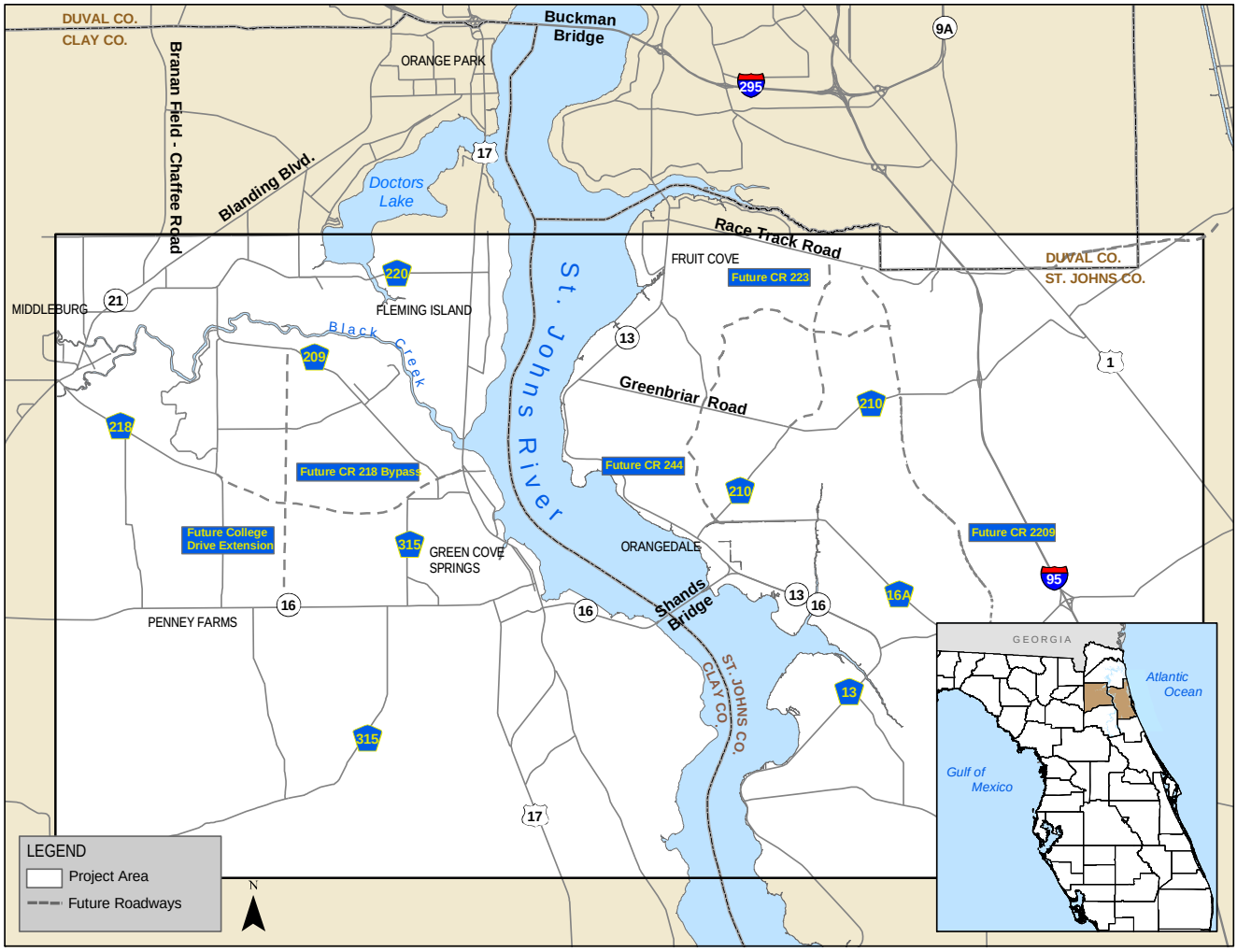
The project area, as shown in **Exhibit ES-1**, encompasses portions of Clay and St. Johns Counties in northeast Florida, south of Duval County. The St. Johns River separates Clay and St. Johns Counties, and the Shands Bridge is the only direct connection between the two Counties within the defined project area.

ES.2 WHY ARE WE PROPOSING THE PROJECT?

FDOT established three goals to guide the development of potential solutions to existing transportation problems in the project area:

- Provide additional capacity to improve current and future transportation network deficiencies;
- Promote and support employment and economic development; and
- Improve emergency evacuation.

Exhibit ES-1: Project Area and Vicinity



ES.3 WHY IS THE PROJECT NEEDED NOW?

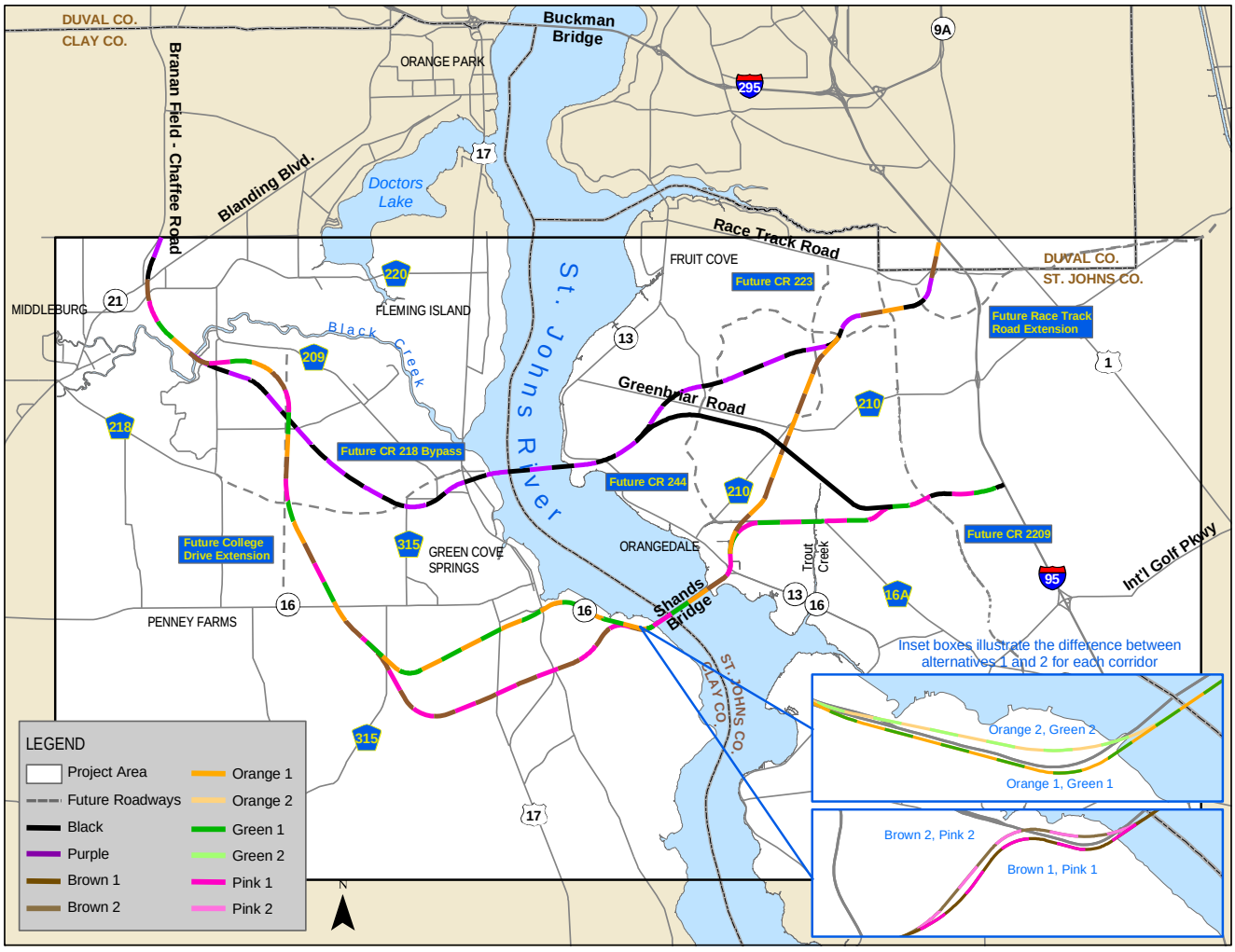
Rapid population growth in this area has resulted in additional traffic and congestion on local roads. When compared to recent years, growth in the area has slowed with the downturn in the economy, however, fluctuations in the market conditions are to be expected. By the year 2035, traffic congestion is still expected to worsen and there will still be a need for the project. Providing additional capacity to improve current and future transportation network deficiencies in the near term will help alleviate this congestion. In addition, providing access for residents to local employment centers will aid in promoting and supporting economic development. Perhaps most important, an improved crossing of the St. Johns River will result in more efficient emergency evacuation.

Chapter 1 of this Final Environmental Impact Statement (EIS) more fully describes the purpose and need for the proposed project.

ES.4 WHAT ALTERNATIVES WERE CONSIDERED?

FDOT has conducted studies since 2002 to identify potential solutions to the existing and future transportation issues in the project area. Through a series of technical studies, public meetings, and agency coordination efforts, FDOT identified and refined ten Build Alternatives which were evaluated in detail in the Draft EIS dated December 14, 2009, along with the No Build Alternative. The Build Alternatives, shown on **Exhibit ES-2**, were developed based on

Exhibit ES-2: Final Build Alternatives



their ability to meet the project goals and minimize environmental effects. The No Build Alternative represents the baseline condition against which Build Alternatives are measured.

All Build Alternatives involve a new bridge across the St. Johns River. The two northern alternatives (Black and Purple Alternatives) would cross the river north of Green Cove Springs (**Exhibit ES-2**), and the existing Shands Bridge to the south would remain in place. The eight southern alternatives (Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives) would cross the river near the existing Shands Bridge, which would be removed after the new bridge was completed.

Chapter 2 of this Final EIS describes the alternative development process and the public and agency involvement programs and activities.

ES.5 WHICH ALTERNATIVE WAS SELECTED AS THE PREFERRED ALTERNATIVE?

The Pink 1 Alternative was identified by FHWA and FDOT as the Preferred Alternative. The Pink 1 Alternative was initially identified in the Draft EIS as the Locally-Preferred Alternative (LPA) by FDOT based on the alternative analysis results and input received from the public and local jurisdictions. After further analysis and public input from a series of Public Hearings, the Pink 1 Alternative was selected as the Preferred Alternative. A discussion on the selection of the Preferred Alternative is provided in Chapter 2. Provided below are several of the key reasons for selection of the Pink 1 Alternative:

- Provides additional capacity to improve current and future transportation network deficiencies;
- Best promotes and supports employment and economic opportunities by serving new southern developments in Clay County;
- Most improves emergency evacuation by removing the greatest number of vehicles in queue in areas prone to flooding and providing a connection to I-95 nearest to SR 16, the emergency evacuation route for St. Johns County;

- Complies with and best supports local government plans and policies in both Clay and St. Johns Counties; and

- Avoids, minimizes and/or mitigates effects on affected communities and the environment.

ES.6 HOW WILL THE PROPOSED PROJECT BE FUNDED?

FDOT developed estimated project costs for construction, engineering and inspection, design, right-of-way acquisition, and wetland mitigation for each of the final Build Alternatives. The total estimated costs range from $1.9 billion for the Pink 1 Alternative to $2.5 billion for the Black Alternative. It became evident from these costs that the project could not be implemented using traditional methods of finance, so FDOT will need to design and implement the project as a tolled facility. However, FDOT has determined that if any of the southern alternatives are selected (where the existing Shands Bridge would be replaced), trips using the toll road solely to cross the river will remain toll free. This decision was made because, with any of the southern alternatives, an existing free crossing of the river (on the existing Shands Bridge) would be removed. Also, there would not be a non-tolled crossing option within a reasonable driving distance (see Chapter 2 for more detail).

FDOT conducted a preliminary toll revenue and feasibility study for the project in 2006 which indicated that the St. Johns River Crossing Project was not toll-feasible as a stand-alone project under any of the Build Alternatives. In

response to these findings and based on the need for the project, FDOT will combine this project (for tolling purposes only) with the Branan Field-Chaffee Road (State Route 23) Project. This combined toll route will form a beltway outside of the I-295 loop from I-10 to I-95. Combining tolling efforts for these two independent projects makes the St. Johns River Crossing Project toll-feasible. See Chapter 2, Section 2.11 of this Final EIS for more information.

ES.7 WHAT ARE THE POTENTIAL PROJECT IMPACTS?

Based on technical studies and public and agency input, FDOT refined the final Build Alternatives to avoid or minimize environmental impacts to the extent feasible. They then evaluated the ten final Build Alternatives and the No Build Alternative to identify potential impacts, both adverse and beneficial, that may occur as a result of implementing any of the alternatives. The project team documented their analyses in a series of technical study reports (included on the enclosed CD in electronic format and part of this Final EIS), and summarized the results in Chapter 3 of this Final EIS.

Exhibit ES-3 provides a summary comparison of some of the key technical and environmental impacts and benefits of each alternative. The impacts shown on this exhibit represent potential, direct impacts prior to the application of any mitigation measures. Chapter 3 provides details on all potential impacts and benefits, including indirect and cumulative impacts, followed by a more detailed comparison matrix of the alternatives.

FDOT also considered measures to reduce the extent or severity of impacts from the proposed project. **Exhibit ES-4** summarizes mitigation measures that FDOT has proposed now that a Preferred Alternative has been selected. Chapter 3 provides more detail on mitigation. Some impacts will remain after mitigation measures are implemented. These are summarized in Chapter 4.

Exhibit ES-3: Summary Comparison of Key Impacts and Benefits of Project Alternatives

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
ALTERNATIVES CHARACTERISTICS											
Length of Alternative (miles)	N/A	35.6	25.6	34.0	34.0	33.3	33.3	30.7	30.7	31.4	31.4
Number of Local Access Interchanges	N/A	8	6	9	9	9	9	7	7	7	7
Total Cost Including Wetland Mitigation ($ billions)	N/A	$2.39	$1.92	$2.15	$2.24	$2.27	$2.30	$1.96	$1.99	$1.84	$1.93
TRAFFIC AND TRANSPORTATION (Section 3.3)											
2035 Network Performance (volume/capacity)	0.878	0.822	0.824	0.819	0.819	0.813	0.813	0.823	0.823	0.825	0.825
2035 Annual Congestion Cost ($ billions)	$7.2	$5.2	$5.0	$5.2	$5.2	$5.1	$5.1	$5.4	$5.4	$5.5	$5.5
Emergency Evacuation Lane Miles West of River	82.0	102.62	103.01	125.69	125.69	124.03	124.03	124.03	124.03	125.69	125.69
Evacuation Effectiveness (vehicles in queue east of river)	65,419	59,977	59,874	53,886	53,886	54,324	54,324	54,324	54,324	53,886	53,886
NOISE (Section 3.5)											
Noise Impacts (number of sites)	N/A	37	37	66	66	81	82	73	74	71	71
LAND USE (Section 3.6)											
Total Acres Converted to Right-of-Way	N/A	1,907	1,301	1,724	1,710	1,654	1,639	1,590	1,576	1,661	1,647
SOCIOECONOMICS (Section 3.7)											
Total Displacements and Relocations (residential, commercial, churches)	N/A	58	57	31	42	42	53	45	56	34	45
Developments Served By Proposed Interchanges (number within miles)	N/A	10	8	12	12	12	12	8	8	8	8

Exhibit ES-3: Summary Comparison of Key Impacts and Benefits of Project Alternatives (cont)

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
ENVIRONMENTAL JUSTICE – MINORITY AND LOW-INCOME POPULATIONS (Section 3.8)											
Total EJ Displacements (residential and commercial)	N/A	0	0	4	15	16	27	16	27	4	15
Potential Disproportionate Impacts from Displacements?	N/A	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Potential Disproportionate Impacts from Tolling?	N/A	No	No	No	No	No	No	No	No	No	No
CULTURAL RESOURCES (Section 3.9)											
Known Resources Potentially Eligible for NRHP Listing	N/A	6	6	1	1	5	5	5	5	1	1
SECTION 4(f) RECREATIONAL RESOURCES – BAYARD CONSERVATION AREA IMPACTS (Section 3.10)											
Direct Impacts – Right-of-Way Take (acres)	N/A	N/A	N/A	34.5	0	23.6	0	23.6	0	34.5	0
PUBLIC SERVICES AND UTILITIES (Section 3.11)											
Blacks Ford Swamp Effluent Disposal Site (acres)	N/A	3.5	3.5	9.3	9.3	9.3	9.3	0	0	0	0
VISUAL QUALITY (Section 3.12)											
Additive Visual Impact Rating (higher numbers indicate higher impacts)	NA	37.1	33.8	41.0	38.3	42.3	39.6	36.3	33.6	35.0	32.3
AIR QUALITY (Section 3.13)											
Carbon Monoxide	No exceedances of the 1-hour or 8-hour National Ambient Air Quality Standards										
WATER RESOURCES (Section 3.14)											
Clean Water Act Section 303(d) Basins Affected	N/A	4	4	4	4	4	4	3	3	3	3
WETLANDS (Section 3.15)											
Total Acres	N/A	1,812	1,163	1,240	1,210	1,194	1,170	1,257	1,234	1,305	1,278
UMAM Debit	N/A	643	408	430	417	413	406	435	427	450	438
WILDLIFE AND HABITAT (Section 3.16)											
Total Habitat (acres)	N/A	2,044	1,395	1,840	1,817	1,751	1,731	1,591	1,571	1,679	1,657
FISH AND AQUATIC RESOURCES (Section 3.17)											
EFH and SAV Habitat (acres)	N/A	265	227	239	228	230	222	174	166	183	172
CONTAMINATED PROPERTIES (Section 3.20)											
Total Contaminated Sites	N/A	9	9	8	10	18	18	18	18	8	10

Exhibit ES-4: Summary of Avoidance, Minimization and Mitigation Measures

Resource Area	Proposed or Potential Mitigation Measures[1]
Traffic and Transportation	▪ Implement traffic management plan to reduce congestion and delays, keep public informed of construction activities, and maintain access for emergency services, businesses and residences
Noise Impacts	▪ Contractor will adhere to FDOT guidance on construction ▪ FDOT will reevaluate feasible noise abatement measures as part of final design ▪ Will evaluate noise barriers at Bayard Conservation Area
Land Use	▪ Restore any temporary staging areas to pre-construction condition ▪ Minimize to extent practical the footprint of right-of-way for roadway and interchanges during final design
Displacements	▪ Relocate all residents, businesses and churches that are displaced as specified under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 *et seq),* and FDOT guidelines ▪ Relocate in same vicinity if feasible and desired by residents and businesses
Community Cohesion	▪ For any permanent barrier effects, evaluate feasibility of maintaining access or connectivity during final design ▪ Measures could include maintaining or restoring pedestrian crossings or informal pathways within communities, where feasible and safe
Environmental Justice	▪ Relocate displaced residents and businesses as specified under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 *et seq),* and FDOT guidelines
Cultural Resources	▪ Consult with State Historic Preservation Office to evaluate appropriate measures, which may include avoidance, recordation of resources, or excavation ▪ Develop inadvertent discovery plan to address potential resources uncovered during construction

[1]Some mitigation measures listed above remain under consideration by FDOT, and will be further evaluated for applicability, feasibility and effectiveness during the design phase.

Exhibit ES-4: Summary of Avoidance, Minimization and Mitigation Measures (cont)

Resource Area	Proposed or Potential Mitigation Measures[1]
Section 4(f) Properties – Bayard Conservation Area	▪ Convey 73.81 acres of land adjacent to BCA to the SJRWMD for incorporation into the conservation area ▪ Reconstruct parking areas, caretaker residence, trails affected ▪ Construct multi-use trail along north side of roadway
Public Services and Utilities	▪ Implement a coordinated utility plan to avoid service interruptions and identify necessary utility relocations ▪ Implement traffic control plan to maintain access for emergency services, and coordinate with all service providers and school officials to minimize disruption
Visual Quality	▪ Use selective clearing of vegetation to extent feasible ▪ Incorporate landscaping in project design ▪ Use or retain vegetative screening where feasible for sensitive viewing locations ▪ Maintain clean work sites and stage equipment away from sensitive land uses where practical during construction
Air Quality	▪ Appropriate fugitive dust suppression controls, such as spraying water on haul roads adjacent to construction sites, daily street sweeping, covering loaded trucks, and washing haul trucks before leaving the construction site. ▪ Adhere to FDOT's most current edition of *Standard Specifications for Road and Bridge Construction (Florida, 2007).* ▪ Revegetate disturbed areas as soon as possible after construction ▪ Avoid excessive equipment idling ▪ Route heavy truck traffic away from schools and residences when feasible ▪ Maintain construction equipment and ensure proper pollution controls are working ▪ Preserve existing vegetation to extent possible
Water Resources	▪ Meet all permit requirements for water quality through project design, including treatment of stormwater runoff ▪ Implement Best Management Practices during construction to minimize water quality impacts
Wetlands	▪ Mitigate for wetland impacts through use of federally permitted mitigation banks or equivalent offsite mitigation ▪ Design methods will be incorporated that will avoid and minimize wetland impacts
Wildlife and Habitat	▪ Dispose of debris, construction muck and other materials in detention areas or off-site ▪ Implement special provisions for protection of protected species potentially occurring in project area, including shortnosed sturgeon, eastern indigo snake, and manatees. Provisions will include a construction education program ▪ Consider design of underpasses, large culverts, or other wildlife passage ways that may be used to link public land

[1]Some mitigation measures listed above remain under consideration by FDOT, and will be further evaluated for applicability, feasibility and effectiveness during the design phase.

Exhibit ES-4: Summary of Avoidance, Minimization and Mitigation Measures (cont)

Resource Area	Proposed or Potential Mitigation Measures[1]
Fish and Aquatic Resources	▪ Continue coordination with National Marine Fisheries Service, Corps of Engineers, and US Fish and Wildlife Service to conduct detailed field reviews of selected alternative and develop specific mitigation measures and construction procedures ▪ No blasting for Shands Bridge demolition
Geology and Soils	▪ Implement Best Management Practices for the disposal of wastes and the control of erosion and sedimentation
Contaminated Sites	▪ Complete full evaluation of sites warranting further investigation within the selected corridor ▪ Develop response plan to avoid or remove sites that may be affected, and for handling unexpected sites that may be encountered during construction ▪ Develop a spill plan to be implemented in case of any hazardous materials releases during construction
Navigable Waterways	▪ Provide vertical and horizontal bridge clearances in final design that are acceptable to maritime community ▪ Coordinate with the US Coast Guard to develop and implement marine traffic management plans during construction and to provide public information on construction activities that affect navigation
Floodplains	▪ Avoid any longitudinal encroachments in final design ▪ Design facility to be consistent with applicable regulatory and design standards, with no significant changes to base flood elevations or flood limits ▪ Size all culverts to quality for a FEMA Zero Rise for any regulatory floodways ▪ Design cross drains to maintain natural and beneficial floodplain values ▪ Implement Best Management Practices to minimize erosion and sedimentation effects during construction

[1]Some mitigation measures listed above remain under consideration by FDOT, and will be further evaluated for applicability, feasibility and effectiveness during the design phase.

ES.8 WHAT ARE THE NEXT STEPS?

After the release of this Final EIS and the announcement in the Federal Register, there will be a minimum 30-day review period. After this review period, FHWA and FDOT will consider all comments received on the Final EIS and the analysis in the Final EIS in preparing the Record of Decision. The Record of Decision will explain the reasons for the project decision, summarize any mitigation measures that will be incorporated in the project, and document Section 4(f) *de minimis* findings. After all project approvals are received, FDOT can proceed with future phases.

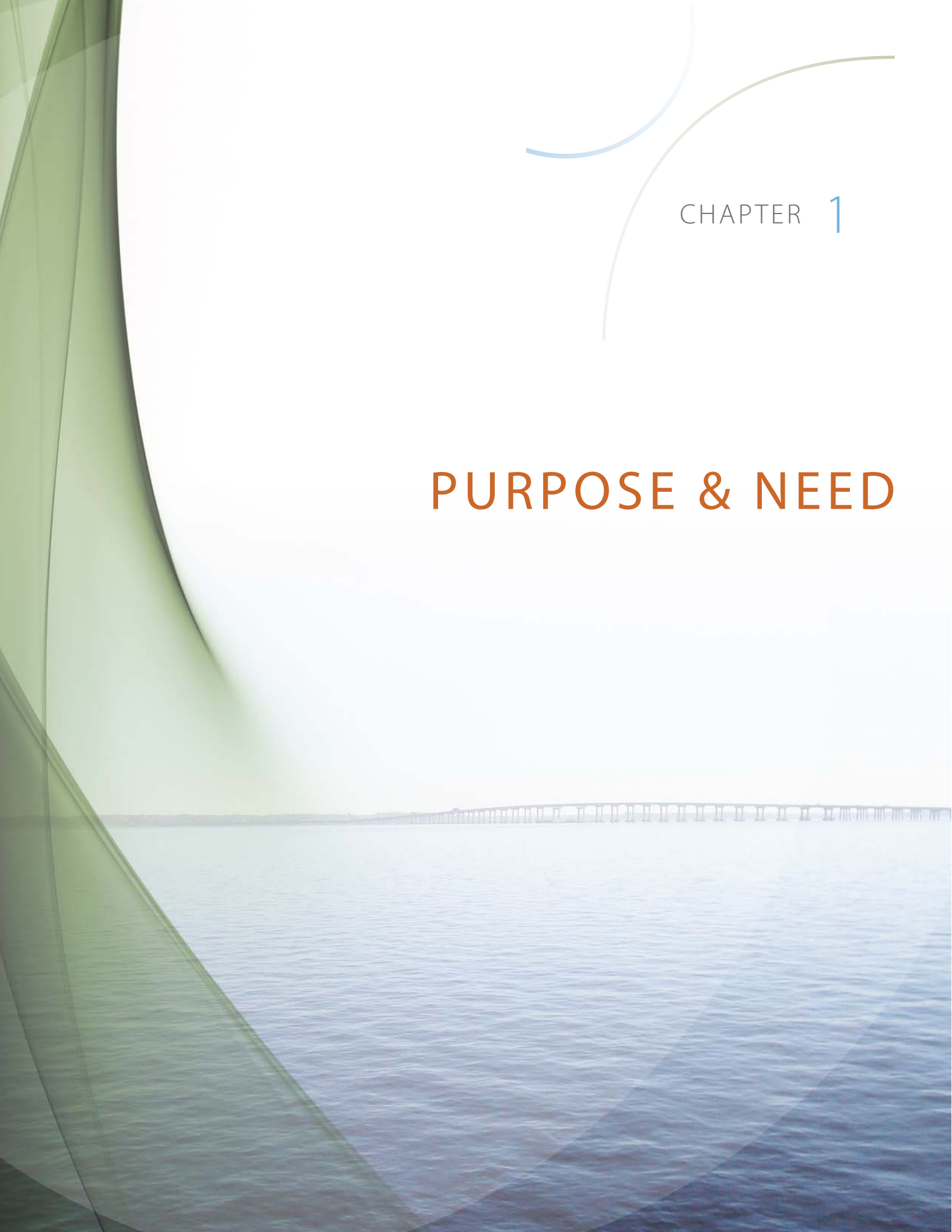
Major Permits Required

Major permits required by this project include:

- Environmental Resource Permit (ERP) (St. Johns River Water Management District)
- Section 404 Dredge and Fill Permit (U.S. Army Corps of Engineers)
- National Pollutant Discharge Elimination System Permit (NPDES)
- Section 9 Bridge Permit (U.S. Coast Guard)
- Gopher Tortoise Relocation Permit (Florida Fish and Wildlife Conservation Commission)
- Section 10 Permit (U.S Army Corps of Engineers)

CHAPTER 1

PURPOSE & NEED



CHAPTER 1 Purpose and Need

This chapter describes factors in the project area that have led to the need for the St. Johns River Crossing Project.

1.1 WHAT IS THE ST. JOHNS RIVER CROSSING PROJECT?

The Florida Department of Transportation (FDOT) identified the need for an improved highway corridor and bridge crossing of the St. Johns River between Clay and St. Johns Counties. The St. Johns River Crossing Project is an effort to identify the best solution to address that need, while trying to minimize the effect that solution might have on the communities and the environment in the two counties.

1.2 WHY ARE WE PROPOSING THE PROJECT?

FDOT established three goals to guide the development of potential solutions to existing transportation problems in the project area (further defined below):

- Provide additional capacity to improve current and future transportation network deficiencies,
- Promote and support employment and economic development, and
- Improve emergency evacuation.

They then consolidated these goals into a statement of purpose, used to evaluate alternatives and identify the one that will best serve the area's transportation needs:

> To address population growth and resulting traffic by providing additional capacity that meets the area's transportation, economic, employment and safety needs while avoiding, minimizing, and/or mitigating effects on the affected communities and the environment.

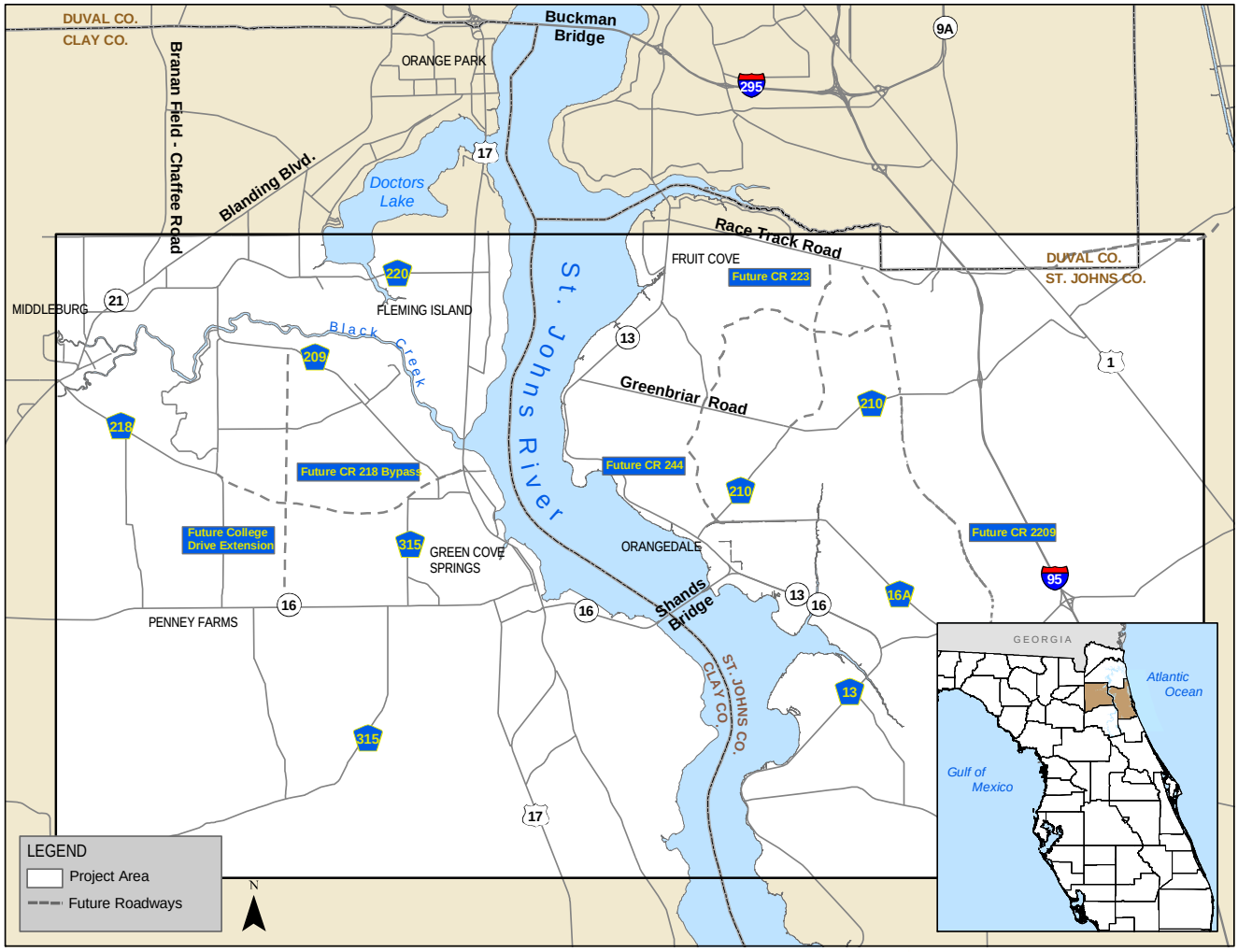
Traffic on the existing Shands Bridge

Congestion at the SR 13 / I-295 Interchange

1.3 WHERE IS THE PROJECT LOCATED?

The project area, as shown in **Exhibit 1-1**, encompasses portions of Clay and St. Johns Counties in northeast Florida, south of Duval County. The St. Johns River separates Clay and St. Johns Counties, and the Shands Bridge is the only direct connection between the two Counties within the defined project area. The Shands Bridge is a two-lane bridge that carries State Road (SR) 16 east of Green Cove Springs in Clay County across the river to St. Johns County south of Orangedale. The Buckman Bridge is also in the vicinity of the project area,

Exhibit 1-1: Project Area and Vicinity



located in Duval County approximately 12 miles north of the Shands Bridge. The Buckman Bridge is an eight-lane bridge that carries Interstate (I)-295 over the St. Johns River southwest of downtown Jacksonville. I-295 serves as the beltway to the Jacksonville metropolitan area, connecting I-95 south of downtown to I-95 north of downtown near the Jacksonville International Airport. SR 9A completes the eastern portion of the beltway, forming a continuous loop through the entire city.

The project area focuses on the communities south of Duval County where a large amount of residential development has occurred in recent years. Although the areas north and south are served by wider bridge crossings of the St. Johns River, the two-lane Shands Bridge that services the population in this area is the only bridge between the eight-lane Buckman Bridge to the north and the four-lane United States (US) 17 bridge nearly 30 miles farther south in

Palatka. Within the project area, connection points for a new route that could reasonably be expected to carry additional traffic are Branan Field – Chaffee Road west of the river and I-95 east of the river.

1.4 WHY IS THE PROJECT NEEDED NOW?

Rapid population growth in this area has resulted in additional traffic and congestion on local roads. When compared to recent years, growth in the area has slowed with the downturn in the economy, however, fluctuations in the market conditions are to be expected. By the year 2030, traffic congestion is still expected to worsen and there will still be a need for the project. Providing additional capacity to improve current and future transportation network deficiencies in the near term will help alleviate this congestion. In addition, providing access for residents to local employment centers will aid in promoting and supporting economic development. Perhaps most important, an improved crossing of the St. Johns River will result in more efficient emergency evacuation.

1.5 WHAT FACTORS HAVE AFFECTED DEVELOPMENT IN THE PROJECT AREA?

The three major factors influencing current conditions in the project area are (1) population growth and development, (2) transportation demand, and (3) economic and employment conditions. These factors, discussed below, help to demonstrate the need for the St. Johns River Crossing Project.

1.5.1 Population Growth and Development

In 1970, FDOT opened the first segment of I-295. This stretch of highway began in the southeastern portion of Duval County at I-95 and extended west to 103rd Street, north of Orange Park. Interchanges were provided at St. Augustine Road, San Jose Boulevard (SR 13), Roosevelt Boulevard (US 17), Blanding Boulevard (SR 21) and 103rd Street (SR 134). The opening of this roadway facilitated the first major change in the area's development patterns by providing improved access to northern Clay County. This resulted in large population increases in Clay County and Orange Park. In the decade following the opening of I-295, the population of Clay County more than doubled. Orange Park, located immediately south of I-295, experienced a 75 percent increase in population. The following years saw continued steady growth in most

of Clay County and the surrounding area. Orange Park, however, reached build-out in the early 1980s, forcing surrounding development farther to the south and west toward unincorporated areas of the county, near Middleburg and Fleming Island.

Following the completion of I-295 in the late 1980s, growth continued to expand, shifting south from Duval County into Clay and St. Johns Counties. The population of Clay County grew from 105,986 persons in 1990 to 140,814 in 2000, reaching a population of 190,865 persons in 2010. St. Johns County experienced similar increases in population, growing from 83,829 persons in 1990 to 123,135 persons in 2000 and reaching a population of 190,039 in 2010. **Exhibit 1-2** displays the changes in population experienced by Clay, St. Johns and Duval Counties.

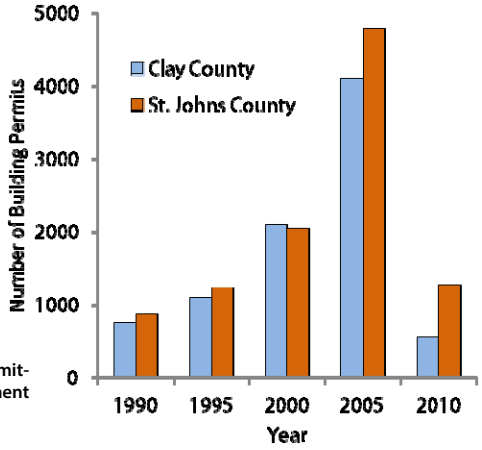
Exhibit 1-2: Regional Population Growth

County	1960	1970	1980	1990	2000	2010
Clay	19,535	32,059	67,052	105,986	140,814	190,865
Duval	455,411	528,865	571,003	672,971	778,879	864,263
St. Johns	30,034	31,035	51,303	83,829	123,135	190,039
Region	**504,980**	**591,959**	**689,358**	**862,786**	**1,042,828**	**1,245,167**

Source: US Census Bureau

The number of building permits issued between 1990 and 2005 further illustrates the continuing growth trends in Clay and St. Johns Counties, as shown in **Exhibit 1-3**. Clay County issued 751 permits in 1990, compared to 4,101 permits in 2005, an increase of 446 percent. St. Johns County issued 867 building permits in 1990, compared to 4,781 permits in 2005, an increase of 450 percent. The number of building permits issued dropped with the economic downturn. In 2010 there were 551 in Clay County and 1,268 in Johns County. As previously discussed in Section 1.4, fluctuations in market conditions, including building activity, are to be expected.

Exhibit 1-3: Building Permits Issued



Source: St. Johns and Clay County Permitting Department

Defining Developments of Regional Impact (DRI)

Developments of Regional Impact (DRIs) are large-scale developments that are likely to have regional effects beyond the local government jurisdiction in which they are located including schools, roadways, housing and recreation.

These increases in building activity are attributed to the number of Developments of Regional Impact (DRIs) approved since 1990 in the northern areas of Clay and St. Johns Counties. Since 1990, Clay County approved seven DRIs south of Orange Park. These developments, listed in **Exhibit 1-4**, consist primarily of residential land uses, supporting Clay County's trend of developing as a bedroom community to the City of Jacksonville.

Exhibit 1-4: Clay County Developments of Regional Impact

Development of Regional Impact	Map No.	No. of Residential Units		Future Daily Trips at Build-out (Year)
		At Build-out	Approximate Units Built	
Argyle Forest	1	32,384	28,980	183,000 (2020)
Eagle Harbor	2	4,234	3,684	41,366 (2011)
Fleming Island Plantation	3	3,790	2,822	44,489 (2012)
Governor's Park	4	6,000	0	84,728 (2028)
Orange Park South	5	954	954	Complete
Pace Island	6	1,214	1,214	Complete
Saratoga Springs	7	4,256	0	29,621 (2017)
Total		**52,832**	**37,654**	**383,204**

Source: Northeast Florida Regional Council, 2008

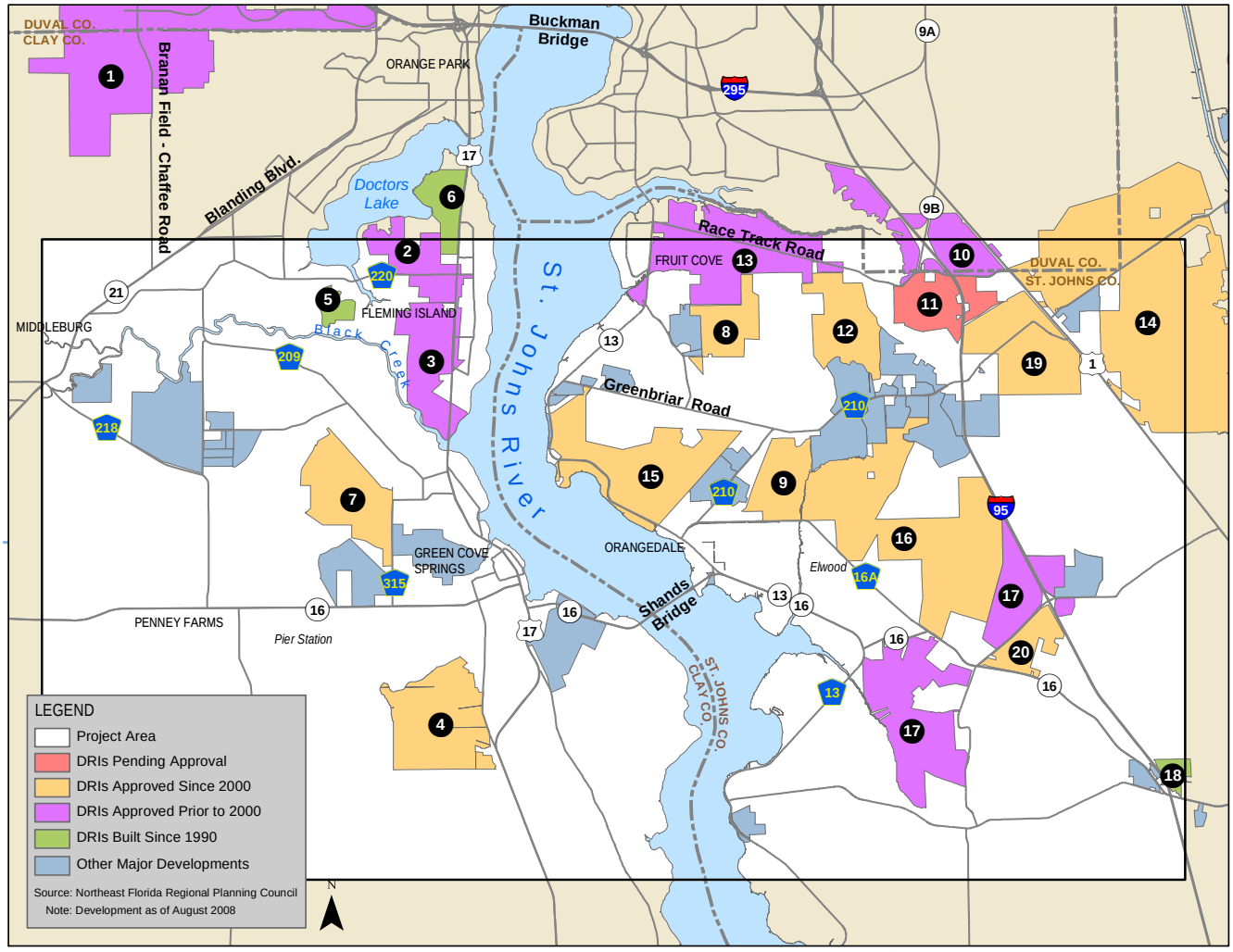
St. Johns County approved only four DRIs prior to 2000, but development patterns quickly changed. Since 2000, another eight DRIs have been approved and one is pending approval in the northern part of the County, as shown in **Exhibit 1-5**. In addition, the County approved 12 residential developments, each consisting of 300 residential units or more, for the area along County Road (CR) 210. At build-out in the year 2035, the DRIs are projected to add more than 500,000 daily trips to area roadways. **Exhibit 1-6** shows existing and pending DRIs in Clay and St. Johns Counties.

Exhibit 1-5: St. Johns County Developments of Regional Impact

Development of Regional Impact	Map No.	No. of Residential Units		Future Daily Trips at Build-out (Year)
		At Build-out	Approximate Units Built	
Aberdeen	8	2,018	506	14,227 (2013)
Ashford Mills	9	2,633	0	34,554 (2015)
Bartram Park	10	5,288	368	50,606 (2015)
Durbin	11	4,500	0	12,014 (2022)
Durbin Crossing	12	2,498	779	17,123 (2017)
Julington Creek	13	6,292	5,847	65,460 (2012)
Nocatee	14	14,920	669	114,667 (2035)
Rivertown	15	4,500	14	28,731 (2023)
Silverleaf Plantation	16	10,700	0	65,628 (2021)
Saint Johns	17	7,200	3,465	62,370 (2026)
St. Augustine Centre	18	817	817	Complete
Twin Creeks	19	5,000	0	34,544 (2010)
World Commerce Center	20	1,156	380	7,629 (2024)
Total		**67,522**	**12,845**	**507,553**

Source: Northeast Florida Regional Council, 2008

Exhibit 1-6: Developments of Regional Impact (DRIs) and Other Major Developments



Key:

Clay County

1. Argyle Forest
2. Eagle Harbor
3. Fleming Island Plantation
4. Governor's Park
5. Orange Park South
6.
7.

St. Johns County

8. Aberdeen
9. Ashford Mills
10. Bartram Park
11. Durbin
12. Durbin Crossing
13. Julington Creek
14. Nocatee
15. Rivertown
16. Silverleaf Plantation
17. Saint Johns
18. St. Augustine Centre
19. Twin Creeks
20.

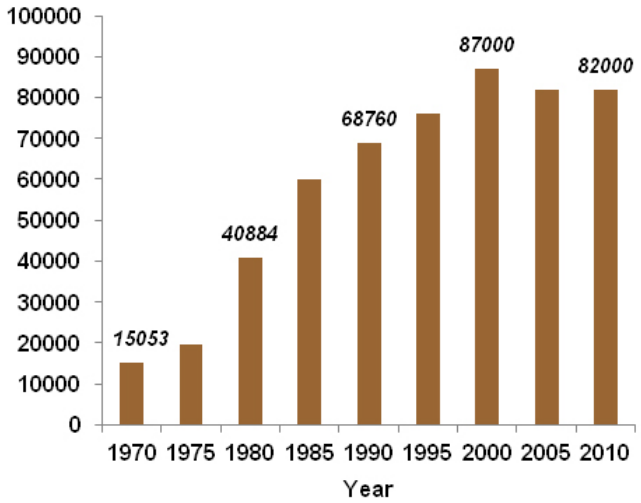
Defining Average Annual Daily Traffic (AADT)

Average Annual Daily Traffic (AADT) is a simple measure of how much traffic is traveling a facility --- the higher the AADT, the more traffic on the roadway. It is calculated by taking the total volume of vehicle traffic in both directions for a year and dividing by 365 days.

1.5.2 Transportation Demand

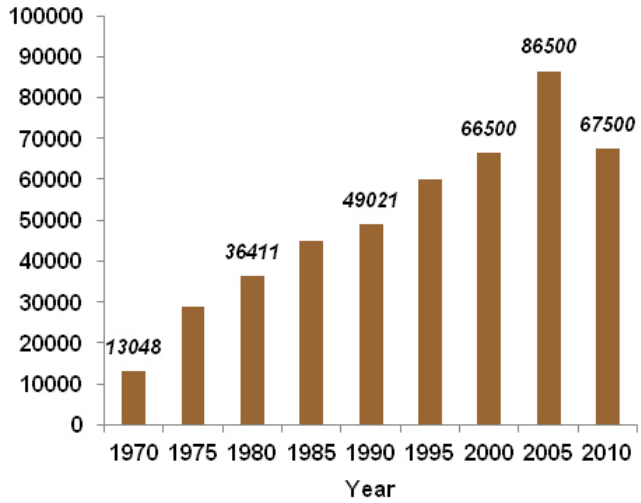
As a result of population growth in Clay and St. Johns Counties since the 1970s, traffic congestion on the area's road network is getting worse. Other than localized improvements, the transportation network within these Counties has remained relatively unchanged over the years. In Clay County, growth has had the greatest impact on SR 21 and US 17, the County's major north-south roadways. These are both six-lane facilities providing the County's only access to I-295. Many County residents rely heavily upon SR 21 and US 17 to reach one of several major employment centers in the region. As shown in **Exhibit 1-7**, the Average Annual Daily Traffic (AADT) on SR 21 increased from 15,053 vehicles in 1970 to 82,000 vehicles in 2005, an average increase of 13 percent per year. In 2010, AADT was at approximately the same level as 2005. As shown in **Exhibit 1-8**, the AADT on US 17 increased from 13,048 vehicles in 1970 to 86,500 vehicles in 2005, an average increase of 16 percent per year. AADT went back down in 2010 to approximately 67,500. In an attempt to add more north-south capacity, in 2001 FDOT constructed and opened the Branan Field-Chaffee Road segment between Argyle Forest Boulevard and SR 21 (refer to **Exhibit 1-1**). The AADT on Branan Field-Chaffee

Exhibit 1-7: SR 21 AADT



Source: FDOT, Transportation Statistics Office

Exhibit 1-8: US 17 AADT



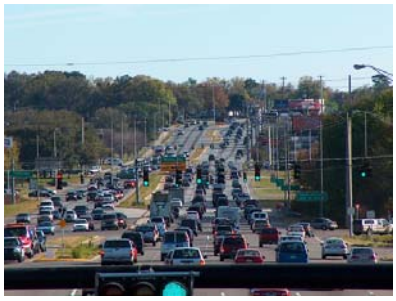
Source: FDOT, Transportation Statistics Office

Road has increased from 6,500 vehicles in 2001 to 18,400 vehicles in 2005 and 18,900 in 2010, an average increase of 21 percent per year.

St. Johns County has experienced similar travel demand increases due to growth that has occurred along CR 210. This corridor is the only east-west road in the northern part of the County. As a result, it has absorbed the majority of trips generated by new development in the area. AADT on CR 210 has increased from fewer than 11,000 vehicles in 2002 to over 19,000 vehicles by 2007. In 2005, the county widened this road from two to four lanes.

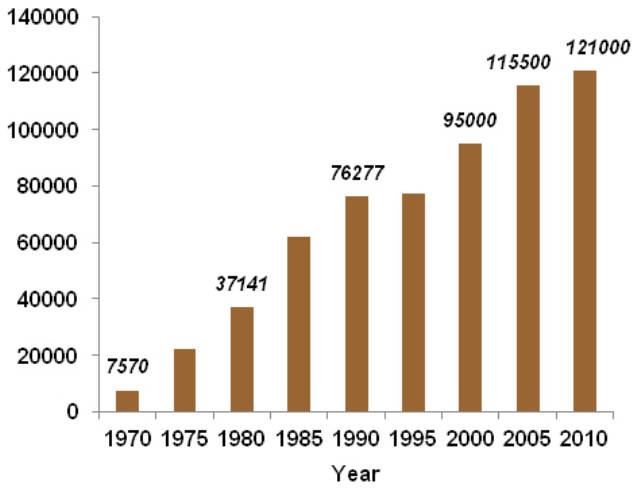
In addition to impacting the local road network, growth has also affected bridges in the project area. The Buckman Bridge and Shands Bridge are the greater area's two crossings of the St. Johns River. Growth that occurred since the opening of I-295 has had the most impact on the Buckman Bridge to date. As shown in **Exhibit 1-9**, AADT on the Buckman Bridge has increased from 7,570 vehicles in 1970 to and 115,500 vehicles in 2005 and to 121,000 in 2010, an average annual increase of 37 percent. In 2010, the Buckman Bridge operated at 93 percent of its capacity during peak traffic hours and is expected to operate at 107 percent of its intended capacity by 2030. In 2005, 15 percent of the total traffic on this bridge was truck traffic; this is one of the highest percentages for any road segment in north Florida.

Congestion at US 17 / I-295 interchange



Congestion at SR 21 / I-295 interchange

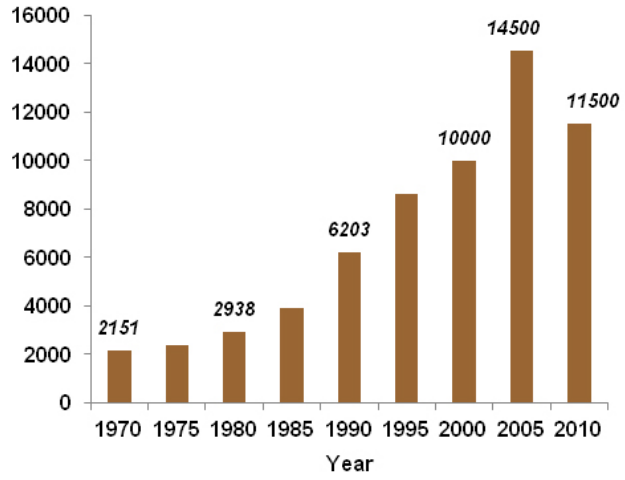
Exhibit 1-9: Buckman Bridge AADT



Source: FDOT, Transportation Statistics Office

Although the Shands Bridge has not carried the traffic volumes experienced by the Buckman Bridge to date, it is expected to experience a similar trend as growth moves farther south. As shown in **Exhibit 1-10**, traffic on this two-lane bridge has gradually increased from 2,151 vehicles in 1970 to 14,500 vehicles in 2005, an average annual increase of 16 percent. AADT has decreased slightly since 2005 down to 11,500. The bridge operated at 107 percent of its capacity during peak traffic hours in 2005 and 85 percent in 2010. Peak traffic volumes in 2030 are projected to be 286 percent of the bridge's intended capacity, rendering this river crossing option virtually inoperable during peak hours. When built in 1961, the Shands Bridge was never intended to carry these projected volumes of traffic.

Exhibit 1-10: Shands Bridge AADT



Source: FDOT, Transportation Statistics Office

1.5.3 Economic and Employment Conditions

Clay County has developed as a bedroom community to Jacksonville, and so relies heavily on neighboring Duval County to provide employment. According to the United States Census American Community Survey (ACS) 2005-2009 estimates, 57 percent of Clay County's residents who are employed full-time work outside the County. Nearly all of these residents work in Duval County, and their average one-way commute time is over 33 minutes, the highest in the State, exceeding the national average by over eight minutes (ACS 2005-2009).

This traveling of the labor force out of Clay County is likely due, in part, to the lack of transportation infrastructure needed to provide and support in-County jobs. Many of the County's residents travel the north-south roads each day to the region's employment centers, including downtown Jacksonville, Jacksonville Naval Air Station, Cecil Commerce Center and the Southside Business District, located east of the St. Johns River. In 2005, 187,000 vehicles traveled each day on US 17, SR 21 and Branan Field-Chaffee Road combined, more than the County population itself (FDOT, Transportation Statistics Office). Clay County is the largest populated county in Florida without an Interstate facility and has the largest out-of-county commuting population in the state (Clay County Economic Development Council). These conditions have prompted Clay County's Board of County Commissioners to identify and promote future employment centers in Clay County (See Chapter 3, Sections 3.6 and 3.7 for more details).

In contrast to Clay County, St. Johns County has several major employment Centers located within its boundaries that serve approximately 60 percent of its resident labor force (St. Johns Chamber of Commerce). The largest facility in the area is the World Commerce Center, located along the I-95 corridor near International Golf Parkway. It houses the corporate headquarters for Ring Power and Rulon, and has development rights for more than 3.5 million square feet (MSF) of office, retail and light industrial. Other existing major facilities in the area include the St. Augustine Centre (2.5 MSF), St. Johns Place (2.1 MSF of office), and the St. Augustine Industrial Park (1.7 MSF of industrial). Commerce facilities are also planned as part of several approved DRIs (refer to **Exhibit 1-6**). Silverleaf Plantation, located between International Golf Parkway and CR 210, and Twin Creeks, located just north of CR 210, include the development rights for more than 4.3 MSF of commercial and light industrial use. Rivertown and Ashford Mills, located in the vicinity of CR 16A, include the development rights for approximately 800,000 square feet of office and light industrial. Improving access to these employment centers, thereby facilitating the efficient movement of goods and services, will continue to support and enhance the economic opportunities within St. Johns County.

1.6 HOW DOES THE AREA'S GROWTH AFFECT RESIDENTS' SAFETY?

As the population in the project area continues to rise, more and more people will need to use the roadways for emergency evacuation in the case of a hurricane or other disaster. Peak hour traffic already exceeds the design capacity of the Shands Bridge and will continue to increase in the future. FDOT has serious concerns about the levels of traffic that will result from a coastal evacuation scenario. During Hurricane Floyd in 1999, 80 percent of those in northeast Florida living in Category 1 evacuation zones complied with evacuation orders (NEFRC, 2005 Hurricane Evacuation Study Technical Report). A majority of evacuees left their counties, with the percentages increasing south to north along the eastern coast. This evacuation, in itself, caused high traffic volumes on local and regional road networks. But, in addition, a significant number of residents in non-surge areas, coastal and inland counties also perceived that they heard a directive from local officials that they should or must leave. Thus, for most evacuees, regardless of region, the actual time to reach their intended destinations exceeded their expected travel time.

Congestion related to development could place the residents in St. Johns County at risk. Approximately 106,000 persons, or two-thirds of the County's population, will be required to evacuate during a Category 4 hurricane (NEFRC, 2005 Hurricane Evacuation Study Technical Report). These residents currently have three choices to move inland: the four-lane US 17 bridge in Palatka, the two-lane Shands Bridge at Green Cove Springs, or the eight-lane Buckman Bridge on I-295. Although the Buckman Bridge has an eight-lane capacity, it must also provide for evacuation of Duval County residents as well as vehicles from other southern coastal areas traveling north on I-95. The Shands Bridge has two lanes, accessed from St. Johns County by two-lane roads, and it disperses westward via SR 16, another two-lane road. The US 17 bridge connects to SR 20 and SR 100 in Palatka, both of which are two-lane roads leading inland. As population increases in St. Johns County and other coastal areas, relying on these existing routes to move a large number of people inland will jeopardize public safety by failing to provide safe and efficient evacuation during hurricanes or other times of emergency.

1.7 WHAT OTHER PROJECTS ARE BEING IMPLEMENTED AS PART OF THE REGION'S TRANSPORTATION PLANS?

FDOT is currently constructing improvements to Branan Field-Chaffee Road, although some segments remain unfunded. They also plan to make improvements to the CR 210/I-95 interchange in 2009. St. Johns County is planning three new north-south County roads (CR 2209, CR 244 and CR 223) as part of several approved DRIs, and Clay County is planning an extension of CR 218. While these projects will help local traffic, they will do little to relieve existing and projected congestion on the bridges and roadways addressed in this analysis.

1.8 WHAT HAPPENS IF THE ST. JOHNS RIVER CROSSING PROJECT IS NOT BUILT?

Regardless of whether the St. Johns River Crossing Project is built, population growth is expected to continue in Clay and St. Johns Counties. As of December 2011, one DRI is still pending approval in the St. Johns County portion of the study area (**Exhibit 1-6**). This DRI, in combination with other developments already approved, will add over 100,000 more residential units to northern Clay and St. Johns Counties and generate over 800,000 additional daily vehicle trips at build-out in 2025 (NEFRC). Other developments are expected to be approved as well, adding even more population and trips. Forecasts show that the combined populations of Clay and St. Johns Counties will increase by more than 80 percent, from a 2010 population of 380,904 persons to approximately 692,763 persons by 2040 (Florida Bureau of Business and Economic Research).

This continued population growth will result in increased traffic congestion on the regional network. As noted earlier, area roads have experienced annual rises in AADT ranging from 13 percent (SR 21) to 21 percent (Branan Field-Chaffee Road). FDOT expects these increases to continue at a similar rate in the future, and expects the Level of Service (LOS) on area bridges to deteriorate. The Buckman Bridge currently operates at a LOS C, but is projected to drop to LOS F by 2030. In 2005, the Shands Bridge operated at a LOS D; this is projected to drop to LOS F by 2030 (FDOT, Transportation Statistics Office). As noted earlier, by 2030, traffic is expected to be nearly triple the bridge's design capacity. Congestion of that magnitude may make the bridge impassible during peak hours.

Defining Level of Service (LOS)

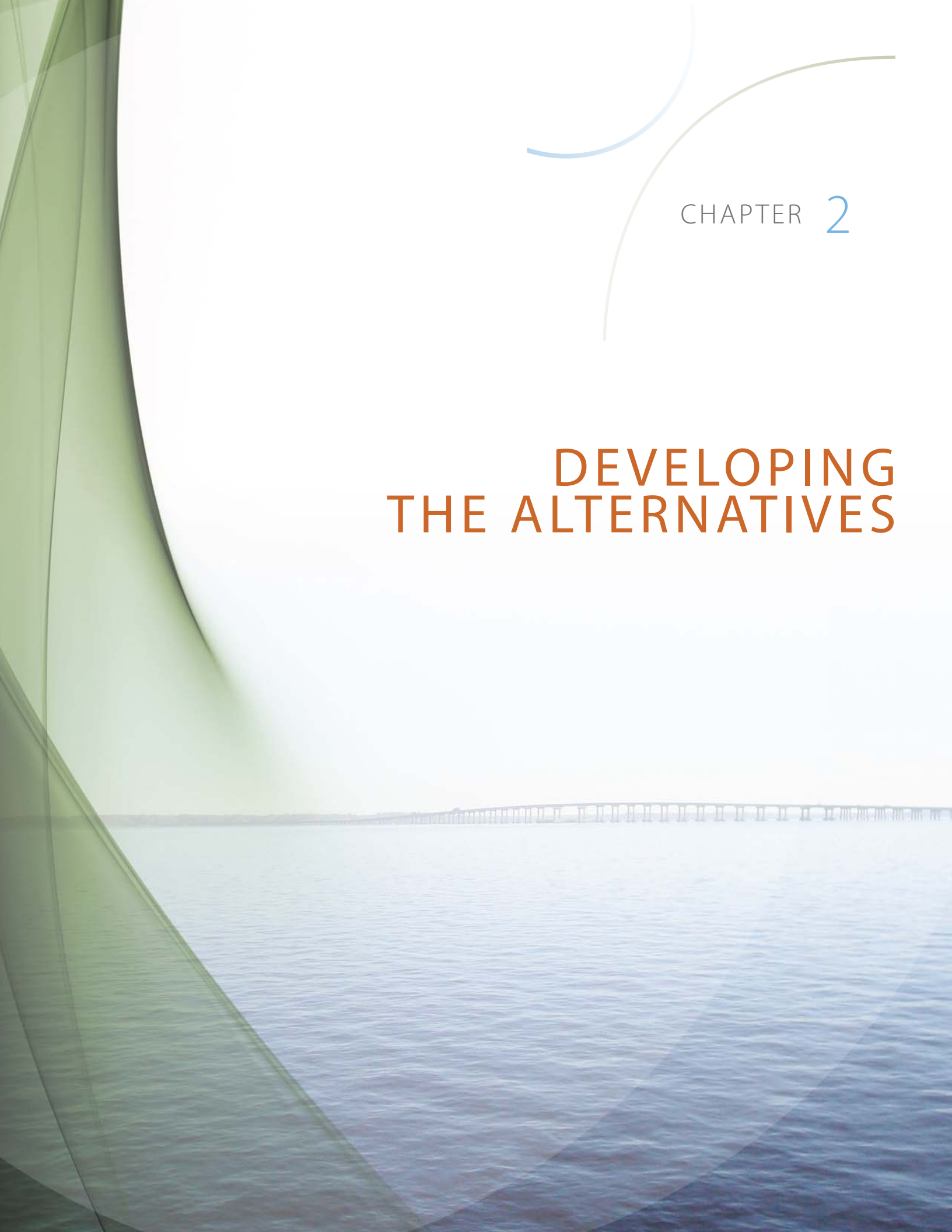
Roadway level of service (LOS) is a measure used to determine the quality of service a transportation facility provides. Much like a student's report card, LOS is represented by the letters "A" through "F", with "A" generally representing the most favorable driving conditions and "F" representing the least favorable.

As residential development progresses, it is likely that Clay County residents will still commute outside of their County to seek employment. Economic development is expected to continue in St. Johns County, but mainly along the I-95 corridor. The availability of jobs either outside these Counties or focused along I-95 will encourage long commutes for county residents, further adding to traffic congestion and commute time. As congestion on the roadway network continues to increase, the inefficient movement of goods and employees may cause developers to seek locations outside of the project area for creation of new employment centers. Residents may try to avoid this congestion by moving nearer these new jobs, thus reducing the available workforce, which will in turn further discourage economic development.

Emergency evacuation from St. Johns County in the event of a hurricane will remain a serious concern without improvements to the river crossing. The two-lane road system leading to and across the Shands Bridge is not capable of carrying the number of residents that will need to evacuate from coastal areas. The resulting congestion could result in death or injury both to those trapped east of the St. Johns River as well as drivers caught in accidents along the roadway in their efforts to evacuate.

CHAPTER 2

DEVELOPING THE ALTERNATIVES



CHAPTER 2

Developing the Alternatives

This chapter describes how the alternatives for the St. Johns River Crossing Project were developed and what alternatives are considered in this Final EIS.

2.1 HOW WERE PROJECT ALTERNATIVES DEVELOPED?

The Florida Department of Transportation (FDOT) considered a number of alternative actions to address transportation problems in the project area. They evaluated conceptual alternatives identified through planning and feasibility studies, and refined them through public scoping and more detailed analysis. These efforts led to the final set of alternatives analyzed in this Final Environmental Impact Statement (EIS).

FDOT first conducted a planning level study that looked at conceptual corridors and suggested several potential locations for an improved crossing of the St. Johns River. A corridor study immediately followed, building upon the results of the planning study and laying the groundwork for the corridor screening stages. The team then conducted an analysis to begin screening the potential alternatives, based on existing environmental and technical information. After public scoping and additional information gathering, the team performed a final corridor screening to select the final set of alternatives for detailed analysis. The dates and timeline for these activities are shown in **Exhibit 2-1**.

This chapter summarizes the findings of earlier studies, and describes how alternatives were developed and refined, including the public and agency input that was considered in the eventual selection of the alternatives analyzed in this Final EIS. **Exhibit 2-1** summarizes the alternative development process that is described in this chapter.

Exhibit 2-1: **Summary of Alternative Development Activities**

2002	**Regional Transportation Planning Study**
	12 conceptual alternatives (A through L) tested for traffic volume and travel time savings
	B, D, F, G and K incorporated into next set of alternatives
2004	**Arterial Corridor Analysis**
	2 arterial widening/upgrade alternatives (Red and Blue Arterials)
	Widening/upgrading did not meet project need
2004	**Desktop Analysis**
	Developed 5 limited access alternatives based on results of 2002 study - Purple, Brown, Orange, Green, and Pink Alternatives
	Corridors were 500 feet wide to allow for further refinement
	2004 Public Meetings
	▪ *Informed public of proposed project, need and process*
	▪ *Input received on overall project and 5 limited access alternatives*
2004-2005	**Refinements to Alternatives**
	Refined alternatives based on public input and further technical analysis
	Added Black Alternative based on public input
	Corridors were reduced to 400 feet wide to reduce impacts
	2005 Public Meetings and Agency Involvement
	▪ *Input received on refinements to original 5 alternatives and new Black Alternative*
	▪ *Advance Notification Package sent to federal, state and local agencies*
2005-2006	**Further Refinements to Alternatives and New Decisions**
	Refined alternatives based on public input
	FDOT decided the existing Shands Bridge will be removed as part of any southern alternative (Brown, Orange, Green or Pink)
	Resolutions received from Clay and St. Johns Counties favoring project and preferring southern alternatives
	FDOT identified Pink Alternative as Locally Preferred Alternative
	2006 Workshop and Agency Involvement
	▪ *Informed public of decision to remove Shands Bridge with southern alternatives*
	▪ *Received input on refined alternatives*
	▪ *Informed public that the St. Johns River Crossing Project will be combined with the Branan-Field Chaffee Road Project and the entire route will be tolled*
	▪ *Initiated Efficient Transportation Decision Making process with agencies*
	▪ *Held agency coordination meetings*
2007-2008	**Final Desktop Analysis and Alternatives Screening**
	Re-evaluated Alternative E from planning study
	Re-evaluated Alternative I from planning study and included it in final desktop analysis
	Reduced all corridors to 324 feet to minimize right-of-way footprint and impacts
	Conducted final desktop screening analysis with environmental and economic data
2008	**Determine Final Set of Alternatives to Evaluate in Draft EIS**
	Alternatives eliminated from detailed evaluation in Draft EIS: ▪ Red and Blue Arterial Corridors, Alternative E, TSM Alternative eliminated because they did not meet need
	▪ Alternative I eliminated due to very high residential relocation impacts
	Four additional alternatives developed to avoid Section 4 (f) Resources
	Alternatives carried forward to detailed evaluation in Draft EIS: ▪ Black, Purple, Brown 1, Brown 2, Orange 1, Orange 2, Green 1, Green 2, Pink 1, Pink 2 and No Build Alternatives
	FDOT determines new southern bridge will be toll free

2.2 WHAT ALTERNATIVES WERE INITIALLY CONSIDERED?

The following sections summarize the studies and analyses that FDOT conducted to identify and evaluate initial alternatives, prior to public and agency scoping activities.

2.2.1 Regional Transportation Planning Study (2002)

In 2002, FDOT completed a planning-level study for the St. Johns River Crossing Project that confirmed the need to provide additional traffic capacity between Clay and St. Johns Counties. The main purpose of this study was to assess the current and future travel demand and performance, so it did not consider social, economic, environmental or physical impacts, nor the costs of design, right-of-way acquisition, or construction.

FDOT evaluated the performance of twelve conceptual corridor alternatives (referred to as A through L), as shown in **Exhibit 2-2**, plus a No Build Alternative. Nine of the alternatives were freeway-type facilities connecting Branan Field-Chaffee Road (State Road (SR) 23) to Interstate (I)-95. The remaining three alternatives (E, H, and L) were arterial-type facilities, which simply provided another bridge over the St. Johns River by connecting United States (US) 17 in Clay County to SR 13 in St. Johns County. The study evaluated all of the corridors as four-lane roadways based upon a set of roadway improvements included in the 2025 North Florida Transportation Planning Organization (TPO) Long Range Transportation Plan (LRTP).

The study examined internal-external trips and external-external trips. Internal-external trips are those with an origin or destination in Clay or St. Johns County, which means they are influenced by local factors, such as changes in population and employment. External-external trips are those passing through the counties without stopping, and so are influenced by regional factors, such as changes in Florida's tourism or citrus industry.

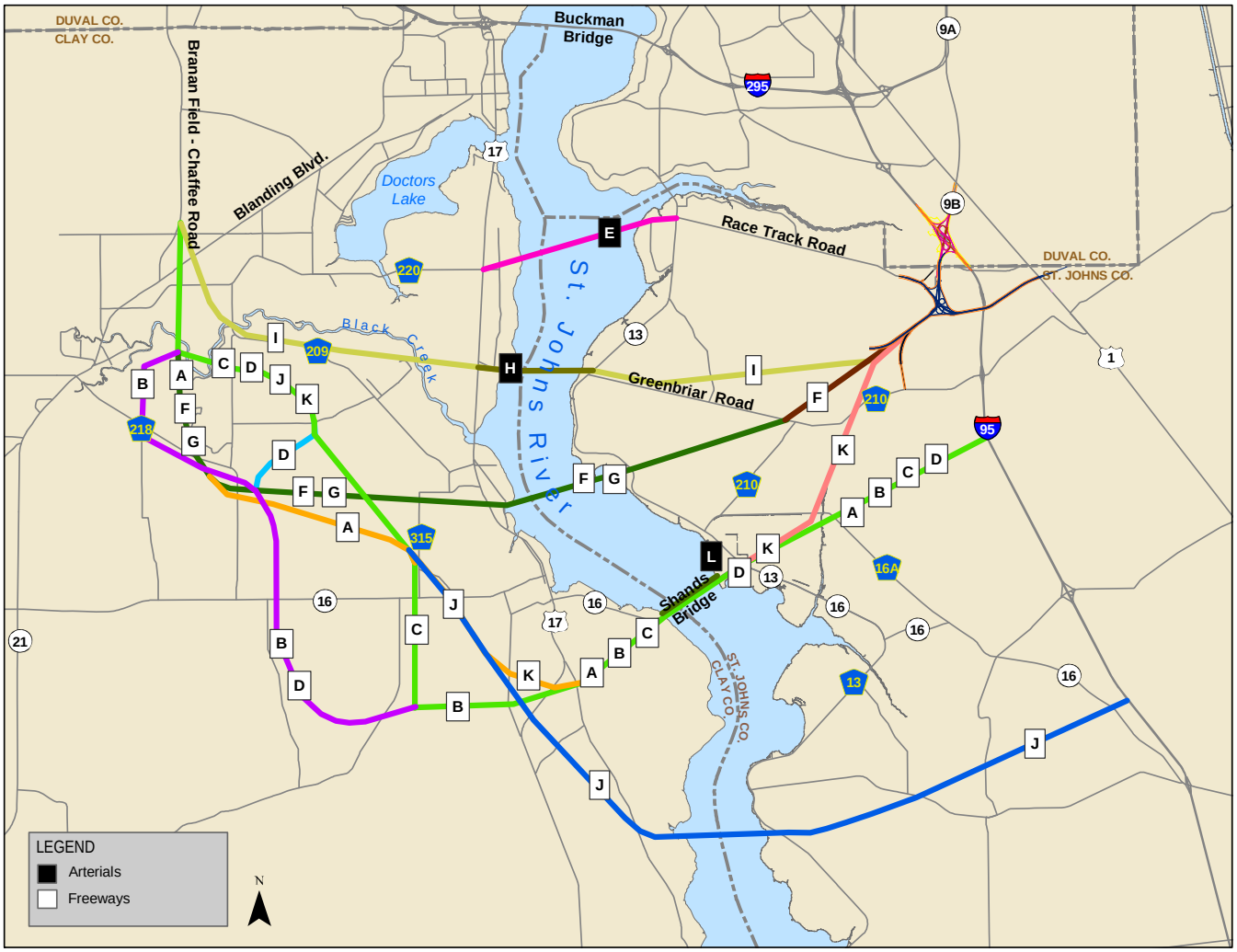
The analysis of the origins and destinations of trips crossing the St. Johns River showed that most trips would be an exchange of traffic between northern St. Johns County and neighboring Clay County, as residents traveled to em-

Planning Study Key Findings

Analysis conducted during the Regional Transportation Planning Study determined the following:

- The demand for travel across the St. Johns River stemmed evenly from both Clay and St. Johns Counties.
- A new bridge location, regardless of its location, would provide little relief to the Buckman Bridge because of latent demand.
- The best performing corridors were the middle corridors and the Shands Bridge corridors.

Exhibit 2-2: **Planning Study Conceptual Corridors**



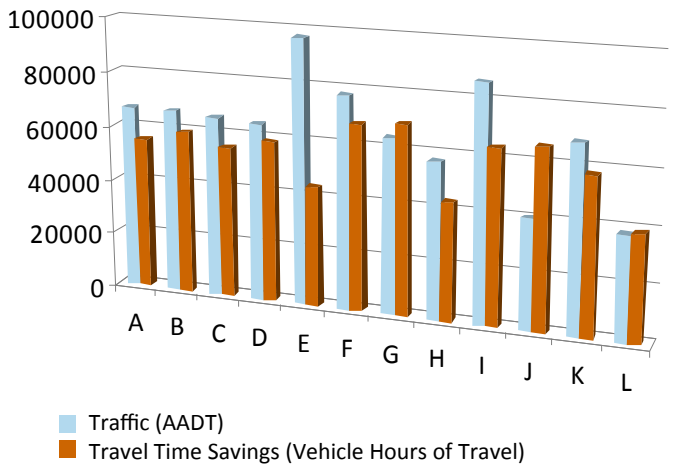
ployment centers in St. Johns and Duval Counties, with 58 percent of these trips expected to originate in Clay County and 42 percent in St. Johns County. The analysis concluded that most of the traffic crossing the St. Johns River would be local and could be satisfied by another bridge connecting the two counties across the river.

The study also evaluated the ability of major roadways, including the Buckman (I-295) and Shands (SR 16) bridges, to accommodate traffic projected in the year 2025. **Exhibit 2-3** shows the projected traffic volumes for the 12 alternatives. Despite the high volumes forecasted at each of the alternative bridge crossings, none of the alternatives provided much relief to the Buckman Bridge (I-295) due to latent demand (that is, at the times when the bridge does have free-flowing travel capacity available, people will be induced to use that roadway).

The planning study also evaluated how traffic would change if new capacity, in the form of a new bridge across the St. Johns River, were added at various locations. FDOT developed traffic forecasts for a new bridge, the existing bridges, and the connections to the existing roadways. An analysis of travel time savings (refer to **Exhibit 2-3**) showed that, while all alternatives reduced overall travel times on a system-wide basis, the middle alternatives (F and G) offered the most travel time savings to the public, while the northern-most arterial alternatives (E and H), and the alternative which simply widens the Shands Bridge (L), offered the least amount of travel time savings.

As depicted in **Exhibit 2-3**, the best performing alternatives overall, in terms of the combination of traffic volumes and travel time savings, were the middle alternatives (F, G and I) and Shands Bridge alternatives (B, D, and K) that connected to either SR 9B or I-95 in St. Johns County.

Exhibit 2-3: **Planning Study Corridor Comparison**

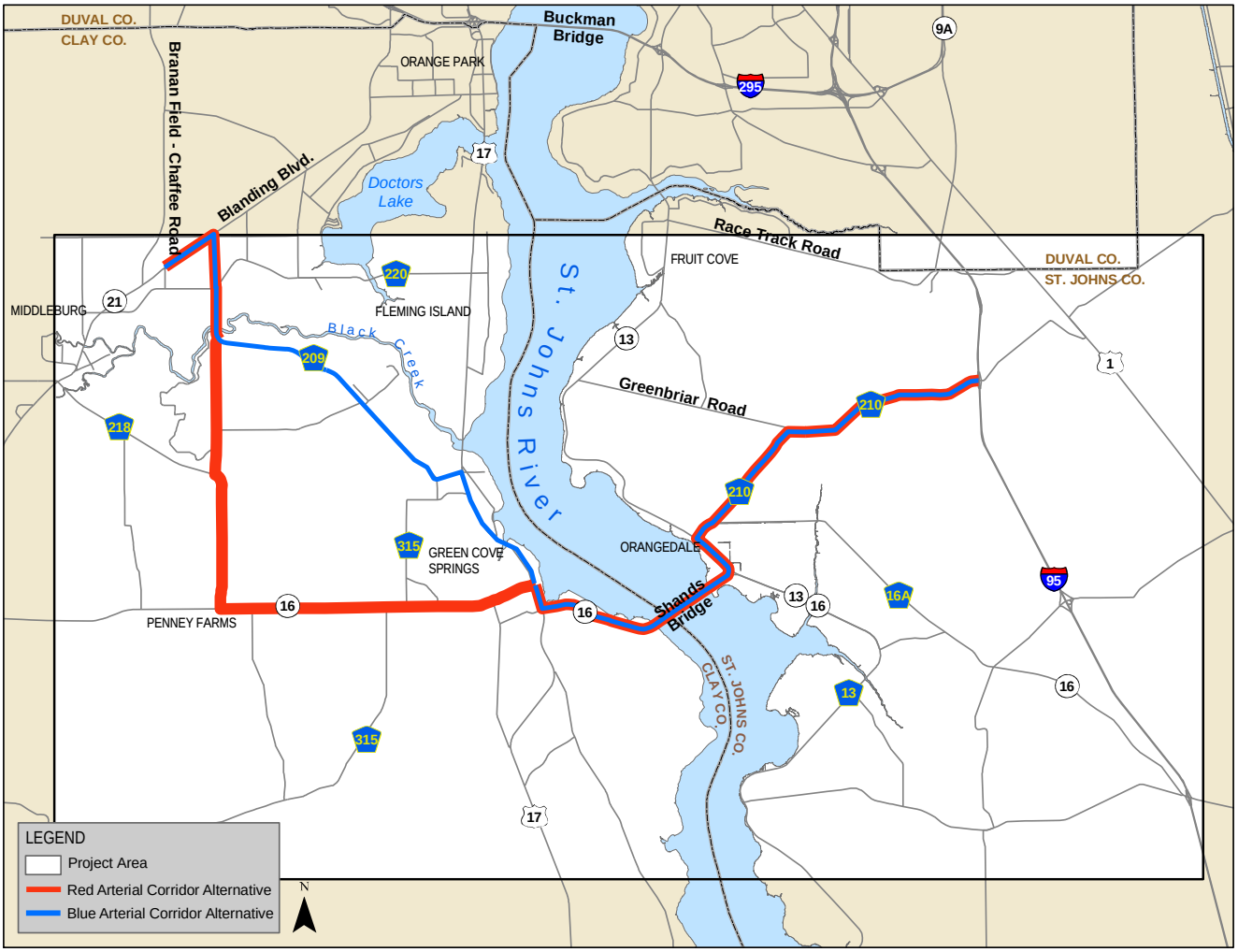


2.2.2 Arterial Corridor Analysis (2004)

The analysis conducted during the planning study identified the best performing crossings of the St. Johns River in terms of travel time savings and volume of traffic. The next step was to develop corridor alternatives that took into account these factors.

A key consideration in the development of alternatives was to determine if the need for additional roadway capacity in the area could be met by upgrading existing roadways. Two alternatives, referred to as the Red and Blue Arterial Corridor Alternatives (**Exhibit 2-4**), were developed that traveled entirely along existing routes and included the reconstruction of the existing Shands Bridge to a four-lane facility. These alternatives would involve upgrading or

Exhibit 2-4: **Red and Blue Alternatives**



widening an existing roadway or contiguous set of existing roadways within the project area, depending on existing right-of-way availability.

These corridors were coded into the regional travel demand model by FDOT and the resulting future year volumes were developed based on these model runs. Analysis indicated that in the year 2015, several of the corridor segments for both alternatives will operate at a condition below Level of Service (LOS) D, the acceptable standard as established by the state. By 2035, over half of the roadway segments for both the Red and the Blue Arterial Corridor Alternatives will operate below the acceptable LOS. For the Red Alternative, 9 out of 15 segments would fail to meet the LOS standard, with 7 segments operating at LOS F. For the Blue Alternative, 8 out of 14 segments will fail to meet the standard, all of which are projected to operate at LOS F. These deficiencies would continue to grow as demand increased. Thus, these alternatives did not improve the transportation network or offer relief to existing hurricane evacuation routes. Additionally, the Red and Blue Alternatives were not anticipated to promote employment and economic development. The results of the analysis indicated that the need for the project cannot be met by simply upgrading and/or widening existing roadways.

2.2.3 Desktop Analysis (2004)

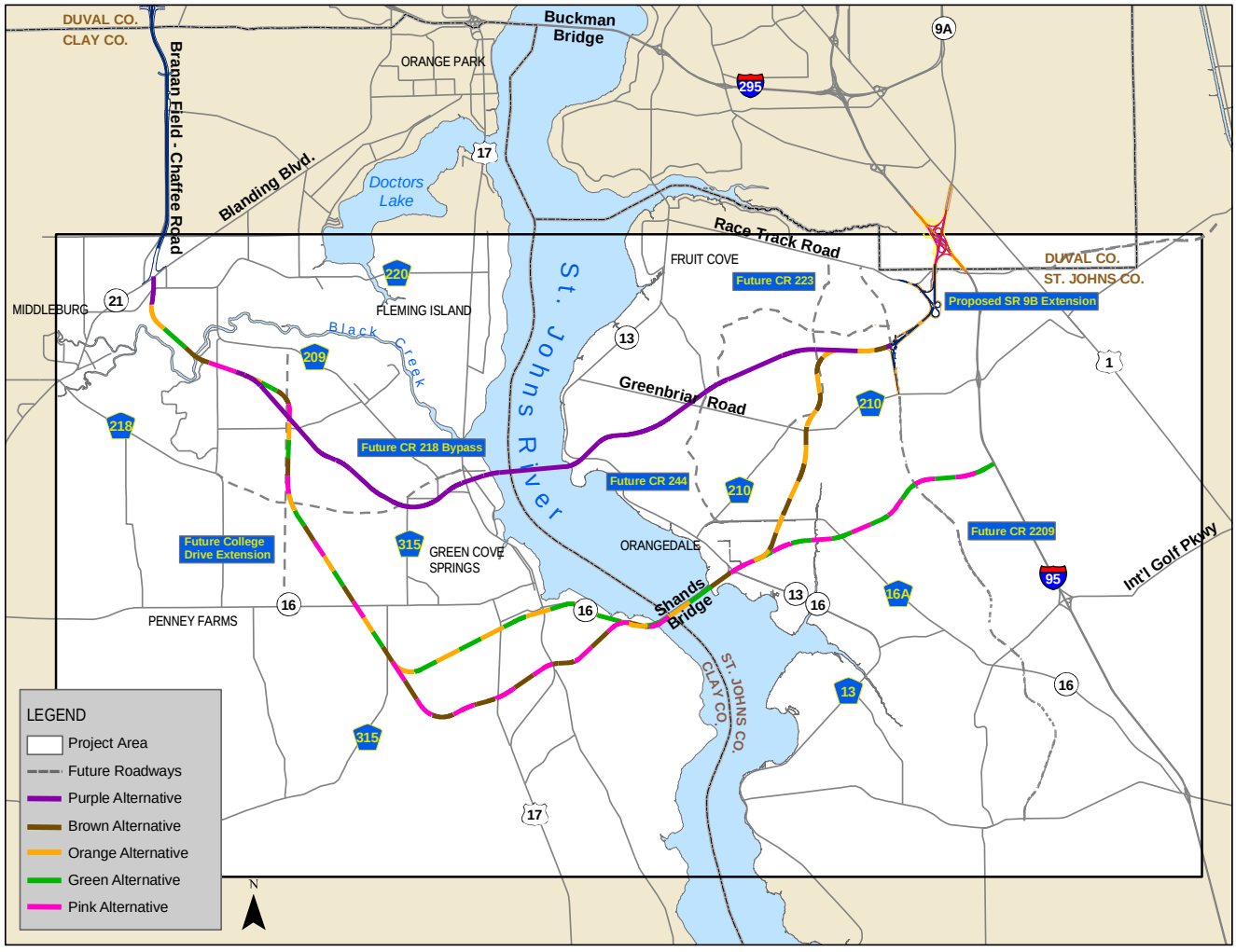
Based on the results of the Regional Transportation Planning Study and the arterial corridor analysis, FDOT developed five limited access alternatives. They established these alternatives, referred to as the Purple, Brown, Orange, Green, and Pink Alternatives (shown in **Exhibit 2-5**), utilizing a 500-foot corridor width, which provided sufficient room for further adjustments to avoid, minimize or mitigate for impacts in later analyses. The Purple Alternative reflected the F and G corridors identified in the planning study, and the Brown, Orange, Green, and Pink Alternatives reflected the B, D and K corridors.

As they developed the limited access alternatives, FDOT considered various environmental, social and technical factors. They evaluated the alternatives using the project's geographic information system (GIS), an electronic database that consists of a series of data layers. The GIS database included layers containing each of the alternatives and more than 50 layers of various environmental data including information on wetlands, floodplains, threatened and

endangered species, neighborhoods and community services. Key factors that influenced alternative design included wetlands, conservation and recreational lands, and residential relocations. Throughout the development process, FDOT attempted to design and refine project alternatives to avoid or minimize these impacts.

FDOT presented the five limited access alternatives to the public and agencies, and used input gained through the scoping process to further refine the initial alternatives. The public and agency input received is summarized in the following section. This input, in conjunction with further environmental and technical analysis, determined which alternatives FDOT would consider for detailed evaluation in this EIS.

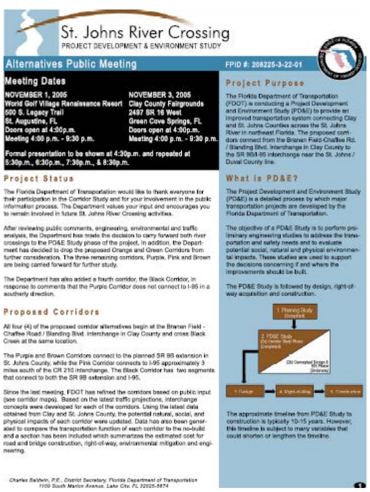
Exhibit 2-5: **2004 Desktop Analysis Alternatives**



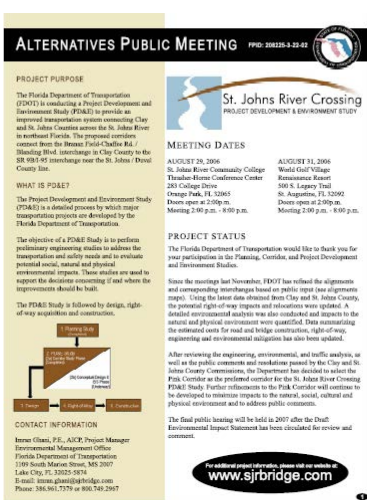
2.3 HOW WAS THE PUBLIC INVOLVED IN ALTERNATIVE DEVELOPMENT AND ANALYSIS?

FDOT developed and implemented a Public Involvement Program (PIP) as an integral part of this project. The purpose of the PIP was to provide every reasonable opportunity for interested citizens and civic groups to participate in the development of the proposed project and to fully identify, address and resolve project related issues. The PIP is an on-going effort that continues to be updated and enhanced by stakeholder participation.

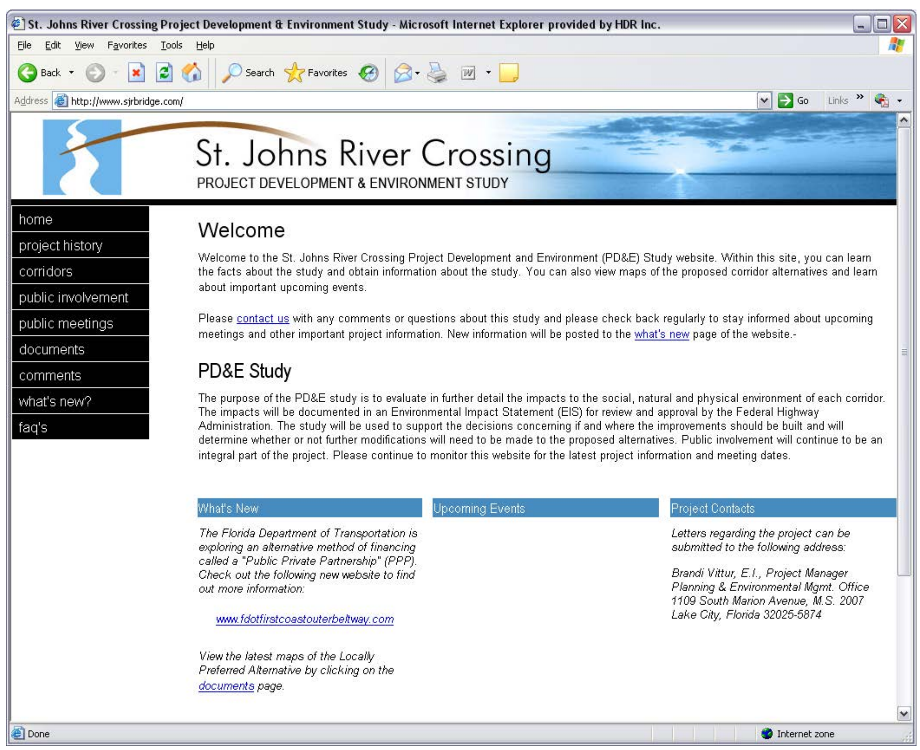
The project team used a variety of methods to answer project questions and keep the public informed of the study's progress including mailing lists, project newsletters, mass e-mailings, a project website (www.sjrbridge.com), and public meetings. Detailed information on public and agency involvement is documented in the *Public Involvement Program Discipline Report* and *Agency Coordination Memorandum* located on the enclosed CD. The following sections summarize the results of public meetings and the input relevant to the development and refinement of project alternatives.



Newsletter distributed prior to the November 2005 public meetings.



Newsletter distributed prior to the August 2006 public meetings.



FDOT developed a project website as part of the Public Involvement Program.

2.3.1 Public Meetings

Public information meetings began in early 2004 and have continued throughout the study process. As of October 2010, a total of three rounds of public meetings and a series of public hearings had been held, along with three focused community meetings and nearly 30 visits to planning groups and city council meetings. The formal public meetings are discussed below; for a listing of all meetings held and/or attended, see the *Public Involvement Program Discipline Report* located on the enclosed CD. There was good representation at the various public meetings from the following communities: Pier Station, Orangedale, Popo Point, Black Creek, and Lake Asbury. Representation was noted through the comments and concerns that were brought to FDOT's attention during the public meetings.

Prior to each meeting, the project team met individually with County Commissioners from Clay and St. Johns Counties, giving them an opportunity to provide input and review information that would be presented to the public. They documented comments made by the elected officials into the official record, along with comments submitted by the public, and gave consideration to these in the development and refinement of the Build Alternatives. Members of the project team also met with the North Florida Transportation Planning Organization (NFTPO) and their subcommittees: the Technical Coordinating Committee and Citizens Advisory Committee. Please see **Exhibit 2-6** for a summary of coordination meetings.

Exhibit 2-6: **Summary of Coordination Meetings**

Date	Entity/Organization	Agenda
10/26/2010	Clay County Board of County Commissioners	Presented a PowerPoint presentation to update the commission on the current status of the project.
2/16/2010	St. Johns County Board of County Commissioners	Presented a PowerPoint presentation to update the commission on the current status of the project.
2/11/2010	North Florida Transportation Planning Organization (NFTPO)	Presented a PowerPoint presentation on the current status of the project and to mention the upcoming public hearings.
2/9/2010	Clay County Board of County Commissioners	Presented a PowerPoint presentation to update the commission on the current status of the project.
2/4/2010	Northeast Florida Regional Council	Presented a PowerPoint presentation on the current status of the project and to mention the upcoming public hearings.
2/3/2010	NFTPO - Citizens Advisory Committee	Presented a PowerPoint presentation on the current status of the project and to mention the upcoming public hearings.

Exhibit 2-6 (con't): **Summary of Coordination Meetings**

Date	Entity/Organization	Agenda
10/29/2009	FDOT Plantation Oaks Over-pass Construction Project Open House	At a construction open house for an adjacent FDOT project, exhibits of the St. Johns River Crossing / First Coast Outer Beltway project were displayed and staff was available to answer any questions.
8/20/2009	Clay County Kiwanis Club	Presented a PowerPoint presentation on the project.
6/2/2009	Clay County Chamber of Com-merce	Presented a PowerPoint presentation on the project.
5/18/2009	Cecil Field Airport Advisory Committee Meeting	Presented a PowerPoint presentation on the project.
4/2/2009	Northeast Florida Regional Council	Presented a PowerPoint presentation on the current status of the project.
11/5/2008	Clay County Builders Council	Presented a PowerPoint presentation on the project.
9/18/2008	Jacksonville Chamber of Com-merce	Presented a PowerPoint presentation on the project.
12/13/2007	NFTPO	Presented a PowerPoint presentation to up-date the TPO on the current status of the project.
12/6/2007	Northeast Florida Regional Council	Presented a PowerPoint presentation on the current status of the project.
11/27/2007	Clay County Board of County Commissioners	Presented a PowerPoint presentation to up-date the commission on the current status of the project.
11/27/2007	St. Johns County Board of County Commissioners	Presented a PowerPoint presentation to up-date the commission on the current status of the project.
11/13/2007	Jacksonville chapter of the American Society of Civil Engi-neers	Presented a PowerPoint presentation on the project.
5/23/2007	Clay County Commercial Real Estate Showcase	Presented a PowerPoint presentation on the project.
1/20/2006	Orange Park Sunrise Rotary Club	Presented a PowerPoint presentation on the project.
1/17/2006	Green Cove Springs City Coun-cil Meeting	Discussed the project.
12/6/2005	Green Cove Springs City Coun-cil Meeting	Updated the Council on the current status of the project.

Exhibit 2-6 (con't): **Summary of Coordination Meetings**

Date	Entity/Organization	Agenda
11/10/2005	NFTPO	Updated the TPO on the current status of the project.
11/7/2005	Green Cove Springs Rotary Club	Presented a PowerPoint presentation on the project.
10/18/2005	St. Johns County Board of County Commissioners	Provided an update to the commission on the current status of the project.
10/11/2005	Clay County Board of County Commissioners	Provided an update to the commission on the current status of the project.
10/11/2005	Putnam County Board of County Commissioners	Updated the Commission on the current status of the project.
10/6/2005	Northeast Florida Regional Council	Updated the NEFRC on the current status of the project.
10/5/2005	NFTPO - Technical Coordinating Committee	Updated the TCC on the current status of the project.
10/5/2005	NFTPO - Citizens Advisory Committee	Updated the CAC on the current status of the project.
9/8/2005	NFTPO	Updated the NFTPO on the St. Johns River Crossing Toll Feasibility Study
8/3/2005	North Florida Transportation Planning Organization - Technical Coordinating Committee	Updated the TCC on the St. Johns River Crossing Toll Feasibility Study
8/3/2005	North Florida Transportation Planning Organization - Citizens Advisory Committee	Updated the CAC on the St. Johns River Crossing Toll Feasibility Study
6/14/2005	St. Johns County Board of County Commissioners	Provided an update to the commission on the current status of the project.
4/8/2004	NFTPO	Updated the TPO on the current status of the project.
4/1/2004	Northeast Florida Regional Council	Updated the NEFRC on the current status of the project.
3/11/2004	NFTPO	Updated the TPO on the current status of the project.
3/9/2004	St. Johns County Board of County Commissioners	Provided an update to the commission on the current status of the project.
3/3/2004	NFTPO - Technical Coordinating Committee	Updated the TCC on the current status of the project.
3/3/2004	NFTPO - Citizens Advisory Committee	Updated the CAC on the current status of the project.

Spring 2004 Public Meeting

Spring 2004 Meeting Summary

Meeting Dates:
March 30th and April 1st, 2004

Meeting Locations:
Switzerland Point Middle School, St. Johns County
Clay High School, Clay County

Attendance:
426 – St. Johns County
405 – Clay County

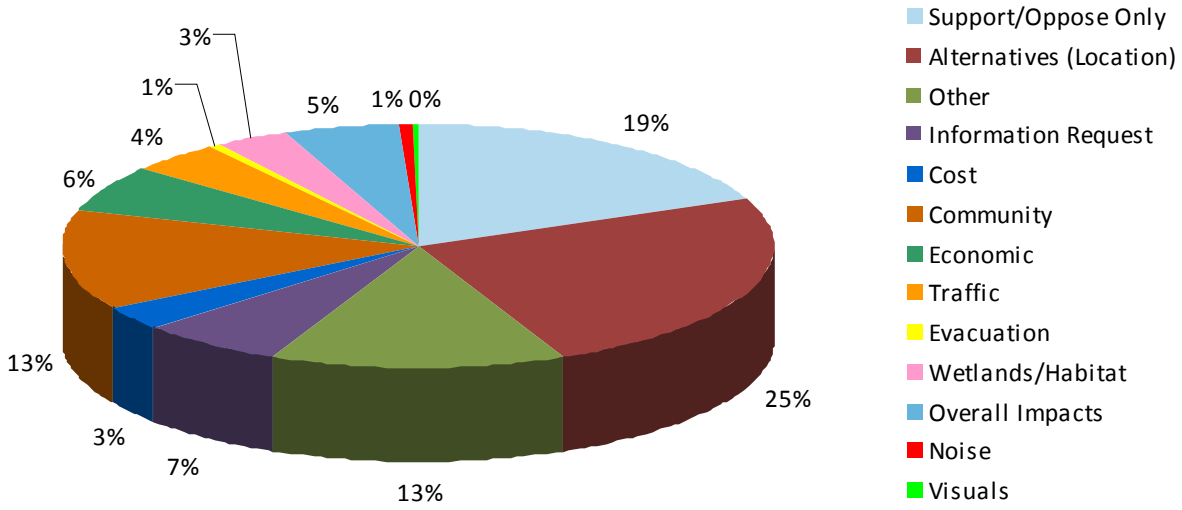
Spring 2004 Public Meetings

FDOT held the first meetings from 5:00 p.m. to 8:00 p.m. on March 30 and April 1, 2004, at Switzerland Point Middle School in St. Johns County and Clay High School in Clay County, respectively. Their purpose was to provide citizens with an opportunity to learn about the five initial Build Alternatives (Purple, Brown, Orange, Green, and Pink Alternatives). A total of 831 persons signed in at these meetings (426 at the meeting in St. Johns County and 405 in Clay County).

FDOT received a total of 579 comment statements from the meetings and during the 30-day comment period that followed. Most of the comments either expressed a general position of support or opposition for the project or focused mainly on the location of the alternatives as they cross the St. Johns River. Of those comments that supported a general location for an improved river crossing, preferences were nearly equally divided among the northern route (Purple), southern routes (Brown, Orange, Green and Pink), and no preference as to location. Other topics that were frequently commented on included cost of the project and community impacts. **Exhibit 2-7** summarizes the subjects of the comments received.

In addition to the comments, FDOT also received two petitions. The first, submitted by the Orangedale Community Association, included 1,026 signatures and opposed any river crossing near the Orangedale community in St. Johns County.

Exhibit 2-7: **Spring 2004 Public Meeting Comments**



The second petition, submitted by St. Johns County Citizens for Sound Improvement, included 3,170 signatures and endorsed the selection of either the Green or Pink Alternative.

Fall 2005 Public Meetings

FDOT refined some of the initial Build Alternatives, incorporating public input from the 2004 meetings, and added a new northern crossing alternative called the Black Alternative (shown in **Exhibit 2-15** and described on **pg 2-32**). All alternative corridors were reduced in width from the initial 500 feet to 400 feet at this stage. Additional public meetings were then held on November 1 and 3, 2005, at the St. Johns County Convention Center at the World Golf Village Renaissance Resort in St. Johns County and at the Clay County Fairgrounds, respectively. FDOT showed the public changes that had been made to the Purple, Brown, and Pink Alternatives and presented them with the new Black Alternative.

A total of 576 persons signed in at these meetings (259 at the meeting in St. Johns County and 317 in Clay County). Meeting attendees returned 291 survey forms at the meetings, and another 77 attendees provided oral comments. At this series of meetings, more people expressed a preference for a southern route (Brown, Orange, Green and Pink), than a northern route (Black and Purple). However, most of those who commented had no preference as to where the crossing should be located. The comments from this series of meetings still focused on either generally supporting or opposing the project (**Exhibit 2-8**).

Fall 2005 Public Meeting

Fall 2005 Meeting Summary

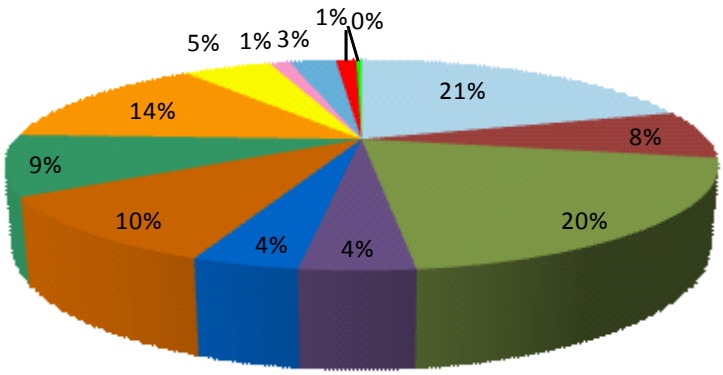
Meeting Dates:
November 1st and 3rd, 2005

Meeting Locations:
St. Johns County Convention Center at the World Golf Village Renaissance Resort

Clay County Fairgrounds, Clay County

Attendance:
259 - St. Johns County
317 - Clay County

Exhibit 2-8: **Fall 2005 Public Meeting Comments**



- Support/Oppose Only
- Alternatives (Location)
- Other
- Information Request
- Cost
- Community
- Economic
- Traffic
- Evacuation
- Wetlands/Habitat
- Overall Impacts
- Noise
- Historical

However, a larger portion of the comments received discussed project impact issues, the majority of which concerned community, economic, and traffic impacts.

Fall 2006 Workshop

Fall 2006 Workshop

Following the 2005 public meetings, the project team continued making refinements to the Build Alternatives. In early 2006, the St. Johns County Board of County Commissioners and Clay County Board of County Commissioners passed resolutions stating their support and need for a new highway facility. On March 21, 2006, the St. Johns County Board of County Commissioners adopted a resolution stating the County's support for a new highway corridor that crossed the St. Johns River near the existing Shands Bridge and terminated at I-95. On June 13, 2006, the Clay County Board of County Commissioners passed a resolution supporting a southerly crossing of the St. Johns River, stating that a new highway corridor will serve as a "critically needed traffic reliever and economic development stimulator."

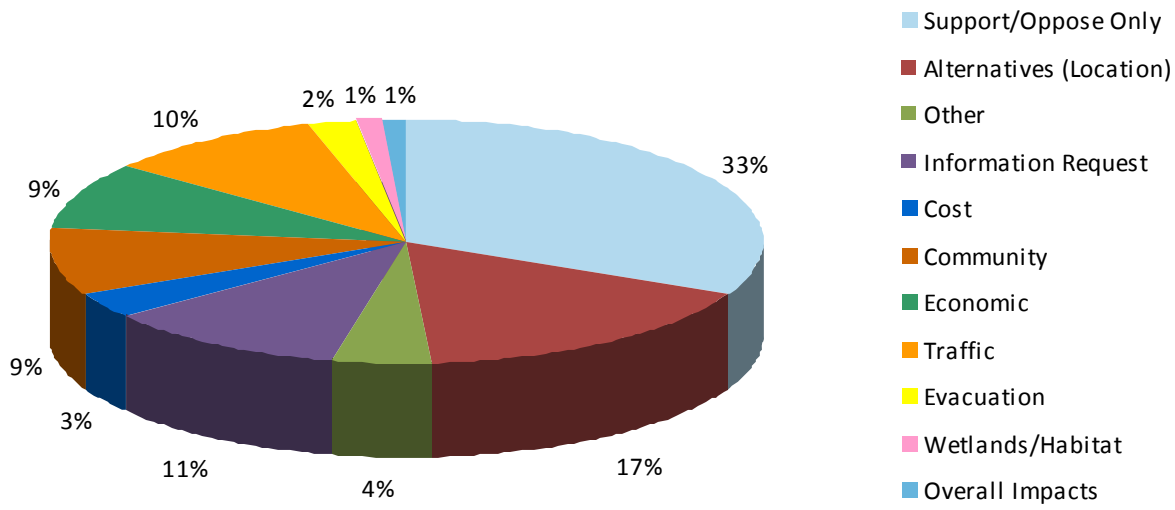
After further refinements to the alternatives, FDOT made two decisions. First, they decided that the existing Shands Bridge would be removed and replaced as part of any of the southern alternatives (Brown, Orange, Green and Pink). FDOT also identified the Pink Alternative as the Locally Preferred Alternative. Thus, they held a third series of meetings in the fall of 2006 in St. Johns, Clay and Duval Counties to inform the public of these decisions and to solicit comment. The meetings were held in open-house format from 2:00 p.m. to 8:00 p.m. on August 29 in Clay County, August 31 in St. Johns County, and September 7 in Duval County. A total of 623 persons signed in at these meetings (217 at the meeting in St. Johns County, 288 in Clay County and 118 in Duval County). These meetings were held in conjunction with two other FDOT projects; the SR 23 (Branan Field-Chaffee Road) project located in western Duval and northern Clay Counties and the SR 9B project located in southern Duval and northern St. Johns Counties. Those projects were in more advanced stages at the time of the public meetings, but were included because they could affect the design and construction of the St. Johns River Crossing Project.

FDOT focused these meetings on four of the alternatives; two northern corridors (Black and Purple) and two southern corridors (Brown and Pink). FDOT also announced at these meetings that they intended to toll the entire route, including the Branan Field – Chaffee Road Project (the entire toll route is referred to as the First Coast Outer Beltway; see page 2-50 for more detail). Due to the tolling issue staff from the Florida Turnpike Enterprise were available to answer questions regarding tolling. (Subsequent to this meeting, FDOT determined that if a southern corridor alternative were selected (Brown, Orange, Green or Pink), the local trip across the river between the US 17 interchange and the CR 16A interchange would remain toll-free; see page 2-49 for more information.)

Ninety comments were received, and they were again nearly equally divided among preferences for a northern (Black and Purple) or southern (Brown and Pink) route or expression of no route preference. As with the other two series of meetings, the majority of the comments expressed support or opposition for the project (**Exhibit 2-9**). Many also commented on Build Alternatives, and several again noted concerns regarding community, economic and traffic impacts.

In addition to their comments on other issues, 12 people also stated their opinion on having a toll road. Of the 12, six people stated that they were not in favor of tolls and six stated that they were in favor of tolls.

Exhibit 2-9: **Fall 2006 Workshop Comments**



Public Hearings

A series of four public hearings were held for the St. Johns River Crossing Project in early 2010 (see details in **Exhibit 2-10**). The purpose of these hearings was to allow the public the opportunity to provide input on the alternatives presented in the Draft EIS. Various displays and detailed aerial maps were provided for public viewing at the hearings along with a presentation which summarized the development of the project alternatives and the potential environmental impacts. In total, approximately 520 people attended the four public hearings and 121 comments were received at the hearings. The majority of comments were concerned with the selection of an alternative, the use of tolls, general support or opposition to the project, opposition to the interchange at CR 739 (the interchange at CR 739 was added after the 2006 Fall Workshop and prior to the Public Hearings), and/or environmental impacts (see **Exhibit 2-11**). Of those comments stating a preference for a particular alternative, the majority stated a preference for the Pink Alternative (mostly without specifying options 1 or 2). For a summary of the comments, please see the *Public Involvement Discipline Report* located on the enclosed CD. For complete copies of all comments received, please see the *Public Hearing Transcript* located on the enclosed CD.

During the 30 day comment period following the series of public hearings, FDOT received approximately 36 comments / questions from the general public. Additionally, FDOT received one petition with 121 signatures supporting the Pink Alternative and a petition from Clay County supporting the interchange at CR 739.

Comments were also received from the Northwest St. Johns County Community Coalition, the Florida Wildlife Federation, the NFTPO. Their comments are described in the *Agency Coordination Memorandum*.

Public Hearings 2010 Summary

Meeting Dates:
February 22, February 25, March 2, March 4

Meeting Locations:
World Golf Village Renaissance Resort
Thrasher-Horne Conference Center
Clay County Fairgrounds
Cecil Conference Center

Attendance:
152 - February 22
180 - February 25
138 - March 2
50 - March 4

Exhibit 2-10: **Public Hearings**

Date	Location	# Attendees	# Oral Comments	# Court Reporter	# Written Comments
2/22/10	World Golf Village (St. Johns County)	152	10	5	7
2/25/10	Thrasher-Horne Conference Center (Clay County)	180	14	9	22
3/2/10	Clay County Fairgrounds (Clay County)	138	8	21	14
3/4/10	Cecil Conference Center (Duval County)	50	4	-	7

Exhibit 2-11: **Public Hearing Comments Summary**

Issue	Total[1]
Comments Stating Support or Opposition to a Particular Alternative	**56**
Supports Pink Alternatives – not specifying 1 or 2	13
Supports Pink 1	4
Supports Pink 2	1
Supports Southern Crossing Alternatives	4
Against Southern Crossing Alternatives	3
Against "2" Alternatives	8
Against "1" Alternatives	3
Supports Purple	6
Supports Black	2
Supports Northern Alternatives	4
Against Northern Alternatives	3
Supports Green	1
Supports Green/Orange	1
Supports Green/Pink	1
Against Pink/Brown	1
Against Brown/Orange	1
Comments Related to Tolls/Project Financing	**15**
Supports Tolls	2
Against Tolls	8
General	5
General Support or Opposition to Project	**29**
Supports Project	4
Against Project/Supports No Build	25
Opposed to Interchange at CR 739	**22**
Environmental Concerns (social, natural, physical impacts)	**12**
Cultural/Recreational	2
Noise	4
Wetlands	2
Residential	3
General	1
Other	**15**
Would support an alternative further south	2
Bridge height	1
Safety	2
Access to local roads	2
Public transportation improvements	3
Against tearing down Shands Bridge	3
General	1

[1]Some individuals commented on more than one topic. Comments may be counted more than once in this table.

2.4 HOW WERE GOVERNMENT AGENCIES AND TRIBES INVOLVED IN ALTERNATIVE DEVELOPMENT AND ANALYSIS?

To ensure early communication and coordination, FDOT processed the project through the Florida Efficient Transportation Decision Making (ETDM) process to solicit agency concerns and recommendations. FDOT provided an Advance Notification (AN) package to state and federal agencies and other interested parties defining the project and describing anticipated issues and impacts.

As part of the ETDM process, FDOT carried out scoping as required under Council on Environmental Quality (CEQ) implementation guidelines for the National Environmental Policy Act (NEPA). These efforts are described in more detail below. Additionally, a matrix of comments received from agencies and FDOT's responses was kept throughout the project and is provided in Appendix A of the *Agency Coordination Memorandum* located on the enclosed CD.

Advance Notification (AN)

Advance Notification (AN) is the process through which other federal, state, and local agencies are informed of a proposed transportation project by FDOT. The AN process provides agencies an opportunity to become involved early in project development and share information about potential impacts the proposal might have on resources of concern within the project area.

Key Dates

The AN Package was mailed on August 30, 2005 to the Florida Department of Environmental Protection (FDEP) Florida State Clearinghouse.

2.4.1 Advance Notification Package

On August 30, 2005, FDOT mailed a project AN package to the Florida Department of Environmental Protection (FDEP) Florida State Clearinghouse. FDOT then distributed the package to Federal, state and local agencies, as well as appropriate Congressional and local senators and representatives. FDOT received comments in response to the AN package from the United States Coast Guard (USCG), United States Army Corps of Engineers (USACE), National Marine Fisheries Service (NMFS), Florida Fish and Wildlife Conservation Commission (FWC), St. Johns River Water Management District (SJRWMD), Clay County Board of County Commissioners, and Putnam County Planning and Development Services. Along with general comments, the agencies noted that wetland impacts, essential fish habitat impacts, and stormwater treatment were areas of special concern. Letters received from agencies in response to the AN package are provided in Appendix B of the *Agency Coordination Memorandum* located on the enclosed CD.

2.4.2 Efficient Transportation Decision Making Process

FDOT used the ETDM process, Florida's streamlined approach for conducting NEPA studies, to comply with section 6002(b) of the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (known as SAFETEA-LU). The project team loaded information into the ETDM system in April 2006 and

Legend

N/A	No Involvement
1	Enhanced
0	None
2	Minimal (after 12/5/2005)
3	Moderate
4	Substantial
5	Dispute Resolution (Programming)

Exhibit 2-12: **Summary Degree of Effect Chart***

	Natural											Cultural			Community						
	Air Quality	Coastal and Marine	Contaminated Sites	Farmlands	Floodplains	Infrastructure	Navigation	Special Designations	Water Quality and Quantity	Wetlands	Wildlife and Habitat	Historic and Archaeological Sites	Recreation Areas	Section 4(f) Potential	Aesthetics	Economic	Land Use	Mobility	Relocation	Social	Secondary and Cumulative Effects
Alternative #1 From SR 21/ SR 23 Interchange To SR 9B Extension or I-95 ▪ *Reviewed from 5/1/2006 to 6/30/2006* ▪ *Published on 6/20/2008*	2	4	2	N/A	4	2	3	4	2	4	4	3	4	3	3	2	3	1	3	3	4
Alternative #2 From SR 21/ SR 23 Interchange To SR 9B Extension ▪ *Reviewed from 5/1/2006 to 6/30/2006* ▪ *Published on 6/20/2008*	2	3	2	N/A	4	2	3	4	2	4	4	3	3	3	3	2	3	1	3	3	4
Alternative #3 From SR 21/ SR 23 Interchange To Interstate 95 ▪ *Reviewed from 5/1/2006 to 6/30/2006* ▪ *Published on 6/20/2008*	2	4	2	N/A	4	2	3	4	2	4	4	3	4	3	3	2	3	1	3	3	4
Alternative #4 From SR 21/ SR 23 Interchange To SR 9B Extension ▪ *Reviewed from 5/1/2006 to 6/30/2006* ▪ *Published on 6/20/2008*	2	3	2	N/A	4	2	3	4	2	4	4	3	2	3	3	2	3	1	3	3	4

*Chart shown is the chart published in the ETDM Summary Report

released it to the Environmental Technical Advisory Team (ETAT) on June 1, 2006 (Programming Screen Review). Included in the information loaded in the ETDM system were four alternatives under consideration at the time of the Programming Screen Review. These alternatives included the Black (Alternative #1), Brown (Alternative #2), Pink (Alternative #3), and Purple Alternatives (Alternative #4). ETAT provided feedback using the ETDM process during July 2006. In general, these comments mirrored those received through the AN process, with wetlands, wildlife and habitat as primary concerns. As part of the review process, ETAT also assigned a degree of effect to each alternative, ranging from 1-5, based on the impact the proposed alternative could have on various natural, cultural and community elements. **Exhibit 2-12** shows the degree of effect assigned to each alternative. Additional information on the Summary Degrees of Effects, ETDM comments and FDOT responses are provided in Appendix C of the *Agency Coordination Memorandum* located on the enclosed CD.

The Efficient Transportation Decision Making (ETDM) Process

ETDM is a process established by FDOT that attempts to streamline procedures for planning transportation projects, conducting environmental reviews, and developing and permitting projects. The premises for ETDM include:

- Early and continuous agency involvement
- Good data upon which to base decisions
- Better transportation decisions

Key Dates

A Notice of Intent (NOI) was published in the Federal Register on September 5, 2006. A NOI is a letter notifying Federal and State agencies that an Environmental Impact Statement (EIS) is being prepared for the project.

In response to agency concerns, FDOT proposed several measures in addition to those undertaken in preparation of the EIS. These measures are consistent with the comments provided during the ETDM process and include the following:

- Conduct a scrub jay survey for potentially occupied scrub habitat (survey is included in Appendix A of the *Wildlife and Habitat Discipline Report* and Appendix A of the *Endangered Species Biological Assessment* located on the enclosed CD).
- Comply with the most recent guidance issued by the United States Fish and Wildlife Service (USFWS) and FWC relating to potential involvement with bald eagles.
- Conduct red-cockaded woodpecker surveys for potentially occupied habitat (survey is included in Appendix A of the *Wildlife and Habitat Discipline Report* and Appendix A of the *Endangered Species Biological Assessment* located on the enclosed CD).
- Conduct submerged grass bed surveys within the vicinity of the alternative bridge crossings of the St. Johns River (survey is included in Appendix A of the *Essential Fish Habitat Discipline Report*).
- Consider wildlife underpasses to facilitate wildlife mobility in the design of the project for areas where the linkage of public lands can be achieved.
- Continue coordination with NMFS on issues relating to Essential Fish Habitat and the Endangered Species Act.
- Prepare an Air Quality Screening Test (located on the enclosed CD) to evaluate project-related intersections.

2.4.3 Environmental Technical Advisory Team and Agency Coordination Meetings

Environmental Technical Advisory Team Meetings

On June 6 and 7, 2006, FDOT conducted a meeting for all the ETAT state and Federal agency participants where the St. Johns River Crossing Project was presented, among others.

The project was presented at another ETAT meeting on June 24, 2008. The team presented responses to comments received from ETAT members during the ETDM Programming Screen Review, as well as answers to questions raised at previous ETAT meetings. (See Appendix D of the *Agency Coordination Memorandum* located on the enclosed CD for ETAT meeting comments and responses.)

Agency Coordination and Methodology Meetings

FDOT conducted an agency coordination meeting on June 7, 2006. A presentation was given to those in attendance explaining the history of and need for the

St. Johns River Crossing Project, followed by a question and answer session. The meeting was attended by the United States Environmental Protection Agency (USEPA), Federal Highway Administration (FHWA), USCG, National Oceanic and Atmospheric Administration (NOAA), NMFS, FDEP, FWC, and USFWS.

Additional coordination meetings took place throughout the study. **Exhibit 2-13** highlights major agency concurrence points. See Appendix E of the *Agency Coordination Memorandum* on the enclosed CD for minutes from the methodology meetings.

2.4.4 Tribal Consultation

To identify any resource concerns or traditional properties, FDOT has requested further input from the six Federally recognized tribes of Florida. (See Appendix F of the *Agency Coordination Memorandum* on the enclosed CD for copies of the letters sent to the tribes). This was a continuation of the consul-

Exhibit 2-13: **Major Agency Concurrence Points**

Date(s)	Agencies	Description
01/29/2007	SHPO and FDOT	SHPO stated in a letter to FDOT that if the preferred alternative was designed to bridge over the historic railroad segment and not interfere with the current or future operation of the rail line, the project would not adversely affect this resource.
01/14/2008	USACE	Suggested revisions to the Draft EIS and 404(b)(1) Alternatives.
04/23/2008	SHPO, FHWA, FDOT	The agencies met and agreed upon the methodology and area of potential effect for historic and archaeological resources.
04/30/2008 and 10/09/2008	FDOT and SJRWMD	These were initial coordination meetings in which SJRWMD indicated that the project could be permitted and that mitigation bank credits were acceptable for wetland mitigation.
01/29/2009	USACE	Suggested revisions to the Draft EIS and 404(b)(1) Alternatives.
05/26/2009	USACE	Suggested revisions to the Draft EIS and 404(b)(1) Alternatives.
11/02/2009	USACE	Concurrence with the Draft EIS for publication in Federal Register.
03/05/2010	USACE	Concurrence with the Draft EIS for publication in Federal Register.
04/16/2010	SJRWMD and FDOT	SJRWMD wrote a letter stating its concurrence with the *de minimis* finding for the Selected Alternative (discussed further in Section 3.10.5).
10/14/2010	SJRWMD, USEPA, FWC, USACE, USFWS, NMFS,FHWA, and FDOT	The agencies agreed to a regional wetland mitigation approach and FDOT committed to coordinating with the resource agencies in developing the framework for a regional wetlands mitigation plan.
05/13/2011	FDOT and NMFS	A teleconference was held in which FDOT and NMFS agreed upon the methodology presented in the Final EIS.
09/20/2011, 09/29/2011 and 10/4/2011	SJRWMD, USEPA, FWC, USACE, USFWS, NMFS,FHWA, and FDOT	Teleconferences were held to discuss wetland mitigation and the selection of the preferred alternative. It was agreed that more detail would be added to the existing wetland mitigation plan. All parties were agreeable to the selection of the Pink 1 Alternative as FDOT's Preferred Alternative. It was advised that FDOT identify the LEDPA and provide supporting information.
10/14/2011	USACE	Suggested revisions to the Draft Final EIS and 404(b)(1) Alternatives.
12/18/2012	FDOT, FWC, FHWA, NMFS, USACE, USEPA, USFWS	A teleconference was held where the revised Endangered Species Biological Assessment and commitments were agreed upon.
01/24/2013	USFWS	Concurrence with the Endangered Species Biological Assessment findings and commitments.

tation that occurred during the ETDM Programming Screen Review conducted in June 2006. As of the publication date of this Final EIS, one comment has been received from the Miccosukee Tribe stating that no historic properties are known to occur in the area (see the *Agency Coordination Memorandum* located on the enclosed CD).

2.5 WHAT WERE THE RESULTS OF THE FINAL CORRIDOR AND DESKTOP ANALYSIS SCREENING?

Before moving forward into the detailed alternatives analysis contained in this EIS, the project team performed a final screening of the alternatives carried forward from previous studies and added during public scoping (Black, Purple, Brown, Orange, Green and Pink Alternatives). In addition, two conceptual alternatives from the 2002 Regional Transportation Planning Study, Alternatives E and I (refer to **Exhibit 2-2**), were re-examined at this stage to confirm they had been fully considered.

The alternative referred to as Alternative E in the original planning study was a conceptual corridor that would involve constructing a new bridge crossing farther north than any of the other alternatives. It would connect CR 220 on the west and Race Track Road east of the St. Johns River. Under this alternative, connecting roadways from SR 21 to I-95 would be upgraded and/or widened. To determine the impact of utilizing existing arterials for an improved crossing, FDOT performed the same analysis for Alternative E as had been done for the Red and Blue Arterial Corridor Alternatives in 2004. As with the Red and Blue Alternatives, the analysis showed that Alternative E resulted in the degradation of the LOS on local road segments to LOS F.

Performing a Desktop Analysis

Before investing time and money in fully developing an alternative, the FDOT is able to take an initial "snapshot" of what the corridor's potential environmental effects might be by performing a desktop analysis.

This is accomplished by electronically overlaying the alternative routes over GIS data for the various resources and seeing where they might directly impact them. This process is called a desktop analysis.

Exhibits 2-14: **Desktop Analysis for Built Environment**

Alternative	Elements of Built Environment within Alternatives					
	Railroads	Major Utilities	Communities	Real Estate Parcels		
				Total Parcels	Commercial Parcels	Residential Parcels
Black	1	7	3	291	9	59
Purple	1	7	3	227	9	57
Brown	1	8	1	222	3	42
Orange	2	8	1	243	6	43
Green	2	8	1	197	6	39
Pink	1	8	1	176	3	38
I	0	6	2	486	9	309

Desktop analysis data was from existing sources and GIS databases, without field verification

Exhibit 2-15: **Desktop Analysis for Natural Environment**

Alternative	Elements of Natural Environment within Alternatives						
	T and E Species (Documented Occurrences)	Conservation Areas (acres)	Wetlands (acres)	Floodplains		Mesic Forest (acres)	Xeric Habitat (acres)
				100-Year Floodplain Crossings	Regulatory Floodway Crossings		
Black	1	0	381	29	8	952	45
Purple	1	0	194	18	7	542	38
Brown	2	34	333	29	5	801	168
Orange	2	24	319	29	6	731	172
Green	2	24	311	30	5	715	154
Pink	2	34	325	30	4	785	150
I	1	0	134	22	8	488	12

Desktop analysis data was from existing sources and GIS databases, without field verification

The team performed a final desktop screening analysis on the six Build Alternatives carried forward through the earlier studies and the public meetings in 2004 and 2005 (Black, Purple, Brown, Orange, Green and Pink). The conceptual Alternative I from the earlier planning study was also re-examined in the final desktop screening analysis. This was done because Alternative I had been shown to perform reasonably well in the planning study (based on traffic volume and travel time savings), but it had not been incorporated into the initial Build Alternatives after the planning study.

2.5.1 Final Desktop Analysis (2008)

For the final desktop analysis of these seven alternatives, FDOT again reduced the corridor width of all alternatives from 400 feet to 324 feet, minimizing the right-of-way footprint to avoid and/or minimize potential impacts. They also developed conceptual interchange layouts for each Build Alternative in order to estimate construction costs, determine right-of-way needs, and analyze potential impacts to the local roads. The results of the final desktop screening are summarized in **Exhibits 2-14** and **2-15**, and were used to identify the final set of alternatives carried forward for detailed evaluation in this EIS. Alternatives eliminated from detailed evaluation are summarized in the next section, followed by a detailed description of all alternatives carried forward.

2.6 WHAT ALTERNATIVES WERE ELIMINATED FROM DETAILED EVALUATION IN THIS FINAL EIS, AND WHY?

2.6.1 Build Alternatives Eliminated

FDOT did not consider the Red and Blue Arterial Alternatives to be reasonable Build Alternatives at the conclusion of the 2004 Arterial Corridor Study because

they failed to provide the needed capacity for the projected traffic demand, as discussed in section 2.2.2. During the final corridor screening, the team also dismissed the E Alternative (identified during the planning study in 2002) for failing to provide needed capacity, as well as representing an alternative where the full corridor could not be tolled, as tolling was considered essential for funding the project (see *Transportation Technical Memorandum* located on the enclosed CD).

After the final desktop screening, FDOT also eliminated the I Alternative from further analysis. This was done because the desktop screening revealed a significant number of residential relocations that would occur within this corridor (refer to **Exhibit 2-14**), and these high residential impacts were not considered by FDOT to be reasonably offset by some reductions in other environmental impacts.

2.6.2 Transportation Systems Management Alternative

Transportation Systems Management (TSM) refers to a set of transportation policies or strategies aimed at reducing traffic congestion and improving roadway mobility without major capital expenditures to increase physical roadway traffic capacity. TSM strategies are aimed at making adjustments to the existing roadway transportation system to increase traffic flow, and include the optimization of traffic signal timing, improvements to intersection geometry, the designation of High Occupancy Vehicle (HOV) lanes, and Intelligent Transportation Systems (ITS).

Based on the anticipated population growth and traffic projections, as discussed in Chapter 1: Purpose and Need, TSM strategies alone would not meet the predicted transportation needs of the project area. Traffic projections indicate the need for additional physical capacity for efficient movement of goods and people within the area. Therefore, a TSM alternative was eliminated from detailed evaluation.

2.7 WHAT ALTERNATIVES ARE STUDIED IN DETAIL IN THIS FINAL EIS?

Based on previous studies, public input, and the final desktop analysis, the Black, Purple, Brown, Orange, Green and Pink Alternatives were carried forward for detailed evaluation in this EIS, along with the No Build Alternative. As described in section 2.5.1, FDOT reduced the width of the final Build Alternatives from 400 feet to 324 feet, in an effort to avoid or minimize environmental and community impacts. However, the results of the final desktop analysis showed that there was still a potential to impact conservation and recreation properties within the re-

Why use a 324 foot right-of-way?

The border and median widths shown in the roadway typical sections are justified for safety needs. The majority of severe crashes that occur on rural freeway facilities are "leave the road crashes". Typical crash incidents often involve cross-over crashes across the median including vehicle to vehicle crashes or vehicle to barrier crashes if a barrier is present. Other common crashes involve vehicles leaving the roadway and hitting fixed objects such as trees and culvert endwalls in the outer border area. Both the median width and the border width have a direct impact on the number and severity of these type crashes. Further, the American Association of State Highway and Transportation Officials (AASHTO) Green Book, which is used by FHWA to determine the need for design exceptions for certain critical design elements, suggest median widths on rural freeways to be between 50 to 100 feet and border widths in the range of 80 to 150 feet "to facilitate maintenance operations and safety". The proposed median width and border width for this project are in the middle of these recommended ranges.

duced right-of-way width of the Brown, Orange, Green and Pink Alternatives. To avoid or minimize potential impacts to these areas, FDOT developed four additional alternatives for detailed analysis: Brown 2, Orange 2, Green 2 and Pink 2. Additionally, FDOT added an interchange at CR 739 for the Brown 1 and 2, Orange 1 and 2, Green 1 and 2 and Pink 1 and 2 Alternatives so that residents in the Lake Asbury area could more easily access the new highway.

The ten final Build Alternatives and the No Build Alternative (**Exhibit 2-16**) are described in detail in the following sections. For any of the Build Alternatives, the proposed project will look similar to existing highway facilities in the area including I-10 and I-295. Typical roadway and bridge cross-sections are shown in **Exhibits 2-17** thru **2-21,** reflecting the final proposed right-of-way width of 324 feet. The roadway was designed to FDOT Plans Preparation Manual Chapter 2 interstate criteria. The proposed facility will consist of a combination of four, six or eight lanes depending on the traffic needs for each Build Alternative, but all lanes will remain within the same 324-foot-wide right-of-way. As travel demand increases, the use of a 324-foot right-of-way will allow for future expansion of the road-

Exhibit 2-16: **Final Build Alternatives**

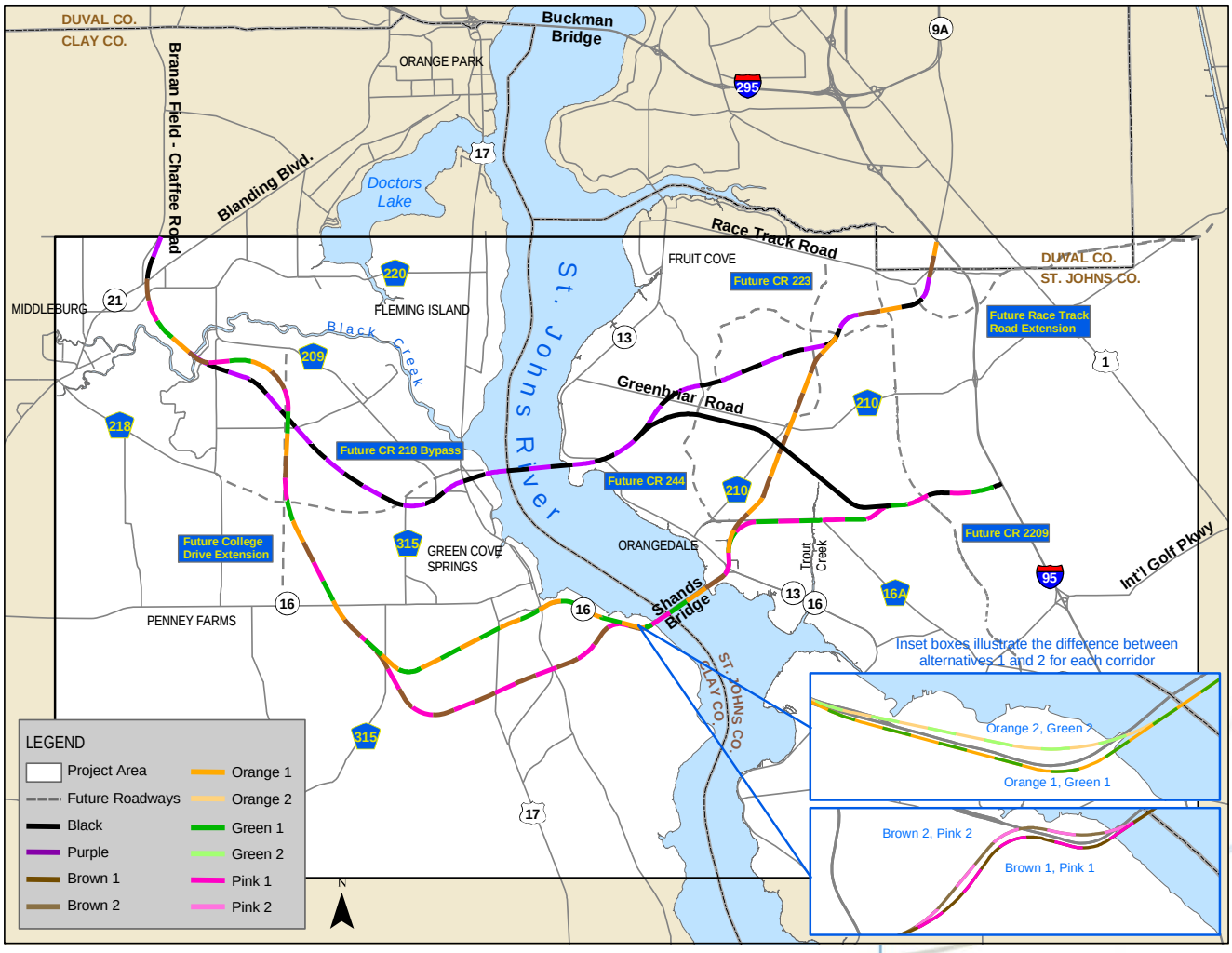
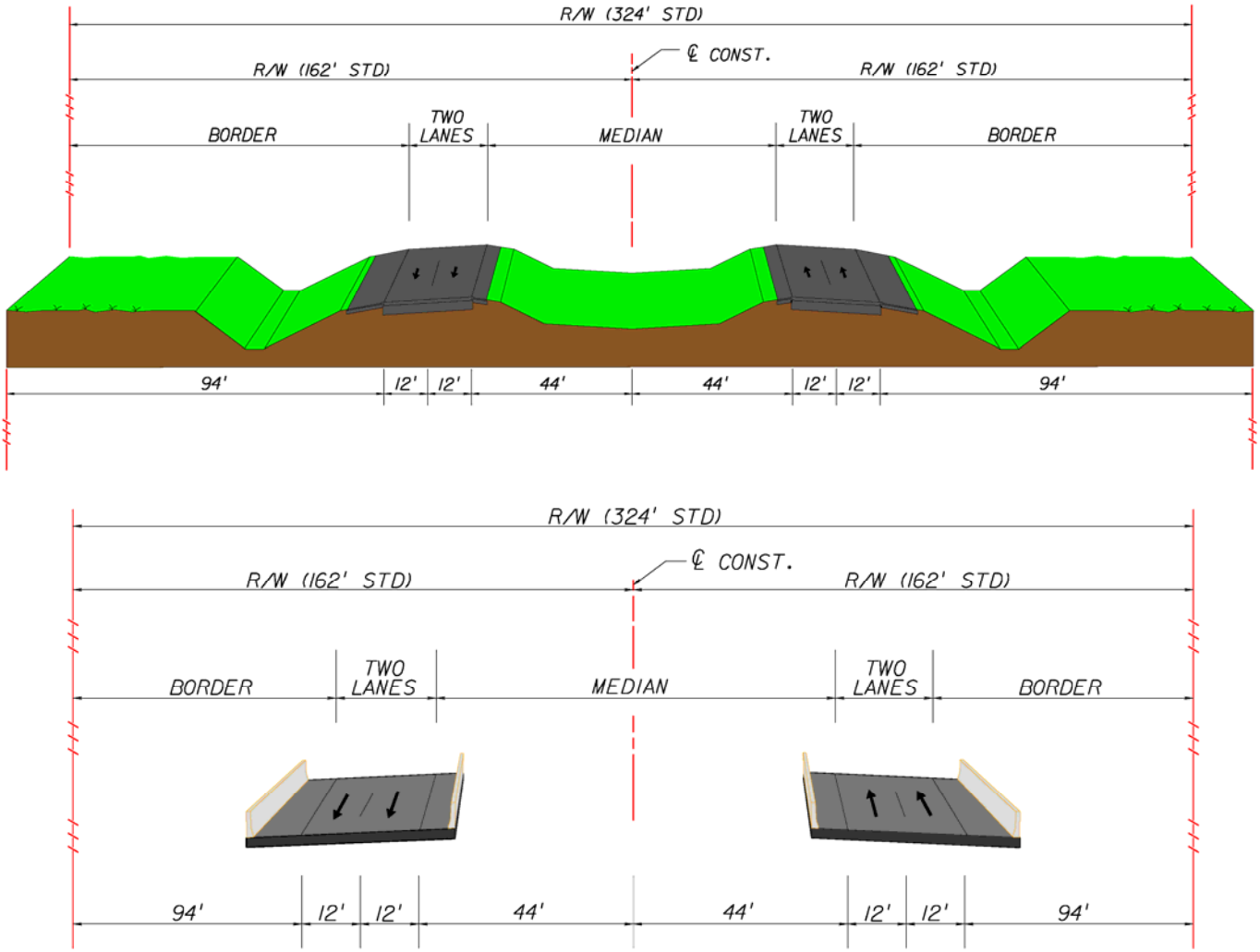
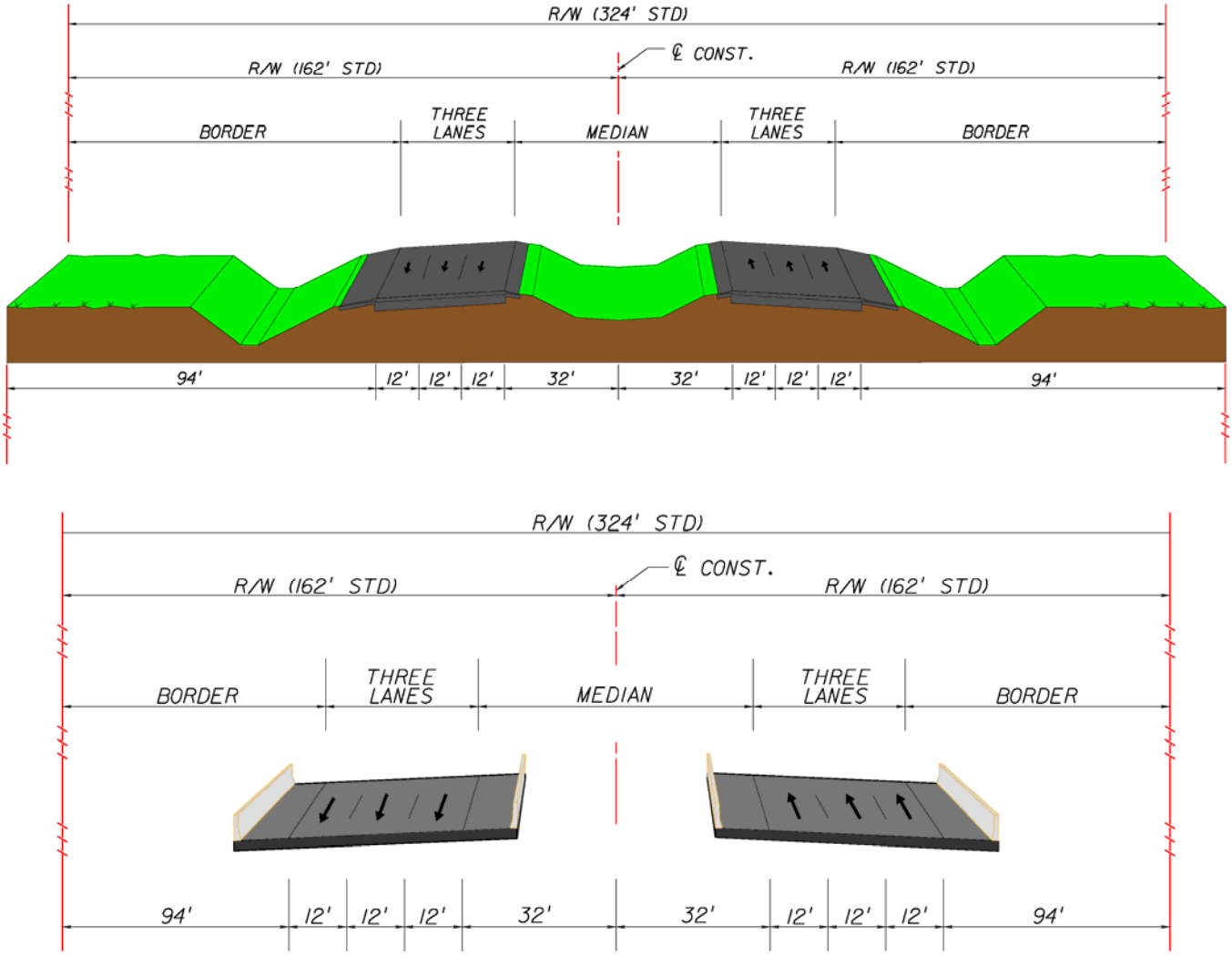


Exhibit 2-17: **Typical Four Lane Roadway and Bridge Cross Section**



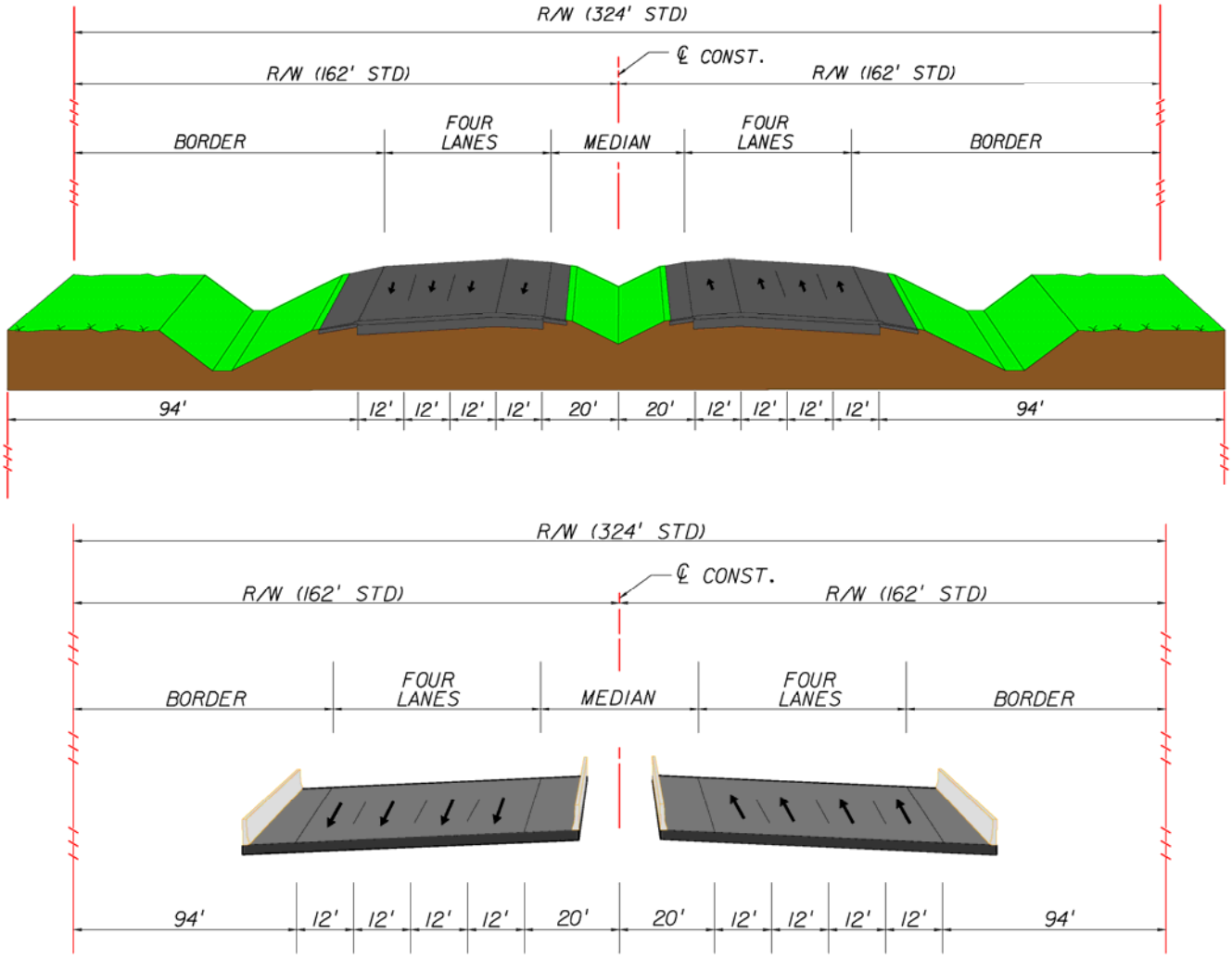
way within the median and will help avoid future impacts by preventing the need to acquire additional right-of-way or build parallel facilities. As part of the 324-foot proposed typical section, the distance between the outside edge of pavement and the right-of-way, referred to as the border width, is proposed at 94 feet. A 94-foot border width will facilitate maintenance operations, provide an area for tolling equipment and provide for a safer roadway. All reasonable measures will be taken to avoid or minimize direct impacts to wetlands and other environmental factors within the proposed border width. Although a 94-foot border is proposed to meet FDOT design criteria, border area will remain undisturbed except as necessary to accommodate construction and maintenance.

Exhibit 2-18: **Typical Six Lane Roadway and Bridge Cross Section**



For the alternatives that would remove and replace the existing Shands Bridge (Brown 1 and 2, Orange 1 and 2, Green 1 and 2, or Pink 1 and 2 Alternatives), a 12-foot wide, toll free shared-use path will be provided on the north side of the new bridge, beginning near the existing entrance to Bayard Conservation Area in Clay County and terminating in St. Johns County just west of Riverwood Road. It will provide bike/pedestrian connectivity with existing and proposed routes, including SR 16 in Clay County and SR 13 in St. Johns County, that the existing Shands Bridge could not facilitate due to the new walls. In these cases, the shared-use path will also be accommodated within the 324-foot-wide right-of-way.

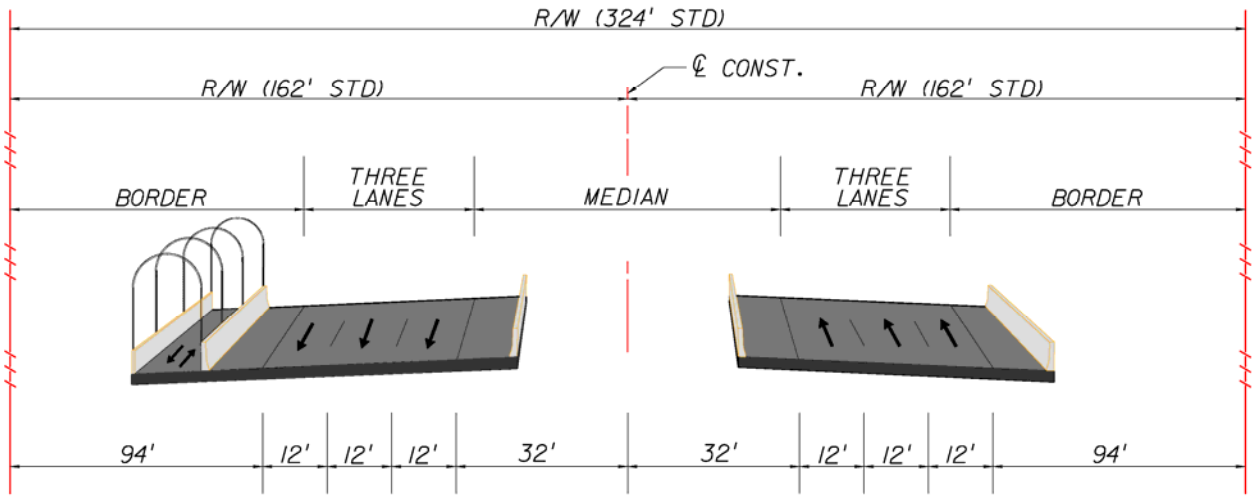
Exhibit 2-19: **Typical Eight Lane Roadway and Bridge Cross Section**



2.7.1 No Build Alternative

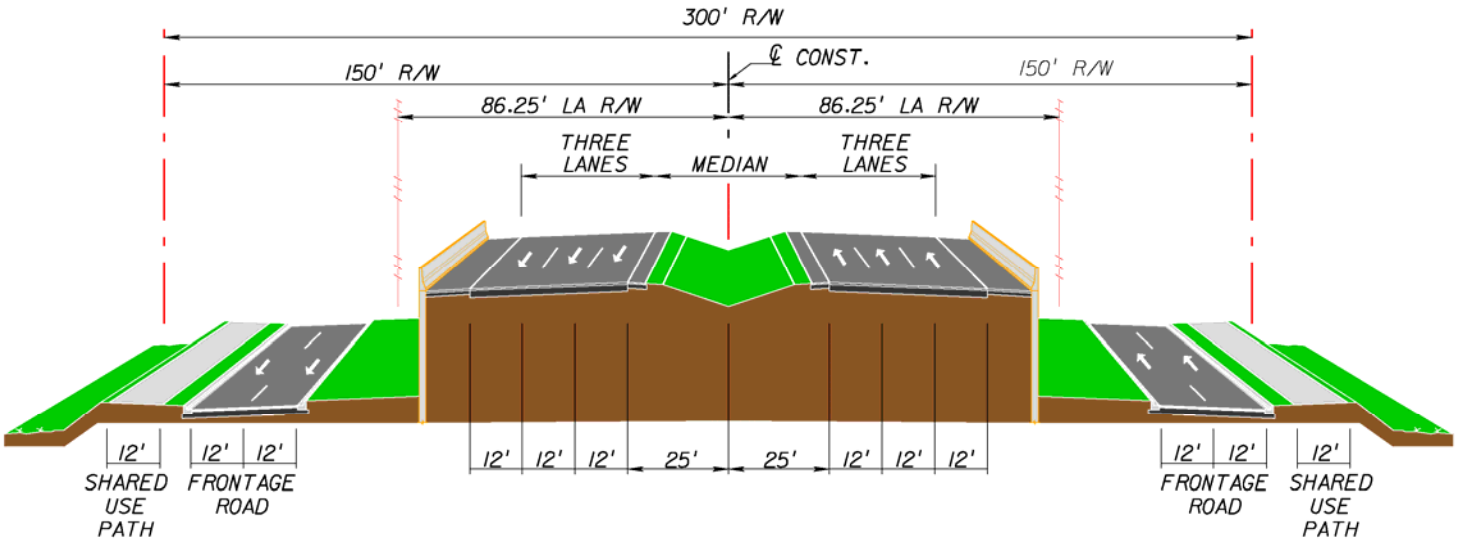
Consistent with NEPA requirements, this EIS considers an alternative that assesses what would happen to the environment in the future if the proposed project were not built. This alternative, called the No Build Alternative, includes the routine maintenance and improvements of the existing roads in the study area and the currently programmed, committed, and funded roadway projects as included in the North Florida TPO 2030 LRTP. While the No Build Alternative does not meet the purpose and need, it provides a baseline condition against which to compare and measure the effects of all the Build Alternatives.

Exhibit 2-20: **Typical St. Johns River Crossing Bridge Cross Section with Shared-Use Path**



NOTE: Shared-use path applies only to the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives.

Exhibit 2-21: **Mainline and Frontage Road Typical Section**



NOTE: Only for Green 1 and 2 and Orange 1 and 2 Alternatives near the Reynolds Industrial Park in Clay County.

2.7.2 Build Alternatives

For all the Build Alternatives, the first segment starts at the intersection of Branan Field-Chaffee Road and SR 21 in Clay County and continues to the Black Creek crossing. This segment continues to a point just east of CR 739, where the first independent alternative alignment begins.

The Black Alternative

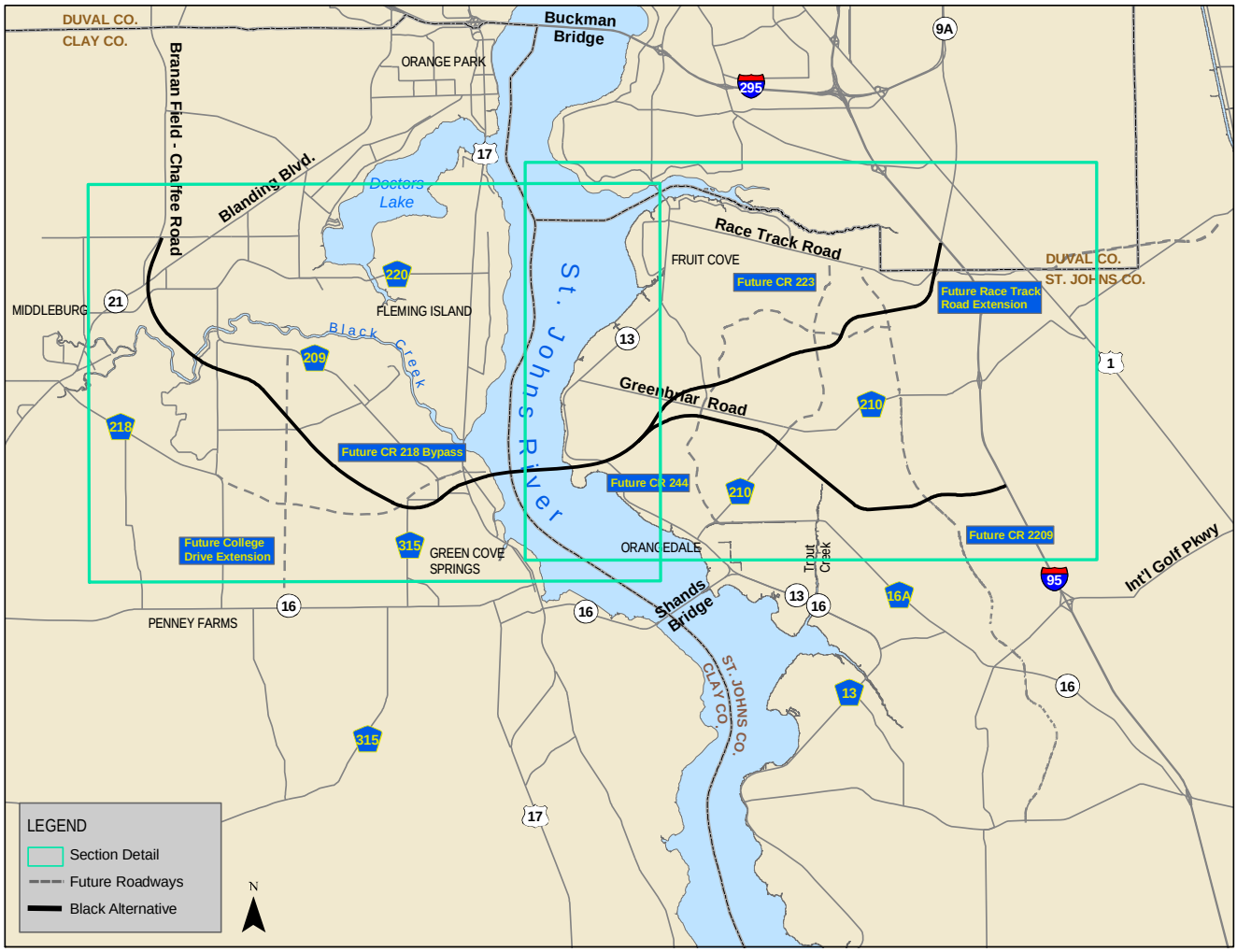
The Black Alternative consists of a northern segment that connects to I-95 at proposed SR 9B and a southern segment that connects to I-95 (**Exhibits 2-22, 2-23** and **2-24**). The total length of the Black Alternative is 35.6 miles. After crossing Black Creek, the northern segment of the Black Alternative proceeds in a southeasterly direction away from Black Creek towards Green Cove Springs and crosses the St. Johns River at one of its narrower locations, proceeding into St. Johns County. The northern segment continues in a northeasterly direction toward the proposed SR 9B/I-95 interchange near the St. Johns County/Duval County line. The northern segment of the Black Alternative then turns towards the east, interchanging with CR 2209 south of Race Track Road. The northern segment continues to the northeast, connecting to I-95 at proposed SR 9B. The length of the northern segment is 25.6 miles.

The southern segment of the Black Alternative begins by splitting from the northern segment just south of Greenbriar Road and west of the proposed CR 244 in St. Johns County. The alternative continues east, paralleling Greenbriar Road to the south and then proceeding in a southeasterly direction, crossing CR 210 approximately one-quarter mile south of the Greenbriar Road/CR 210 intersection. The southern segment of the Black Alternative continues southeasterly, crossing Trout Creek 1 mile north of CR 16A. The southern segment then turns east towards I-95, terminating approximately 3 miles south of CR 210 and 3 miles north of International Golf Parkway. The length of the southern segment is 10.0 miles.

Interchanges along the Black Alternative are provided for in Clay County at SR 21, the proposed College Drive extension, and US 17. Interchanges in St. Johns County are provided for at Greenbriar Road, CR 2209, the planned Race Track Road Extension, and I-95 for the northern segment; and at CR 210, CR 2209 and I-95 for the southern segment.

The Black Alternative uses a 4-lane roadway section from a point just north of SR 21 to the interchange with US 17 in Clay County. From the US 17 interchange, the Black Alternative uses a 6-lane roadway section to the split east of the St. Johns River (including the bridge over the St. Johns River). After the split, the northern segment of the Black Alternative continues with a 4-lane section but then transitions into a 6-lane section from a the CR 2209 interchange to the segment's terminus at I-95. After the split, the southern segment of the Black Alternative uses a 4-lane roadway section to the interchange with I-95.

Exhibit 2-22: **Black Alternative**



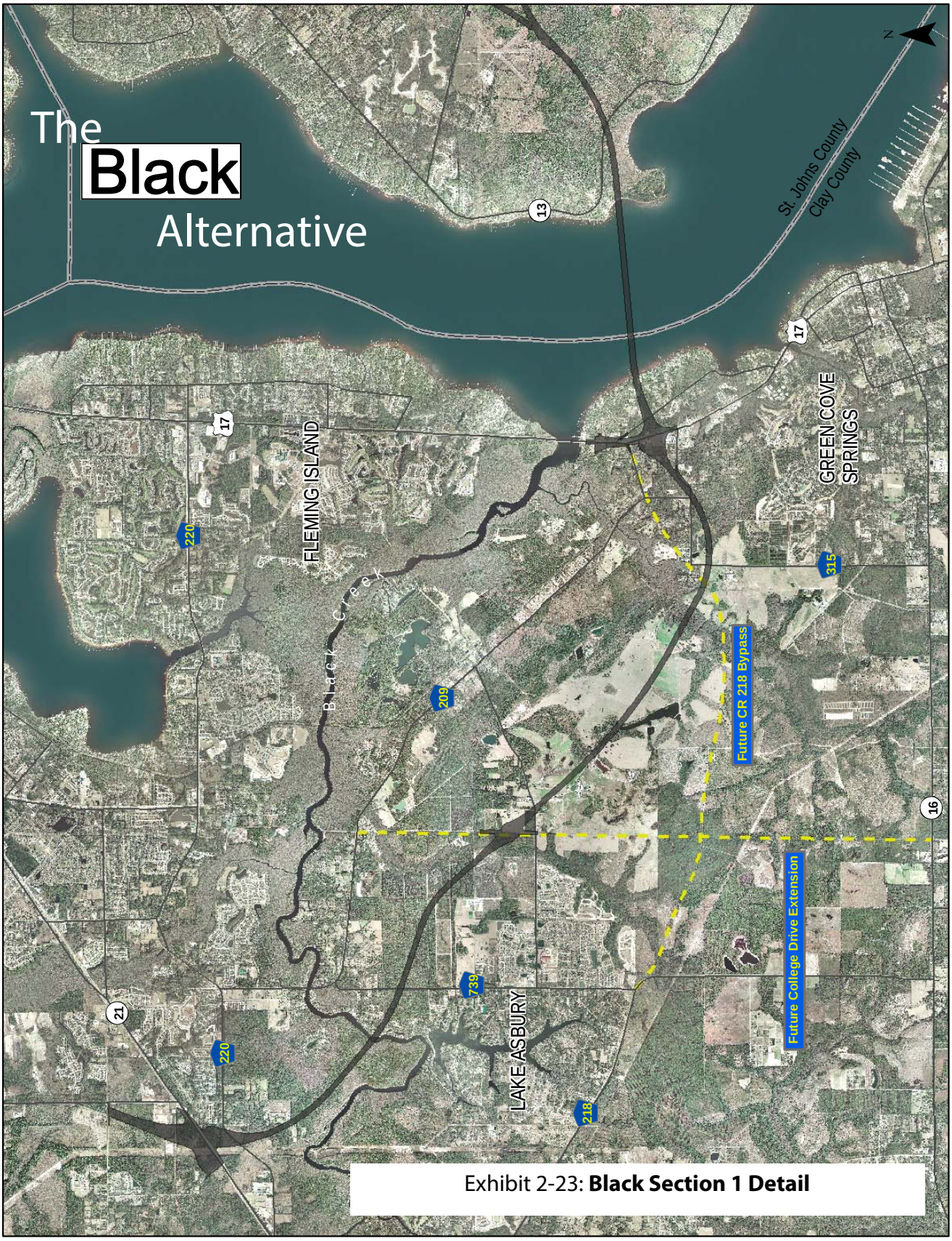


Exhibit 2-23: **Black Section 1 Detail**

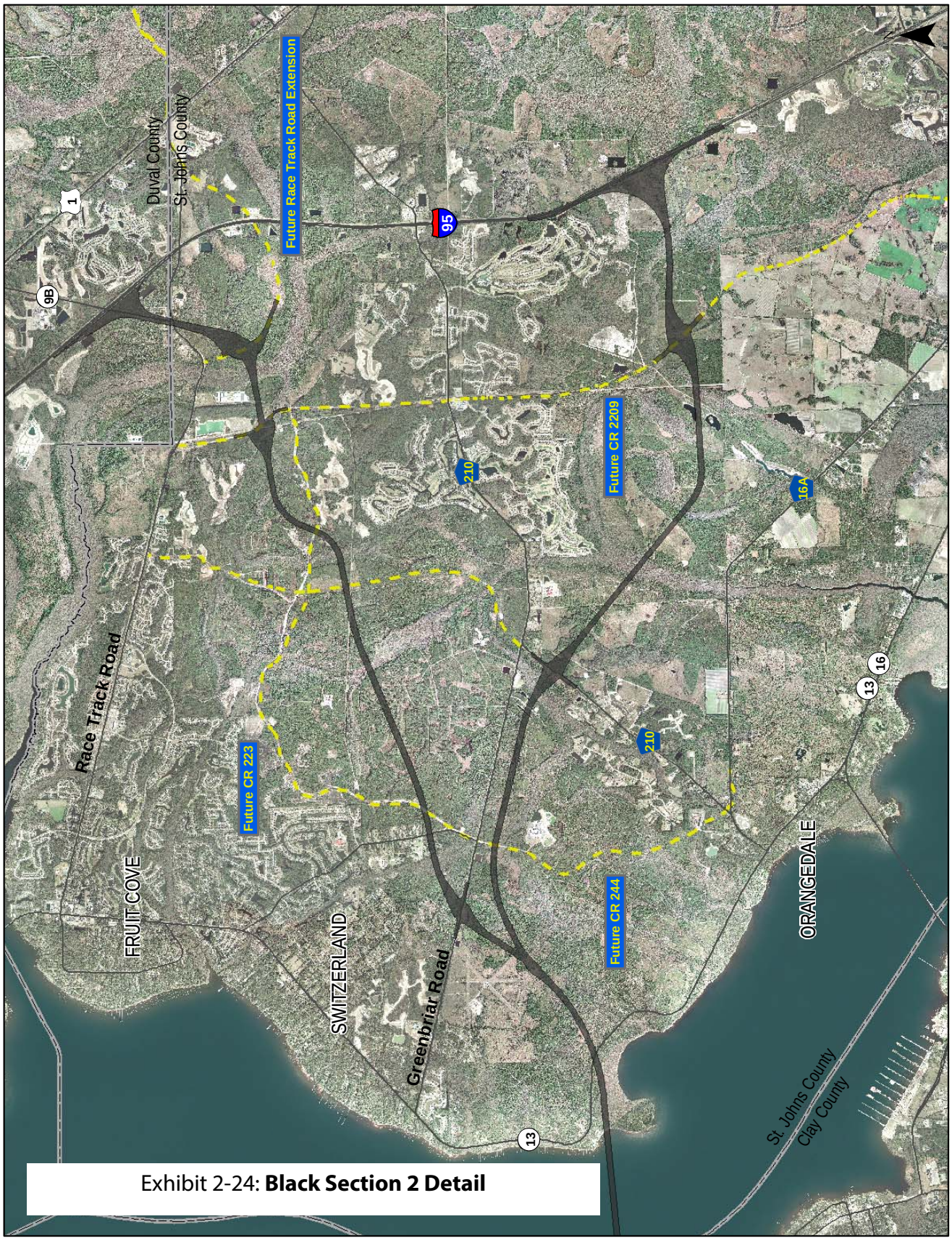


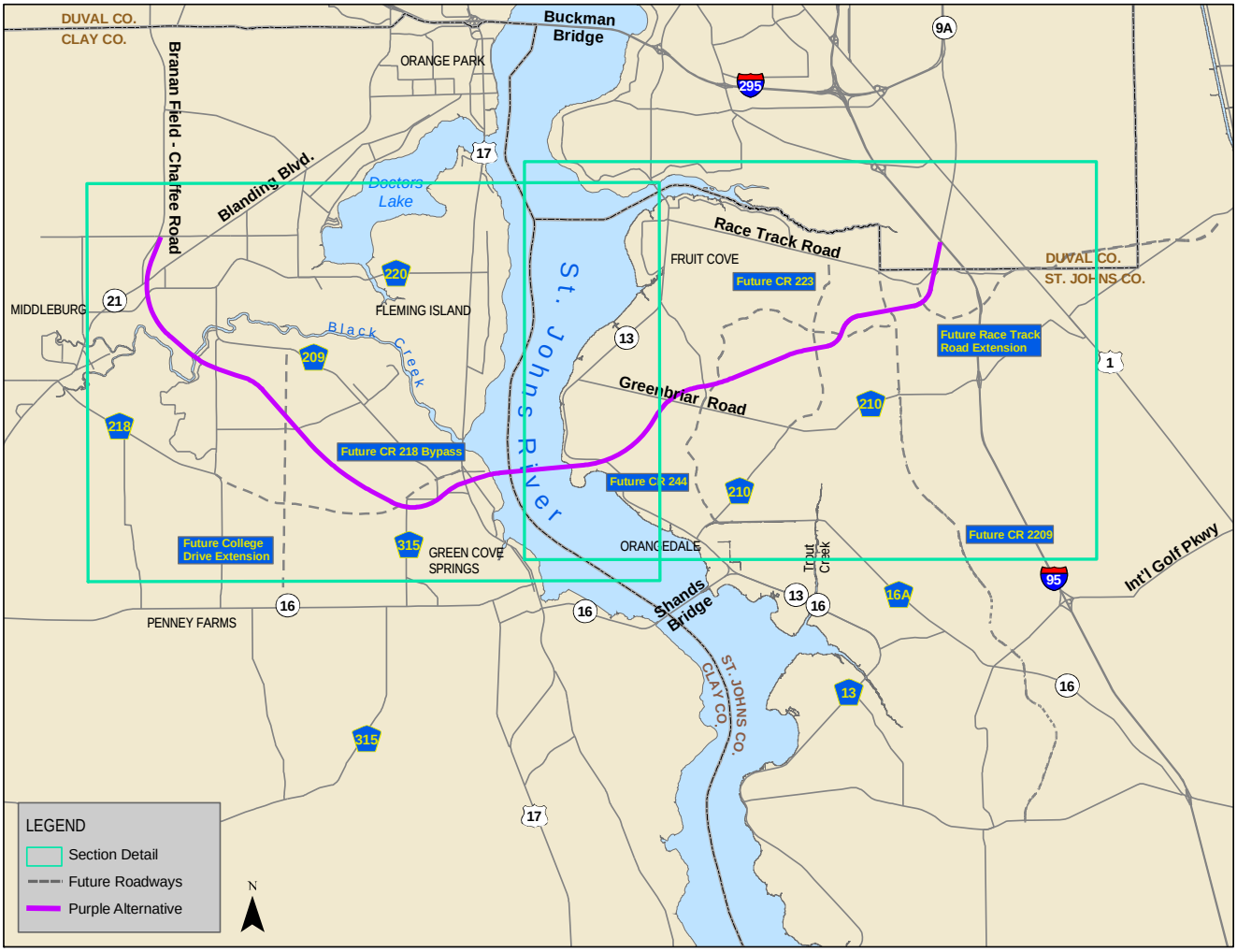
Exhibit 2-24: **Black Section 2 Detail**

The Purple Alternative

The Purple Alternative follows the same alignment as the northern segment of the Black Alternative (**Exhibits 2-25, 2-26** and **2-27**). The total length of the Purple Alternative is 25.6 miles. Interchanges along the Purple Alternative are provided for in Clay County at SR 21, the proposed College Drive extension, and US 17. Interchanges in St. Johns County are provided for at Greenbriar Road, CR 2209, the planned Race Track Road Extension, and I-95.

The Purple Alternative uses a 4-lane roadway section from a point just north of SR 21 to the interchange with US 17 in Clay County. From the US 17 interchange, the Purple Alternative crosses the river with a 6-lane bridge, continuing with a 6-lane roadway section until Racetrack Road in St. Johns County. From Racetrack Road, the alternative uses an 8-lane roadway section to its terminus at I-95.

Exhibit 2-25: **Purple Alternative**



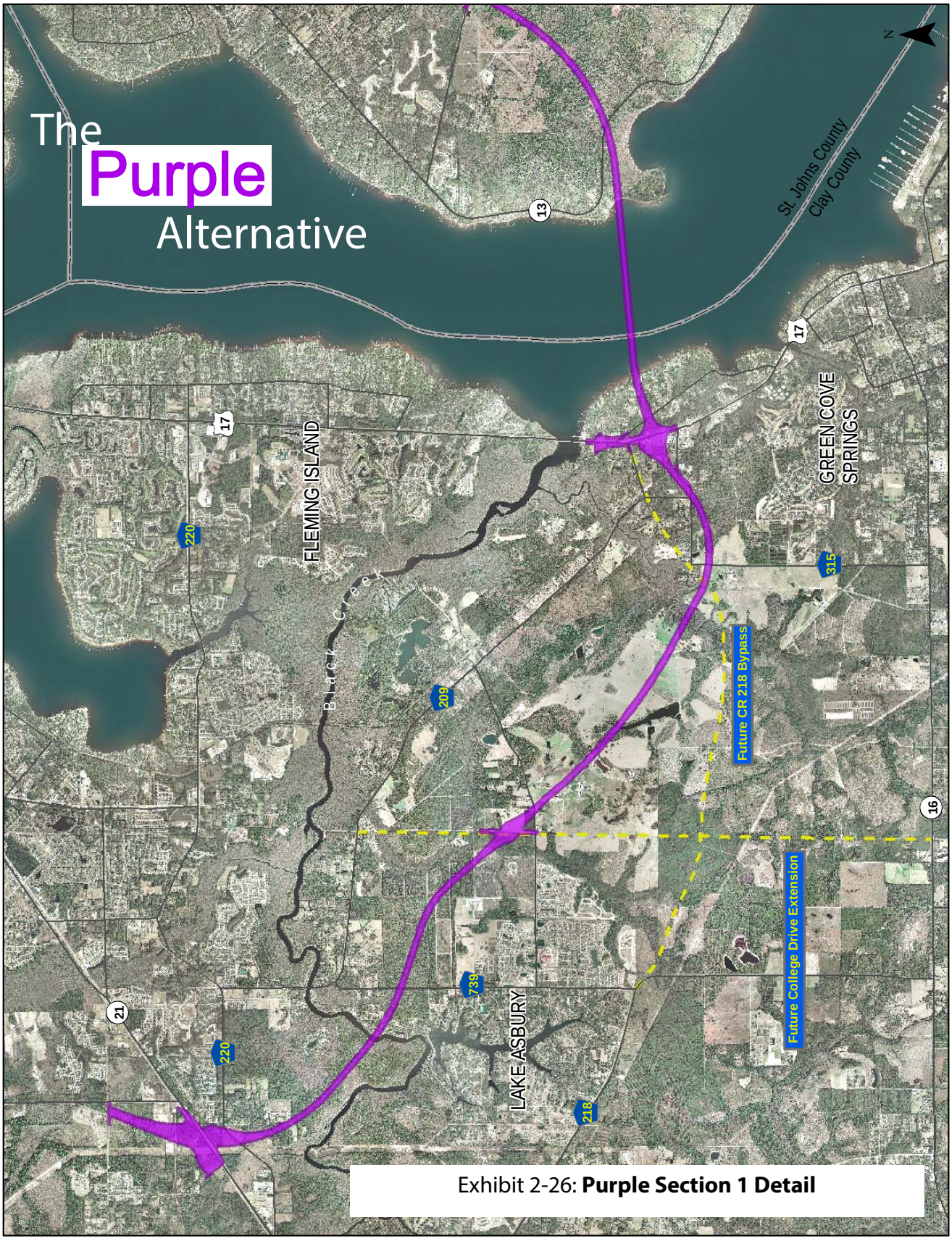


Exhibit 2-26: **Purple Section 1 Detail**

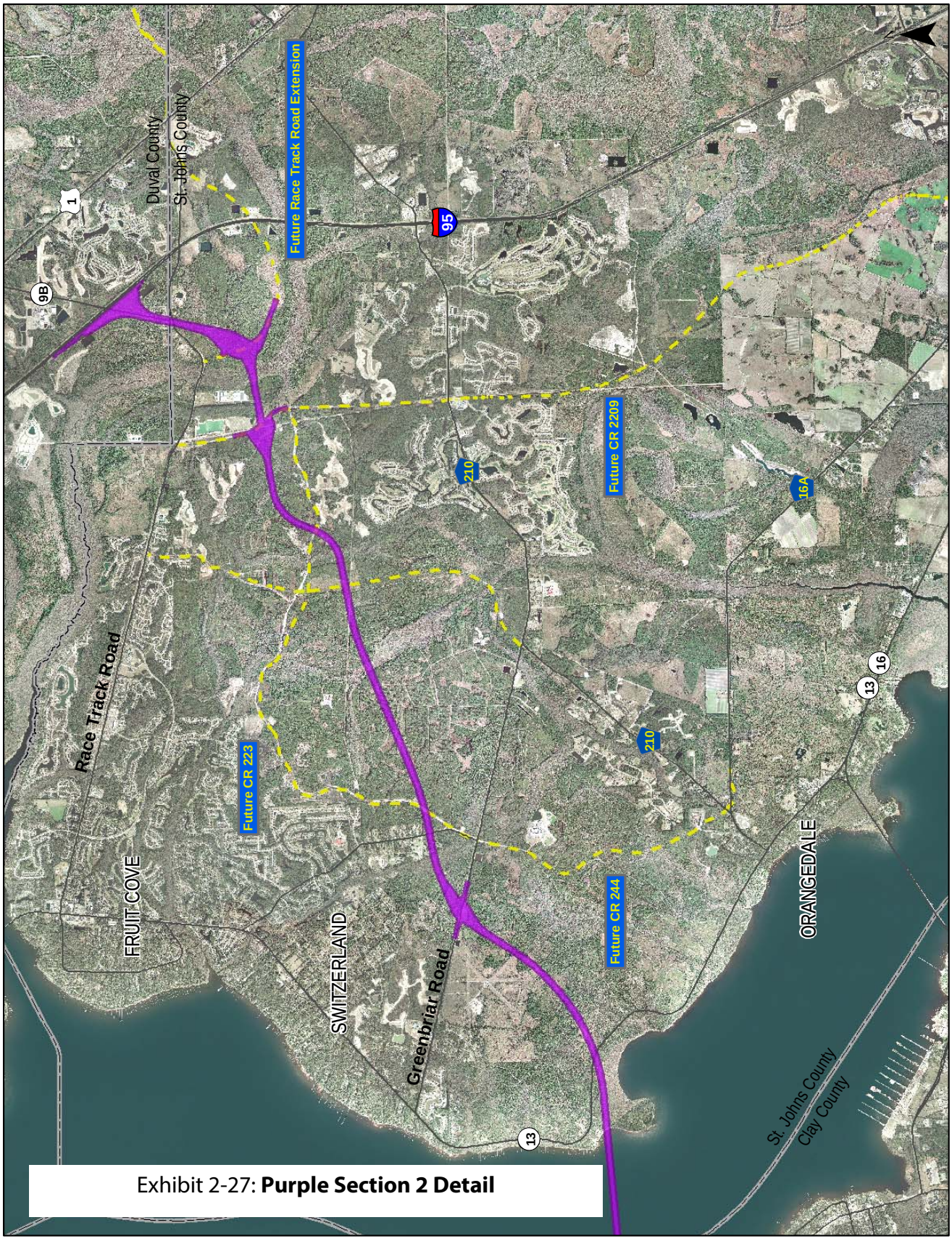


Exhibit 2-27: **Purple Section 2 Detail**

The Brown 1 and Brown 2 Alternatives

After crossing Black Creek, the Brown 1 Alternative (**Exhibits 2-28, 2-29** and **2-30**) turns south towards SR 16, paralleling the proposed College Drive extension on the east. The total length of the Brown 1 Alternative is 34.0 miles. The alternative intercepts a power line easement just south of the proposed CR 218 Bypass and then parallels it on its western side to its intersection with SR 16. The alternative continues to follow the power line on the west side south of SR 16, crossing CR 315. East of CR 315, the Brown 1 Alternative proceeds in a northeasterly direction, interchanging with US 17 south of Green Cove Springs. After crossing US 17, the alternative continues east toward the existing Shands Bridge, just east of the Reynolds Industrial Park. The Brown 1 Alternative then crosses the St. Johns River into St. Johns County, paralleling and replacing the existing Shands Bridge and SR 16 on the south.

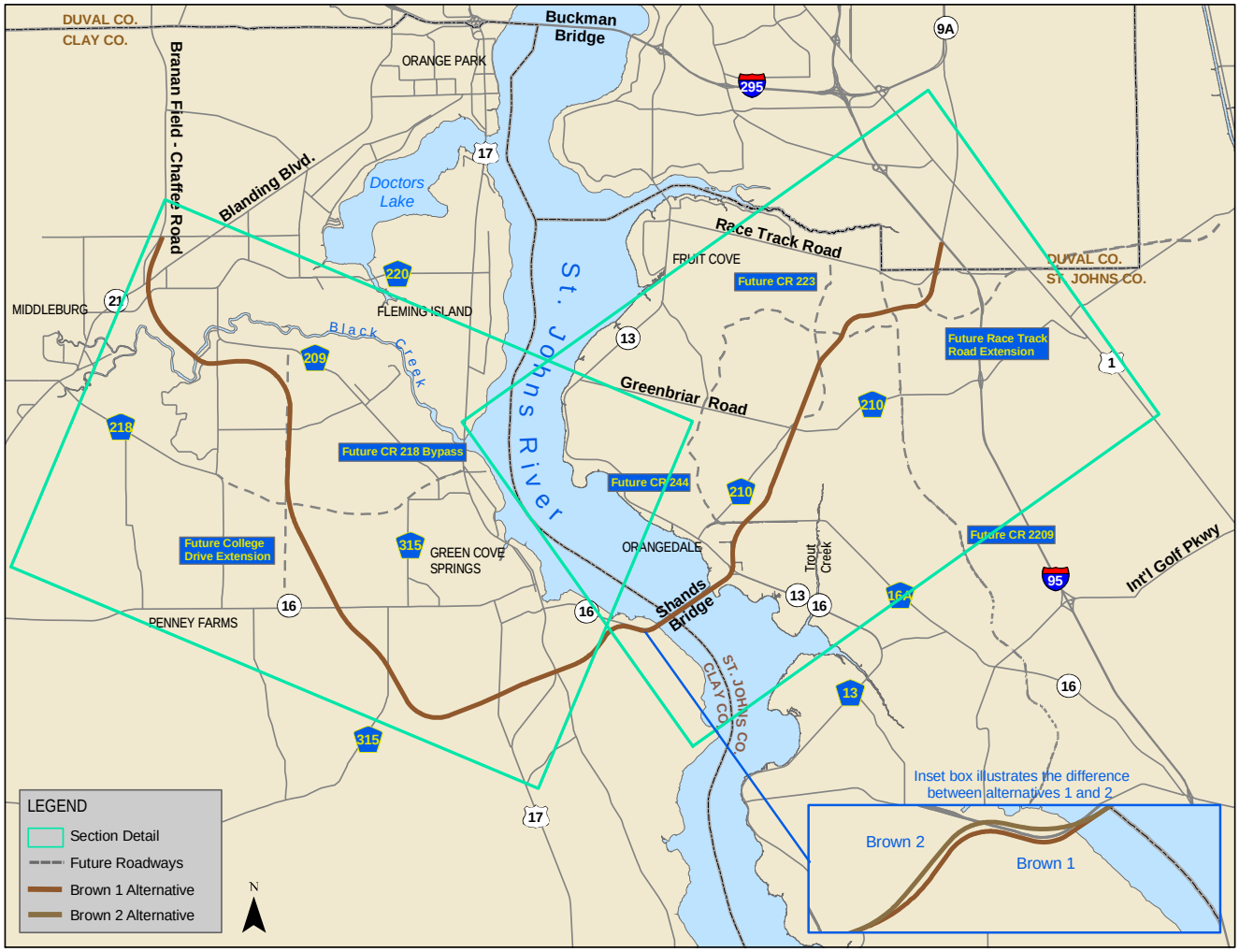
The alternative then proceeds northeast towards the proposed SR 9B/I-95 interchange, interchanging with CR 210 just east of the CR 210/Greenbriar Road intersection. The Brown 1 Alternative continues north across CR 210 and turns east, interchanging with the proposed CR 2209 roadway. As with the Purple Alternative, the Brown 1 Alternative connects to I-95 at the proposed SR 9B.

Interchanges along the Brown 1 Alternative are provided for in Clay County at SR 21, CR 739, the proposed CR 218 Bypass, SR 16, and US 17. Interchanges in St. Johns County are provided for at CR 16A, CR 210, CR 2209, the planned Race Track Road Extension, and I-95.

The Brown 2 Alternative (see inset, **Exhibits 2-28** and **2-30**) follows the same route as the Brown 1 Alternative with an exception in route location east of the Reynolds Industrial Park in Clay County in order to avoid the Bayard Conservation Area (See section 3.10 and the *Draft Section 4(f) Evaluation,* section 5.1.2, located on enclosed CD). The total length of the Brown 2 Alternative is 34.0 miles. The Brown 2 Alternative parallels SR 16 on the north side, continuing east towards the St. Johns River. The alternative crosses the St. Johns River paralleling the south side of the existing Shands Bridge (which it would replace), following the same route as the Brown 1 Alternative.

The Brown 1 and 2 Alternatives use a 4-lane roadway section from Branan Field – Chaffee Road to the interchange with US 17 in Clay County. From US 17, the alternatives transition to a 6-lane roadway and bridge section to the interchange with CR 16A in St. Johns County. From CR 16A, the Brown 1 and 2 Alternatives use a 4-lane roadway section to CR 2209. From CR 2209 to I-95 the alternatives use a 6-lane roadway section.

Exhibit 2-28: **Brown 1 and 2 Alternatives**



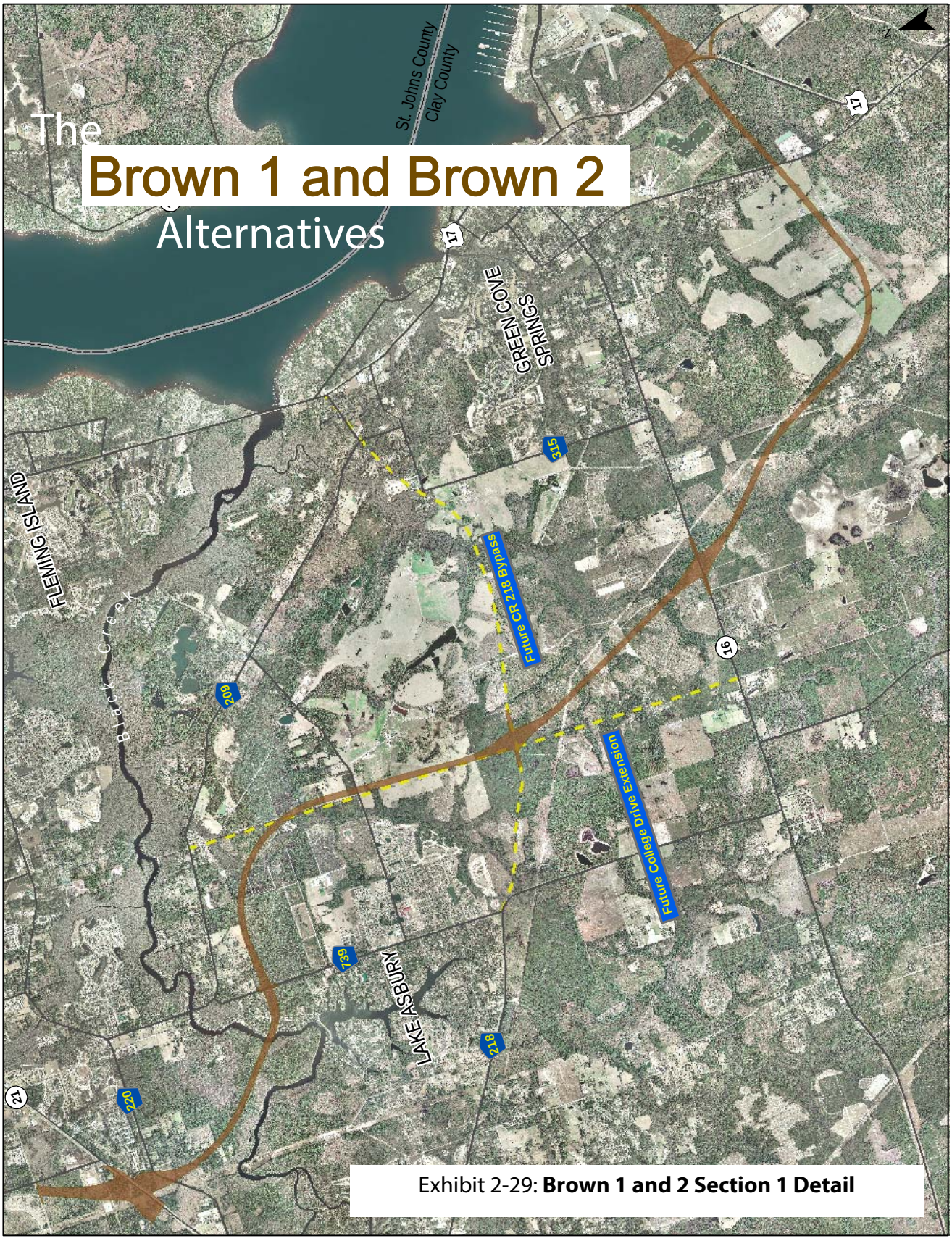


Exhibit 2-29: **Brown 1 and 2 Section 1 Detail**

Exhibit 2-30: **Brown 1 and 2 Section 2 Detail**

The Orange 1 and Orange 2 Alternatives

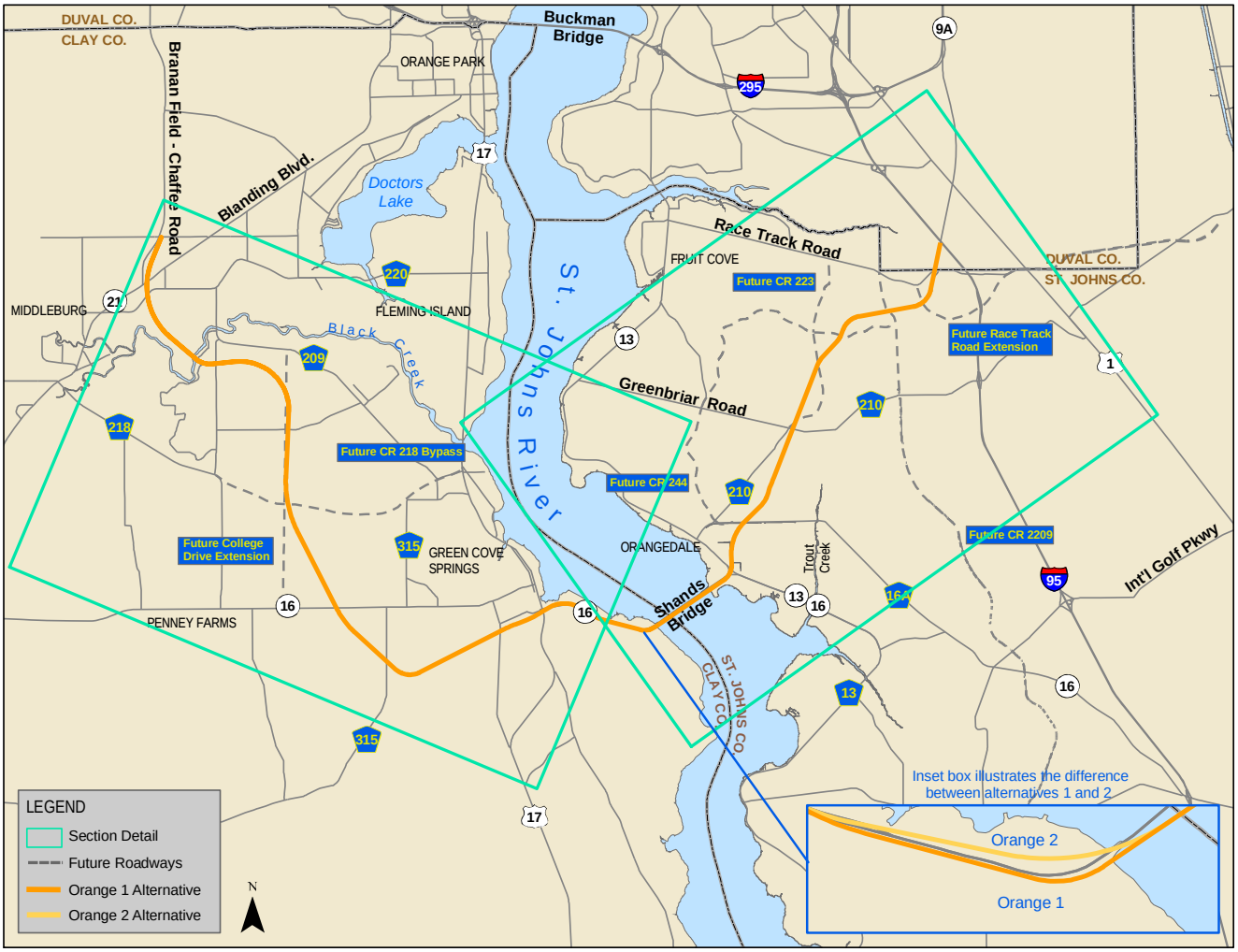
The Orange 1 Alternative follows the same alignment as the Brown 1 Alternative to a point just south of SR 16 in Clay County (**Exhibits 2-31, 2-32** and **2-33**). The total length of the Orange 1 Alternative is 33.3 miles. The alternative then takes an easterly course north of the Brown 1 Alternative. It skirts the southern fringe of Green Cove Springs, interchanging with US 17 near the existing US 17/SR 16 intersection. From this point to the Shands Bridge, the alternative collocates with SR 16. This alternative will involve the reconstruction of SR 16 to serve as parallel, one-way frontage roads on either side of the mainline, providing local access to the Reynolds Industrial Park and the development north of SR 16. The Orange 1 Alternative crosses the St. Johns River south of the existing Shands Bridge (which it would replace), at which point the alternative then assumes the Brown 1 alternative routing. After crossing the river, the alignment heads north then east to the proposed SR 9B/I-95 Interchange.

Interchanges along the Orange 1 Alternative are provided for in Clay County at SR 21, CR 739, the proposed CR 218 Bypass, SR 16, and US 17. Interchanges in St. Johns County are provided for at CR 16A, CR 210, CR 2209, the planned Race Track Road Extension, and I-95.

The Orange 2 Alternative (see inset, **Exhibits 2-31** and **2-33**) follows the same route as the Orange 1 Alternative with an exception in route location east of the Reynolds Industrial Park in Clay County in order to avoid the Bayard Conservation Area (See section 3.10 and the *Draft Section 4(f) Evaluation,* section 5.1.4, located on enclosed CD). The total length of the Orange 2 Alternative is 33.2 miles. The Orange 2 Alternative parallels SR 16 on the north side continuing east towards the St. Johns River. The alternative crosses the St. Johns River parallel and to the south of the existing Shands Bridge (which it would replace), following the same route location as the Orange 1 Alternative.

The Orange 1 and Orange 2 Alternatives use a 4-lane roadway section from Branan Field – Chaffee Road to the interchange with US 17 in Clay County and from CR 210 to CR 2209 in St. Johns County. The alternatives use a 6-lane section between US 17 and CR 210 (including the bridge over the St. Johns River), and from CR 2209 to I-95.

Exhibit 2-31: **Orange 1 and 2 Alternatives**



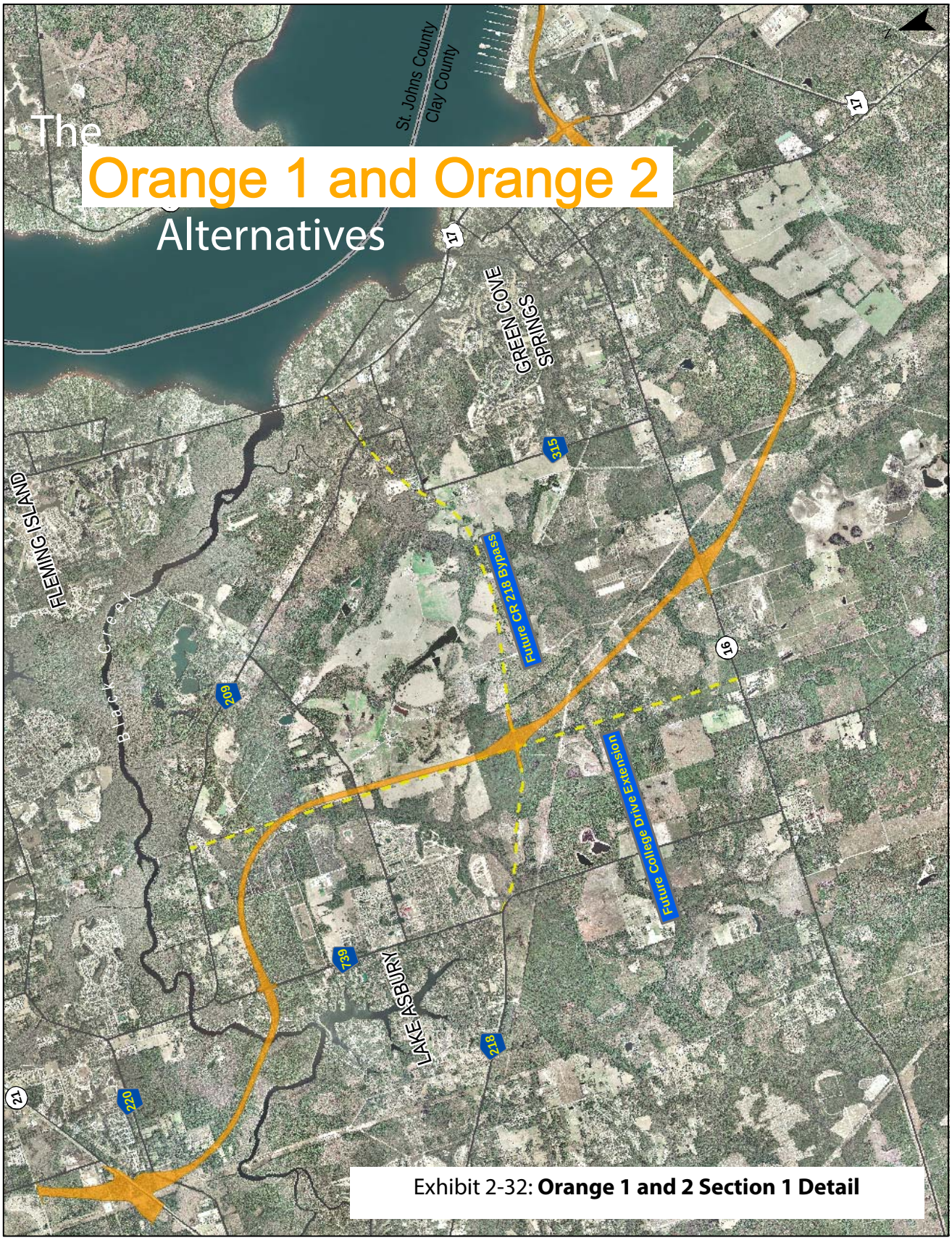


Exhibit 2-32: **Orange 1 and 2 Section 1 Detail**

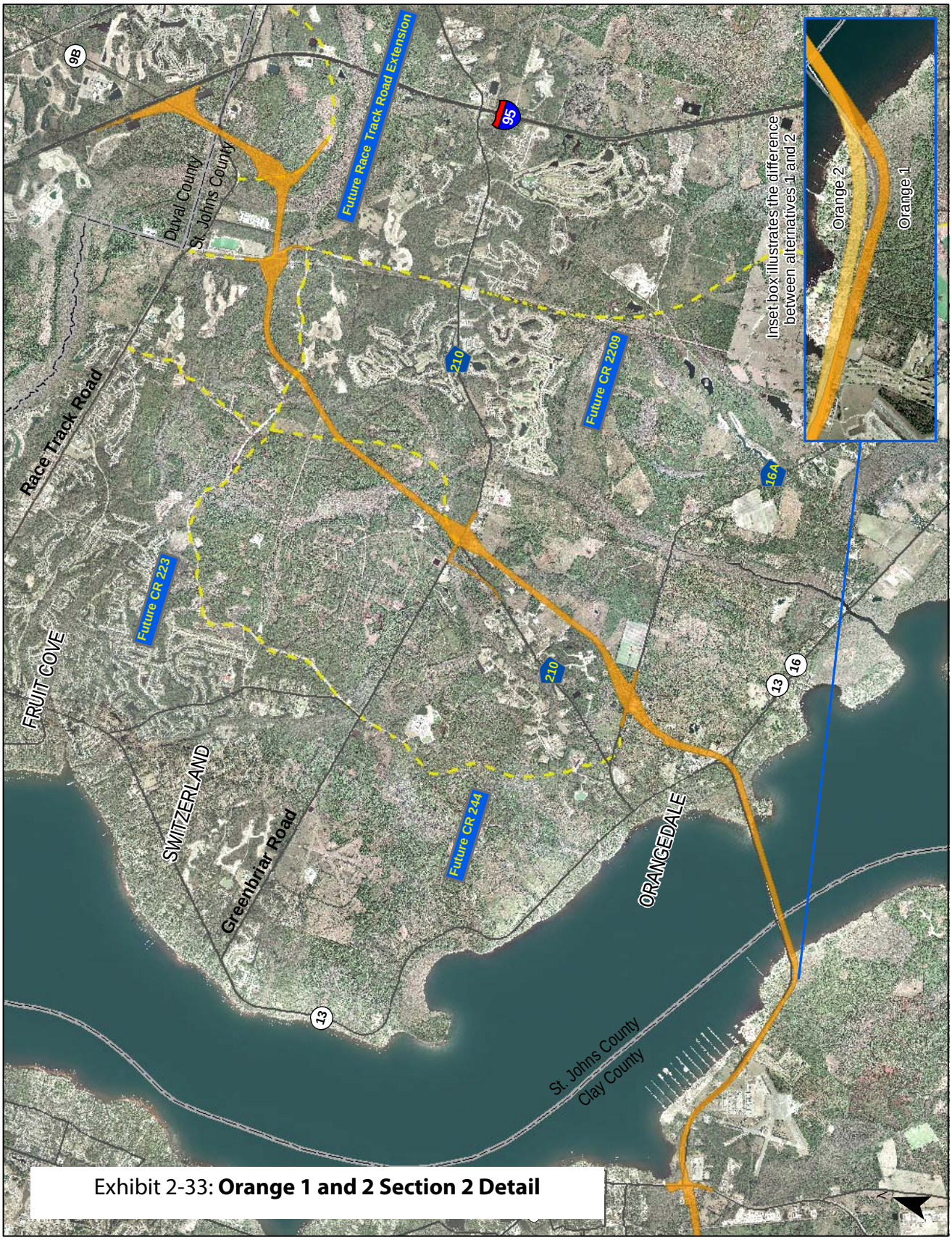


Exhibit 2-33: **Orange 1 and 2 Section 2 Detail**

The Green 1 and Green 2 Alternatives

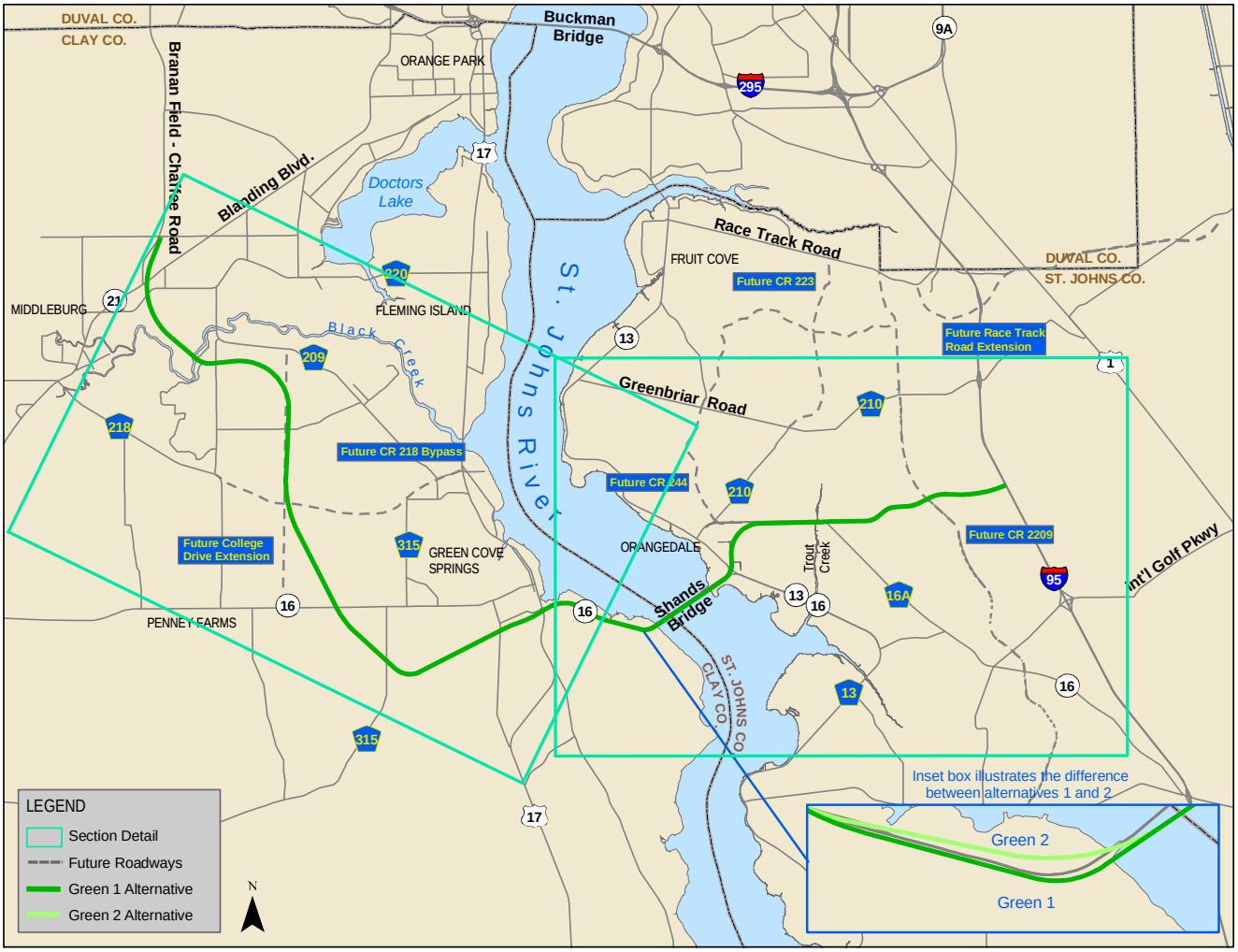
The Green 1 Alternative follows the same route as the Orange 1 Alternative in Clay County and across the St. Johns River to a point just east of SR 13 in St. Johns County (**Exhibits 2-34, 2-35** and **2-36**). The total length of the Green 1 Alternative is 30.7 miles. Similar to the Orange 1 Alternative, the Green 1 Alternative will include the reconstruction of SR 16 to serve as parallel, one-way frontage roads on either side of the mainline, providing local access to the Reynolds Industrial Park and the development north of SR 16. After crossing SR 13 in St. Johns County, the Green 1 Alternative continues east, paralleling CR 16A to the south, and intersecting the proposed CR 2209 roadway just west of I-95, approximately 3 miles north of the I-95/International Golf Parkway interchange.

Interchanges along the Green 1 Alternative are provided for in Clay County at SR 21, CR 739, the proposed CR 218 Bypass, SR 16, and US 17. Interchanges in St. Johns County are provided for at CR 16A, CR 2209 and I-95.

The Green 2 Alternative (see inset, **Exhibits 2-34** and **2-36**) follows the same route as the Green 1 Alternative with an exception in route location east of the Reynolds Industrial Park in Clay County in order to avoid the Bayard Conservation Area (See section 3.10 and the *Draft Section 4(f) Evaluation,* section 5.1.4, located on enclosed CD). The total length of the Green 2 Alternative is 30.6 miles. The Green 2 Alternative parallels SR 16 on the north side continuing east towards the St. Johns River. The alternative crosses the St. Johns River parallel and to the south of the existing Shands Bridge (which it would replace), following the same route location as the Green 1 Alternative.

The Green 1 and Green 2 Alternatives use a 4-lane roadway section from Branan Field – Chaffee Road to the interchange with US 17 in Clay County and from CR-16A to I-95 in St. Johns County. The segment between US 17 and CR-16A uses a 6-lane roadway section.

Exhibit 2-34: **Green 1 and 2 Alternatives**



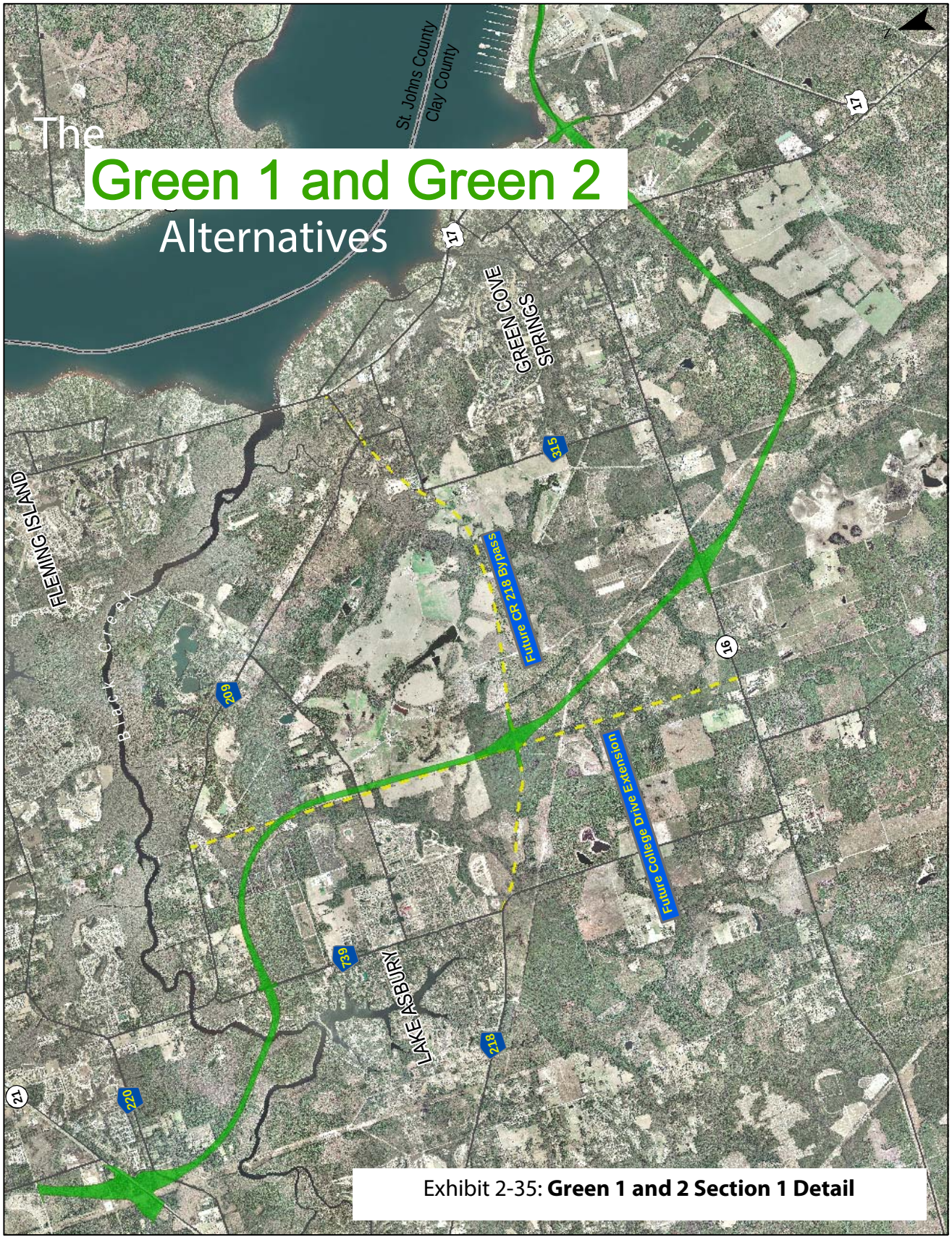


Exhibit 2-35: **Green 1 and 2 Section 1 Detail**

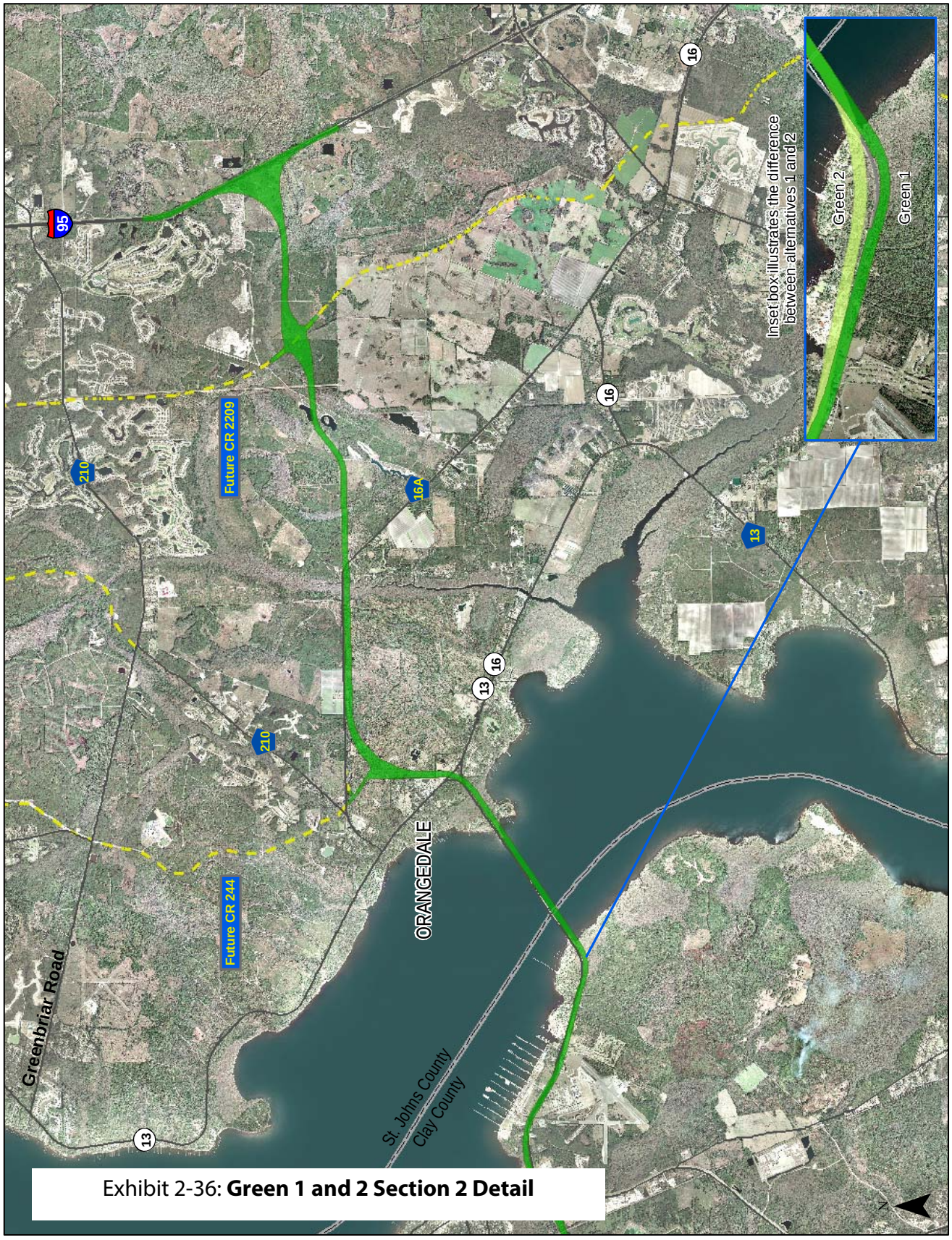


Exhibit 2-36: **Green 1 and 2 Section 2 Detail**

The Pink 1 and Pink 2 Alternatives

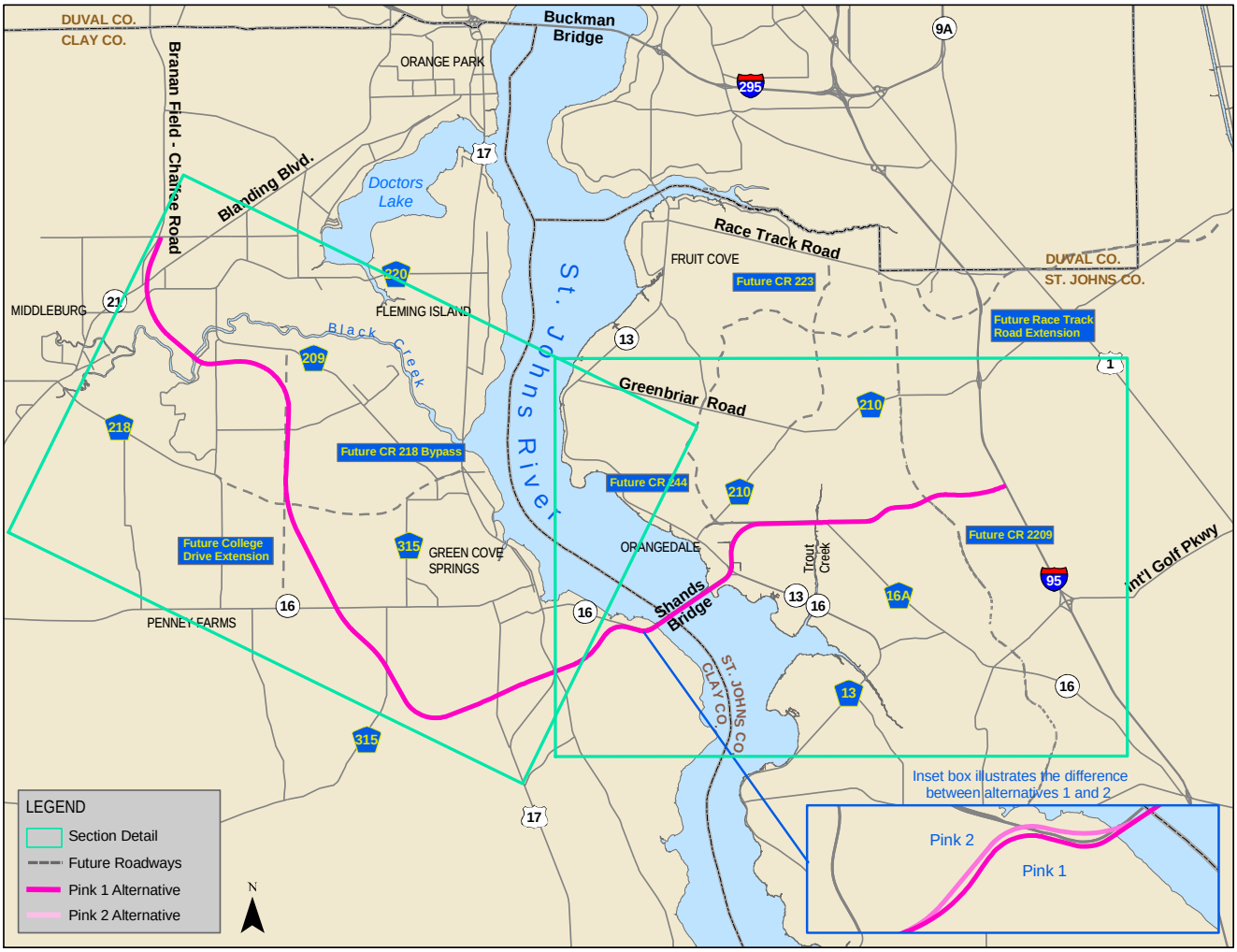
The Pink 1 Alternative follows the same route as the Brown 1 Alternative in Clay County to just east of the St. Johns River (**Exhibits 2-37, 2-38** and **2-39**). The total length of the Pink 1 Alternative is 31.4 miles. The alternative then continues east along the same route as the Green 1 Alternative to its termination at I-95.

Interchanges along the Pink 1 Alternative are provided for in Clay County at SR 21, CR 739, the proposed CR 218 Bypass, SR 16, and US 17. Interchanges in St. Johns County are provided for at CR 16A, CR 2209, and I-95.

The Pink 2 Alternative (see inset, **Exhibits 2-37** and **2-39**) follows the same route as the Pink 1 Alternative with an exception in route location east of the Reynolds Industrial Park in Clay County in order to avoid the Bayard Conservation Area (See section 3.10 and the *Draft Section 4(f) Evaluation,* section 5.1.2, located on enclosed CD). The total length of the Pink 2 Alternative is 31.4 miles. The Pink 2 Alternative parallels SR 16 on the north side continuing east towards the St. Johns River. The alternative crosses the St. Johns River parallel and to the south of the existing Shands Bridge (which it would replace), following the same route location as the Pink 1 Alternative.

The Pink 1 and 2 Alternatives use a 4-lane roadway section from Branan Field – Chaffee Road to the interchange with US 17 in Clay County and from CR-16A to I-95 in St. Johns County. The segment between US 17 and CR-16A uses a 6-lane roadway section.

Exhibit 2-37: **Pink 1 and 2 Alternatives**



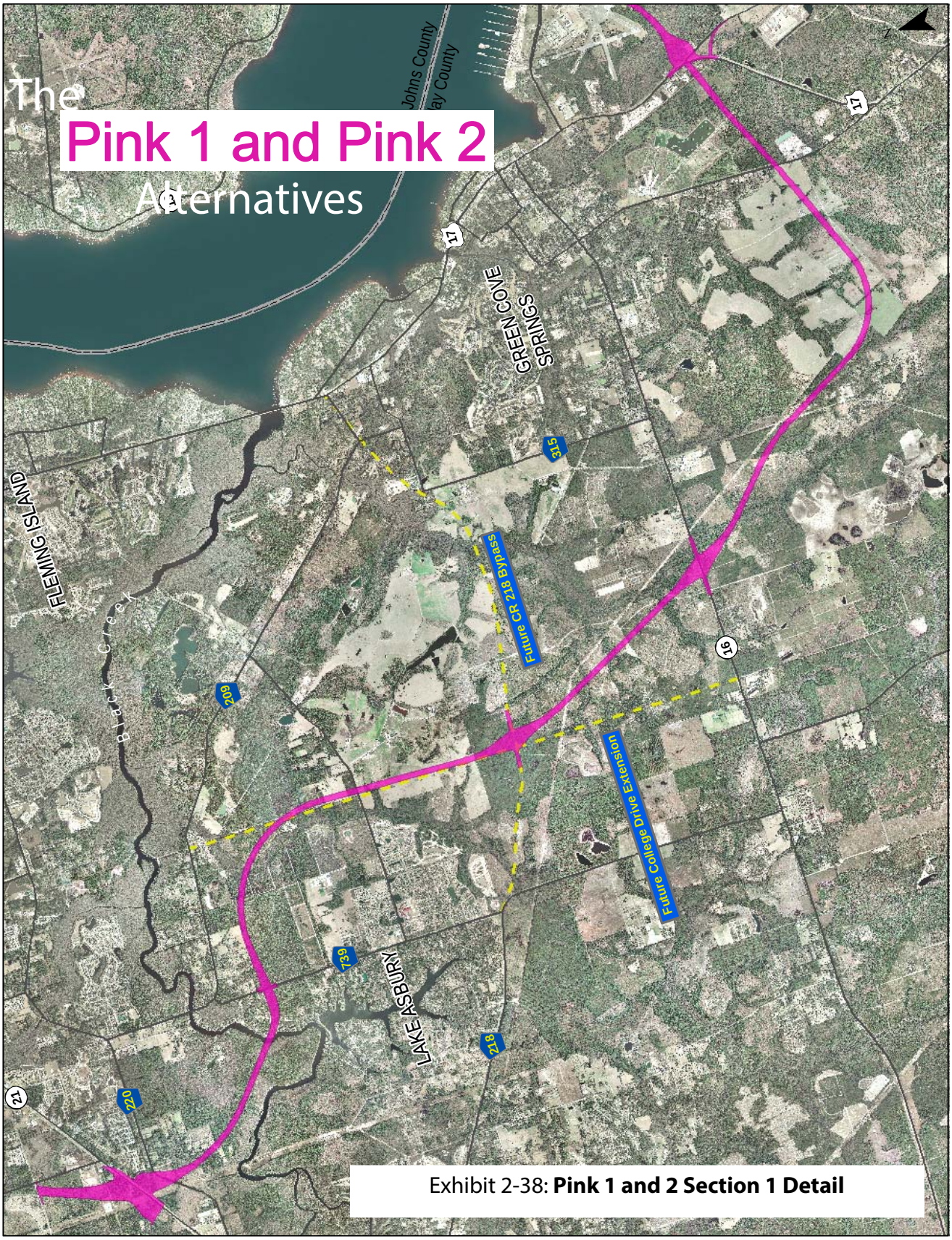


Exhibit 2-38: **Pink 1 and 2 Section 1 Detail**

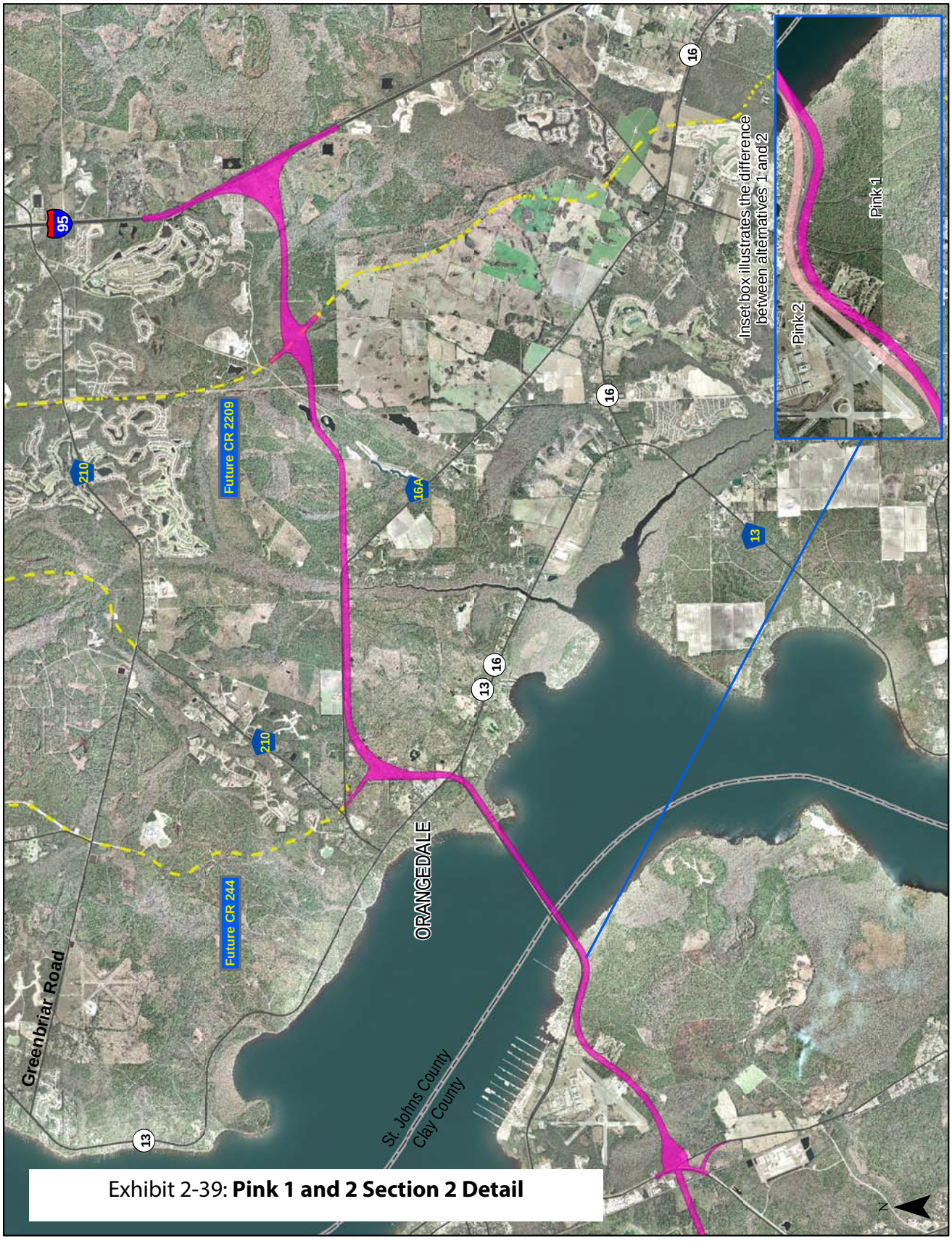


Exhibit 2-39: **Pink 1 and 2 Section 2 Detail**

2.8 WILL THE SHANDS BRIDGE REMAIN IN ANY OF THE BUILD ALTERNATIVES?

As described previously, the existing Shands Bridge will be removed and replaced if the Brown 1 or 2, Orange 1 or 2, Green 1 or 2 or Pink 1 or 2 Alternative is chosen as the Preferred Alternative, but will remain in place if either the Black or Purple Alternative is selected. FDOT informed the public of this decision by means of a mass emailing and the project website prior to the public meetings held in the fall of 2006, mentioned earlier, when it became evident that the Build Alternatives would not be viable using traditional funding methods and that the entire route would be tolled.

Although there would be no need to remove the Shands Bridge now if either the Black or Purple Alternative were selected, it might still be necessary to make improvements or consider replacing the bridge in the future as traffic increases. Even though the Black and Purple Alternatives cross the river well north of the Shands Bridge, traffic on the bridge is expected to increase over time. The 45-year old Shands Bridge is functionally obsolete and was not intended to carry the levels of traffic projected to occur in the future. Costs associated with future improvements to the existing bridge were not considered in the project costs discussed in Section 2.10.

2.9 HOW WILL THE SHANDS BRIDGE BE REMOVED?

As stated above, if one of the southern corridor alternatives is selected for implementation, FDOT proposes to remove the existing Shands Bridge over the St. Johns River and construct a new bridge. The existing Shands Bridge will be demolished only after the new bridge is fully complete and open to traffic. Since the proposed location of the new bridge is completely offset from the existing Shands Bridge, there will be no need to stage either the construction of the new bridge or the demolition of the existing Shands Bridge.

A permit from the SJRWMD will be required for bridge demolition. FDOT will request that its permit include a condition requiring the bridge demolition Contractor to prepare the detailed bridge demolition plan identifying specific means and methods, and submit the plan for approval by SJRWMD before commencing demolition activities.

FDOT proposes the requirements listed below as part of its permit application, and these requirements were used in the assessment of potential impacts (see Chapter 3):

Pre-Demolition/Construction

- Prior to beginning construction or demolition, the river bottom 500 feet upstream and downstream from the bridge centerline will be surveyed by multi-beam and side scan sonar to set baseline conditions for bottom elevation (multi-beam) and bottom material (side scan).

- Erosion and turbidity control measures will be installed and maintained around work areas.

Demolition Plan

- The existing bridge will be removed down to six inches above the mud line and disposed of offsite at a landfill or recycling facility. No demolition material will be discharged to the water way or disposed of onsite.

- No blasting will be used to demolish the bridge.

- The river bottom will be resurveyed after demolition if there are any concerns from the regulatory agencies concerning deposition (multi-beam) or remnant debris (side scan).

- In the event of an accidental spill of demolition materials or equipment, the Contractor will immediately notify SJRWMD and the USACE. Retrieval of the accidentally discharged material will be initiated within seventy-two hours of approval from the regulatory agencies.

- The project will not involve excavation of the river bottom without the Contractor applying for and receiving a permit modification and mixing zone approval.

2.10 HOW MUCH WILL THE PROJECT COST?

FDOT developed estimated project costs for construction, right-of-way and wetland mitigation for each of the final Build Alternatives (**Exhibit 3-40**). The estimates included the major cost components typically associated with highway construction including roadway, bridge and interchange construction. Es-

Exhibit 2-40: **Estimated Project Costs**

Criteria	Unit of Measure	Alternative									
		Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
Total Length of Alternative	Miles	35.6	25.6	34.0	34.0	33.3	33.3	30.7	30.7	31.4	31.4
St Johns River Bridge Length	Feet	11,077	11,077	9,228	9,228	9,228	9,228	9,228	9,228	9,228	9,228
Minor Bridge Crossings	Feet	32	27	32	32	34	34	29	29	27	27
Number of Interchanges	Number	10	7	10	10	10	10	8	8	8	8
Net Roadway Length	Miles	30.5	21.9	30.6	30.5	29.8	29.7	27.2	27.1	28.1	28.0
Roadway Cost	$ Millions	$511	$405	$498	$501	$516	$516	$448	$448	$430	$432
St. Johns River Bridge Cost	$ Millions	$251	$249	$230	$230	$226	$230	$226	$230	$230	$230
Minor Crossings Bridge Cost	$ Millions	$191	$151	$150	$153	$162	$164	$107	$109	$95	$99
Interchange Cost	$ Millions	$621	$470	$569	$574	$636	$638	$549	$551	$481	$486
Total Construction Cost	**$ Millions**	**$1,574**	**$1,275**	**$1,447**	**$1,458**	**$1,540**	**$1,548**	**$1,330**	**$1,338**	**$1,236**	**$1,247**
Right-of-Way	$ Millions	$337	$269	$284	$359	$286	$314	$239	$265	$236	$313
Inspection	$ Millions	$236	$191	$217	$219	$231	$232	$200	$201	$124	$125
Design	$ Millions	$157	$128	$145	$146	$154	$155	$133	$134	$124	$125
Wetland Mitigation	$ Millions	$85	$54	$57	$55	$55	$54	$57	$56	$59	$57
Total Project Cost	**$ Millions**	**$2,390**	**$1,917**	**$2,150**	**$2,237**	**$2,266**	**$2,303**	**$1,959**	**$1,994**	**$1,840**	**$1,929**

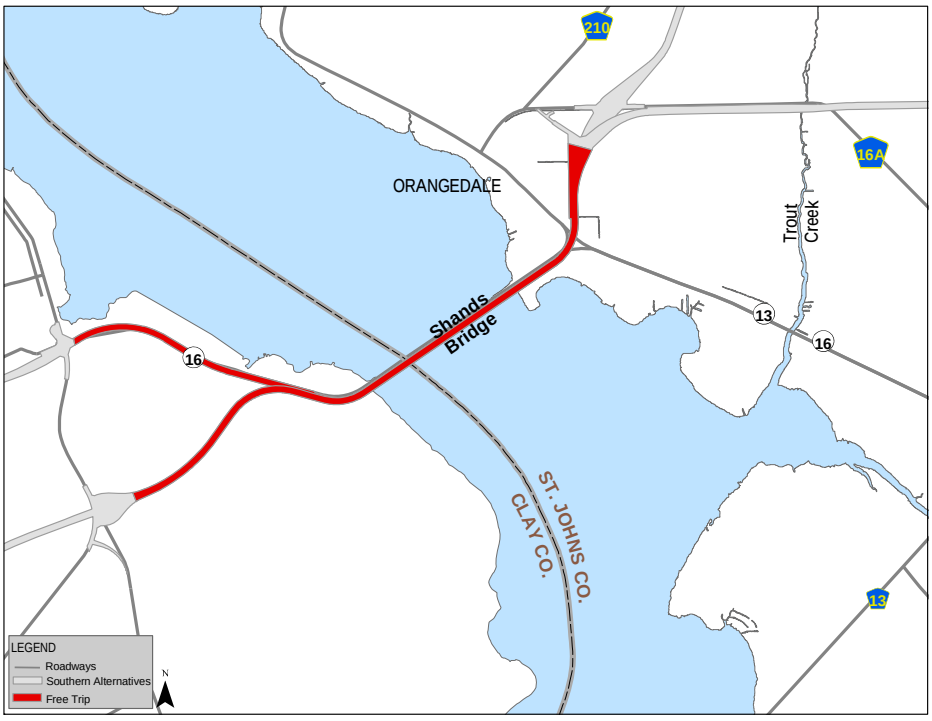
timates also included the cost related to the demolition of the existing Shands Bridge in the case of the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives. Projected costs for the Black, Purple, Brown 1 and 2 and Orange 1 and 2 Alternatives that connect to I-95 at its proposed intersection with 9B also include the cost of upgrading that proposed interchange. A plan view of the I-95/SR 9B interchange and each of the other proposed interchanges for all alternatives are provided in the Appendix of the *Transportation Technical Memorandum* located on the enclosed CD.

FDOT estimated design costs and construction, engineering and inspection (CEI) service costs as a percentage of the total construction cost. Design cost was estimated at 10 percent of total construction cost, and CEI cost was estimated at 15 percent. Right-of-way appraisers made an initial estimation of right-of-way costs that were further verified by FDOT during field inspection. Estimated costs considered a taking of 324 feet of right-of-way, the potential impacts to approved developments, and the right-of-way needed for the proposed interchange concepts for each alternative. Finally, the team estimated the costs associated with wetland mitigation using a cost of $100,000 per impacted primary and fragment acre and $10,000 per secondary impacted acre, based on typical wetland mitigation costs seen by FDOT on other projects.

2.11 HOW WILL THE PROJECT BE FUNDED?

It will be necessary for FDOT to establish a Public / Private Partnership (P3) in order to fund and construct the proposed St. Johns River Crossing Project. If the project is built, repayment of state funds and the costs associated with construction, operation and maintenance of the facility by the P3 entity will be paid for through the use of tolls. FDOT did not consider using tolls to fund the project during the initial stages of project development because project costs could not be accurately calculated using the information available at the time. During development of this EIS, preliminary engineering and detailed environmental analysis has been on-going, thereby providing more accurate information to calculate the costs of each Build Alternative. It became evident from these costs that the project could not be implemented using traditional methods of finance. Thus, FDOT decided in August 2006 to design and implement the project as a limited access, tolled facility. However, FDOT has determined that if any of the southern alternatives are selected (where the existing Shands Bridge would be replaced) the trips using the toll road solely to cross the river will remain toll-free. This toll-free local trip route is shown on **Exhibit 2-41.** This decision was made because, with any of the southern alternatives, an existing free crossing of the river (on the existing Shands Bridge) would be removed. Also, there would not be a non-tolled crossing option within a reasonable driving distance. A new northern river crossing (with ei-

Exhibit 2-41: **Toll-free Local Trip Route**



Public / Private Partnerships

The Department is also exploring developing this project through a public private partnership. The term "public/private partnerships," or PPPs, refers to a contractual arrangement by which public and private entities collaborate in the design, construction, operation and financing of a transportation project. As the public sponsor, the Florida Department of Transportation would shape the technical, legal, and financial features in delivering the project.

ther the Black or Purple Alternative) would be tolled because this would be a new, additional river crossing and these alternatives would leave drivers with a toll-free crossing option within a reasonable distance since the existing Shands Bridge would remain in place under these circumstances.

FDOT conducted a preliminary toll revenue and feasibility study for the project in the summer of 2006 which indicated that the St. Johns River Crossing Project was not toll-feasible as a stand-alone project under any of the Build Alternatives. Additionally, tolling only the bridge and not the corridor would not generate sufficient revenue. In response to these findings and based on the need for the project, in 2006 FDOT decided to combine the project (for tolling purposes) with the Branan Field – Chaffee Road (SR 23) Project, forming a beltway outside of the I-295 loop from I-10 to I-95. Combining tolling efforts for the two projects makes the St. Johns River Crossing Project toll-feasible and promotes the opportunity for the advancement of future project phases of the Branan Field – Chaffee Road Project. While the interchanges and alignments have been slightly adjusted since the study, the magnitude of project changes and their effect on revenues is minimal compared to the accuracy of a fifty plus year revenue projection.

Toll rates for the project are unknown but are estimated by FDOT's financial advisors to be between $0.15-0.20/mile (See *Client First Coast Outer Beltway Preliminary Traffic and Revenue Analysis* located on the enclosed CD). The toll rate will be established at the time of bid by the potential private partners (concessionaires). The conditions of bidding documents have not been set but will generally specify the requirements of the concessionaire to design, build, operate, maintain and finance the project for a term of 50-75 years. The bid will basically be reduced to which concessionaire can meet the requirements of the bid documents for the lowest per mile toll rate. The bid documents will limit toll rate increases to an inflation index (such as the Consumer Price Index).

First Coast Outer Beltway (FCOB)

The combination of the St Johns River Crossing Project and the Branan Field / Chaffee Road Project has been identified as the First Coast Outer Beltway (FCOB). Although these two projects are in very different stages of development, the ultimate result of combining these projects will be a 46.5 mile, limited access expressway connecting I-10 in Duval County to I-95 in St. Johns County. This project will be funded using tolls.

The benefit of developing the FCOB as a toll facility will be that the entire project can be completed in a significantly shorter time than with conventional funding. Joining these projects greatly enhances the ability of FDOT to completely deliver both projects.

2.12 WHAT IS THE IMPACT OF TOLLS ON BRANAN FIELD – CHAFFEE ROAD?

In 2005, FHWA approved a Supplemental EIS examining realignment of the Branan Field-Chaffee Road corridor, but the use of tolls was not a part of that analysis. During the workshops held in August and September of 2006, the

public was informed that Branan Field-Chaffee Road could eventually be combined with the St. Johns River Crossing Project when it came to collecting tolls for the repayment of project funding in the future.

In the meantime, however, the two projects continue on separate tracks. Portions of Branan Field-Chaffee Road are already completed and others are under construction. All of the main-line right-of-way for that project has been acquired. FDOT expects to use "open road" tolling on this project, a system that utilizes in-motion transponders read by overhead sensors. Implementation would only require the construction of gantries at certain locations.

In the future, tolls will pay for the ultimate completion of the Branan Field-Chaffee Road Project, including constructing grade separated interchanges at major intersections. As a result, motorists will have the benefit of getting a more efficient facility completed significantly sooner than if tolls were not used.

2.13 WHEN WILL CONSTRUCTION BEGIN AND HOW LONG WILL IT TAKE?

Although FDOT cannot determine the exact timing and phasing for construction of the St. Johns River Crossing Project at this time, they project the earliest anticipated start date as 2013 and the opening year as 2025. Prior to construction, FHWA must approve the Final EIS and complete a Record of Decision (ROD) on the project. If a Build Alternative is selected in the ROD, FDOT then will complete the design and right-of-way acquisition phases. The duration of these phases and the project construction start date will be subject to many variables that could shorten or lengthen their timelines. Once construction begins, FDOT anticipates that construction will be complete within five years.

2.14 WHAT IS THE OBJECTIVE OF THIS FINAL EIS?

This Final EIS offers a detailed evaluation of the effects that could potentially occur as a result of the St. Johns River Crossing Project, and of the effectiveness of the Preferred Alternative and the other alternatives in meeting the project purpose outlined in Chapter 1.

Defining NEPA

This Environmental Impact Statement (EIS) is being prepared to meet the requirements of the National Environmental Policy Act (NEPA). NEPA requires federal agencies, such as the FHWA, to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

The range of reasonable alternatives, carried through the screening process, is examined to see how the alternatives could affect the natural and built environments. Where possible, the extent of the impact is quantified, although for some resources, only a qualitative evaluation is possible. The impacts of each alternative are then compared with the No Build Alternative to determine what might change in the environment if the St. Johns River Crossing Project is built.

As noted in Chapter 1, FDOT developed three goals that formed the basis of the statement of purpose for the St. Johns River Crossing Project. Each alternative is compared against these goals to measure how well each of them meets the project need. **Exhibit 2-42** shows the project goals and the standards of measurement used to assess the effectiveness of each alternative.

The comparison of each alternative's impact on the environment and its effectiveness in meeting the project purpose will form the basis of FHWA's and FDOT's decision making process. Using this evaluation, the FHWA and FDOT can make an informed decision as to which alternative should be selected.

Exhibit 2-42: **Project Goals and Measures**

Project Goal	Measures
Provide additional capacity to improve current and future transportation network deficiencies	▪ Network Performance ▪ System Deficiency ▪ Network Vehicle Travel Time Reduction ▪ Corridor Volume Across the St. Johns River ▪ Annual Cost of Traffic Congestion
Promote employment and economic development	▪ Provide access to activity centers identified for future industrial and commercial development ▪ Improve access to key employment and commerce centers in the area ▪ Provide access to areas of anticipated residential development
Improve Emergency Evacuation	▪ Vehicles removed from the more flood-prone areas east of the river. ▪ Queue length east of the St. Johns River

2.15 WHAT FUTURE OUTREACH IS PLANNED FOR THE ST. JOHNS RIVER CROSSING PROJECT?

After the release of this Final EIS and the announcement in the Federal Register, there will be a minimum 30-day review period. After this review period, FHWA and FDOT will consider all comments received on the Final EIS and the analysis in the Final EIS in preparing the Record of Decision. The Record of Decision will explain the reasons for the project decision, summarize any mitigation measures that will be incorporated in the project, and document Section 4(f) *de minimis* findings. After all project approvals are received, FDOT can proceed with future phases.

2.16 WHY WAS THE PREFERRED ALTERNATIVE SELECTED?

The Pink 1 Alternative was identified by FHWA and FDOT as their Preferred Alternative for the St. Johns River Crossing Project. The following discussion explains the factors considered by FHWA and FDOT and summarizes the reasons for the selection of the Pink 1 Alternative as the Preferred Alternative. Alternatives were compared relative to the project purposes and environmental impacts. **Exhibit 2-43** summarizes the results of the comparison among alternatives. The following sections further describe this evaluation.

2.16.1 Traffic and Emergency Evacuation

All of the Build Alternatives provide additional capacity and improve transportation network deficiencies over the No Build Alternative. As discussed in Chapter 1, the major north-south roads in Clay County, US 17 and SR 21, and the only major east-west route in St. Johns County in the study area, CR 210, have been impacted by increasing transportation demand. The Preferred Alternative adds 44 new lane miles west of the St. Johns River in Clay County and 21 new lane miles east of the river in St. Johns County. While the Preferred Alternative does not reduce travel time as much as other alternatives, the Pink 1 and 2 and Green 1 and 2 Alternatives would have the fewest number of segments operating below LOS C in the design year. Additionally, these alternatives require the least amount of mitigation along I-95 to achieve the same or better LOS compared to the No-Build. I-95 ramp mitigation analysis shows that all of the Build Alternatives except for the Pink 1 and 2 and Green 1 and 2 Alternatives require some freeway ramp mitigation. Even with the rec-

ommended mitigation there are some ramp junctions in the Build Alternatives that have LOS worse than the No Build Alternative. This is true for all Alternatives except Pink and Green. For example, under the Purple Alternative, the two-lane SR 9B northbound entrance ramp has a LOS E whereas the No Build Alternative has a LOS D for the same ramp with two lanes.

All of the Build Alternatives provide some benefit to emergency evacuation by increasing the amount of roadway west of the St. Johns River. The southern alternatives (Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2) provide the most lane miles west of the St. Johns River and result in the lowest number of vehicles in queue east of the river in the areas prone to flooding. The southern alternatives remove over 5,000 more vehicles from east of the river in areas prone to flooding when compared to the northern alternatives. Of the southern alternatives, Pink 1 and 2 and Brown 1 and 2 provide slightly more lane miles west of the St. Johns River.

Another distinguishing emergency evacuation factor between the Build Alternatives was the location of the I-95 interchange. For evacuation purposes, a location near the center of St. Johns County is preferred by the county. SR 16 is the primary arterial for evacuating the City of St. Augustine. The Pink 1 and 2 and Green 1 and 2 Alternatives have the closest interchange on I-95 to SR 16. Thus, Pink 1 and 2 and Green 1 and 2 Alternatives provide the better evacuation route for the St. Augustine area, an area currently underserved by existing evacuation routes, and also serve the populated areas in southern St. Johns County, Flagler County and Volusia County by providing a more accessible route from I-95.

Considering both the number of vehicles in queue in areas prone to flooding and the location of the connection to I-95, the Preferred Alternative provides the most favorable results.

2.16.2 Economics and Project Cost

The Preferred Alternative supports employment and economic opportunities in Clay County. The right-of-way and interchanges associated with the Preferred Alternative will be adjacent to land uses identified by the County for future industrial and commercial development including the Reynolds Industrial Park located west of the Shands Bridge, the proposed Lake Asbury activi-

ty center located west of the City of Green Cove Springs, and Governors Park DRI located west of the existing US 17 / SR 16 intersection. The Green 1 and 2 and Orange 1 and 2 Alternatives are also located near these developments; however, these alternatives have more community and business impacts to the Green Cove Springs area, including displacement of a shopping center. The Black and Purple Alternatives also involve more relocations in the Green Cove Springs area and would not serve the southern developments as well.

In St. Johns County, the Preferred Alternative terminus at I-95 will be directly north of the World Commerce Center, one of the St. Johns County's major employment centers. The Preferred Alternative will be easily accessible to and from five employment centers, including the World Commerce Center, International Park, St. Augustine Center, St Augustine Industrial Park and the St. Augustine Airport Park. In addition, it will be accessible to 2.6 million square feet of industrial / commercial property and adjacent to 376 acres of vacant industrial zoned land. The northern alternatives would provide access to more employment areas and DRIs; however, due to the DRIs approved or in place and the existing six interchanges with I-95, the Build Alternatives would add little value to St. Johns County as an economic driver.

In addition, the Preferred Alternative would cost the least of all the Build Alternatives, have the least taxable revenue lost from right-of-way conversion and generate the second highest amount of toll revenue.

2.16.3 Right-of-Way Impacts and Displacements

The Preferred Alternative would have the least amount of residential, commercial and total parcel impacts compared to other Build Alternatives and result in the least amount of taxable revenue lost due to right-of-way conversion. The Black, Purple, Brown 1 and 2 and Orange 1 and 2 Alternatives would all lose at least $650,000 more tax revenue annually from right-of-way conversion.

In terms of displacements, the Preferred Alternative displaces the second fewest number of residences, businesses and other facilities according to the Conceptual Stage Relocation Plan. The Preferred Alternative is also the only southern alternative that would not have a potential disproportionately high and adverse impact on minority or low-income populations from displacements.

2.16.4 Complies with Local Government Plans and Policies

Regional Planning: The North Florida Transportation Planning Organization (NFTPO) included the St. Johns River Crossing project in the December 2009 adoption of the Long-Range Transportation Plan (LRTP) as well as the Transportation Improvement Program (TIP) for fiscal year 2010/11 – 2014/15, approved June 10, 2010. The NFTPO also included the St. Johns River Crossing project in their *2010 List of Priority Projects*, which are projects in the 2035 LRTP determined by the NFTPO to be of the highest priority. Excerpts from these plans are contained in Appendix B of the Land Use and Economics Discipline Report located on the enclosed CD.

St. Johns County: To address the growth that the northern part of the county has experienced, the County drafted the *St. Johns County Northwest Sector Plan*. The plan was approved by the Board of County Commissioners and the Department of Community Affairs (DCA) in 2003. The plan includes an adopted policy stating the following:

"…additional needed roadway capacity across the St. Johns River shall be provided at the existing Shands Bridge location (Policy A.2.1.2)."

In 2003, the County's *2015 Comprehensive Plan* was amended to include the goals, objectives and policies identified in the sector plan. The County also amended its *2015 Transportation Plan* to include the proposed action, describing the new highway corridor as:

"…entering St. Johns County near the existing Shands Bridge and terminating at Interstate 95 between CR 210 and International Golf Parkway. "

In accordance with the planning efforts of St. Johns County, the Preferred Alternative is consistent with the *St. Johns County Northwest Sector Plan* and the *2015 St. Johns County Comprehensive Plan.*

In 2006, the St. Johns County Board of County Commissioners took the next steps in establishing the support for a new highway facility when they adopted a resolution. The resolution, adopted March 21, 2006, stated the County's support for a new highway corridor that crossed the St. Johns River near the existing Shands Bridge and terminated at Interstate 95.

The Pink 1 and 2 and Green 1 and 2 Alternatives are consistent with St. Johns County plans.

Clay County: To address the long-term future growth and the issues facing its transportation infrastructure, the County in 1998 drafted the *Lake Asbury Master Plan*. The master plan was developed as a partnership between Clay County

government and the community and consists of a planning area that is 30,293 acres, of which approximately 18,000 acres are largely undeveloped. This planning area is in the heart of the Clay County portion of the project study area. The adopted master plan identifies a conceptual location for the St. Johns River Crossing Project at the location of the existing Shands Bridge and includes a policy stating:

"The County shall support FDOT in their efforts to plan for and fund an Outer Beltway that connects the terminus of Branan Field Road with Interstate 95 in St. Johns County (LA Policy 1.4)."

The St. Johns River Crossing project is included in the Transportation Element of the county's 2015 Comprehensive Plan. The project is shown in the plan as beginning at Branan Field – Chaffee Road and exiting the county at the existing Shands Bridge.

In 2006, the Clay County Board of County Commissioners joined in the effort with St. Johns County to pass a resolution stating their support and need for a new highway facility in their county. The resolution supported the southerly crossing of the St. Johns River, stating that a new highway corridor will serve as a "critically needed traffic reliever and economic development stimulator." The Preferred Alternative is consistent with this statement and with the *Lake Asbury Master Plan* and the *2015 Clay County Comprehensive Plan.*

The southern alternatives are consistent with Clay County plans. The Preferred Alternative and Brown 1 Alternative best support the County's goal of economic development. Additionally, the Preferred Alternative received the most public support of all the Build Alternatives at the Public Hearing.

2.17 WHAT IS THE LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE?

Under the 23 CFR 777 guidelines, the FHWA may only permit discharges of dredged or fill material into waters of the United States where there is no practicable alternative to such construction and the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use. Additionally, 33 CFR parts 320 through 330, Regulatory Program, U.S. Army Corps of Engineers; Section 404, Clean Water Act and 40 CFR part 230, Section 404(b)(1) Guidelines for the Specification of Disposal Sites for Dredged or Fill Material, establish requirements for the permitting of discharge of dredge or fill material in wetlands and other waters of the United States.

Any new highway alignment will have impacts on the environment. FDOT made every reasonable effort to avoid and minimize impacts to wetlands and other resources. Where impacts were unavoidable, FDOT examined mitigation options. On the basis of the guidelines, all of the Build Alternatives dredge and fill sites are specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem. The Selected Alternative is the least environmentally damaging practicable alternative (LEDPA) because the other alternatives have either greater impacts to the aquatic ecosystem, or have other significant environmental consequences. An alternative is considered practicable if "it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes".

While the Preferred Alternative does not have the least amount of wetland impacts, it best meets the purpose and need, best complies with local government plans and minimizes impacts to other environmental resources resulting in the least overall environmental impact (See **Exhibit 2-43**). The Preferred Alternative avoids several environmental impacts which would occur with the selection of other alternatives. The Preferred Alternative:

- Avoids the Green Cove Springs Nature Preserve which would be impacted by the Green and Orange Alternatives.
- Avoids longitudinal floodway crossings which occur under the Purple and Black Alternatives.
- Avoids Blacks Ford Swamp which would be crossed by all alternatives except the Green 1 and 2 and Pink 1 and 2 Alternatives.
- Is the only southern crossing alternative that does not result in a disproportionately high and adverse Environmental Justice impact.
- Has the least potential to impact cultural resources both in terms of known resources and the probability for undiscovered archaeological sites.
- Has the second lowest number of relocations (residential and business) with just three more relocations than the Brown 1 Alternative. All other Build Alternatives have at least 10 more relocations than the Preferred Alternative.
- Has the least amount of taxable value lost from lands within the road right-of-way. The Build Alternatives with a connection at I-95 further north would all lose at least five times more taxable value.

- Has the lowest amount (same as the Brown 1 Alternative) of potential involvement with contaminated sites.

The Preferred Alternative incorporates all practicable measures to minimize harm. These measures are outlined in Chapter 3 of this EIS along with a summary of the potential environmental impacts.

The following table compares and ranks the alternatives according to how they performed relative to cost, meeting the purpose and need and environmental impacts. The Build Alternatives were ranked one through ten for various parameters and resources with one being the best score and ten being the worst score. The scores within the three categories of cost, purpose and need and environment were totaled and the alternatives were given an overall rank for each category. The sum of the overall rankings for the three categories was calculated to determine the final ranking of the Build Alternatives. These rankings demonstrate the rationale for the selection of the Preferred Alternative.

Exhibit 2-43: **Summary Comparison and Ranking of Alternatives**

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
PROJECT COSTS											
Construction Cost ($ billions)	N/A	$1.57	$1.28	$1.45	$1.46	$1.54	$1.55	$1.33	$1.34	$1.24	$1.25
Right-of-Way Cost ($ millions)	N/A	$337	$269	$284	$359	$286	$314	$239	$265	$236	$313
Wetland Mitigation Costs ($ millions)	N/A	$85	$54	$57	$55	$55	$54	$57	$56	$59	$57
Total Cost ($ billions)	N/A	$2.39	$1.92	$2.15	$2.24	$2.27	$2.30	$1.96	$1.99	$1.84	$1.93
Cost Rank	N/A	10	2	6	7	8	9	4	5	1	3
PURPOSE AND NEED											
TRAFFIC AND EMERGENCY EVACUATION											
2035 Network Performance (volume/capacity)	0.878	0.822	0.824	0.819	0.819	0.813	0.813	0.823	0.823	0.825	0.825
Rank	N/A	5	8	3	3	1	1	6	6	9	9
2035 Network Travel Time Reduction (daily vehicle hours)	N/A	328,041	358,199	331,900	331,900	352,425	352,425	290,639	290,639	280,654	280,654
Rank	N/A	6	1	4	4	2	2	7	7	9	9
2035 Annual Congestion Cost ($ billions)	$7.2	$5.2	$5.0	$5.2	$5.2	$5.1	$5.1	$5.4	$5.4	$5.5	$5.5
Rank	N/A	5	1	5	5	2	2	7	7	9	9
Number of Segments on New Facility Operating below LOS C in design year	N/A	8	5	10	10	8	8	2	2	2	2
Rank	N/A	6	5	9	9	6	6	1	1	1	1
Emergency Evacuation Lane Miles West of River	82.0	102.62	103.01	125.69	125.69	124.03	124.03	124.03	124.03	125.69	125.69
Rank	N/A	10	9	1	1	5	5	5	5	1	1

Note: 10 is the most favorable rank and 1 is the least favorable.

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
Evacuation Effectiveness (vehicles in queue east of river, including the bridge)	65,419	59,977	59,874	53,866	53,866	54,325	54,324	54,324	54,324	53,886	53,886
Rank	N/A	10	9	1	1	5	5	5	5	1	1
Southern Interchange with I-95	N/A	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Rank	N/A	10	10	10	10	10	10	1	1	1	1
SOCIOECONOMICS											
Consistency with Local Plans	N/A	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Rank	N/A	10	10	10	10	10	10	1	1	1	1
Resolutions from Clay and St. Johns County	N/A	No	No	No	No	No	No	No	No	Yes	No
Rank	N/A	10	10	10	10	10	10	10	10	1	10
Public Comments from Public Hearing in Favor of Alternative	25	6	10	4	4	5	5	7	7	21	18
Rank	N/A	6	3	9	9	7	7	4	4	1	2
Existing & Proposed Developments Served by Proposed Interchanges (number within 2 miles)	N/A	10	8	12	12	12	12	8	8	8	8
Rank	N/A	5	10	1	1	1	1	10	10	10	10
Annual Tax Revenue Lost from Right-of-Way Conversion ($ thousands)	N/A	$989	$928	$815	$834	$860	$883	$181	$204	$137	$155
Rank	N/A	10	9	5	6	7	8	3	4	1	2
Estimated Toll Revenue for years 2025 to 2040 (in billions)	N/A	$1.17	$1.10	$1.14	$1.14	$1.14	$1.14	$1.15	$1.15	$1.18	$1.18
Rank	N/A	2	10	5	5	5	5	3	3	1	1
Purpose and Need Score	N/A	95	95	73	74	71	72	63	64	46	57
Purpose and Need Rank	N/A	9	9	7	8	5	6	3	4	1	2

Note: 10 is the most favorable rank and 1 is the least favorable.

Exhibit 2-43: **Summary Comparison and Ranking of Alternatives (continued)**

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
ENVIRONMENTAL CONSIDERATIONS (INCLUDES SOCIAL, PHYSICAL AND NATURAL ENVIRONMENT)											
ENVIRONMENTAL JUSTICE – MINORITY AND LOW-INCOME POPULATIONS											
Residential Displacements	N/A	0	0	2	12	3	13	3	13	2	12
Business Displacements	N/A	0	0	2	2	13	14	13	14	2	3
Rank	N/A	1	1	3	5	7	9	7	9	3	6
Potential Disproportionate Impacts from Displacements?	N/A	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Rank	N/A	1	1	10	10	10	10	10	10	1	10
CULTURAL RESOURCES											
Known Resources Potentially Eligible for NRHP Listing	N/A	6	6	1	1	5	5	5	5	1	1
Rank	N/A	10	10	1	1	5	5	5	5	1	1
Moderate to High Potential for Archeological Sites (percent of corridor)	N/A	22%	27%	30%	30%	32%	32%	20%	20%	18%	18%
Rank	N/A	5	6	7	7	9	9	3	3	1	1
PUBLIC SERVICES AND UTILITIES											
Blacks Ford Swamp Effluent Disposal Site (acres)	N/A	3.5	3.5	9.3	9.3	9.3	9.3	0	0	0	0
Rank	N/A	5	5	10	10	10	10	1	1	1	1
VISUAL QUALITY											
Additive Visual Impact Rating (higher numbers indicate higher impacts)	N/A	37.1	33.8	41.0	38.3	42.3	39.6	36.3	33.6	35.0	32.3
Rank	N/A	6	4	8	7	10	9	5	3	2	1

Note: 10 is the most favorable rank and 1 is the least favorable.

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
WATER RESOURCES (Section 3.14)											
Stormwater Runoff Treatment Volume Required (millions of cubic feet)	N/A	4.9	3.7	4.8	4.8	4.7	4.7	4.4	4.4	4.4	4.4
Rank	N/A	10	1	8	8	6	6	2	2	2	2
Clean Water Act Section 303(d) Basins Affected	N/A	4	4	4	4	4	4	3	3	3	3
Rank	N/A	10	10	10	10	10	10	1	1	1	1
WETLANDS (Section 3.15)											
Direct, Dredge or Fill (acres)	N/A	748	477	502	487	484	476	501	493	518	504
Direct, No Dredge or Fill (acres)	N/A	976	601	666	653	642	629	687	674	713	702
Surface Water (acres)	N/A	88	85	72	70	67	65	69	67	74	72
Total Acres	N/A	1,812	1,163	1,240	1,210	1,194	1,170	1,257	1,234	1,305	1,278
UMAM Debit	N/A	643	408	430	417	413	406	435	427	450	438
Rank	N/A	10	1	6	4	3	2	7	5	9	8
WILDLIFE AND HABITAT (Section 3.16)											
Total Acres (including agriculture, rangeland, water, wetlands, and upland forests)	N/A	2,044	1,395	1,840	1,817	1,751	1,731	1,591	1,571	1,679	1,657
Rank	N/A	10	1	9	8	7	6	3	2	5	4
FISH AND AQUATIC RESOURCES (Section 3.17)											
Submerged Aquatic Vegetation (acres)	N/A	3.7	3.7	2.5	2.3	2.5	2.3	2.5	2.3	2.5	2.3
Rank	N/A	10	10	5	1	5	1	5	1	5	1
EFH Habitat (acres)	N/A	261	223	237	226	228	220	172	164	170	37
Rank	N/A	10	6	9	7	8	5	3	1	4	2

Note: 10 is the most favorable rank and 1 is the least favorable.

Exhibit 2-43: **Summary Comparison and Ranking of Alternatives (continued)**

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
ENERGY (Section 3.19)											
Energy Used for Construction (millions of BTUs)	N/A	14,664,277	11,369,046	12,850,146	12,949,822	13,668,194	13,734,505	11,945,563	12,011,874	11,127,515	11,227,191
Rank	N/A	10	3	6	7	8	9	4	5	1	2
Energy Savings per Year over No Build (gallons)	0	7,492,635	8,331,066	4,980,908		5,586,637		3,463,017		2,979,071	
Rank	N/A	2	1	4		3		5		6	
CONTAMINATED PROPERTIES (Section 3.20)											
Contaminated Sites	N/A	9	9	8	10	18	18	18	18	8	10
Rank	N/A	5	5	1	3	10	10	10	10	1	3
FLOODPLAINS (Section 3.22)											
Transverse Crossings of 100-Year Flood-plain	N/A	13	6	17	17	15	15	14	14	16	16
Rank	N/A	2	1	9	9	5	5	3	3	7	7
Transverse Crossings of Regulatory Flood-ways	N/A	8	7	5	5	6	6	5	5	4	4
Rank	N/A	10	9	3	3	7	7	3	3	1	1
Longitudinal Cross-ings	N/A	2	2	0	0	0	0	0	0	0	0
Rank	N/A	10	10	1	1	1	1	1	1	1	1

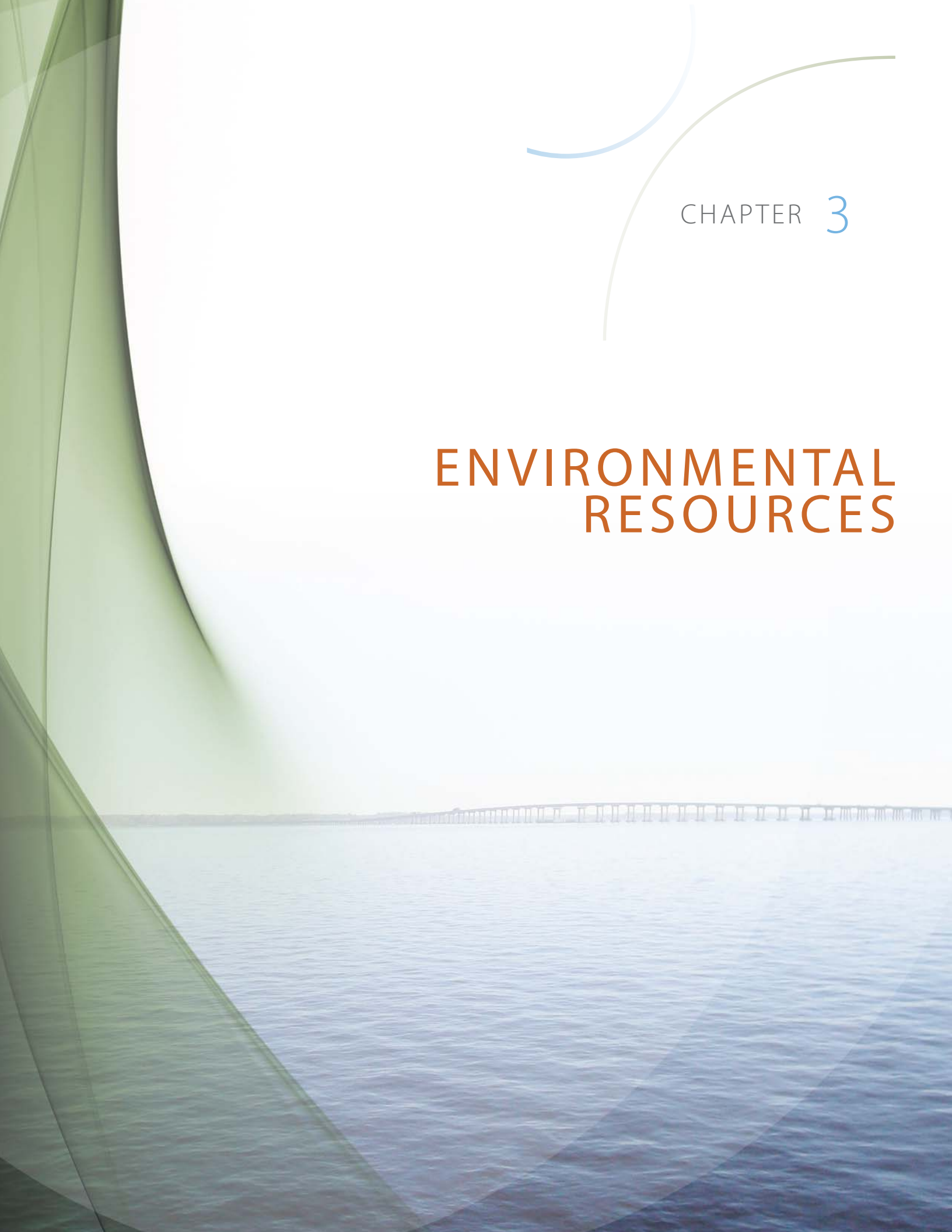
Note: 10 is the most favorable rank and 1 is the least favorable.

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
RIGHT-OF-WAY IMPACTS											
Total Parcels	N/A	273	219	206	221	227	245	183	201	162	177
Rank	N/A	10	6	5	7	8	9	3	4	1	2
Total Acres Converted to Right-of-Way	N/A	1,907	1,301	1,724	1,710	1,654	1,639	1,590	1,576	1,661	1,647
Rank	N/A	10	1	9	8	6	4	3	2	7	5
Total Displacements (Residential, Business, Church)	N/A	58	57	31	42	42	53	45	56	34	45
Rank	N/A	10	9	1	3	3	7	5	8	2	5
Environmental Score	N/A	157	101	125	123	141	137	89	84	62	70
Environmental Rank	N/A	10	5	7	6	9	8	4	3	1	2
Sum of Cost, Purpose and Need and Environmental Ranks	N/A	29	16	20	21	22	23	11	12	3	7
OVERALL RANK	N/A	**10**	**5**	**6**	**7**	**8**	**9**	**3**	**4**	**1**	**2**

Note: 10 is the most favorable rank and 1 is the least favorable.

CHAPTER 3

ENVIRONMENTAL RESOURCES



CHAPTER 3

Environmental Resources

This chapter compares how the No Build and proposed Build Alternatives are expected to affect the natural, physical and social environments of the project area.

The first two chapters of this Final Environmental Impact Statement (EIS) provided an overview and described the context of the St. Johns River Crossing Project, current travel conditions in the project area, and the alternatives that have been developed. This chapter describes and compares the impacts and benefits of each alternative and, where appropriate, discusses mitigation measures.

3.1 HOW WERE THE ALTERNATIVES EVALUATED?

To provide an equal basis of comparison of alternatives, the Florida Department of Transportation (FDOT) developed all the final Build Alternatives to a standard level of conceptual design. They reduced the right-of-way width for all corridors to 324 feet, and developed conceptual interchange layouts for each alternative.

The project team then examined existing conditions and analyzed potential environmental, social and economic changes that could occur within the project area for each alternative, compared to the baseline conditions represented by the No Build Alternative. The results of these analyses are summarized in this chapter, and where applicable, are more fully documented in a series of study reports located on the enclosed CD. These reports are part of this Final EIS and include the following (listed in alphabetical order):

- Agency Coordination Memorandum
- Air Quality Technical Memorandum
- Client First Coast Outer Beltway Preliminary Traffic and Revenue Analysis
- Climate Change Technical Memorandum
- Conceptual Stage Relocation Plan
- Contamination Level 1 Screening Report
- Cultural Resource Overview Survey Technical Memorandum
- Cultural Resource Assessment Survey Technical Memorandum Update
- Economics and Land Use Discipline Report
- Endangered Species Biological Assessment
- Energy Technical Memorandum
- Environmental Justice Discipline Report
- Essential Fish Habitat Discipline Report
- Evacuation Analysis Report
- Geology and Soils Technical Memorandum

- Indirect and Cumulative Effects Discipline Report
- Location Hydraulic Report
- Navigable Waterways Discipline Report
- Noise Study Report
- Public Involvement Program Discipline Report
- Public Services and Utilities Discipline Report
- Section 4(f) Evaluation and *De Minimis* Finding Report
- Social Impacts Discipline Report
- St. Johns River Crossing Traffic Analysis Report
- Stormwater and Water Quality Technical Memorandum
- Transportation Technical Memorandum
- Visual Quality Discipline Report
- Wetlands Evaluation Report
- Wildlife and Habitat Discipline Report

The study area for each resource topic varied, depending on the geographic extent of the potential effects being evaluated and the type of data needed for the analysis. For example, the study area for noise impacts generally falls along the linear roadway corridors, within the area shown by noise contours to be potentially affected. The study area required for examination of essential fish habitat and water quality is broader and includes the course of the streams the highway crosses and their interaction with the watershed as a whole. Each study report discusses the study area analyzed for that resource and why that portion of the project area was studied.

For the analysis of indirect and cumulative effects, the team analyzed a No Build Scenario and two representative Build Scenarios: the Northern Corridor Build Scenario (based on the Purple alternative corridor, and representing the two northern alternatives, Purple and Black) and the Southern Corridor Build Scenario (based on the Pink 1 alternative corridor and representing the eight southern alternatives, Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2).

3.2 HOW COULD ENVIRONMENTAL INFORMATION BE USED TO IMPROVE THE PROJECT?

As part of the analysis effort, the St. Johns River Crossing Project team collected baseline data and identified areas where the project could have impacts on the environment. This information can be used to refine details of the project design and minimize impacts even further. For example, in areas where the project will impact wetlands, there may be opportunities to use steeper slopes or longer bridges to minimize the degree of impact. Similar efforts can be used to reduce the effects to other resources.

3.3 TRAFFIC AND TRANSPORTATION

This section summarizes the analysis of traffic and transportation issues. For more detail, see the *Client First Coast Outer Beltway Preliminary Traffic and Revenue Analysis, St. Johns River Crossing Traffic Analysis Report,* and *Transportation Technical Memorandum* located on the enclosed CD.

Existing Shands Bridge

Congestion on Blanding Boulevard

3.3.1 How were traffic and transportation evaluated?

FDOT prepared a planning level traffic and revenue study for the project using the Northeast Regional Planning Model (NERPM). The Traffic Analysis Report was updated in September 2011 to reflect new lane calls and a design year of 2045 instead of 2035. Average Annual Daily Traffic (AADT) projections for year 2045 were generated and used to calculate turning movement volumes. Traffic turning movement volume projections were modeled assuming medium level forecasts of population by the Bureau of Economic and Business Research (BEBR) and a $0.15 per mile toll rate. Toll rates for the project are unknown but are estimated by FDOT's financial advisors to be between $0.15-0.20/mile (See *Client First Coast Outer Beltway Preliminary Traffic and Revenue Analysis* located on the enclosed CD). The St. Johns River Crossing Project Design Traffic Report (prepared with the benefit of the Sketch Level Traffic and Revenue Study being completed) assumed $0.15/mile to be reasonable and to ensure that adequate facilities are planned.

FDOT further evaluated traffic to estimate year 2045 Measures of Effectiveness (MOE) for both the No Build and Build Alternatives. The team performed a network analysis to estimate the MOE of regional significance and to evaluate the performance of each alternative.

The project team exported the highway network results to geographic information system (GIS) files, trimmed the data to fit the traffic study area (**Exhibit 3-1**), and exported the data in tabular format to calculate the following MOEs:

- Network Performance
- System Deficiency
- Network Vehicle Travel Time Reduction
- Corridor Volume across the St. Johns River
- Annual Cost of Traffic Congestion

3.3.2 How do the alternatives compare in their ability to move traffic?

The results of the MOE analysis are summarized in **Exhibit 3-2**.

Exhibit 3-1: **Traffic Study Area**

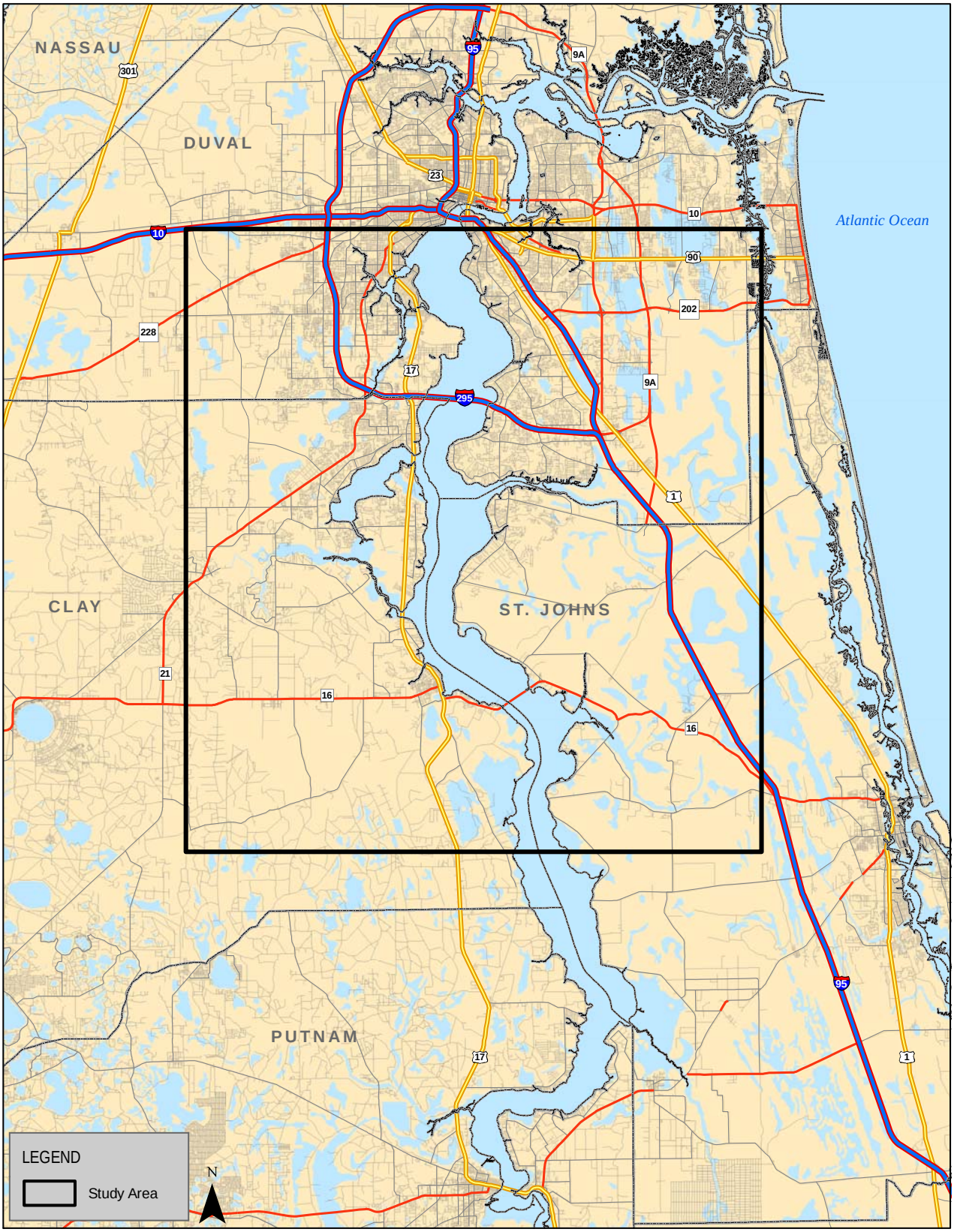


Exhibit 3-2: **Measures of Effectiveness**

	Network Performance (V/C)	System Deficiency (% of roadway segments over capacity)	Network Vehicle Travel Time Reduction (daily vehicle hours of travel)	Corridor Volume Across the St. Johns River** (AADT)	Annual Cost of Traffic Congestion ($ millions)
Black	0.822	27.58%	328,041	72,600	$5,153
Purple	0.824	26.69%	358,199	74,200	$5,000
Brown 1 and 2	0.819	26.59%	331,900	63,900	$5,172
Orange 1 and 2	0.813	26.03%	352,425	65,500	$5,066
Green 1 and 2	0.823	27.11%	290,639	63,300	$5,416
Pink 1 and 2	0.825	27.32%	280,654	65,100	$5,472
No Build	0.878	31.97%	N/A	N/A	$7,197

*These measures of effectiveness apply to the traffic study area shown in Exhibit 3-1.

**SOURCE: Toll Traffic Produced May 2008

Network Performance

Network performance is measured by determining the overall study area traffic volume and comparing it to the capacity of the network. This provides an estimate of available system capacity for future traffic. Network performance is measured using a number called volume-to-capacity ratio, often noted as V/C ratio. Typically, a number equal to or less than 1.0 indicates acceptable performance while a number greater than 1.0 indicates the network is starting to fail. The higher the number, the worse the traffic conditions while the lower the number, the better the traffic conditions. All the Build Alternatives improve network performance by increasing system capacity over the No Build Alternative.

System Deficiency

System deficiency is measured by determining the percentage of study area individual roadway segments that have a V/C ratio greater than 1.0. Unlike network performance, this measurement addresses individual roadway segments such as SR 21 and US 17. A lower percentage indicates better performance, as there are fewer roadway segments over capacity. The Build Alternatives all have lower system deficiency than the No Build Alternative.

Network Vehicle Travel Time Reduction

Network Vehicle Travel Time Reduction is a measure of reduced congestion as compared to the No Build Alternative. A higher value indicates more travel time savings, improved speed and less congestion. The Build Alternatives all result in travel time reductions, ranging from a low of about 280,651 daily vehicle hours saved for the Pink 1 and 2 Alternatives, to a high of more than 358,000 daily vehicle hours saved for the Orange 1 and 2 Alternatives.

Corridor Bridge Volume across the St. Johns River

The corridor bridge volume across the St. Johns River is the total number of vehicle trips crossing the river on an average day (AADT). Higher volumes indicate an increased demand for the facility and the potential increase in toll revenue collection that will result. The Build Alternatives result in corridor bridge volumes ranging from 63,900 AADT for the Green 1 and 2 Alternatives to 74,200 AADT for the Purple Alternative.

Annual Cost of Traffic Congestion

The annual cost of traffic congestion is estimated by determining the value of personal time lost and the cost of excess fuel consumed due to traffic congestion on the study area network. A lower total annual cost of congestion indicates better performance. Annual estimated savings to the traveling public can be determined by subtracting the congestion cost for each of the Build Alternatives from the No-Build congestion costs. The total annual estimated savings range from a low of $1.7billion for the Pink 1 and 2 Alternatives to a high of $2.2 billion for the Purple Alternative.

In addition to the MOEs, FDOT also performed a mainline and ramp lane call analysis (number of lanes required to achieve acceptable Level of Service or LOS) for each of the Build Alternatives. The criterion used for determining the lane calls along each alternative was a LOS D or better. The LOS and lane calls for the mainline in the peak direction of each alternative for the design year are summarized in **Exhibit 3-3**. The mainline analysis shows that the Pink 1 and 2 and Green 1 and 2 Alternatives will have the least number of segments below LOS C and the Brown 1 and 2 Alternatives will have the most. Refer to the *St. Johns River Crossing Traffic Analysis Report* located on the enclosed CD for a further explanation of the analysis results.

Exhibit 3-3: **Design Year Mainline Calls and Level of Service**

		Black North Leg		Black South Leg		Purple		Brown 1 and 2		Orange 1 and 2		Green 1 and 2		Pink 1 and 2	
		LOS	Lanes	LOS	Lanes	LOS	Lanes	LOS	Lanes	LOS	Lanes	LOS	Lanes	LOS	Lanes
Westbound	WB east of I-95	**D**	3	-	-	**D**	3	**D**	3	**D**	3	-	-	-	-
	WB west of I-95	**D**	3	A	2	C	4	**D**	3	**D**	3	C	2	C	2
	Race Track Rd to CR 2209	C	3		-	D	3	C	3	C	3	-	-	-	-
	CR 2209 to CR 210	**D**	2	A	2	C	3	**D**	2	**D**	2	-	-	-	-
	CR 2209 to CR 16A	-	-	-	-	-	-	-	-	-	-	C	2	C	2
	CR 210 to CR 16A	-	-	-	-	-	-	**D**	2	C	3	-	-	-	-
	River Crossing (Bridge)	C	3	-	-	C	3	C	3	C	3	C	3	C	3
	US 17 to SR 16	-	-	-	-	-	-	C	2	C	2	C	2	C	2
	SR 16 to CR 218 Bypass	-	-	-	-	-	-	C	2	C	2	B	2	C	2
	US 17 to College Dr	C	2	-	-	C	2	-	-	-	-	-	-	-	-
	CR 218 Bypass to College Dr	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CR 218 Bypass to CR 739	-	-	-	-	-	-	B	2	B	2	B	2	B	2
	College Dr to CR 739	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	College Dr to Blanding	C	2	-	-	C	2	-	-	-	-	-	-	-	-
	CR 739 to Blanding Blvd	-	-	-	-	-	-	C	2	C	2	C	2	C	2
	West of Blanding Blvd	**D**	2	-	-	**D**	2	**D**	2	**D**	2	**D**	2	**D**	2
Eastbound	West of Blanding Blvd	**D**	2	-	-	**D**	2	**D**	2	**D**	2	**D**	2	**D**	2
	Blanding to CR 739	-		-	-	-	-	C	2	C	2	C	2	C	2
	Blanding to College Dr	C	2	-	-	C	2	-	-	-	-	-	-	-	-
	CR 739 to College Dr	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CR 739 to CR 218 Bypass	-	-	-	-	-	-	B	2	B	2	B	2	B	2
	College Dr to CR 218 By-pass	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	College Dr to US 17	C	2	-	-	C	2	-	-	-	-	-	-	-	-
	CR 218 Bypass to SR 16	-	-	-	-	-	-	C	2	C	2	B	2	C	2
	SR 16 to US 17	-	-	-	-	-	-	C	2	C	2	C	2	C	2
	River Crossing (Bridge)	C	3	-	-	C	3	C	3	C	3	C	3	C	3
	CR 16A to CR 210	-	-	-	-	-	-	**D**	2	C	3	-	-	-	-
	CR 16A to CR 2209	-	-	-	-	-	-	-	-	-	-	C	2	C	2
	CR 210 to CR 2209	**D**	2	A	2	C	3	**D**	2	**D**	2	-	-	-	-
	CR 2209 to Race Track Rd	C	3	-	-	**D**	3	C	3	C	3	-	-	-	-
	WB east of I-95	**D**	3	A	2	C	4	**D**	3	**D**	3	C	2	C	2
	WB west of I-95	**D**	3	-	-	**D**	3	**D**	3	**D**	3	-	-	-	-

3.3.3 What measures are proposed to avoid or minimize effects on traffic during construction?

FDOT will develop a traffic management plan that will be implemented by the contractor during construction. The plan will include:

- Traffic management and signage,
- Access to local businesses and residences,
- Detour routes,
- Public notification and alternate routes,
- Emergency services coordination, and
- Project scheduling.

These measures will help to keep the public informed of construction activities and potential delays, and maintain access for critical emergency services as well as area residents and businesses.

3.4 EMERGENCY EVACUATION

This section summarizes the results of the emergency evacuation analysis. Refer to the *Evacuation Analysis Report* located on the enclosed CD for more information.

Proposed project would provide alternate evacuation routes

Hurricane Katrina

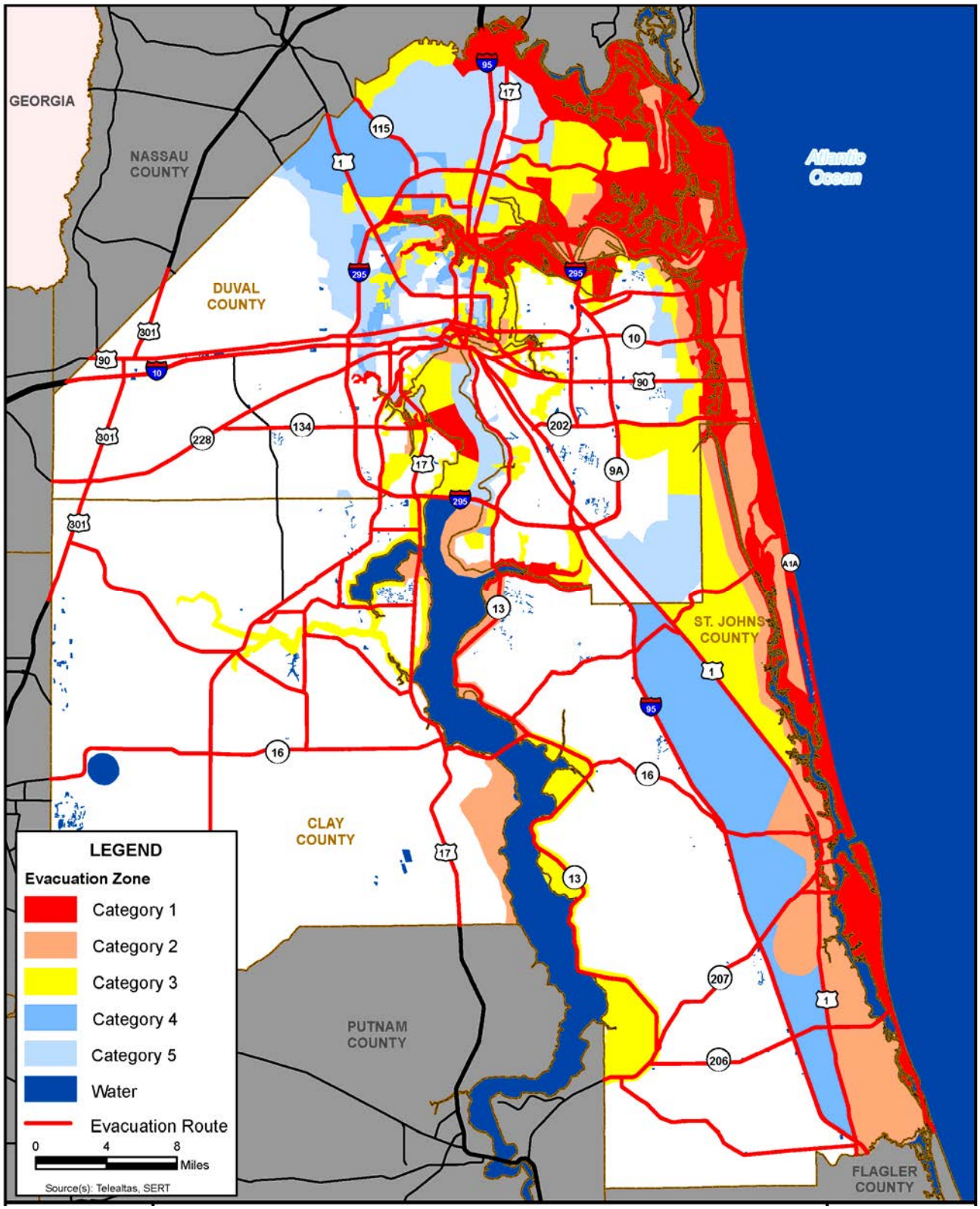
Hurricane evacuees waiting for congestion to clear

3.4.1 What existing conditions were factored into the evacuation analysis?

The evacuation analysis evaluates the Build Alternatives relative to their potential use as evacuation routes in the case of hurricanes, wildfires, or other events that require the evacuation of people from the coastal region. Although the Build Alternatives pass through St. Johns and Clay Counties, it is important to consider the evacuation demands of the entire region, since the general direction of evacuation is northwest. According to the *Northeast Regional Planning Council 2005 Hurricane Evacuation Study Technical Report*, an estimated 71,231 Clay County, 460,170 Duval County and 158,359 St. Johns County residents will potentially evacuate during a Category 5 hurricane. Of these residents, approximately 23,013 (estimated shelter capacity in Clay, Duval and St. Johns Counties) can be served by local public shelters. An additional 195,642 persons are likely to evacuate during a Category 5 hurricane from the surrounding counties including Baker, Flagler, Nassau and Putnam. This results in St. Johns County and Clay County having to compete with neighboring counties for capacity on the limited number of evacuation routes. **Exhibit 3-4** displays the existing hurricane evacuation zones and routes in the study area.

Traffic from Clay and St. Johns Counties contributes to the travel demand and congestion on Duval County's roads during an evacuation. This becomes particularly significant for heavily impacted roadways such as I-10, I-95, I-295, SR 16, US 17 and SR 100. SR 16 and SR 100 are among the two most heavily used evacuation routes for Clay County residents. Both of these routes are two-lane facilities that carry in excess of 8,000 vehicles away from the coast and river during a Category 4-5 hurricane. I-10 and I-95 are also heavily used by the region during an evacuation. Over 82 percent of the traffic leaving Duval County in an evacuation desires to travel west on I-10 and almost 60 percent of the evacuating traffic from St. Johns County travels north on I-95 to access I-10 westbound. For more information on evacuating traffic, refer to the *Evacuation Analysis Report* located on the enclosed CD.

Exhibit 3-4: **Hurricane Evacuation Zones**



3.4.2 How were evacuation needs analyzed?

To determine how the Build Alternatives meet hurricane and other evacuation needs, FDOT performed an analysis that assumed a Category 5 hurricane scenario and that the vehicles are exiting the region due to a lack of capacity at the local public shelters. FDOT used information from the *Northeast Regional Planning Council 2005 Hurricane Evacuation Study Technical Report* as the basis for their analysis. FDOT factored into the analysis the road segments in the area that serve as critical routes for evacuation identified in the technical report, calculated vehicle storage capacities, and determined the number of vehicles removed from the east side of the St. Johns River, which is prone to flooding during hurricane events (**see Exhibit 3-5**).

Roadway segments identified in the *Northeast Florida Regional Planning Council 2005 Hurricane Evacuation Study Technical Report* as critical to the control of the evacuating traffic include the following:

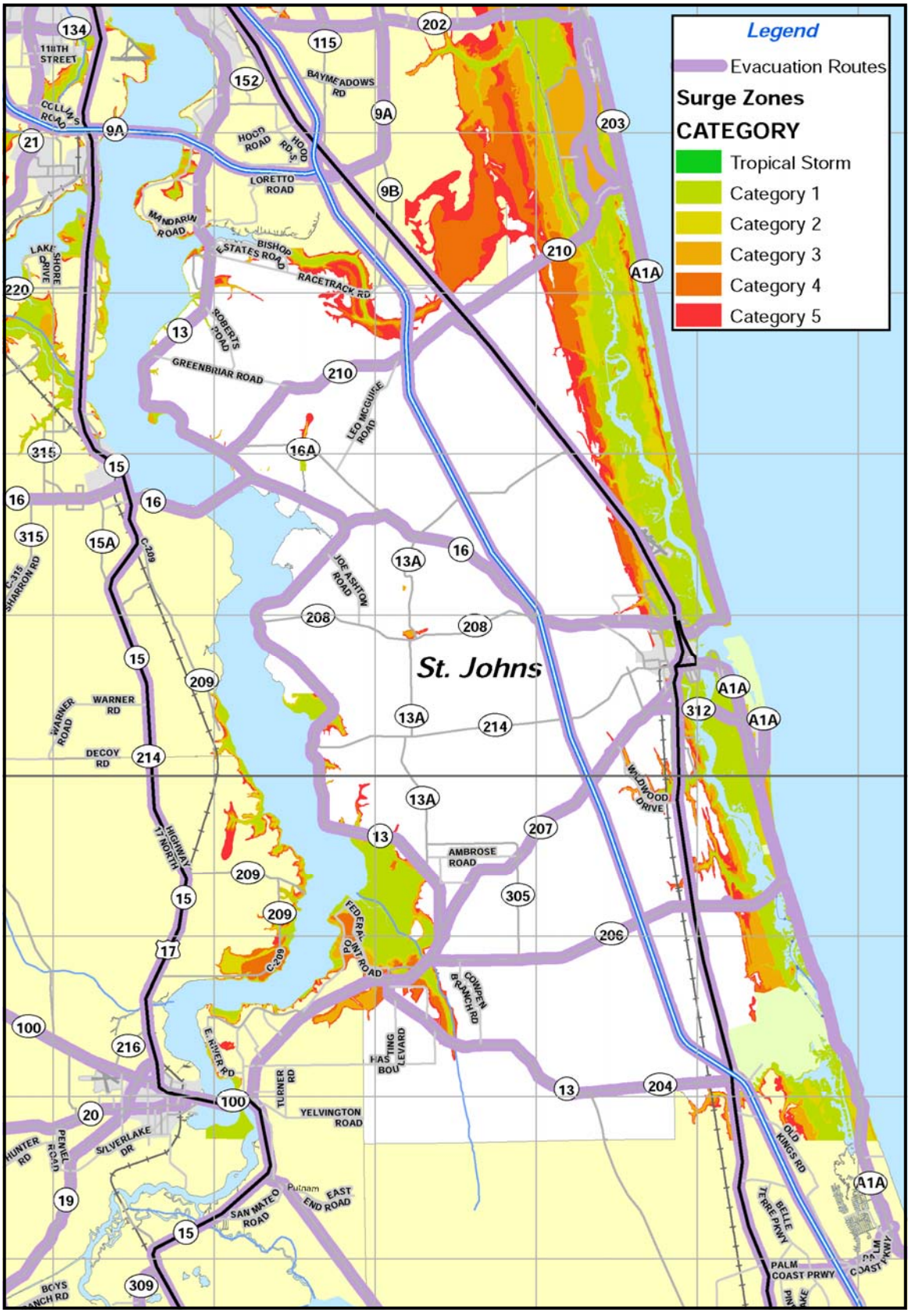
Duval County

- I-10 westbound from I-295 to Chaffee Road and continuing to Nassau County line
- Atlantic Boulevard between Girvin Road and US 90A
- I-10 westbound on-ramp from I-295
- I-295 northbound from Blanding Boulevard to I-10
- I-95 northbound and all on-ramps through downtown Jacksonville
- I-95 northbound from St. Johns County line to I-295
- Dames Point Bridge (high level wind vulnerability)

St. Johns County

- SR 16/Charles Usinas Highway between US 1/SR 5/Ponce de Leon Boulevard and I-95
- US 1/SR 5/Ponce de Leon Boulevard between Picolata Road/SR 17 and King Street
- SR 207 between US 1/SR 5 and I-95
- SR 206 between A1A and I-95
- I-95 northbound from St. Johns County line to I-295 in Duval County
- All I-95 on-ramps in the study area

Exhibit 3-5: **Storm Surge Zones**



Clay County

- SR 21/Blanding Boulevard between SR 16 and CR 224/College Drive
- SR 100 from SR 21 to out of region
- I-295 on-ramps

Once the most critical segments were identified, the existing traffic queue (delay) lengths and the vehicle storage capacities were calculated. First, lane miles were calculated by measuring the length of the roadway segment in the traffic queue, then multiplying the queue length by the number of lanes on the roadway segment. For example, a 30-mile queue on a highway with three lanes is equivalent to 90 lane miles of queue. Vehicle storage capacity was calculated by multiplying the lane miles by 5,280 feet (to convert lane miles to feet), then dividing by 20 feet (the average length of a vehicle) to estimate the number of vehicles that may be stored on the road in a queued condition. Using this method, the No-Build condition queue length was calculated at 329.80 lane miles, with 247.8 east of the St. Johns River, and 82.0 west of the river. (The No-Build condition, as described in Chapter 2, includes programmed, committed and funded projects included in the North Florida TPO 2030 LRTP. Therefore, the No-Build condition used for the evacuation analysis included the Branan Field-Chaffee Road link between I-10 and SR 21 which is currently under construction. (See the *Evacuation Analysis Report* located on the enclosed CD for further detail).

The next step in the analysis was to subtract the new lane miles created west of the St. Johns River for the different alternatives from the 247.8 lane mile queue east of the river under the No-Build condition. The result is the total queue length east of the St. Johns River . This is important because it provides a comparison for the number of vehicles removed east of the river in the areas prone to flooding during hurricanes.

3.4.3 How do the alternatives provide for emergency evacuation?

The evacuation analysis compares the ability of each alternative to move traffic away from the coastal areas and west of the St. Johns River. From this perspective, the best alternatives are those that best serve the evacuation needs of Clay, Duval and St. Johns Counties, while reducing the number of vehicles queued east of the St. Johns River in the areas prone to flooding during hurricanes.

All the alternatives provide some benefit by increasing the amount of roadway west of the St. Johns River. **Exhibit 3-6** summarizes the results of the analysis. The highlighted columns show the number of vehicles that will be removed from the I-95 corridor due to the construction of the new roadway from S.R. 21 to I-95, and the reduction in queuing east of the river due to the construction of new roadway west of the river. Depending on the alternative, lane miles west of the river increase between 20.62 and 43.69 lane miles over the No-Build condition. Although all the alternatives provide some evacuation benefit, the southern alternatives (Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2) provide the greatest amount of lane miles west of the St. Johns River. Consequently, these alternatives remove the highest number of people and vehicles from the areas on the east side of the St. Johns River prone to flooding during hurricanes. The southern alternatives remove over 5,000 more vehicles, on average, from east of the river when compared to the northern alternatives.

Although this analysis focuses on Clay, Duval and St. Johns Counties, the analysis has regional implications, since the majority of the regional evacuees are traveling north on I-95 through St. Johns County to access I-10 and travel west. Due to the limited number of lanes on I-10 west of I-295, a significant queue will form at this location and is estimated to contain over 87,000 vehicles and reach a maximum of 132 miles in length (See the *Evacuation Analysis Report* located on the enclosed CD for further detail). None of the proposed Build Alternatives resolve this issue. Only the creation of additional lanes on I-10 or the construction of a parallel facility will ease this congestion and reduce clearance times.

Exhibit 3-6: **Alternative Comparison of Queue in Lane Miles and Vehicles**

Alternative	New Lane Miles East of SR 21	Lane Miles West of River	Vehicles Removed from I-95	New Lane Miles West of River	Lane Miles of Queue East of River (including bridge)	Vehicles in Queue East of River
No Build	N/A	96.00	N/A	N/A	233.80	61,723
NORTHERN ALTERNATIVES						
Black	75.64	102.62	19,969	20.62	227.18	59,977
Purple	65.94	103.01	17,409	21.01	226.79	59,874
SOUTHERN ALTERNATIVES						
Brown 1 and 2	72.60	125.69	19,167	43.69	204.11	53,886
Orange 1 and 2	74.79	124.03	19,744	42.03	205.77	54,324
Green 1 and 2	64.47	124.03	17,019	42.03	205.77	54,324
Pink 1 and 2	65.11	125.69	17,188	43.69	204.11	53,886

3.5 NOISE

3.5.1 How was noise evaluated?

FDOT used the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM) to predict traffic noise levels for the St. Johns River Crossing Project Build Alternatives. This program estimates the noise level at a noise sensitive site (the receiver) from a series of roadway segments (the source). The TNM program uses data on the volume and types of vehicles traveling the roadway, vehicle speed and roadway path, and the presence of barriers between the road and receiver, such as berms, building rows and dense trees. All measured and predicted noise levels are expressed in decibels (dB) using an A-scale (dBA) weighting. All noise levels are reported as hourly equivalent noise levels (Laeq1h). The Laeq1h is defined as the steady-state sound level that, in a given hourly period, contains the same acoustic energy as the time-varying sound for the same hourly period." In July 2010, FHWA revised portions of their noise policy contained in Title 23 CFR, Part 772. The noise analysis has therefore been updated since the Draft EIS to follow the revised policy and to incorporate the updated traffic numbers.

The adjacent land use along the Clay County portion of the study area consists of silviculture, light industrial and commercial uses, a golf course, the Bayard Conservation Area, and scattered pockets of residential development. In the St. Johns County portion, land use consists of vacant land, silviculture, the Twelve Mile Swamp Conservation Area, scattered residences in rural areas, and areas of residential Developments of Regional Impact (DRIs), particularly between County Road (CR) 16A and CR 210.

The FHWA has established Noise Abatement Criteria (NAC) for different land use activity categories. These criteria determine when noise abatement analysis is required. The analysis for the Build Alternatives used the residential land use Category B with a corresponding 67.0 decibel (dBA) NAC. However, FDOT requires that noise abatement and mitigation measures also be considered whenever predicted project noise levels approach the FHWA criteria within one decibel, or 66.0 dBA. In addition, even when project noise levels are *below* the NAC, abatement considerations may also be warranted if the predicted levels show a substantial increase, i.e., 15 dBA or more, over existing levels.

This section summarizes the results of the traffic noise analysis. The *Noise Study Report* is available at the FDOT District Two Office in Lake City, Florida and on the enclosed CD.

Noise Abatement Criteria (NAC)

The level at which noise requires action to be taken varies depending on the use of the property:

A – Lands on which serenity and quiet serve an important public need: 57 dBA.

B – Residential: 67 dBA.

C – Recreation areas, schools, churches, libraries and hospitals: 67 dBA.

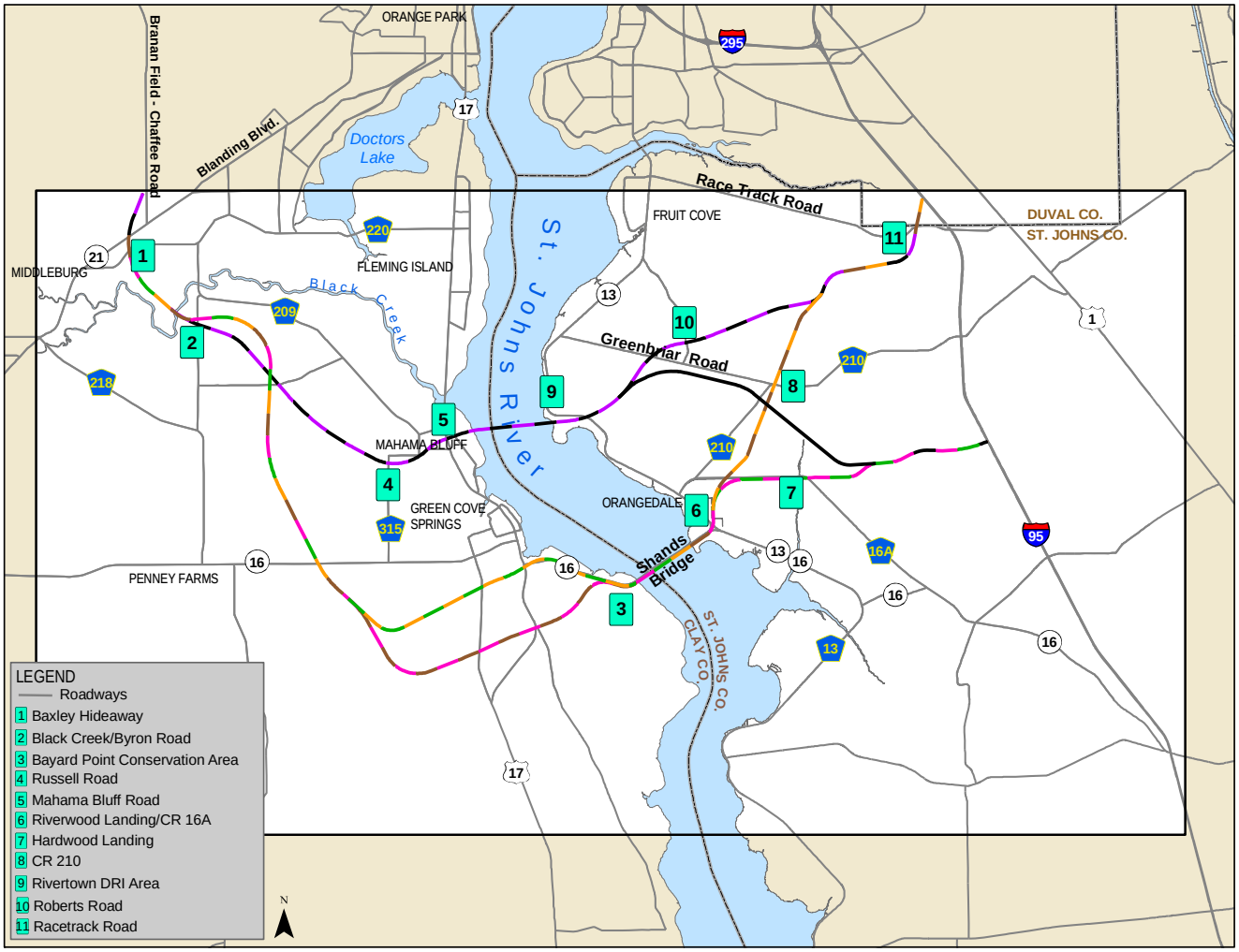
E – Commercial and other developed land: 72dBA.

Areas where the St. Johns River Crossing project may approach (within 1 dBA) or exceed the NAC require additional analysis to determine whether mitigation is feasible.

Typical noise wall

Black Creek Bridge

Exhibit 3-7: **Noise Monitoring Locations**



Before the TNM can be used to predict traffic noise, field measurements are required to validate the model. Because this is a new alignment project with no existing roadways in some areas, measurements are also needed to verify the existing noise conditions. FDOT measured existing noise levels at the eleven monitoring locations listed on the following page and shown on **Exhibit 3-7**. These locations were selected for measurement because of their proximity to the proposed alternatives and because they represent noise sensitive sites.

Typical ambient noise meter

- *Baxley Hideaway* – near western terminus of all alternatives
- *Black Creek / Byron Road* – near all alternatives
- *Bayard Point Conservation Area* – near St. Johns River crossing for all alternatives except Black and Purple
- *Russell Road* – vacant land representative of single-family homes adjacent to CR 315 near Black and Purple Alternatives

- *Mahama Bluff Road* – near Black and Purple Alternatives
- *Riverwood Landing / CR 16A* – near all alternatives except Black and Purple
- *Hardwood Landing* – near the Pink and Green Alternatives
- *CR 210* – near the Orange and Brown Alternatives
- *Rivertown DRI Area* – near the Black and Purple Alternatives
- *Roberts Road* – near the Black and Purple Alternatives
- *Race Track Road* – near the eastern terminus of the Black, Purple, Brown and Orange Alternatives

Monitoring data at locations near existing roadways included traffic data such as the number of passenger cars, medium trucks, buses, motorcycles, and heavy trucks, as well as the average speed for each vehicle type. FDOT used the monitoring data from these sites to make sure that the TNM computer model properly predicted the noise levels for those areas along roadways to within 3 dBA of the field measurements. **Exhibit 3-8** shows the comparison between the averaged field-measured noise level and the TNM-predicted noise level at the eleven monitoring sites. As indicated on this table, the model was

Exhibit 3-8: **Noise Model Validation Results**

Monitor Site	Averaged Field Measurement (dBA)	TNM Prediction (dBA)	Difference (dBA)	Validated
1: Baxley Hideaway	52.2	NA*	N/A*	N/A*
2: Black Creek / By-ronRoad	51.6	NA*	NA*	N/A*
3: Bayard Point Conservation Area	62.4	64.9	2.5	Yes
4: Russell Road	59.5	62.4	2.9	Yes
5: Mahama Bluff Road	53.8	N/A*	N/A*	N/A*
6: Riverwood Landing / CR 16A	60.9	N/A*	N/A*	N/A*
7: CR 16A/Hardwood Landing	54.9	52.1	2.8	Yes
8: CR 210	54.4	57.4	3.0	Yes
9: Rivertown DRI Area	56.0	58.8	2.8	Yes
10: Roberts Road	54.0	N/A*	N/A*	N/A*
11: Race Track Road	59.8	58.5	1.3	1.3

* = Site not located near roadway with measurable traffic volumes. Model could not be used for validation purposes.

validated and capable of calculating existing steady-state and future traffic noise for this project. After the model was verified, it was used to predict existing and future traffic noise for the project.

To accurately predict future impacts, FDOT used traffic volumes producing the worst-case noise condition in the TNM modeling. The noisiest conditions occur with the maximum volume of free flowing traffic, a roadway Level of Service (LOS) C. LOS C volumes for the No Build and all Build Alternatives were obtained using FDOT guidance for each roadway type (FDOT, 2007). For interchange ramps, the predicted design hourly traffic volumes (DDHV) were used. Other traffic parameters, including a 9.8 percent peak hour factor, a 2.0 percent medium truck factor, and a 3.4 percent heavy truck factor were also obtained from the FDOT (see Appendix A of the *Noise Study Report* for detail on the traffic data used for the TNM analysis).

3.5.2 How will the alternatives affect noise levels?

For the noise analysis, only the Category B, C and E land uses discussed earlier were analyzed for noise impacts. Categories B and C carry a FHWA noise abatement threshold of 67.0 dBA and a FDOT threshold of 66.0 dBA; Category E carries a FHWA threshold of 72.0 and a FDOT threshold of 71.0. To determine which noise-sensitive sites might be affected by the Build Alternatives, the project team prepared a series of 66.0 and 71.0 dBA noise contours. These contours represent the approximate distance at which the FHWA 67.0 and 72.0 dBA noise abatement thresholds will be approached in the design year and where noise abatement consideration may be required. The distance of a noise contour from each alternative's centerline varied based on the number of lanes of each roadway segment and the proximity of the noise sensitive site. In general, where a 4-lane typical section is proposed, the critical noise contours lie approximately 240 and 125 feet from the proposed alignment centerline; for a 6-lane typical section, the contours lie approximately 340 and 200 feet from the proposed alignment centerline; and for an 8-lane typical section, the contours lie approximately 375 and 250 feet from the proposed alignment centerline. The number of sites that lie within the contours or are in proximity to the project where noise levels may increase 15.0 or more decibels varies between alternatives. There are 67 sites that lie within the contours for the Black and Purple Alternatives, 66 sites for the Brown 1 and 2 Alternatives, 81

Decibel (dBA)

A decibel describes the difference between measured sound pressure levels. For traffic noise purposes, the A-weighted scale is used, which closely approximates the frequency range of human hearing. The A-weighted decibel is abbreviated dBA.

Most people cannot perceive a difference in sound levels of less than 3 dBA.

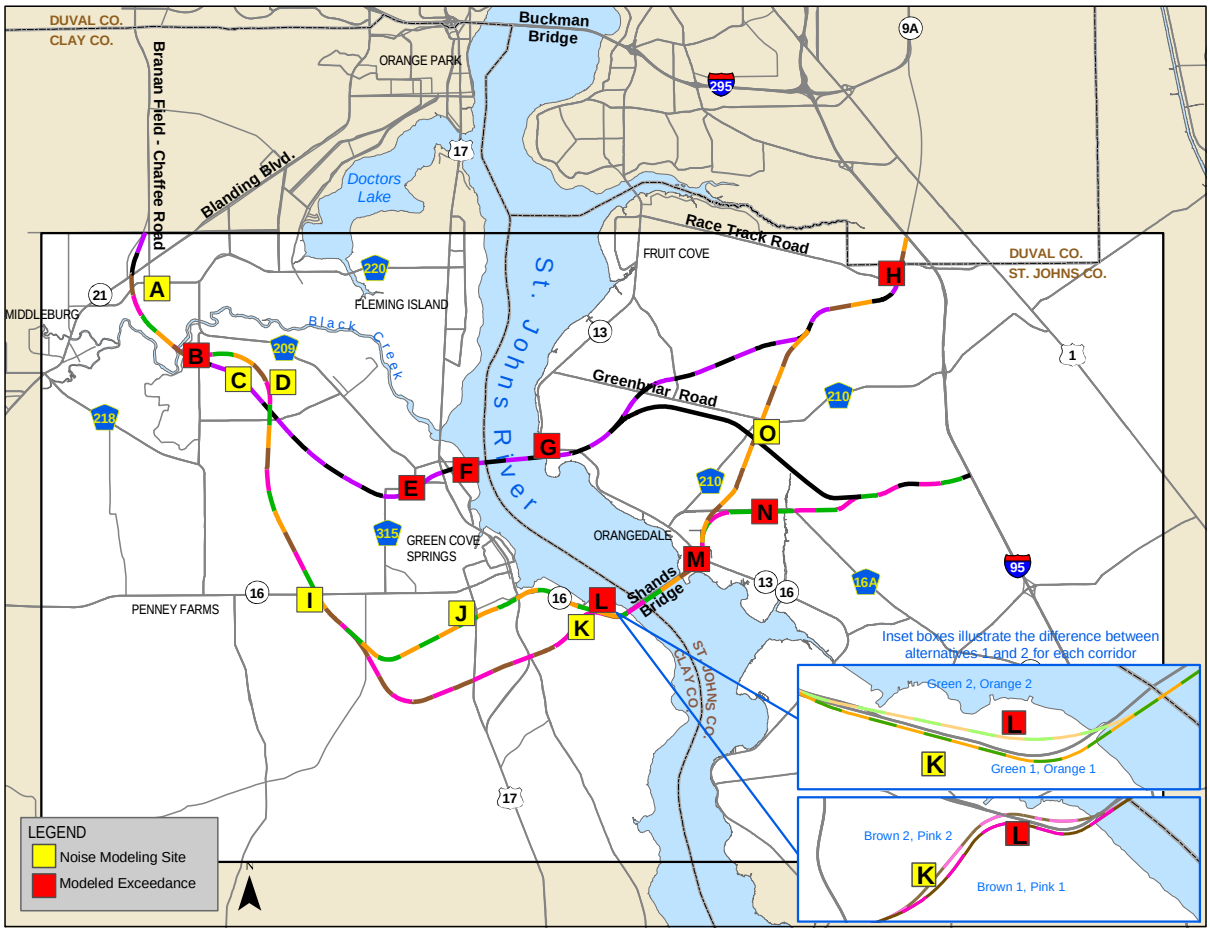
sites for the Orange 1 Alternative, 82 sites for the Orange 2 Alternative, 73 sites for the Green 1 Alternative, 74 sites for the Green 2 Alternative, and 71 sites for the Pink 1 and 2 Alternatives.

To facilitate the noise analysis, receptors were identified to represent the potentially impacted noise sensitive sites identified within the contours. These representative receptors were chosen because they are comparable with other nearby sites (i.e., they are at similar distances from the proposed alternative and are in the same general location). There were 38 analysis receptors identified for the Purple Alternative, 39 receptors for the Black Alternative, 35 receptors for the Brown 1 Alternative, 36 receptors for the Brown 2 Alternative, 46 receptors for the Orange 1 Alternative, 47 receptors for the Orange 2 Alternative, 43 receptors for the Green 1 Alternative, 44 receptors for the Green 2 Alternative, 40 receptors for the Pink 1 Alternative, and 42 receptors for the Pink 2 Alternative.

Exhibit 3-9 shows the generalized locations of sites modeled for noise impacts, and the sites where traffic noise impacts are expected for each alternative. (Note that, for each square shown on the map, there may be multiple noise-sensitive sites.) Site-specific locations of modeled sites for each Build Alternative and information on the 66.0 dBA noise contours are provided in the *Noise Study Report* located on the enclosed CD.

Exhibit 3-10 shows the comparison of the number of sites impacted by noise for the Build Alternatives. Specific noise levels for each modeled site are shown in **Exhibit 3-11** for each alternative.

Exhibit 3-9: **Location of Noise Impacts**



Key:

- A Baxley Hideaway & CR 220 (BH 1 & CR 220 1-2)
- B Black Creek (BC 1-6)
- C Rolling Hills (RH 1-3)
- D Sandridge (S1-2)
- E Green Cove (North GC1-14)
- F Mahama Bluff (M1-8)
- G North SR 13 (1-3)
- H Racetrack Road (RT1-4)
- I Pier Station (PS 1)
- J Green Cove (South GC 1-2)
- K Bayard Point Conservation Area (BCA 1-2)
- L Bayard & Susan Drive (B1-4 & S1)
- M Riverwood Landing, Shands Landing South SR13, Bartram Oaks & Ranchwood (RW1-3,SL1,South SR13 1-3, BO1-5, & Ranch 1-3)
- N SR 16A & Hardwood Landing (SR16A-1 & HL1)
- O CR 210 (1-2)

The noise analysis indicates that increased traffic will occur with implementation of the any of the Build Alternatives. In the residential areas where there are no existing major roadways or where receivers are located a far distance from an existing roadway, but in close proximity to a Build Alternative, noise level increases are substantial (15.0+ dBA).

Exhibit 3-10: **Noise Impacts Comparison**

Alternative	Number of Sites Modeled	Number of Modeled Sites with Noise Impacts [1]
Black	67	37
Purple	67	37
Brown 1	66	46
Brown 2	66	43
Orange 1	81	57
Orange 2	82	55
Green 1	73	47
Green 2	74	46
Pink 1	71	48
Pink 2	71	46

[1]Noise impacts are defined as levels above 66 dBA and/or sites where existing noise levels would increase by 15 dBA or more.

Throughout the project study area and specifically within the Bayard Conservation Area, the project's Wildlife and Habitat Discipline Report and the Endangered Species Biological Assessment both indicate that construction activities for the proposed project will have noise impacts on wildlife and associated habitats within the immediate vicinity of the project. Further discussion of methods used to minimize these impacts is presented in Section 3.5.4 of this EIS.

Exhibit 3-11: **Noise Analysis Summary**

Representative Noise Receiver		Predicted Noise Levels (dBA) by Alternative										
Existing/No-Build	Noise Sensitive Sites * sf = single family	Existing/ No-Build	Pink 1	Purple	Black	Brown 1	Orange 1	Green 1	Pink 2	Brown 2	Orange 2	Green 2
Baxley Hideaway (BH)1	2 sf	57.9	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5	60.5
CR220-1	1 sf	49.0	66.6	66.6	66.6	66.6	66.6	66.6	66.6	66.6	66.6	66.6
CR220-2	1 sf	49.0	65.8	65.8	65.8	65.8	65.8	65.8	65.8	65.8	65.8	65.8
Black Creek 1	1 sf	51.6	70.2	71.3	71.3	70.2	70.2	70.2	70.2	70.2	70.2	70.2
BC2	1 sf	51.6	70.8	71.2	71.2	70.8	70.8	70.8	70.8	70.8	70.8	70.8
BC3	3 sf	51.6	65.5	71.5	71.5	65.5	65.5	65.5	65.5	65.5	65.5	65.5
BC4	1 sf	51.6	68.3	66.3	66.3	68.3	68.3	68.3	68.3	68.3	68.3	68.3
BC5	1 sf	51.6	65.4	N/A	N/A	65.4	65.4	65.4	65.4	65.4	65.4	65.4
BC6	1 sf	51.6	70.3	N/A	N/A	70.3	70.3	70.3	70.3	70.3	70.3	70.3
Rolling Hills 1	3 sf	51.0	67.3	N/A	N/A	67.3	67.3	67.3	67.3	67.3	67.3	67.3
RH2	6 sf	51.0	66.2	N/A	N/A	66.2	66.2	66.2	66.2	66.2	66.2	66.2
RH3	6 sf	51.0	66.1	N/A	N/A	66.1	66.1	66.1	66.1	66.1	66.1	66.1
RH1a	3 sf	51.0	62.4	N/A	N/A	62.4	62.4	62.4	62.4	62.4	62.4	62.4
RH2a	5 sf	51.0	62.3	N/A	N/A	62.3	62.3	62.3	62.3	62.3	62.3	62.3
RH3a	1 sf	51.0	62.1	N/A	N/A	62.1	62.1	62.1	62.1	62.1	62.1	62.1
Pier Station (PS) 1	2 sf	63.8	64.7	N/A	N/A	64.7	64.7	64.7	64.7	64.7	64.7	64.7
Green Cove 1	1 sf	51.6	N/A	N/A	N/A	N/A	63.0	63.0	63.0	N/A	63.0	63.0
GC2	1 sf	51.6	N/A	N/A	N/A	N/A	61.2	61.2	61.2	N/A	61.2	61.2
Bayard Point Conservation Area 1	1 (Caretaker's House)	59.9	N/A	N/A	N/A	N/A	N/A	N/A	61.5	61.5	61.5	61.5
BCA 2	1 (Trail Head)	60.3	>66.0	N/A	N/A	>66.0	>66.0	>66.0	65.4	65.4	65.4	65.4
Bayard Point 1	2 sf	63.2	70.8	N/A	N/A	70.8	75.7	73.1	68.0	68.0	68.0	73.1
B2	1 sf	48.7	65.3	N/A	N/A	65.3	70.9	66.7	62.1	62.1	62.1	66.7
B3	2 sf	61.9	68.7	N/A	N/A	68.7	72.8	68.8	65.5	65.5	65.5	68.8
B4	3 sf	49.1	70.1	N/A	N/A	70.1	67.2	63.4	67.0	67.1	67.1	63.4
Susan Drive (S)1	1 sf	62.1	69.1	N/A	N/A	69.1	69.1	69.1	69.1	69.1	69.1	69.1
Riverwood 1	1 sf	62.2	69.9	N/A	N/A	69.9	69.9	69.9	69.9	69.9	69.9	69.9
RW2	1 sf	64.2	70.3	N/A	N/A	70.3	70.3	70.3	70.3	70.3	70.3	70.3
RW3	1 sf	48.2	70.1	N/A	N/A	70.1	70.1	70.1	70.1	70.1	70.1	70.1
Shands Landing (SL) 1	1 sf	49.2	70.5	N/A	N/A	64.9	70.5	70.5	70.5	64.9	70.5	70.5
South SR13-1	1 sf	66.5	69.9	N/A	N/A	66.8	69.9	69.9	69.9	66.8	71.7	69.9
South SR13-2	1 sf	68.9	71.7	N/A	N/A	69.9	71.7	71.7	71.7	69.9	69.9	71.7
South SR13-3	1 sf	66.5	70.7	N/A	N/A	68.4	70.7	70.7	70.7	68.4	70.7	70.7
Bartram Oaks 1	2 sf	53.1	65.3	N/A	N/A	N/A	65.3	65.3	65.3	N/A	65.3	65.3
BO2	2 sf	49.0	67.5	N/A	N/A	N/A	67.5	67.5	67.5	N/A	67.5	67.5
BO3	1 sf	49.0	66.3	N/A	N/A	N/A	66.3	66.3	66.3	N/A	66.3	66.3
BO4	3 sf	49.0	67.1	N/A	N/A	N/A	67.1	67.1	67.1	N/A	67.1	67.1
BO5	1 sf	49.0	67.7	N/A	N/A	N/A	67.7	67.7	67.7	N/A	67.7	67.7
Ranchwood1	1 sf	47.6	63.7	N/A	N/A	N/A	63.7	63.7	63.7	N/A	63.7	63.7
Ranch2	1 sf	47.6	63.2	N/A	N/A	N/A	63.2	63.2	63.2	N/A	63.2	63.2
Ranch3	1 sf	47.6	64.6	N/A	N/A	N/A	64.6	64.6	64.6	N/A	64.6	64.6

Exhibit 3-11: **Noise Analysis Summary Cont.**

Representative Noise Receiver		Predicted Noise Levels (dBA) by Alternative										
Existing/No-Build	Noise Sensitive Sites * sf = single family	Existing/ No-Build	Pink 1	Purple	Black	Brown 1	Orange 1	Green 1	Pink 2	Brown 2	Orange 2	Green 2
Ranch 4	1 sf	47.6	62.4	N/A	N/A	N/A	62.4	62.4	62.4	N/A	62.4	62.4
SR-16A 1	1 sf	59.0	68.2	N/A	N/A	N/A	N/A	68.2	68.2	N/A	N/A	68.2
SR-16A 2	1 sf	59.0	62.8	N/A	N/A	N/A	N/A	62.8	62.8	N/A	N/A	62.8
Hardwood Landing (HL) 1	1 sf	59.0	62.8	N/A	N/A	N/A	N/A	68.7	68.7	N/A	N/A	68.7
Sandridge 1	1 sf	51.0	N/A	57.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SR2	1 sf	51.0	N/A	60.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Green Cove 1	1 sf	49.6	N/A	64.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC2	1 sf	49.6	N/A	70.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC3	2 sf	49.6	N/A	70.0	70.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC4	2 sf	49.6	N/A	68.9	68.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC5	2 sf	49.6	N/A	66.9	66.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC6	1 sf	49.6	N/A	65.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC7	1 sf	49.6	N/A	63.1	63.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC8	3 sf	49.6	N/A	60.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC9	2 sf	49.6	N/A	63.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC10	1 sf	49.6	N/A	60.3	60.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC11	1 sf	49.6	N/A	60.2	60.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC12	1 sf	49.6	N/A	61.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC13	5 sf	57.7	N/A	60.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC14	1 sf	58.4	N/A	58.3	58.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mahama Bluff 1	3 sf	57.5	N/A	63.1	63.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M2	3 sf	52.3	N/A	70.5	70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M3	1 sf	51.0	N/A	64.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M4	2 sf	51.0	N/A	63.7	63.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M5	2 sf	51.0	N/A	74.9	74.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M6	2 sf	51.0	N/A	69.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M7	1 sf	51.0	N/A	60.9	60.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M8	4 sf	51.0	N/A	57.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North SR13-1	2 sf	55.0	N/A	70.6	70.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North SR13-2	2 sf	55.0	N/A	73.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North SR13-3	2 sf	55.0	N/A	69.8	69.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CR210-1	1 sf	54.7	N/A	N/A	N/A	58.8	58.8	N/A	N/A	58.8	58.8	N/A
CR210-2	1 sf	54.7	N/A	N/A	N/A	58.4	58.4	N/A	N/A	58.4	58.4	N/A
Racetrack 1	2 sf	63.6	N/A	74.9	73.7	73.7	73.7	N/A	N/A	73.7	73.7	N/A
RT2	3 sf	63.6	N/A	68.1	66.4	66.4	66.4	N/A	N/A	66.4	66.4	N/A
RT3	2 sf	63.6	N/A	69.3	67.8	67.8	67.8	N/A	N/A	67.8	67.8	N/A
RT4	2 sf	63.6	N/A	71.8	70.4	70.4	70.4	N/A	N/A	70.4	70.4	N/A

3.5.3 What measures are proposed to avoid or minimize noise impacts during operation?

A number of noise abatement techniques were evaluated for feasibility, using guidelines outlined in the FDOT Project Development and Environment (PD&E) Manual. The following four measures were not deemed feasible for this project for reasons summarized herein:

- *Traffic management measures* that limit vehicle speed, volume, and time of day operations, were not considered viable because one purpose of this project is to provide an alternate route from I-10 to I-95.
- *Alignment modification* involves positioning the roadway at sufficient distances from noise sensitive areas to minimize traffic noise. All Build Alternatives were selected as viable alignments after an extensive corridor analysis. The alignments were positioned to lessen impacts to residential properties as much as practical.
- *Property acquisition programs* to provide noise buffer zones will be further evaluated during the design phase.
- *Land use controls* can be used to minimize development of noise sensitive sites that may be affected by traffic noise. However, there are no such controls in place at this time in Clay, St. Johns, or Duval Counties.

FDOT also evaluated noise barriers at twelve locations as the only viable means to mitigate traffic noise impacts associated with the proposed project.

Several factors are considered when analyzing barriers. The first factor is feasibility. Feasibility is focused on the ability of the noise barrier to reduce traffic noise to affected property owners. To achieve maximum sound reduction, a barrier must be proportioned to cast a large sound shadow. This is accomplished by the barrier being relatively long, continuous, and of sufficient height to achieve the FHWA's minimum-requirement of 5.0 dBA in noise reduction. A 5.0 dBA reduction is the point at which a lowered noise level is noticeable to a noise sensitive site and is the threshold for determining whether a site is benefited from a noise barrier. To determine noise reduction possibilities, barriers were first analyzed to ensure the 5.0 dBA minimum insertion loss can be achieved.

On a limited access facility such as the proposed corridor, noise barriers must be positioned within the FDOT rights of way, not obstruct safe access to adjacent properties and streets, and allow adequate driver visibility of the roadway from an adjacent driveway or side street. At some locations, site restrictions do not allow

construction of an adequately-long noise barrier along FDOT right of way, as is the case along Black Creek and the St. Johns River. In these instances, the team analyzed barriers positioned on the embankment shoulder, and where the shoulder terminates at the bridge, a wall on bridge structure. However, the eight-foot maximum height limitation of a structure barrier coupled with the structure barriers located at too great a distance from the impacted sites, did not provide the minimum 5.0 dBA of noise reduction to impacted receivers, thus rendering them ineffective. Similarly, several of the analyzed barriers are near side streets that require access openings. The noise analysis concluded that in these instances, such openings prohibit construction of a continuous noise barrier, and negate any benefit barriers at these locations could provide.

For those barriers that can achieve the minimum-required 5.0 dBA of noise reduction, the noise analysis determined the reasonableness of the barrier. Measures of reasonableness include: economics, calculated noise levels' and antiquity. To be deemed economically reasonable, the total cost to construct the barrier should not exceed $42,000 per benefited receiver, including additional right-of-way and/or easements needed. Estimated costs are calculated using the FDOT current statewide average of $30 per square foot. Another reasonableness measure is the relationship of calculated noise levels to the 66.0 dBA FDOT noise abatement consideration threshold. Abatement is less desirable if the noise levels are 1-3 dBA above the criterion and more desirable at 15 dBA over the criterion.

The remaining barrier areas could accommodate right-of-way barriers, but the noise analysis determined that the rural, low density land use that is prevalent throughout the alternative corridors makes construction of noise barriers cost prohibitive. None of the barriers meet the $42,000 cost per benefited receiver guideline. Based on these considerations, FDOT deemed that noise barriers are not reasonable or feasible at this phase of project development.

The one site not analyzed for noise barriers are the two trail heads in the Bayard Point Conservation Area. The trail heads are located near existing SR 16, at the edge of the conservation area, and are already exposed to traffic noise and nearby airport noise. The trailheads are categorized as Activity Category C and are within the 66.0 dBA critical noise contour for the Alternative Pink 1, Brown 1,

Orange 1 and Green 1 Alternatives but the adjoining parking lots that access the trail heads lie within the proposed right of way and will require relocation as part of this project. As of this report date, the relocation sites have yet to be determined. Consequently, a barrier analysis for the trail heads cannot be conducted until the parking lot relocations and trail access issues have been finalized. Therefore, FDOT has committed to reanalyzing this site for the feasibility of noise barriers during final design when relocation data is available, if one of these alternatives is selected.

Although no noise barriers are being proposed as mitigation at this time, FDOT is committed to reevaluating feasible noise abatement measures as part of the final design of the Preferred Alternative.

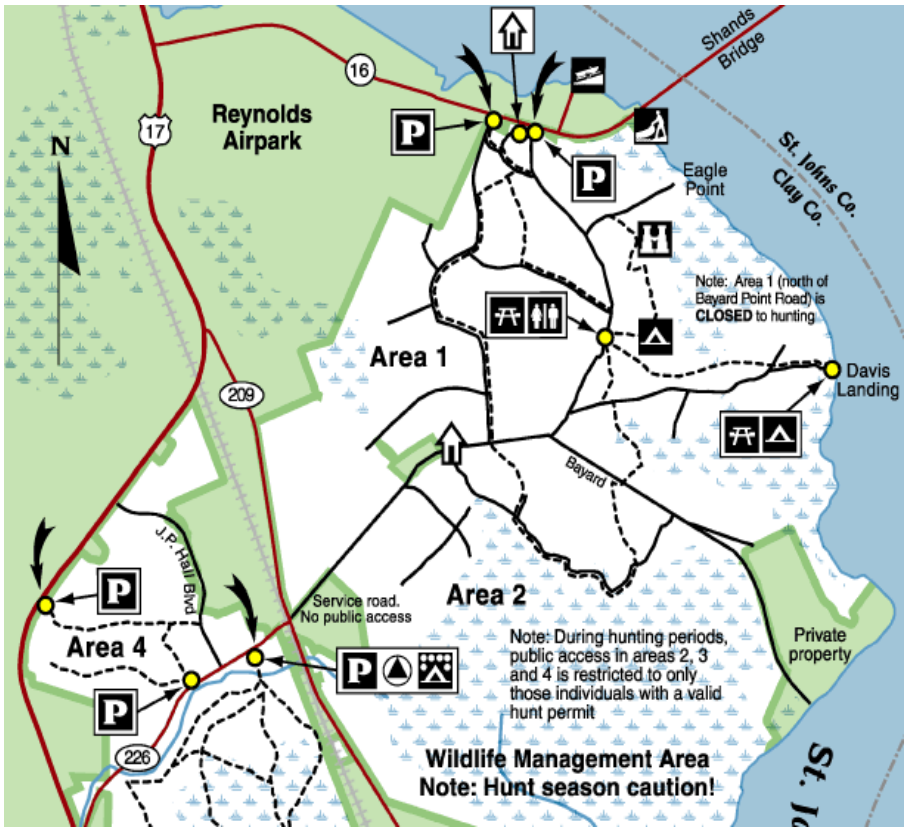
3.5.4 What measures are proposed to avoid or minimize noise impacts during construction?

Trucks, earth moving and pile driving equipment, pumps and generators are sources of noise and vibration during construction. Peak noise levels from these types of equipment are short in duration, but may vary from 70 to 100 dBA.

Construction of the proposed project will have a temporary impact on the noise-sensitive sites identified previously. A survey of construction noise and vibration sensitive receivers, including sites listed in *Table 17.2: Construction Noise and Vibration Sensitive Sites* of Part 2, Chapter 17 of the PD&E Manual, has been conducted and no additional receivers were identified.

The contractor will be required to adhere to the most current FDOT guidance for construction and any special provisions related to the control of noise and vibration impacts. The FDOT Standard Specifications contain the following requirements for construction noise and vibration control:

- The contractor shall operate only factory recommended exhaust mufflers on internal combustion engines;
- Pile driving operations will be restricted to the hours between 7:00 am and 10:00 pm to avoid interfering with any adjacent noise and/or vibration sensitive land uses or a different foundation design will be considered (i.e., a drilled shaft);
- Preformed pile holes will be required where they are in proximity to vibration-sensitive land uses to maximize vibration transfer;



The two Bayard Conservation Area trailheads near existing SR 16 are categorized as Category B lands.

- Back up alarm noise from heavy equipment and trucks will be minimized by requiring the contractor to operate in forward passes or a figure eight pattern when dumping, spreading, or compacting material;
- Adequate equipment maintenance procedures will be used to insure that the elimination of unnecessary noise caused by loose body parts on all construction equipment;
- Excessive tailgate banging by haul trucks will be prohibited;
- All stationary equipment shall be screened from noise sensitive receivers if the equipment is to operate beyond normal working hours. If feasible, the equipment shall be screened during normal working hours to reduce noise impacts;

- When feasible, the contractor shall establish haul routes to direct vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum; and
- Specific noise impact problems that may arise during construction of the project will be addressed by the FDOT Construction Engineer in cooperation with environmental staff.

This section summarizes the analysis of land use issues. See the *Economics and Land Use Discipline Report* located on the enclosed CD for more information.

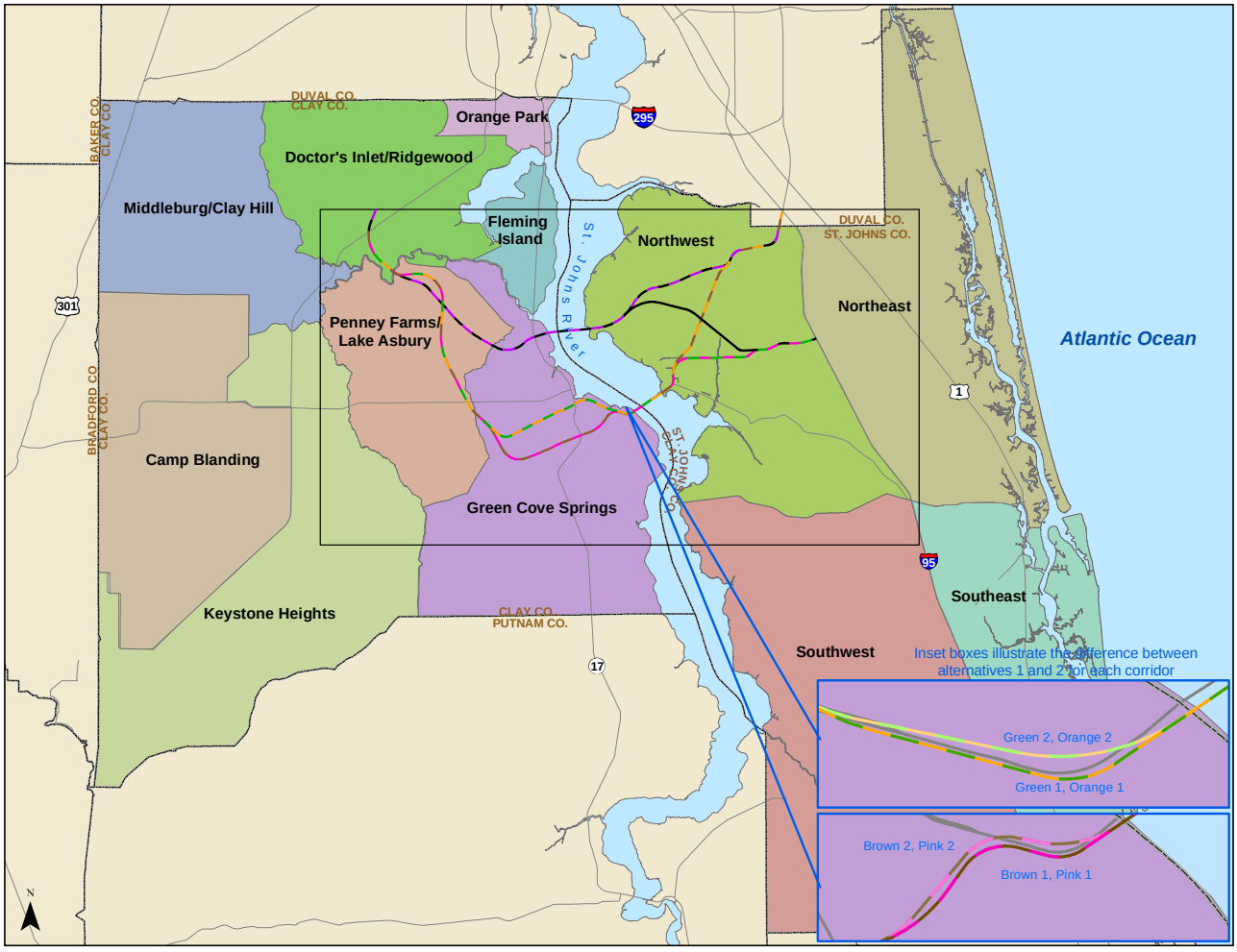
3.6 LAND USE

Over the past 20 years, northern Clay and St. Johns Counties have changed from a primarily rural and silviculture area to a suburbanized region of the Jacksonville area. The northern portion of Clay County is largely developed, and includes a mixture of residential and commercial land uses. As described in Chapter 1, northern St. Johns County is currently experiencing a much higher growth rate than Clay County and development mainly consists of residential land uses. The project area also contains agricultural and timber lands, conservation and recreation lands, and undeveloped areas.

3.6.1 What development is planned for the project area?

The planning areas and districts within the project area are shown on **Exhibit 3-13**. Between now and 2025, planned development in Clay County is ex-

Exhibit 3-12: **Planning Areas and Districts**



pected to occur primarily within three planning areas that the alternatives cross through: Doctor's Inlet/Ridgewood, Penney Farms/Lake Asbury, and Green Cove Springs. Most of the planned growth in St. Johns County will occur in the Northwest planning district, which also is crossed by all alternatives. The Northeast planning district is not directly crossed by the alternatives, but three large developments planned in this district lie near the eastern terminus of all but the Green 1 and 2 and Pink 1 and 2 Alternatives.

Exhibit 3-14 shows the major development projects, including Developments of Regional Impact (DRIs), expected to account for the majority of existing and future development in and near the alternative corridors. **Exhibit 3-15** summarizes the size and type of development planned and occurring in these areas. Most of these projects are currently undeveloped, sparsely developed, or developed to less than half of their approved or planned capacity. Development time frames vary from 10 to 25 years.

Exhibit 3-13: **Major Developments in the Study Area**

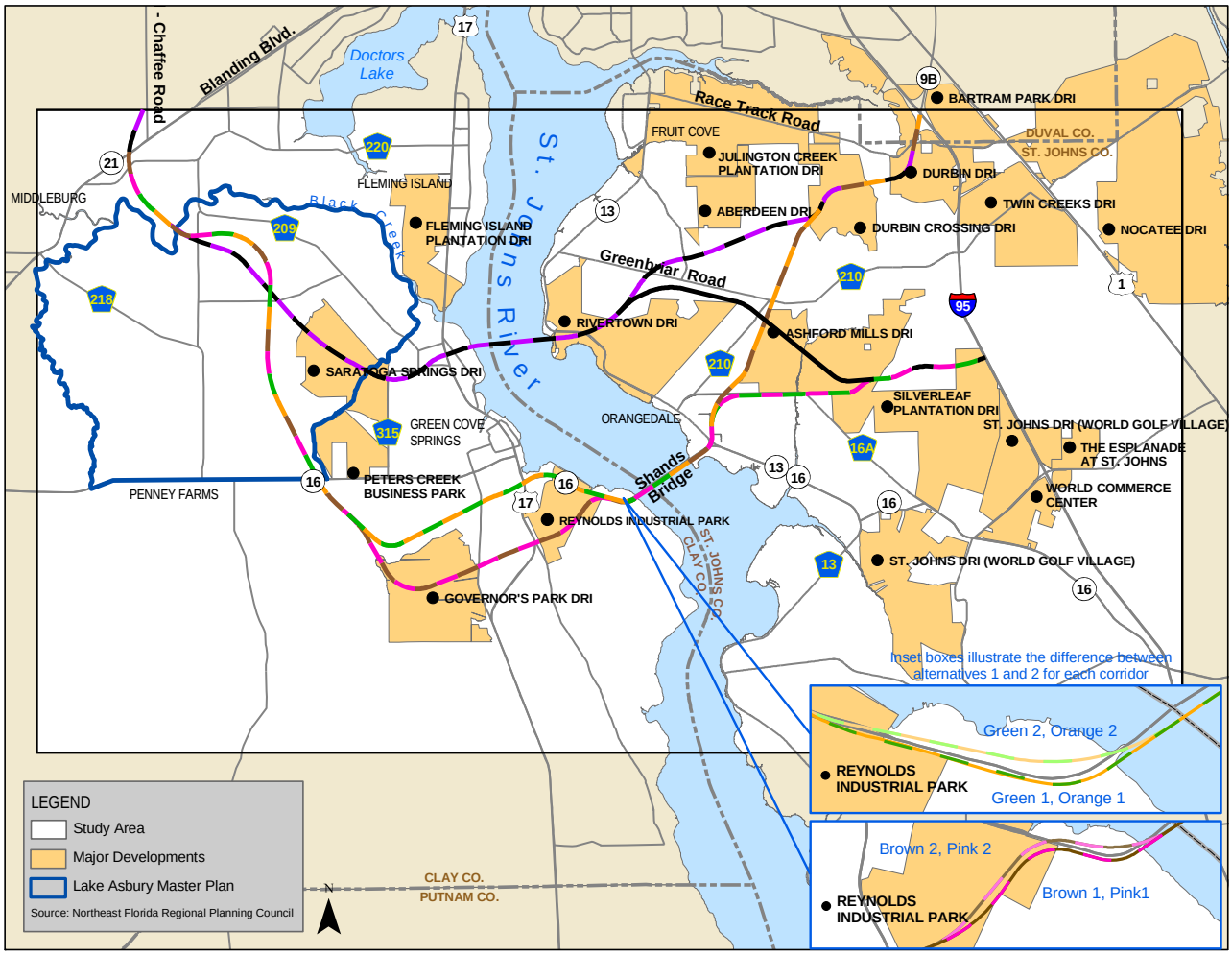


Exhibit 3-14: **Summary of Major Development Types and Sizes**

Development	Total Area (Acres)	Housing Units	Non-Residential Uses (square feet x 1000)
CLAY COUNTY			
Fleming Island Plantation DRI	2,120	3,790	1,450
Governor's Park DRI	3,267	6,000	3,540
Lake Asbury Master Plan Area	30,923	25,000	2,500
Peters Creek Business Park	1,044	227	2,540
Reynolds Industrial Park	1,700	2,800	1200
Saratoga Springs DRI	2,444	4,256	390
ST. JOHNS COUNTY			
Aberdeen DRI	1,316	2,018	100
Ashford Mills DRI	1,520	2,633	280
Durbin DRI	1,245	4,500	4,700
Durbin Crossing DRI	2,086	2,498	170
Julington Creek Plantation DRI	4,150	6,292	740
Rivertown DRI	4,170	4,500	500
Saint Johns DRI (World Golf Village)	6,414	7,200	5,540
Silverleaf Plantation DRI	7,285	10,700	1,730
World Commerce Center	1,000	1,156	3,563
Esplanade at St. Johns	946	1,400	2,612
Nocatee DRI	15,000	14,920	5,336
Twin Creeks DRI	3,050	5,000	2,900
Bartram Park DRI	3,600	5,288	4,925
Total	**93,280**	**110,178**	**44,576**

3.6.2 How will the proposed project affect land uses in Clay and St. Johns Counties?

The proposed project will affect land uses by converting acreage to road right-of-way. In addition, the project will increase access to some area DRIs, and potentially affect the rate of development in some areas. These effects are summarized below.

Conversion of land uses to right-of-way

With any of the Build Alternatives, existing and planned uses within the road-way corridor will be converted to project right-of-way. For all alternatives, land use conversions will affect residential, commercial, agricultural/timber, and undeveloped lands (some with wetlands). **Exhibit 3-16** summarizes the numbers of parcels and acres of each land use type that would be converted for each alternative, based on the 324-foot-wide right-of-way needed for the project.

Exhibit 3-15: **Land Use Conversions to Right-of-Way**

	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
TOTAL NUMBER OF PARCELS BY LAND USE TYPE										
Residential	59	57	42	57	43	58	39	54	38	53
Office/Commercial	9	9	3	3	6	6	6	6	3	3
Vacant/Undeveloped	81	52	51	61	50	53	32	35	33	43
Agricultural/ Timberland	83	52	66	66	71	71	52	52	47	47
Utilities	3	3	4	4	4	4	1	1	1	1
Subtotal	**235**	**173**	**166**	**191**	**174**	**192**	**130**	**148**	**122**	**147**
Other	38	46	40	30	53	53	53	53	40	30
Total	**273**	**219**	**206**	**221**	**227**	**245**	**183**	**201**	**162**	**177**
TOTAL ACRES BY LAND USE TYPE										
Residential	65	64	43	49	44	44	37	37	37	42
Office/Commercial	17	17	5	5	5	5	5	5	5	5
Vacant/Undeveloped	680	394	454	448	371	376	375	380	458	453
Agricultural/ Timberland	1000	596	893	893	972	972	920	920	841	841
Utilities	18	18	24	24	24	24	15	15	15	15
Subtotal	**1779**	**1090**	**1420**	**1419**	**1415**	**1420**	**1352**	**1357**	**1357**	**1356**
Other	128	211	304	291	239	219	238	219	304	291
Total	**1907**	**1301**	**1724**	**1710**	**1654**	**1639**	**1590**	**1576**	**1661**	**1647**

NOTE: Land use classifications in this table are based on parcel data, and do not correspond to other data in this document such as wetlands or habitat types which are based on field work and/or other GIS databases.

The amount of land converted to right-of-way varies by alternative. Total parcels affected range from a low of 162 on the Pink 1 Alternative to a high of 273 on the Black Alternative. Total impacted acres are lowest on the Purple Alternative (1301 acres) and highest on the Black Alternative (1907 acres). Conversion of residential parcels will be highest for the Black, Purple, Brown 2, and Orange 2 Alternatives and lowest for the Brown 1, Orange 1, Green 1 and Pink 1 Alternatives. Residential and commercial acreage are also highest along the Black and Purple Alternatives.

The proposed project could convert between 596 acres (Purple) and 1000 acres (Black) of agricultural and timber property in the study area. The United States Department of Agriculture (USDA) oversees the Farmland Protection Policy Act (FPPA). The Act's ultimate goal is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses.

For the purposes of implementing the FPPA, farmland is defined as prime or unique farmlands or farmland that is determined by the state or unit of local government agency to be farmland of statewide or local importance. According to the USDA Natural Resource Conservations Service's (NRCS) detailed soils database, no soils classified as "prime" farmland soils occur in the study area (NRCS, 2008). The NRCS's District Conservationist for St. Johns and Clay Counties was consulted on June 30th, 2008 and confirmed that no "unique" farmland occurs in the study area. Through coordination with the NRCS, it has been determined that no farmlands as defined by 7 CFR 658 are located in the project vicinity.

"Prime" vs. "Unique" Farmlands

"Prime" farmland, as defined by the United States Department of Agriculture (USDA), is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses.

"Unique" farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, fruits and vegetables.

Effects on DRIs

The Build Alternatives will directly impact some DRIs in the study area. As shown previously on **Exhibit 3-14**, seven DRIs will be crossed by the Black Alternative, four will be crossed by the Purple Alternative, five will be crossed by the Brown 1 and 2 and the Orange 1 and 2 Alternatives, and two will be crossed by the Green 1 and 2 and the Pink 1 and 2 Alternatives. Where a corridor crosses through a DRI, the affected lots will be converted to roadway right-of-way. The development rate for adjacent lots may slow down due to

the addition of transportation infrastructure. On the other hand, having the project located near a DRI can be a benefit. Developments within two miles of a road interchange are likely to grow faster than those that are farther away due to improved access (see the section addressing Socioeconomics, Communities and Neighborhoods in this document for more detail).

3.6.3 How will project construction affect land use?

Construction of the St. Johns River Crossing Project could require the temporary use of some land outside the right-of-way for equipment staging areas and access roads. However, FDOT and its contractors will not use any properties that have not been purchased for the project without first consulting with those owners. These potential temporary land uses will be minor and short term, and all such property will be restored to its pre-construction condition immediately following construction.

3.7 SOCIOECONOMICS, COMMUNITIES AND NEIGHBORHOODS

This section summarizes the analysis of social and economic issues, including effects to communities and neighborhoods. For more information, see the *Social Impacts Discipline Report,* the *Land Use and Economics Discipline Report,* and the *Conceptual Stage Relocation Plan* located on the enclosed CD.

Civil Rights Act

The project has been developed in accordance with the Civil Rights Act of 1964, as amended by the Civil Rights Act of 1968.

3.7.1 What information was used to understand social, economic and community issues?

To evaluate issues that may affect communities, neighborhoods and the people living within the study area, FDOT collected information on population trends, employment and economic issues, and community and neighborhood characteristics. United States Census Bureau (USCB) data was the primary source of information used for data on housing characteristics, labor force, occupations, major employers, age composition, vehicle ownership rates, mode of transportation to work, household income and the ability of the population to speak English. This section has been updated since the Draft EIS with data from the 2010 Census and the American Community Survey (ACS). FDOT evaluated the potential for a variety of social impacts, including traffic congestion, air quality, property accessibility, safety, impacts on neighborhoods and recreation opportunities, social cohesion, services, schools, aesthetics, and quality of life.

GIS data and other maps identified neighborhoods and facilities within or close to the study area. FDOT also reviewed comprehensive plans, and in some cases, plans for neighborhoods where available to identify planned road improvements, developments, and facilities.

3.7.2 What are the population and housing trends in the study area?

Population growth in Clay and St. Johns Counties largely depends on economic and job growth in Duval County. The Jacksonville Metropolitan Area crossed the one million population threshold in the 1990s and will approach 1.4-1.5 million by 2010. As described in Chapter 1, forecasts show that the combined populations of Clay and St. Johns Counties in 2040 will increase by more than 80 percent, from a 2010 population of 380,904 persons to approximately 692,763 persons by 2040 (Florida Bureau of Business and Economic Research).

Clay County issued permits for 17,000 new single family homes and 2,500 new multi-family units between 2000 through 2007 (Clay County Building Division, 2007). St. Johns County issued permits for 23,500 new single-family homes

and 4,600 new multi-family units during this same period (St. Johns County Permitting Department, 2007). For both counties, this is a substantial increase in activity from the 1990s and reflects both the dispersal of residential growth outside the Jacksonville area as well as a growing regional housing market. Permitted new single-family units actually peaked in 2005 and have fallen since, as homebuilders try to sell existing new houses rather than build more. Also, as discussed in Chapter 1, growth in the area has slowed with the downturn in the economy when compared to recent years, however, fluctuations in the market conditions are to be expected. The number of building permits issued in 2010 was 551 in Clay County and 1,268 in Johns County. Once the current housing and mortgage climate stabilizes, an average annual housing growth rate of around 7,000 units could occur over the long term, due to job growth in the Jacksonville area and a reputation for good schools and a high quality of life in the two counties.

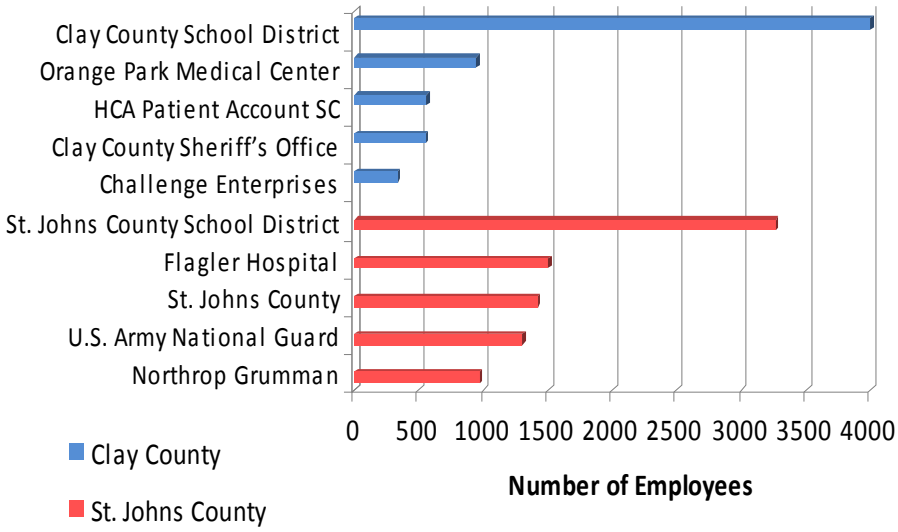
3.7.3 Where do people from the study area work and shop?

As described in Chapter 1, 56 percent of employed residents of Clay County and 40 percent of workers living in St. Johns County work outside these counties (ACS, 2005-2009). The reason for this commute is that the majority of office, industrial, and retail/commercial space and related jobs are located in Jacksonville (Jacksonville Regional Chamber of Commerce, 2006). Neither Clay nor St. Johns County has significant, existing concentrations of office space. Although Clay County has a comparatively minor amount of industrial related employment, St. Johns County has several large industrial employers outside of the study area. Retail development is somewhat more dispersed than office or industrial. The largest concentration, including three regional malls, is in Jacksonville and the greater metropolitan area south and east of the St. Johns River, which includes Clay and St. Johns Counties.

Clay County's unemployment rate for 2010 was 10.5 percent and St. Johns County's unemployment rate was 9.5 percent, which were both lower than the state and regional rates (BEBR, 2011). Retail trade, accommodation and food services, and health care and social assistance are the strongest sectors in St. Johns and Clay Counties (Florida Department of Economic Opportunity, 2010).

Clay and St. Johns Counties exhibit a wide range of large and unique employers. The majority of occupations, though, are found in the education, health care, government administration, business, community, military and manufacturing sectors (**Exhibit 3-16**).

Exhibit 3-16: **Top Five Employers**



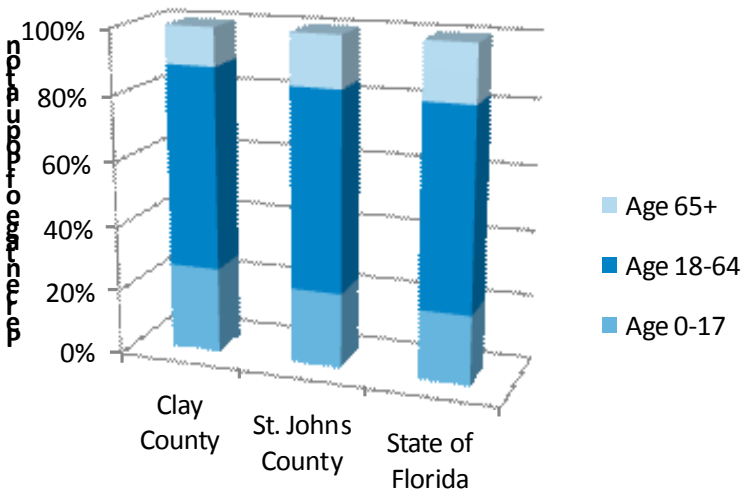
SOURCE: Clay County Chamber of Commerce, 2007; St. John's County Chamber of Commerce, 2007

3.7.4 What are the characteristics of residents in the study area?

Age

Age distribution of an area is one indication of its economic and income earning potential. An area with a higher percentage of working-age residents (18 to 64 years) generally has greater income earning potential. Conversely, areas with greater percentages of dependent populations typically have lower income earning potential. **Exhibit 3-17** shows the age distribution in the study area.

Exhibit 3-17: **Age Distribution**

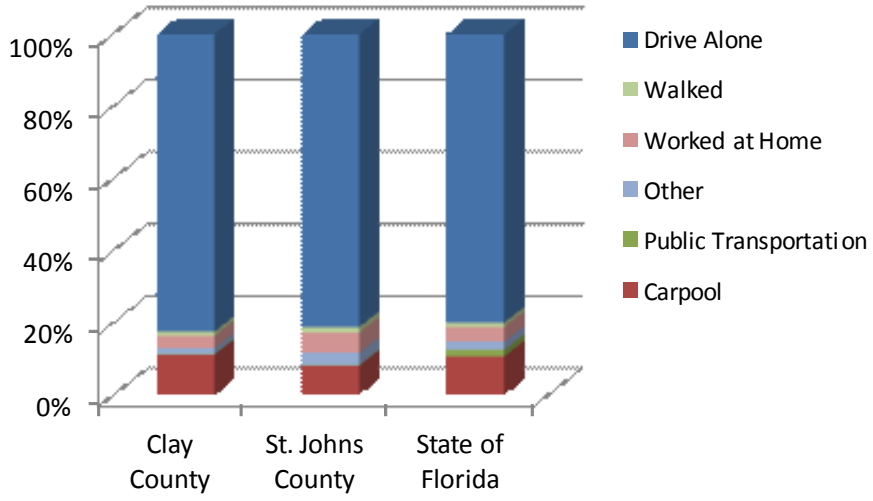


Source: 2010 U.S. Census

Vehicle Ownership and Transportation

Vehicle ownership rates can provide an idea of the dependency or potential need residents of a community have for alternative modes of transportation, such as friends, family or the public transportation system. The percentage of workers without vehicles available was 1.3 and 2.1 percent in Clay and St. Johns Counties. The private automobile is the primary means of transportation to work, and in Clay and St. Johns Counties, the majority of households own a vehicle (ACS, 2010). In fact, most people drive to work, over 80 percent in both counties. The use of public transportation and other alternative modes of transportation to work is generally low in the study area (**Exhibit 3-18**), as it is for the State of Florida in general.

Exhibit 3-18: **Household Transportation**



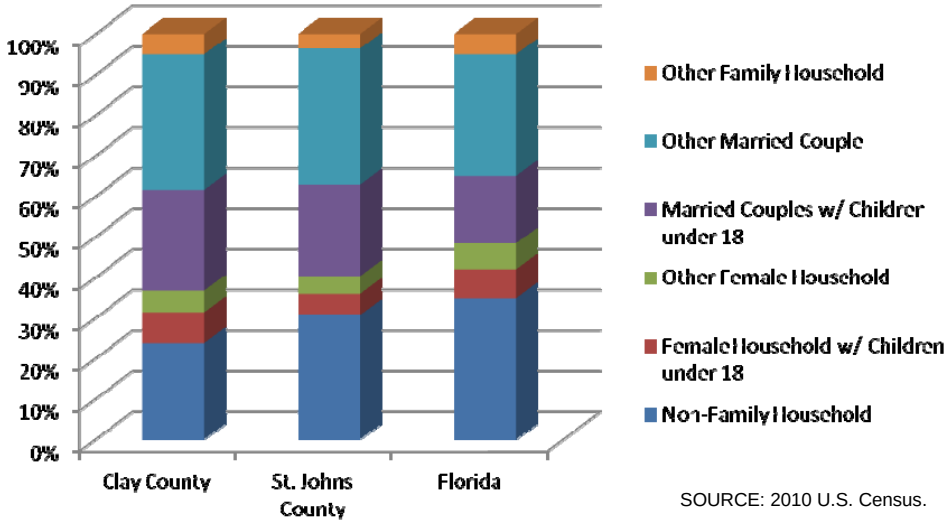
Source: ACS 2005-2009, 5-Year Estimates

Household Characteristics

Household characteristics can be used to measure an area's attractiveness for investment. Housing availability within the study area involves components such as total number of houses, occupancy, household types and size, vacancy rates, and median household income.

According to the 2010 Census, the average household size for the Clay County portion of the study area was 3.1 persons; the St. Johns County portion of the study area averages 3.0 persons per household, the same as the State of Florida average. However, both counties tend to have a smaller percentage of houses occupied by family households than the State of Florida overall (**Exhibit 3-19**).

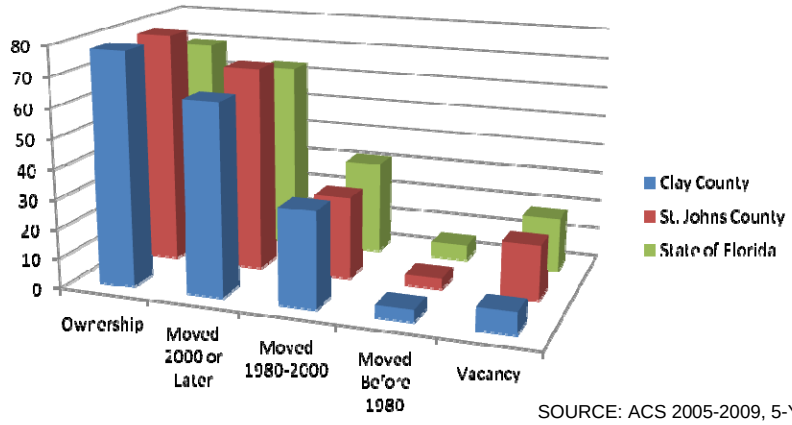
Exhibit 3-19: **Families and Households**



SOURCE: 2010 U.S. Census.

The home ownership rate in the study area is above the State ownership rate of 70 percent (**Exhibit 3-20**). Many families have moved to the area recently, but there is a near average amount of vacant housing, although in Clay County the vacancy rate is about half that for the state overall. Several areas of Clay County have a high concentration of single-family rental units including the area south of CR 218 near Blanding Boulevard and south of SR 16 in Green Cove Springs. There is also an area in St. Johns County near the Shands Bridge in which approximately 30 percent of the single-family residences are occupied by renters.

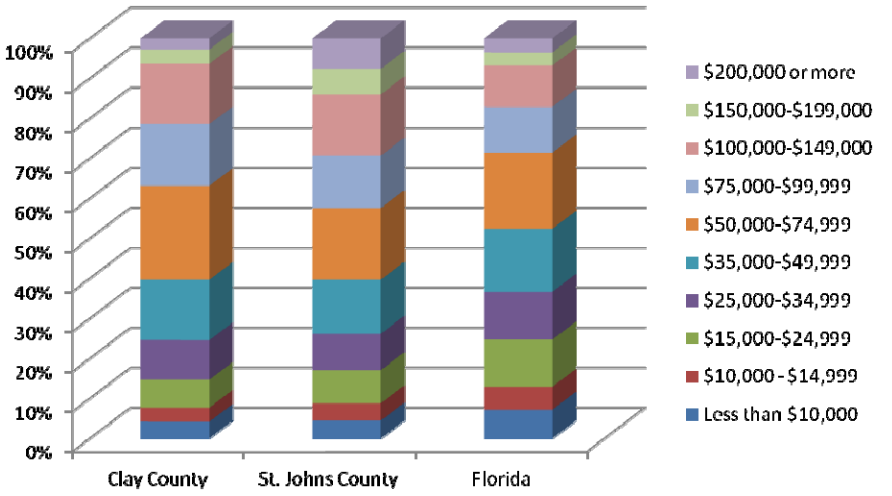
Exhibit 3-20: **Housing Characteristics**



SOURCE: ACS 2005-2009, 5-Year Estimates and U.S. Census 2010

According to the ACS 2005-2009 5-Year Estimates, the population in the study area contained a smaller percentage of people living below the federally-defined poverty level of $22,314 for a family of four than in the State of Florida overall (**Exhibit 3-21**). The majority of households in the study area are in the income range of $50,000 to $74,999, which is consistent with the household income ranges reported at the state level.

Exhibit 3-21: **Family Income**



SOURCE: ACS 2005-2009, 5-Year Estimates

3.7.5 How will the alternatives affect communities and neighborhoods?

Displacement and Relocation

FDOT prepared a *Conceptual Stage Relocation Plan* (CSRP) for the proposed project (FDOT, 2008), based on record searches and field verification. The purpose of the CSRP is to identify the nature and number of residents, businesses and non-profit organizations potentially displaced by each alternative. **Exhibit 3-22** summarizes the estimated displacements from each Build Alternative.

Residential relocations are highest for the Black, Purple, Brown 2, Orange 2, Green 2 and Pink 2 Alternatives. Business relocations are higher along the Purple, Black, Orange 1 and 2 and Green 1 and 2 Alternatives, due to clustered businesses in the Green Cove Springs area that would be displaced along these corridors. The Purple and Black Alternatives would displace 14 businesses in this area, including a pain clinic, two medical offices, three sales / general offices, automobile repair shop, barber shop, two recreational vehicle businesses, a bail bond company, gas station / convenience store, a seasonal

Social Impacts

The analysis of social impacts for the St. Johns River Crossing Project was divided into three categories:

Potential Relocations - businesses and residents that could be displaced from their existing locations because of the proposed project.

Community Cohesion - the ability of people to communicate with each other in ways that lead to a sense of community, including neighborhood population characteristics and linkages with churches, schools, and other community facilities.

Limited English Proficiency (LEP) - residents that do not speak English as their primary language in addition to a limited ability to read, write, speak or understand English.

Exhibit 3-22: **Relocations**

Alternative	Residences Displaced	Businesses Displaced	Churches Displaced	Total Displacements
Black	42	14	2	58
Purple	41	14	2	57
Brown 1	28	2	1	31
Brown 2	38	3	1	42
Orange 1	28	13	1	42
Orange 2	38	14	1	53
Green 1	29	15	1	45
Green 2	39	16	1	56
Pink 1	29	4	1	34
Pink 2	39	5	1	45

business, and a tow truck operation. The Orange 1 and 2 and Green 1 and 2 Alternatives would displace ten businesses within a shopping center in the Green Cove Springs area, including two discount retail sales outlets, a grocery store, a roofing contracting business, a hardware store, a Clay County Supervisor of Elections branch, a State of Florida Department of Juvenile Justice office, a pawn shop, and two restaurants. The remaining business displacements along these alternatives are scattered, single businesses. One of the business relocations along the Pink 2 and Brown 2 Alternatives is a specialized aviation service operation (Pegasus Technologies, Inc.), including a runway and air hangar complex.

All alternatives would displace the Living Waters of Middleburg Church on SR 21 near Branan Field—Chaffee Road. In addition, the Purple and Black Alternatives would displace a church in Clay County on US 17.

The CSRP stated that a recent market search conducted in the Green Cove Springs area revealed abundant available replacement resources to accommodate the relocation of displaced individuals. Displaced persons will be provided relocation assistance as specified under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 *et seq),* and FDOT guidelines.

Community Cohesion

Right-of-way acquisition and access changes can affect the cohesion of a neighborhood. Residents of cohesive communities often have a collective outward identity and are resistant to change. Indications that a community is cohesive include long-term residency, strong family presence, homogeneity, desire to stay in the community, participation in organizations, long-serving community leadership, use of community facilities, and interaction among neighbors. Project effects on community life that could alter social and physical connections between individuals and groups include:

- Disrupting or dividing the physical arrangement of an established community;
- Displacing a large number of people or community services/ businesses;
- Conflicting with established recreational, educational, religious or scientific uses of the area; and/or
- Presenting inconsistencies with local adopted goals and policies that pertain to social or economic conditions.

The Build Alternatives will have varying effects on communities in the study area. Existing communities that could be potentially affected include Lake Asbury, Pier Station and Green Cove Springs in Clay County, and the communities of Orangedale and Switzerland in St. Johns County. A summary of how each alternative may affect community cohesion is provided in the following paragraphs:

Disrupting or dividing the physical arrangement of an established community:

- The Black and Purple Alternatives traverse along the northern edge of Lake Asbury and Green Cove Springs, and along the southern edge of Switzerland. These communities will not be bisected, so these alternatives will not create a new physical barrier in these communities.
- The Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives traverse the northern edge of Lake Asbury, the eastern edge of Pier Station, the southern edge of Green Cove Springs, and the southern edge of Orangedale. These communities will not be bisected, so these alternatives will not create a new physical barrier in these communities.

Defining Community Cohesion

Community cohesion is the degree to which residents feel a sense of belonging to their neighborhood and is evidenced by interaction among neighbors and by residents' involvement in local institutions and activities.

Displacing a large number of people or community services/businesses:

- Residential displacements are dispersed along the alternatives. As described in the previous section, residential relocations are highest along the Black, Purple, Brown 2, Green 2, Orange 2 and Pink 2 Alternatives.
- Business displacements are concentrated in the northern part of the Green Cove Springs area for the Black and Purple Alternatives. Fourteen businesses in this area will be displaced. These displacements are likely to cause some impact to community cohesion, due to the concentration and the types of services displaced (particularly medical offices). For the Orange 1 and 2 and the Green 1 and 2 Alternatives, a similar community cohesion impact will occur in the southern part of Green Cove Springs where ten businesses and local government facilities will be displaced.

Conflicts with established recreational, educational, religious or scientific uses of the study area:

- All alternatives would displace a church on SR 21 (see previous section). The Purple and Black Alternatives would displace a second church in Clay County on US 17.
- For the Purple and Black Alternatives, the proposed Greenbriar interchange would result in a new, physical barrier between residential areas to the north and Bartram High School to the south. This barrier will change access routes to and from the school, and could create a potential safety hazard for students walking to school.

Presenting inconsistencies with local adopted goals and policies that pertain to social or economic conditions:

- The Purple and Black Alternatives are inconsistent with the Clay and St. Johns County Comprehensive Plans, the Lake Asbury Master Plan, and the St. Johns County Northwest Sector Plan, because these plans show a new river crossing south of these Alternatives, near the existing Shands Bridge.
- As described previously under Land Use, the Brown 1 and 2, Orange 1 and 2, Green 1 and 2 and Pink 1 and 2 Alternatives are consistent with the local comprehensive and sector plans.

Exhibit 3-23 summarizes the factors affecting community cohesion. All Build Alternatives will have impacts to community cohesion. These impacts will be highest overall for the Black and Purple Alternatives, and lowest for the Brown 1 and Pink 1 Alternatives.

While the No Build Alternative will not result in any new physical barriers to community cohesion, it will have long-term social impacts because of deteriorating traffic conditions and associated accessibility impacts. Congested conditions within neighborhoods could discourage interactions. While a significant decline in community cohesion is not anticipated, the expected growth in traffic and development in the study area will likely decrease interaction between neighborhoods.

Exhibit 3-23: **Community Cohesion**

Alternative	New Barrier Effects		Displacements and Relocations			Local Plans
	Residential Areas	Schools	Residential	Businesses and Services	Churches	Consistency
Black	0	1	42	14	2	No
Purple	0	1	41	14	2	No
Brown 1	0	0	28	2	1	Yes
Brown 2	0	0	38	3	1	Yes
Orange 1	0	0	28	13	1	Yes
Orange 2	0	0	38	14	1	Yes
Green 1	0	0	29	15	1	Yes
Green 2	0	0	39	16	1	Yes
Pink 1	0	0	29	4	1	Yes
Pink 2	0	0	39	5	1	Yes

Limited English Proficiency

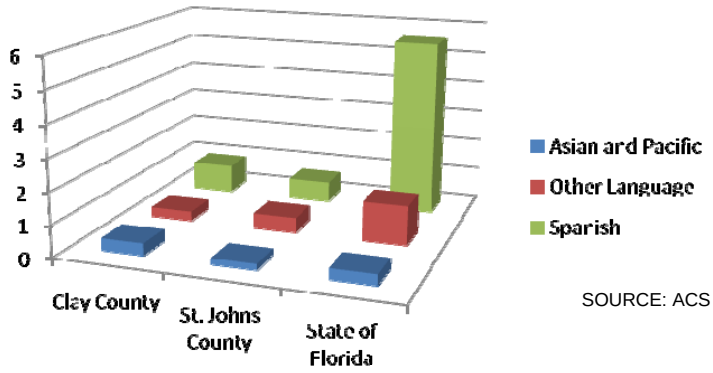
The FHWA defines limited English proficiency (LEP) persons as individuals who do not speak English as a primary language and who have limited ability to read, speak, write or understand English. For these individuals to have an equal opportunity to participate effectively in or benefit from any aid, service or project from a transportation provider, they must be able to communicate in their primary or home language. The ACS identified households in the U.S. that are linguistically isolated. Linguistically isolated refers to households where none of the individuals aged 14 or older speak English "very well."

Exhibit 3-24 shows the number of linguistically isolated households that would be affected by each alternative. In general, the percentage of LEP households in Clay and St. Johns Counties is much lower than in the State of Florida overall. The primary language spoken by LEP persons within the study area is Spanish. For all future public meetings, FDOT will have a Spanish speaking representative available to help assist and communicate information to LEP persons in attendance.

Limited English Proficiency (LEP)

Presidential Executive Order 13166 requires federal agencies to take reasonable steps to provide meaningful access for LEP populations to federally conducted programs and activities. Discrimination on the basis of national origin can occur if an agency does not provide appropriate language assistance to LEP individuals since these individuals, whose language is usually tied to their national origin, will not have access to the same benefits, services, information, or rights provided to everyone else. Thus, in certain circumstances, failure to ensure that LEP persons can effectively participate in or benefit from federally assisted programs and activities may violate Title VI and its regulations prohibiting national origin discrimination.

Exhibit 3-24: **Limited English Proficiency (LEP) Households**

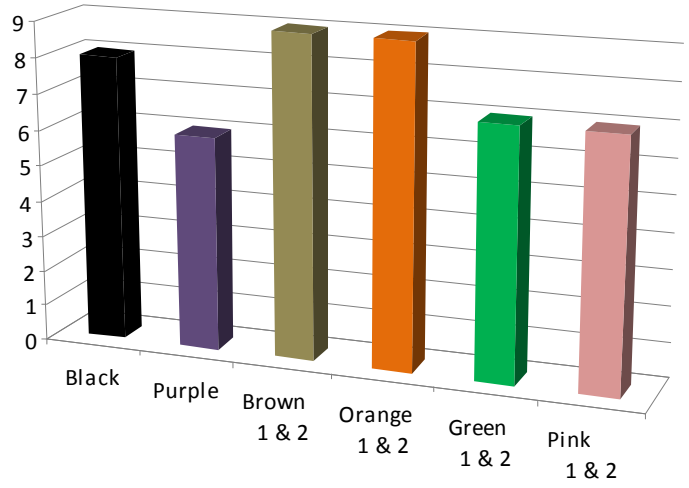


SOURCE: ACS 2005-2009, 5-Year Estimates

3.7.6 How will the alternatives promote and support employment and economic development?

Economic developments that are adjacent to or within two miles of a local access interchange are likely to benefit to the greatest extent in terms of economic impact (NCHRP, 2002). More interchanges can mean better access from residential areas to commercial areas and employment centers, and result in additional economic stimulus. Developments within five miles of a local access interchange may also benefit, but to a lesser extent, particularly in terms of non-residential activity. **Exhibit 3-25** shows the number of local access interchanges for each of the Build Alternatives, adjacent to or within two miles of existing and proposed developments. (These do not include interchanges with I-95).

Exhibit 3-25: **Number of Local Access Interchanges**



The Brown 1 and 2 and the Orange 1 and 2 Alternatives will serve the highest number of developments, twelve each, through local access interchanges adjacent to or within two miles. The Black Alternative will serve ten developments, and the Purple, Green 1 and 2 and Pink 1 and 2 Alternatives will each serve eight developments adjacent to or within two miles of local access interchanges.

Future commercial, industrial and office uses within two miles of each interchange were also analyzed to determine potential economic and employment opportunities. Commercial, industrial and office uses designated in each County's Future Land Use Plan and in approved or planned DRIs were considered. In addition to evaluating employment-type uses, the potential jobs and revenues generated by the approved and planned DRIs within two miles of each interchange were also taken into consideration. The results of the analysis are shown in the following table, **Exhibit 3-26**.

Exhibit 3-26: **Employment Areas and DRI Tax Revenues within 2 Miles of Interchanges**

Alternative	Commercial, Industrial, Office in Comp Plans (acres)		Commercial, Industrial, Office in DRIs and Other Planned Areas* (acres)		Total Commercial, Industrial, Office (acres)		DRI Job Creation within Radius**		DRI Revenues within Radius*** ($millions)	
	Clay	St. Johns	Clay	St. Johns	Clay	St. Johns	Clay	St. Johns	Clay	St. Johns
Black	730	2,003.15	1,742.58	948.43	2,472.58	2,951.58	940	18,744	$6.89	$78.38
Purple	730	2,003.15	1,742.58	539.57	2,472.58	2,542.72	940	16,375	$6.89	$42.71
Brown 1 and 2	3,300	1,569.17	3,167.93	580.81	6,467.93	2,149.98	1,254	16,932	$13.98	$51.07
Orange 1 and 2	2,200	1,569.17	3,049.44	580.81	5,249.44	2,149.98	671	16,932	$10.16	$51.07
Green 1 and 2	2,200	17.73	3,049.44	459.83	5,249.44	477.56	671	2,271	$10.16	$34.38
Pink 1 and 2	3,300	17.73	3,167.93	459.83	6,467.93	477.56	1,254	2,789	$13.98	$34.38

*Includes DRIs as well as the Branan Field Sector Plan, Lake Asbury Master Plan, and the Peter's Creek Planned Unit Development.
**Based on the percent of a DRI's commercial, industrial, and office areas that are within the 2 mile radius multiplied by the total number of jobs to be created.
***Calculated by taking the percent of the DRI within the 2 mile radius and applying it to that DRI's total revenue.

The Clay County 2015 Future Land Use Plan identifies the central portions of the county and the area west of the existing Shands Bridge as areas for future industrial and commercial development. The St. Johns County 2015 Future Land Use plan identifies areas adjacent to the I-95 corridor as areas for future commercial, industrial and office development. These designated areas are in addition to the approved and planned developments shown in **Exhibit 3-13**.

As shown in **Exhibit 3-26**, the effectiveness of how each alternative addresses the need of promoting employment and economic opportunities varies among the alternatives. In Clay County, the southern alternatives (Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2) provide the greatest accessibility to future commercial, industrial and office uses identified in the comprehensive plan and in other future planned areas. The Brown 1 and 2 and Pink 1 and 2 Alternatives also provide the greatest opportunities for future job creation and tax revenue generation. In St. Johns County, the Black and Purple Alternatives provide the greatest accessibility to commercial, industrial and office uses designated in the comprehensive plan. The Black, Brown 1 and 2, and Orange 1 and 2 Alternatives would provide the greatest accessibility to employment-type uses identified in planned areas and would also provide the greatest opportunities for job creation and tax revenue generation.

Clay County is one of only two Florida counties with a population greater than 150,000 that is not served by an interstate-type highway. The proposed St.

Johns River Crossing Project, particularly the southern alternatives, would make Clay County less isolated in the perception of the marketplace as a result of it being more accessible to inbound traffic as well as commuting by residents to employment and shopping centers, primarily in southeast and west Jacksonville. This would also help promote employment-based office and industrial development in Clay County by making it more accessible to workers, customers, and suppliers from outside the county.

For St. Johns County, the proposed project will have less impact on accessibility because the county has six existing I-95 interchanges that are expected to serve as economic generators well into the future. However, St. Johns County will benefit from the proposed project by providing alternative routes to I-95 for St. Johns County commuters and shoppers living in the northwest section of the County.

3.7.7 How will the proposed project affect tax revenues in the study area?

As discussed previously under Land Use, any of the Build Alternatives will convert a number of properties from their current use to road right-of-way. Once those lands are converted, tax revenues will no longer be assessed on those properties. As a result, tax revenues from the lands within the right-of-way will decrease in both Clay and St. Johns Counties, as shown in **Exhibit 3-27**. Annual tax revenue losses would range from a high of approximately $989,000 with the Black Alternative to a low of $137,000 with the Pink 1 Alternative.

Exhibit 3-27: **Taxable Value Lost**

Alternative	Annual Taxable Value Lost from Lands within Road Right-of-Way
Black	$ 989,000
Purple	$ 928,000
Brown 1	$ 815,000
Brown 2	$ 834,000
Orange 1	$ 860,000
Orange 2	$ 883,000
Green 1	$ 181,000
Green 2	$ 204,000
Pink 1	$ 137,000
Pink 2	$ 155,000

Tax revenues lost from conversion of lands to road right-of-way are expected to be offset by planned and approved, future and ongoing development within the project area. As described in Chapter 1, seven DRIs have been approved or are pending in Clay County since 1990, and 13 DRIs have been approved or are pending in St. Johns County since 2000. These developments are planned for the area, with or without the project. Based on available DRI documents, FDOT looked at the total projected annual *ad valorem* tax revenues (primarily property and sales tax) that would be generated at buildout of these DRIs. They looked at only those DRIs where development has not yet commenced or is at less than 5 percent complete (so that only new, future tax revenues were considered).

The combined annual estimated tax revenues from these planned developments at full buildout is approximately $672 million. (See the *Economics and Land Use Discipline Report* located on the enclosed CD for more details). For this analysis, FDOT conservatively assumed that full buildout of all these developments will occur in 2025, and that development will occur incrementally over the next 14 years at approximately the same rate each year (that is, 1/14th of each development would occur each year through 2025). Under these assumptions, these new developments would generate approximately $48 million of new tax revenues in 2010, and will double each year between 2010 and 2025. Therefore, these future revenues from planned development are expected to offset tax revenues lost due to right-of-way conversion over the next few years.

In addition, as discussed previously under Land Use, the proposed project may accelerate the rate of planned development in the project area (especially in areas within two miles of interchanges). Therefore, the additional tax revenues from residential and commercial/industrial development in the project area are likely to be realized sooner with the implementation of the proposed project. For these reasons, the impact from tax revenue loss due to right-of-way conversion will be minimal.

3.7.8 What measures are proposed to avoid or minimize project effects on communities and neighborhoods?

FDOT will relocate all displaced residences, businesses and churches, as described earlier. It appears from initial evaluation that adequate replacement properties do exist in the study area, based on an inventory of available properties in the Green Cove Springs area. Where feasible and desired by residents and business owners, FDOT will attempt to find relocation properties within the same area in which displacements occur. Relocation of the aviation services of Pegasus Technologies, Inc. may be more problematic due to the requirements to relocate the existing runway.

For permanent barrier effects, the feasibility of maintaining access or connectivity will be examined during final design. Measures could include maintaining or restoring pedestrian crossings or informal pathways within communities, where feasible and safe.

3.7.9 How will construction activities affect communities, neighborhoods, and businesses?

Any of the Build Alternatives will result in temporary impacts on the environment due to the necessary construction activities. Construction related impacts will include disruption of the flow of traffic, noise and dust impacts, possible utility outages, and earthborne vibrations.

Relocations

In order to minimize the unavoidable effects of Right-of-Way acquisition and displacement of people, the Florida Department of Transportation will carry out a Right-of-Way and relocation program in accordance with Florida Statute 339-09 and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646 as amended by Public Law 100-17).

The Florida Department of Transportation provides advance notification of impending Right-of-Way acquisition. Before acquiring Right-of-Way, all properties are appraised on the basis of comparable sales and land use values in the area.

Owners of property to be acquired will be offered and paid fair market value for their property rights.

No person lawfully occupying real property will be required to move without at least 90 days written notice of the intended vacation date and no occupant of a residential property will be required to move until decent, safe and sanitary replacement housing is made available. "Made available" means that the affected person has either by himself obtained and has the right of possession of replacement housing, or that the Florida Department of Transportation has offered the relocatee decent, safe and sanitary housing which is within his financial means and available for immediate occupancy.

At least one relocation specialist is assigned to each highway project to carry out the relocation assistance and payment program. A relocation specialist will contact each person to be relocated to determine individual needs and desires, and to provide information, answer questions, and give help in finding replacement property. Relocation services and payments are provided without regard to race, color, religion, sex or national origin.

All tenants and owner-occupant displacements will receive an explanation regarding all options available to them, such as (1) varying methods of claiming reimbursement for moving expenses; (2) rental replacement housing, either private or publicly subsidized; (3) purchase of replacement housing; (4) moving owner-occupied housing to another location.

Financial assistance is available to the eligible relocatee to:

1. Reimburse the relocatee for the actual reasonable costs of moving from homes, businesses, and farm operations acquired for a highway project;
2. Make up the difference, if any, between the amount paid for the acquired dwelling and the cost of a comparable decent, safe and sanitary dwelling available on the private market;
3. Provide reimbursement of expenses, incidental to purchase of a replacement dwelling;
4. Make a payment for eligible increased interest cost resulting from having to get another mortgage at a higher interest rate. Replacement housing payments, increased interest payments, and closing costs are limited to $22,500 combined total.

A displaced tenant may be eligible to receive a payment, not to exceed $5,250, to rent a replacement dwelling or room, or to use as a down payment, including closing costs, on the purchase of a replacement dwelling.

The brochures that describe in detail the Department's relocation assistance program and Right-of-Way acquisition program are "Your Relocation: Residential", "Your Relocation: Business, Farms and Nonprofit Organizations", "Your Relocation: Signs" and "The Real Estate Acquisition Process". All of these brochures are distributed at all public hearings and made available upon request to any interested persons.

3.7.10 What measures are proposed to minimize construction effects?

Actions will be taken to reduce visual impacts, noise, traffic delays, air quality, and other issues during construction that could impact residents' quality of life and desire to participate in community events or access local businesses. Measures to minimize these impacts could include things like staging construction vehicles and materials out of sight from the roadway, coordinating with public service and utility providers during final design, confining work to daytime hours, minimizing fugitive dust, and implementing a traffic control plan along with public information about detours and possible delays.

3.8 ENVIRONMENTAL JUSTICE

This section summarizes the analysis of potential effects on minority and low-income populations. For more information, see the *Environmental Justice Discipline Report* located on the enclosed CD.

Environmental Justice

To comply with Executive Order 12898, entitled Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, the USDOT has developed policies and procedures for all projects that want to remain eligible for federal funding to follow. USDOT requires that projects adhere to these guiding principles:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- Ensure the full and fair participation by all potentially affected communities in the transportation decision making process.
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

3.8.1 How was environmental justice evaluated for the project?

Environmental justice (EJ) acknowledges that the quality of our environment affects the quality of our lives, and that adverse environmental effects should not disproportionately burden low-income or minority communities. Effects associated with transportation projects may include restricted commercial access, economic effects due to tolling, presence of hazardous materials, raised noise levels, and increased water and air pollution. Presidential Executive Order 12898 requires that Federal agencies take action to address EJ in minority and low-income populations.

An EJ analysis considers disproportionate impacts. Therefore, two areas must be defined: the area actually affected for each alternative and a larger regional area that serves as a basis for comparison and includes the actual area affected. The larger regional area is called the Region of Comparison (ROC). The ROC for this EJ analysis includes portions of Clay, St. Johns, Putnam and Duval Counties.

This section has been updated since the publication of the Draft EIS with the most current data available. The primary source for information on the racial, ethnic, and low-income composition of the community is the 2010 Census data and the ACS. The smallest geographic region into which 2010 Census data was divided is the block level. Block level data is available for population, race, ethnicity, and age. Income and poverty data is available in the ACS 2005-2009 5-Year estimates at a slightly larger geographic area, the census tract level. Analyzing data from the smallest geographic region available allows for the identification of small pockets of concern that may be masked by the overall characteristics of a larger area such as a census tract.

For demographic analysis, the study area was defined as a 1,500-foot buffer around each alternative corridor. Census blocks and tracts included wholly within or intersecting the buffer for each alternative were examined.

The criteria used to identify census blocks or block groups with high concentrations of minority or low-income populations were developed based on the guidelines established by the Council on Environmental Quality (CEQ, 1997)

which is consistent with the FHWA guidance updated in June 2012. Census blocks with high concentrations of minority populations were identified as those areas where the minority (non-white) populations exceeded 50 percent and/or where a block had a meaningfully greater percentage of minority individuals. For purposes of this analysis, "meaningfully greater" was determined to be twice the percentage of the ROC average of the total minority population. In 2010, the minority population within the ROC was 21 percent; therefore, the threshold used to identify census blocks with meaningfully greater percentages of minority residents was 42 percent. The minority population for the state during this time was 42 percent.

Similarly, a census tract was determined to have a high concentration of low-income persons if it: (1) had a "meaningfully greater" percentage of people in poverty based on the ACS 2005-2009 5-Year Estimates, and/or (2) the median household income in the block group was 80 percent or less than the median household income for the county (approximately $60,352 in Clay County and $63,630 in St. Johns County during the 2005-2009 estimate period). For purposes of this analysis, "meaningfully greater," was determined as twice the percentage of the ROC total population in poverty. The ROC average of the population in poverty during the 2005-2009 estimate period was 7.0 percent; therefore, the threshold used to determine census block groups with high concentrations of low-income populations was 14.0 percent. Low-income populations can be any readily identifiable group of persons who live in a geographic proximity, and if circumstances warrant, geographically dispersed/ transient persons (such as migrant workers) who would be similarly affected by a proposed FHWA program, policy, or activity (FHWA, 1998).

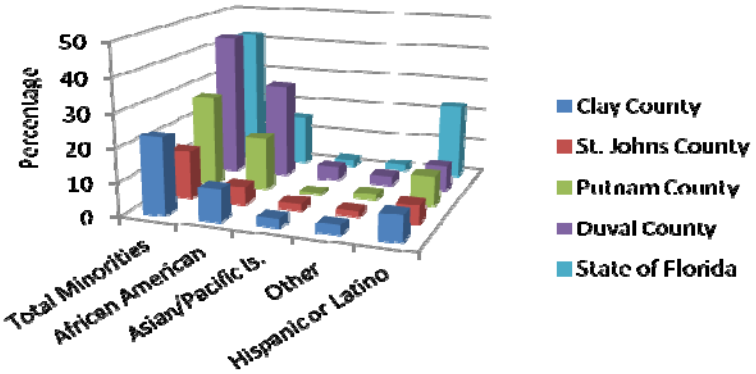
In addition to analyzing census data, the project team held meetings with county planners to further delineate potential EJ communities. The planners verified the analysis results of the census data and identified Pier Station in Clay County and Elwood in St. Johns County as known EJ communities. These communities and those living in other EJ areas will have the opportunity to participate in future public meetings. It should be noted that not everyone living within the geographic areas defined as EJ communities are low-income and/or minority persons.

3.8.2 Are there minority and low-income populations living in the study area?

Minority Concentrations

Exhibit 3-28 summarizes the minority composition of Clay, St. Johns, Putnam and Duval Counties, and the State of Florida. While not shown in the exhibit, the white population was the largest group within all geographic areas compared, from about 60 percent for the State as a whole, up to 85 percent in St. Johns County. African Americans comprise the largest racial minority group, with Hispanics as the second largest. Asian American and Other races, which includes American Indians and those of two or more races, comprise much smaller percentages of the population.

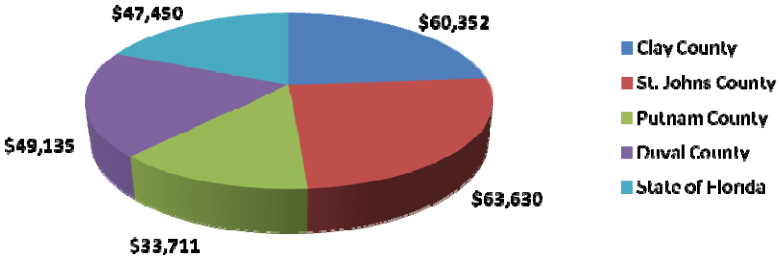
Exhibit 3-28: **Minority Populations (2010)**



Poverty and Low-Income Concentrations

The median household income for Clay, St. Johns and Duval Counties was higher than the median household income for the State, but Putnam County had a lower average income (**Exhibit 3-29**) (ACS 2005-2009 5-Year Estimates). Similarly, there were fewer people living below the poverty level in Clay and St. Johns Counties than in the State overall (**Exhibit 3-301**). In Duval County, the percentage of low-income persons was about the same as that of the State, while in Putnam it was higher.

Exhibit 3-29: **Median Household Income**



Minority and Low-Income Populations

Minority populations are any readily identifiable groups of minority persons who live in geographic proximity that will be similarly affected by the proposed project. Minority includes persons who are:

African American (having origins in any of the black racial groups of Africa),

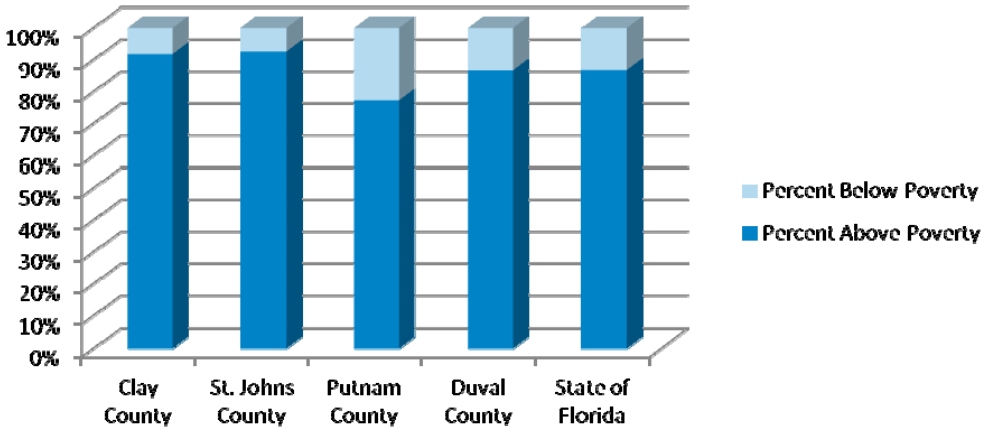
Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race),

Asian American (having origins in any of the original people of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands), or

American Indian and Alaskan Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition)

Low-income persons are those whose household income falls at or below the Department of Health and Human Services (HHS) poverty guidelines.

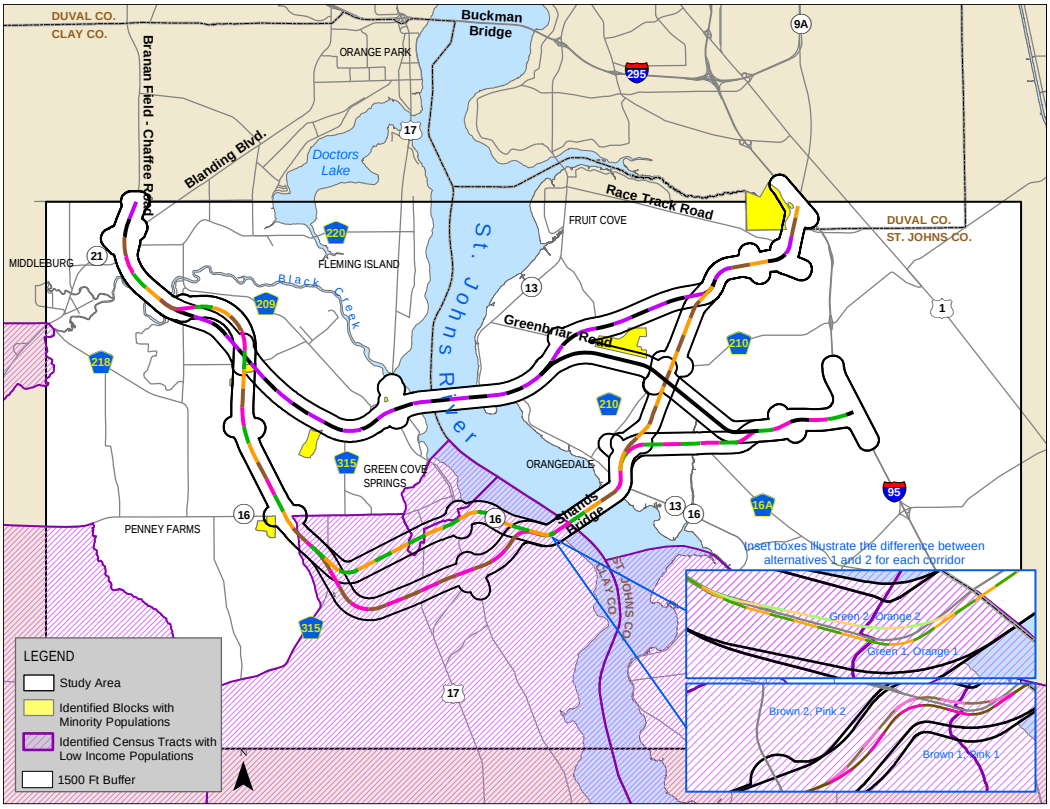
Exhibit 3-30: **Low-Income Population**



3.8.3 How will the alternatives affect environmental justice populations?

EJ communities occur within or adjacent to the study area for the Black, Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives (**Exhibit 3-31**). No EJ areas are located within the study area for the Purple Alternative. As shown below, block groups with low-income populations encompass the majority of southern Clay County. For the alternatives crossing the river at the existing Shands Bridge (Brown 1 and 2, Orange 1 and 2, Green

Exhibit 3-31: **Environmental Justice Areas**



1 and 2, and Pink 1 and 2 Alternatives), these areas were unavoidable but impacts were minimized when possible. The assessment of impacts to EJ communities focused on potential economic impacts of tolling, and displacement and relocation of residences and businesses. These potential impacts are discussed in the following paragraphs.

Example of a toll gantry

Tolling Impacts

Tolling the project will not have any disproportionate impacts on minority populations. To determine the potential effects of tolling on low-income populations, FDOT evaluated tolling technology, toll rates, and the availability of reasonable, alternate routes that would be toll-free.

TOLLING TECHNOLOGY

The proposed St. Johns River Crossing toll road will operate as a fully electronic toll facility. All vehicles using the facility will be required to have transponders that will be read by toll gantries placed along the corridor to determine where a given vehicle (transponder) entered and exited the toll facility, thus determining the toll to be charged for the trip. Each transponder will be registered to a specific user; therefore, the toll will be deducted from an account set up for each user. The daily operation of the program will be conducted by FDOT through a contract with the organization running the toll facility.

Electronic transponders have the potential to restrict access to the facility or disproportionately burden low-income populations because of a lack of credit . However, FDOT has stated that users will be able to set up and maintain a transponder account without needing to have a credit card.

TOLL RATES AND ALTERNATE ROUTES

The estimated toll rates for the project are between $0.15 - 0.20 per mile in the opening year. This analysis of impacts assumes the higher rate of $0.20. The opening-year new bridge crossing toll is estimated to be $2.30 per trip, which is $0.20 per mile toll rate with a $1.00 bridge crossing surcharge.

In general, the economic impact of tolling has the potential to be higher for low-income users because the cost of paying tolls will represent a higher percentage of household income than for non-low-income users. Drivers may decide to reduce their personal economic impacts of tolls by using existing non-tolled roads for their commute.

The Black and Purple Alternatives will establish a new northern tolled crossing of the St. Johns River, but the existing, non-tolled Shands Bridge will remain in operation. Under these alternatives, non-tolled alternate travel routes will be available without adding substantive travel distances (see the *Environmental Justice Discipline Report* located on the enclosed CD for more details on alternate routes and distances.) Therefore, the Black and Purple Alternatives will not present a disproportionate, adverse impact from tolling on low-income populations in the project area.

For the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives, the Shands Bridge, currently a non-tolled facility, will be replaced by a toll bridge without a nearby alternate route. In these cases, the alternate route to cross the St. Johns River without paying a toll would be nearly 37 miles longer than the existing route, which is considered to be unreasonable and would result in an impact that would disproportionately affect low-income populations in the project area. However, in light of this potential impact, FDOT made the decision in late 2008 to eliminate the bridge-crossing toll on the southern alternatives for trips using the toll road solely to cross the river. If any of the southern alternatives are selected (where the existing Shands Bridge would be replaced), trips using the toll road solely to cross the river will remain toll-free (refer to Chapter 2). Therefore, the Brown 1 or 2, Orange 1 or 2, Green 1 or 2, or Pink 1 or 2 Alternatives will not present a disproportionate, adverse impact from tolling on low-income populations in the project area.

For all Build Alternatives, existing roads will still provide a non-tolled alternative to travel on the proposed facility. With the exception of the alternatives that cross the river near the existing Shands Bridge, the proposed alternatives will be on new alignment. The Black and Purple Alternatives propose a northern crossing; therefore, the nearby Shands Bridge would remain a non-tolled facility and would provide an alternative river crossing. Because viable non-tolled alternatives for the entire facility exist, disproportionately high and adverse impacts to low-income populations in the project area would not be anticipated with the Purple or Black Alternatives. FDOT's decision to eliminate the bridge toll for the southern alternatives between the US 17 interchange and the CR 16A interchange (and vice versa) will preclude any disproportionately high and adverse impacts to low-income drivers with the Brown 1 or 2, Orange 1 or 2, Green 1 or 2, and Pink 1 or 2 Alternatives.

Exhibit 3-32: **Summary of Potential Relocation Impacts to Environmental Justice Populations**

	Residential Relocations				Business Relocations			
Alternative	Total in Alt.	Total in EJ Areas	% in EJ Areas	Dispr. High Impact [1] [2]	Total in Alt.	Total in EJ Areas	% in EJ Areas	Dispr. High Impact [1] [2]
Black	42	0	0 %	N/A	14	0	0 %	N/A
Purple	41	0	0 %	N/A	14	0	0 %	N/A
Brown 1	28	2	7 %	No	2	2	100 %	Yes
Brown 2	38	12	32 %	No	3	3	100 %	Yes
Orange 1	28	3	11 %	No	13	13	100 %	Yes
Orange 2	38	13	34 %	No	14	14	100 %	Yes
Green 1	29	3	10 %	No	15	13	87 %	Yes
Green 2	39	13	33 %	No	16	14	88 %	Yes
Pink 1	29	2	7 %	No	4	2	50 %	No
Pink 2	39	12	31 %	No	5	3	60 %	Yes
No Build	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTE: All impacts noted are prior to mitigation.

[1] A disproportionately high and adverse impact is defined as an adverse impact that (a) is predominantly borne by a minority population and/or a low-income population; or (b) is suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population. See text for more discussion.

[2] Residential and business relocations are considered disproportionately high to EJ populations when (a) the percentage of EJ relocations in an alternative corridor is substantively higher than the overall proportion of EJ areas compared with non-EJ areas within the total corridor, and/or (b) businesses to be relocated provide essential services to nearby EJ communities.

Displacements and Relocations

Exhibit 3-32 summarizes the residential, commercial displacements and relocations that are anticipated to occur within EJ communities for each of the Build Alternatives.

Anticipated business relocations for the Orange 1 and 2 and the Green 1 and 2 Alternatives are considered to have disproportionately high and adverse impacts on EJ communities within and adjacent to these alternatives. Business relocations for these four alternatives include ten businesses located within a shopping center in Green Cove Springs: two discount retail sales outlets, a grocery store, a roofing contracting business, a hardware store, a Clay County Supervisor of Elections branch, a State of Florida Department of Juvenile Justice office, a pawn shop, and two restaurants. The businesses in the shopping center likely provide some essential services to nearby EJ communities, and any relocation of these services outside their existing vicinity would be a high impact.

Anticipated business relocations for the Brown 1 and 2 and Pink 2 Alternatives are also considered to have disproportionately high and adverse impacts

to EJ communities. All three of these alternatives include the relocation of two small construction businesses. The Brown 2 and Pink 2 Alternatives would also displace Pegasus Technologies, Inc, a highly specialized aviation business.

Other Impacts

If any of the Build Alternatives are implemented, all nearby residents would be affected by noise quality changes, utility relocations, temporary construction and permanent visual changes. These impacts (discussed further in other sections of Chapter 3) would generally occur in a uniform distribution along the entire length of any alternative; therefore, none of these effects is expected to present a disproportionately high impact to minority or low-income communities.

The Build Alternatives will benefit the surrounding communities, including EJ areas, by enhancing mobility and generally decreasing emergency response times for fire, police and medical rescue when compared to the No Build Alternative. EJ communities will also benefit from project-related clean-up of sites with environmental contamination in EJ areas along the Brown 1 or 2, Orange 1 or 2, Green 1 or 2 or Pink 1 or 2 Alternatives (see Hazardous Sites and Contaminated Properties discussion later in this chapter).

3.8.4 What measures are proposed to avoid or minimize effects of the project on environmental justice populations?

For displacement impacts and relocations, the FDOT *Conceptual Stage Relocation Plan,* located on the enclosed CD, stated that a recent market search conducted in the Green Cove Springs area revealed abundant available replacement resources to accommodate relocation of displaced residences and businesses. Relocating residences and businesses within their existing general vicinity would substantially reduce the impacts of these displacements to EJ communities.

Displaced persons will be provided relocation assistance, including last resort housing assistance if necessary, as specified under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (49 CFR 24) and FDOT guidelines.

3.9 CULTURAL RESOURCES

This section summarizes the analysis of historic and archaeological resources. For more information, see the *Cultural Resource Overview Survey Technical Memorandum* and the *Cultural Resource Assessment Survey Technical Memorandum Update* located on the enclosed CD.

The term "historic properties" is defined as any prehistoric or historic buildings, structures, objects, sites, or community districts age fifty years or older that are listed on or eligible for listing on the National Register of Historic Places (NRHP). When proposing projects that might affect historic properties, FDOT must comply with Section 106 of the National Historic Preservation Act, as required by 36 CFR 800, Protection of Historic Resources. Section 106 requires federal agencies to identify and evaluate the effects of a project on historic and archaeological resources and traditional cultural properties, and to consult with the State Historic Preservation Officer (SHPO) to determine how best to avoid resources or minimize and mitigate any unavoidable effects on these resources. Section 106 protects those resources that are listed on, or are eligible for listing on, the NRHP.

Defining National Register of Historic Places (NRHP)

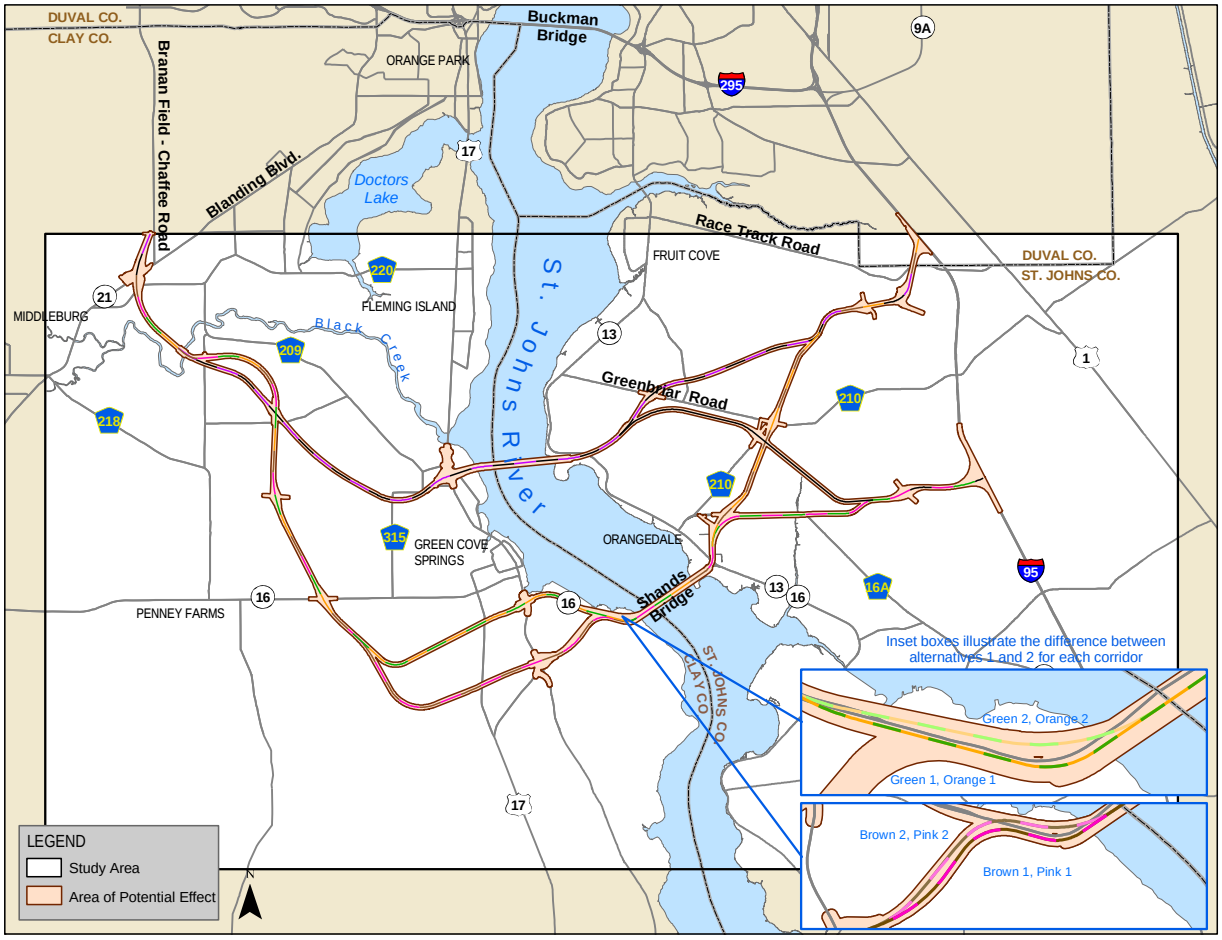
The National Register of Historic Places (NRHP) is the Nation's official list of cultural resources worthy of preservation. Authorized under the National Historic Preservation Act of 1966, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture.

3.9.1 How were cultural resources identified for the study area?

FDOT originally performed a Cultural Resource Overview Survey of all the alternatives evaluated in the Draft EIS, which was completed in July 2009. The purpose of this survey was to identify historic properties and that could be affected by the various Build Alternatives, and to provide consideration of these resources in the comparative assessment of alternatives. Since that time, the alignment of the Pink 1 and Pink 2 Alternatives was refined slightly, and the Pink 1 Alternative was selected as the Preferred Alternative following publication of the Draft EIS. Therefore, FDOT updated the cultural resource data for the Preferred Alternative in late 2010. The Cultural Resource Overview Survey and the Cultural Resource Assessment Update are located on the enclosed CD. A Pond Siting Report will be completed once pond sites are determined. This will include a Cultural Resource Assessment Survey, for those sites not previously evaluated, in coordination with FHWA.

The FDOT and FHWA held a consultation with the SHPO on April 23, 2008 for development of methodology for the resource assessment and to define the Area of Potential Effect (APE). Meeting notes from that consultation are provided in the *Agency Coordination Memorandum*, located on the enclosed CD. The APE was defined as 50 meters (164 feet) either side of the proposed right-of-way edge, and was increased to 100 meters (328 feet) on either side in areas where the roadway will be elevated at Black Creek, the St. Johns River, and the intersection with US 17 (**Exhibit 3-33**).

Exhibit 3-33: **Cultural Resources Areas of Potential Effect (APE)**



The evaluation of potential historic properties that may be affected by the Build Alternatives began with a review of the Florida Master Site File (FMSF) information available in GIS format, a review of aerial photographs and United States Geological Survey (USGS) quadrangle maps, and other archival information. These data included previous cultural resource surveys, previously recorded historic structures, archaeological sites, historic bridges and linear railroad or roadway segments, historic cemeteries, and resource groups, and previous determinations of whether these properties are listed on, or eligible for listing on, the NRHP. After compiling this information, the project team visited the study area to map and field-verify the data.

The potential for each alternative to affect unrecorded/unknown historic resources and archaeological sites was also evaluated. The team reviewed the Clay and St. Johns Counties property appraisers' databases to identify structures built prior to 1963, (that is, those resources that would be considered

historic by the year 2013). An architectural field review verified the locations of these resources and made preliminary determinations regarding NRHP eligibility. The team also developed an archaeological site predictive model to estimate the potential for unrecorded archaeological resources to occur within the APE of each Build Alternative.

To identify any resource concerns or traditional cultural properties, FHWA requested further input from the six federally recognized tribes of Florida. (See the *Agency Coordination Memorandum* located on the enclosed CD for copies of the letters sent to the tribes). This was a continuation of the consultation that occurred during the Efficient Transportation Decision-Making (ETDM) Programming Screen Review conducted in June 2006 and previous consultations initiated by FDOT. As of the publication date of this Final EIS, the Miccosukee Tribe is the only one to respond. They stated that no known historic properties occur in the project study area, but requested completion of a Phase I Cultural Resources Survey.

Area of Potential Effect (APE)

When identifying potential historic resources, an Area of Potential Effect (APE) is used. This is important because it helps determine the area where historic properties must be identified, so that impact to these properties can, in turn, be assessed.

The APE used on this project was developed to include a 50-meter (164 feet) buffer of the proposed right-of-way for each alternative. This APE was expanded to 100 meters (328 feet) in areas where the roadway would be significantly elevated (bridges, railway crossings, major road crossings).

3.9.2 What cultural resources are located in the study area?

Previously Recorded Resources

FDOT consulted the FMSF database of previous cultural resource surveys to determine what percentage of each of the alternatives had been previously investigated. For the purposes of this evaluation, small-scale surveys, such as those required for cell tower construction, and large-scale county-wide surveys were not considered. The percentage of the APE previously surveyed represents the portion of the corridor for which the majority of cultural resources present is already known. For all alternatives, previous surveys had covered half or more of the APE for each Build Alternative (ranging between 49 percent of the Black Alternative APE and 57 percent of the Brown 1 Alternative APE).

Exhibit 3-34 summarizes the number and type of previously recorded cultural resources within the APE for each of the Build Alternatives. (Numbers for the Pink 1 and Pink 2 Alternatives have been updated with data from the Cultural Resource Assessment Update.) The number of sites shown in parentheses indicates those resources classified from previous surveys by SHPO to be eligible for listing on the NRHP, or those that have not yet been evaluated. (All extant sites identified within the APE of the Preferred Alternative have been evaluated; FHWA has made a final determination of eligibility and potential

effects on historic properties which have been concurred by SHPO.) No known resources within the APE are currently listed on the NRHP. Resources listed in the exhibit are summarized for each alternative in the sections below. Further detail on these resources and on the determinations of eligibility to date can be found in the *Cultural Resource Overview Survey Technical Memorandum and the Cultural Resource Assessment Survey Technical Memorandum Update* located on the enclosed CD.

Exhibit 3-34: **Previously Recorded Cultural Resources within the Area of Potential Effect (APE)**

Alternative	Historic Structures	Archaeological Sites	Historic Bridges	Historic Linear Resources	Resource Groups	Total
Black	7 (2)	10 (2)	0	1(1)	2 (1)	20(6)
Purple	7 (2)	10 (2)	0	1(1)	2 (1)	20(6)
Brown 1	6 (0)	11 (0)	1 (0)	3 (1)	3 (0)	24 (1)
Brown 2	6 (0)	11 (0)	1 (0)	3 (1)	3 (0)	24 (1)
Orange 1	18 (4)	11 (0)	1 (0)	5(1)	2 (0)	37(5)
Orange 2	18 (4)	11 (0)	1 (0)	5(1)	2 (0)	37(5)
Green 1	17 (4)	4 (0)	2 (0)	5(1)	3 (0)	31(5)
Green 2	17 (4)	4 (0)	2 (0)	5(1)	3 (0)	31(5)
Pink 1	6 (0)	4 (0)	4 (0)	3 (1)	4 (0)	21 (1)
Pink 2	6 (0)	4 (0)	4 (0)	3 (1)	4 (0)	21 (1)

NOTE: Resources listed above in parentheses have been determined eligible for listing on the NRHP or have not yet been evaluated for eligibility and are considered potentially eligible. For the Pink 1 (Preferred) and Pink 2 Alternatives,, the one resource shown in parentheses has been evaluated and determined to be eligible, as described in this section.

Camp Chowenwaw

Hangar at Lee Field (1941)

Jacksonville, Tampa, and Key West rail corridor

BLACK AND PURPLE ALTERNATIVES

Within the APEs for the Black and Purple Alternatives, seven recorded historic structures, ten archaeological sites, one segment of an historic railroad, and two resource groups were found. Four of the historic structures have been evaluated as ineligible by the SHPO, and the other three have not been evaluated. One of the three unevaluated structures, the Mary Murray House (8CL132), was a c1880 house located at 2790 SR 220; this structure has been destroyed since the time it was recorded. Of the archaeological sites, eight have been evaluated as ineligible for the NRHP. Of the remaining sites, the

LAP 9 site (8SJ3218), a multi-component prehistoric and historic site, has been determined potentially eligible for listing on the NRHP. The Remington site (8SJ4766) has not been evaluated, although the surveyor who recorded the site recommended it as ineligible for the NRHP. A recorded segment of the potentially eligible Jacksonville, Tampa, Key West rail corridor (8CL1180) occurs within the APE of the Black and Purple Alternatives. The two resource groups consist of Camp Chowenwaw (8CL1160) and Switzerland Airfield (8SJ5343). Camp Chowenwaw Resource Group (8CL1160) is a Twentieth Century camp and building complex that has not been evaluated by the SHPO, and Switzerland Airfield (8SJ5343) is a Twentieth Century US Navy practice landing field that has been evaluated as ineligible for the NRHP by the SHPO.

BROWN 1 AND BROWN 2 ALTERNATIVES

Within the APEs for the Brown 1 and Brown 2 Alternatives, six historic structures, two segments of recorded historic railroads, one historic road segment, one historic bridge, three resource groups, and 11 archaeological sites were found. Five of the historic structures have been evaluated as ineligible for the NRHP by the SHPO. The remaining structure, the Mary Murray House (8CL132), has been destroyed since the time it was recorded. The two historic railroads are the potentially NRHP-eligible Jacksonville, Tampa, and Key West rail corridor (8CL1180) and a segment of the Western Railroad Grade (8CL1202) determined to be ineligible for the NRHP by the SHPO. The historic road segment is part of the Bartram Scenic Highway (8SJ5314), which has been evaluated as ineligible for the NRHP by the SHPO. Peters Creek Bridge (8CL1203) was constructed c1951 and was previously evaluated as ineligible for the NRHP by the SHPO. The three resource groups consist of Lee Field Resource Group (8CL1111), Cattail Creek Golf Course (8CL1185), and Cattle Corral at Gustafson Conservation (8CL1186). The SHPO determined these three resource groups to be ineligible for listing in the NRHP. All 11 archaeological sites are recorded as ineligible for the NRHP.

ORANGE 1 AND ORANGE 2 ALTERNATIVES

Within the APEs for the Orange 1 and Orange 2 Alternatives, 18 historic structures, three historic railroad segments, two historic road segments, two resource groups, one historic bridge, and 11 archaeological sites were found.

The SHPO has determined 13 structures to be ineligible for the NRHP, one building (8CL1110) was determined to have insufficient information with which to make an eligibility determination, two buildings (8CL132 and 8CL396) have not been evaluated by SHPO (including the Mary Murray house that has destroyed), and two structures were determined eligible for listing (8CL1106 and 8CL1109). One of the historic structures is the Lee Field Drainage Ditch (8CL1104), a contributing resource to the Lee Field Resource Group (8CL1111), and determined to be ineligible for the NRHP. A segment of the Western Railroad Grade (8CL1202) was determined to be ineligible for the NRHP by the SHPO. The Lee Field Government Residences Oval Road (8CL1105) and the Lee Field Railway Spur Line Railbed (8CL1102) are not eligible for listing in the NRHP. A recorded segment of the potentially eligible Jacksonville, Tampa, Key West rail corridor (8CL1180) occurs within the APE of these alternatives. Bartram Scenic Highway (8SJ5314), a historic road segment, was evaluated as ineligible for the NRHP by the SHPO. The SHPO has determined the historic bridge within the study area, Peters Creek Bridge (8CL1203), is ineligible for the NRHP. The two resource groups consist of Lee Field Resource Group (8CL1111) and Cattail Creek Golf Course (8CL1185), neither of which is eligible for the NRHP.

GREEN 1 AND GREEN 2 ALTERNATIVES

Within the APEs for the Green 1 and Green 2 Alternatives, 17 historic structures, three railroads, two historic roadways, two historic bridges, three resource groups, and four archaeological sites were found. Twelve of the previously recorded structures are recorded as ineligible for the NRHP, one as requiring more information, two have not been evaluated (including the Mary Murray house previously destroyed), and two have been evaluated as potentially eligible for the NRHP by the SHPO. The SHPO has determined that both of the historic bridges within the study area, Peters Creek Bridge (8CL1203) and Trout Creek Bridge (8SJ5313), are ineligible for the NRHP. The three resource groups consist of the Lee Field Resource Group (8CL1111), the Cattail Creek Golf Course Resource Group (8CL1185), and 13-2A (8SJ4946). The SHPO previously evaluated the three resource groups as ineligible for the NRHP. Neither the Lee Field Railway Spur Line Railbed (8CL1102) nor a segment of the Western Railroad Grade (8CL1202) is eligible for listing on the NRHP. However, a recorded segment of the potentially eligible Jacksonville, Tampa, Key West rail corridor (8CL1180) occurs within the APE of these alternatives. The four archaeological sites have all been evaluated by the SHPO as ineligible for the NRHP.

PINK 1 AND PINK 2 ALTERNATIVES

Based on the Cultural Resource Assessment Survey Update (2010), the revised APEs for the Pink 1 and Pink 2 Alternatives contain six historic structures, two historic railroad segments, one historic road segment, four historic bridges, four archaeological sites, and four resource groups. All six historic structures have been evaluated as ineligible for the NRHP by the Florida SHPO. The Mary Murray House (8CL132) has not been evaluated by the SHPO and has been destroyed. The railroads are the potentially NRHP-eligible Jacksonville, Tampa, and Key West rail corridor (8CL1180), and a segment of NRHP-ineligible Western Railroad Grade (8CL1202). Bartram Scenic Highway (8SJ5314), the historic road segment, was evaluated as ineligible for the NRHP by the SHPO. The SHPO has determined that all of the historic bridges within the study area, Peters Creek Bridge (8CL1203), Trout Creek Bridge (8SJ5313), Shands Bridge (8CL1308/8SJ5416) and Grog Branch Bridge (8CL1418), are ineligible for the NRHP. The four archaeological sites have been determined ineligible for the NRHP. The four resource groups are Lee Field (8CL1111), Gustafson's Dairy Farm Rural Historic District (8CL1258), Cattail Creek Golf Course (8CL1185), and Cattle Corral at Gustafson Conservation (CL1186). All of the resource groups have been determined ineligible for listing in the NRHP by the Florida SHPO.

Unrecorded Cultural Resources

HISTORIC STRUCTURES

FDOT consulted the Clay and St. Johns Counties property appraisers' databases to determine the potential for unrecorded historic structures that could be located within each of the alternative APEs. As a result, 56 unrecorded resources (54 buildings and two bridges) were surveyed. Three of the buildings were obscured from view and the field team did not have authorized access to these sites, so their presence and condition could not be confirmed. All three of these occur within the APE for the Purple and Black Alternatives, and two of these also occur within the APE for all other Build Alternatives.

None of the remaining 53 resources were found to be potentially eligible for listing on the NRHP due to lack of architectural distinction, lack of known significant historical associations, and/or lack of historic integrity. Both bridges lack engineering and/or historical significance and are not eligible for listing in the NRHP.

ARCHAEOLOGICAL SITES

Estimating the likelihood of encountering previously undiscovered archaeological sites was based on soil drainage characteristics, topography, wetland distribution, and known archaeological site locations. Previously unrecorded archaeological sites in the study area have been discovered in ecological zones containing well drained soils adjacent to bodies of moving water, such as creeks and rivers. Four creeks – Black, Peters, Bradley, and Governors Creeks – traverse the Clay County portion of the study area. The soils adjacent to these creeks are considered to have a moderate to high probability of containing either historic or prehistoric archaeological sites.

Based on the predictive model, the Brown 1 and Brown 2 and Orange 1 and Orange 2 Alternatives have the highest probability (shown in **Exhibit 3-35**) for unknown resources to be present, and the Pink 1 and 2 Alternatives have the lowest probability.

Exhibit 3-35: **Summary of Potential Impacts to Cultural Resources**

Alternative	Previously Recorded Potentially Eligible Cultural Resources	Unrecorded Historic Structures Not Evaluated*	% of Corridor with Moderate to High Potential for Archaeological Site Probability
Black	6	1	22
Purple	6	1	27
Brown 1	1	0	30
Brown 2	1	0	30
Orange 1	5	0	32
Orange 2	5	0	32
Green 1	5	0	20
Green 2	5	0	20
Pink 1*	1	0	18
Pink 2*	1	0	18

*Updated based on the 2010 Cultural Resource Assessment Survey Update

3.9.3 How will the alternatives affect historic, cultural, and archaeological resources?

A summary comparison of the alternatives' potential to impact cultural resources is presented in **Exhibit 3-35**.

The Black and Purple Alternatives would involve the highest number of known, potentially NRHP-eligible cultural resources (six each), the Orange 1 and 2 and Green 1 and 2 Alternatives would involve five each, and the Brown 1 and 2 and Pink 1 and 2 Alternatives would involve only one each. The Orange 1 and 2 Alternatives have the highest probability for containing unknown archaeological sites, and Pink 1 and 2 Alternatives have the lowest. Unrecorded historic structures that could be eligible are small in number and similar for all alternatives. Overall, the Pink 1 and Pink 2 Alternatives are expected to have the least potential for impacts on cultural resources.

3.9.4 What measures are proposed to avoid or minimize effects to cultural resources during construction?

As described above, only one historic resource identified within the APE of the Preferred Alternative has been determined to be eligible for listing on the NRHP: the recorded segment of the historic Jacksonville, Tampa, and Key West rail corridor. FHWA has completed its evaluation of this resource, and determined that the project would have no adverse effect on this rail corridor, because the Preferred Alternative will bridge over the rail corridor and not affect any existing or future operations. (See Determination of Effect in the *Agency Coordination Memorandum* on the enclosed CD). The SHPO also stated in a letter to FDOT on January 29, 2008 (see the *Agency Coordination Memorandum* located on the enclosed CD), that if the Preferred Alternative was designed to bridge over the railroad segment and not interfere with the current or future operation of the rail line, the project would not adversely affect this resource. FHWA's final findings of no adverse effect to this resource, and concurrence by SHPO, are provided in the *Agency Coordination Memorandum* on the enclosed CD, in FHWA's letter dated January 11, 2011. FDOT will submit design plans to the SHPO when the plans become available so that SHPO can confirm that the final design avoids an adverse effect to the rail segment.

FDOT and FHWA will develop an inadvertent discovery plan to address what steps will be taken if construction areas contain unexpected cultural resources and will mitigate any unavoidable loss of eligible or listed properties or structures under the terms of Section 106.

3.10 SECTION 4(f) RESOURCES: PARKS, RECREATION AND HISTORIC PROPERTIES

This section summarizes the analysis of resources protected under a regulation referred to as Section 4(f). See the *Section 4(f) Evaluation and de Minimis Finding Report*, the *Cultural Resource Overview Survey Technical Memorandum* and the Cultural Resource Assessment Survey Update located on the enclosed CD for more information.

3.10.1 What is Section 4(f) and what resources does it protect?

Section 4(f) of the Department of Transportation Act of 1966 (49 USC 303, 23 USC 138) provides protection for significant publicly owned parks, recreation areas, historic properties (eligible for or listed on the NRHP), and wildlife and waterfowl refuges from conversion to a transportation use. FHWA may not approve such a conversion unless a determination is made that:

- There is no feasible or prudent alternative to the use of land from the property; and
- The action includes all possible planning to minimize harm to the property resulting from each use; or
- It is determined that the use of the property, including any measures to minimize harm committed to by the applicant, will have a *de minimis* impact on the property.

A "use" of Section 4(f) property occurs when:

- Land from a Section 4(f) property is acquired for a transportation project;
- There is a temporary occupancy of land that is adverse in terms of the statute's preservationist purposes; or
- The proximity impacts of the project on the Section 4(f) property, without acquisition of land, are so great that the purposes for which the property exists are substantially impaired (normally referred to as a "constructive use"). Proximity impacts typically include visual and noise effects.

FHWA guidance requires that potential impacts from the use of a Section 4(f) property for highway purposes be evaluated. A Draft Section 4(f) Evaluation was prepared with the Draft EIS; however, FHWA found that the Preferred Alternative would have *de minimis* impacts. Therefore, there is no need to determine whether a feasible and prudent alternative exists, and a Final Section 4 (f) Evaluation is not required (refer to discussion in Section 3.10.5). The enclosed CD contains the *Section 4(f) Evaluation and de Minimis Finding Report.*

Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966, 49 USC §303(c), requires that prior to the use of any 4(f) properties, FHWA must determine that there are no prudent and feasible alternatives that can avoid such use and that the project includes all possible planning to minimize harm to these resources. Section 4(f) resources include land from a publicly owned park, recreational area, wildlife or waterfowl refuge, or land from a historic property on or eligible for inclusion in the National Register of Historic Places.

A "use" of a section 4(f) resource can be either direct or proximate:

Direct – Land from a Section 4(f) property is acquired for a transportation project or there is an occupancy of land that is adverse.

Proximate – Although no acquisition or occupancy occurs, impacts are so great that the intended purpose of the property is sub-

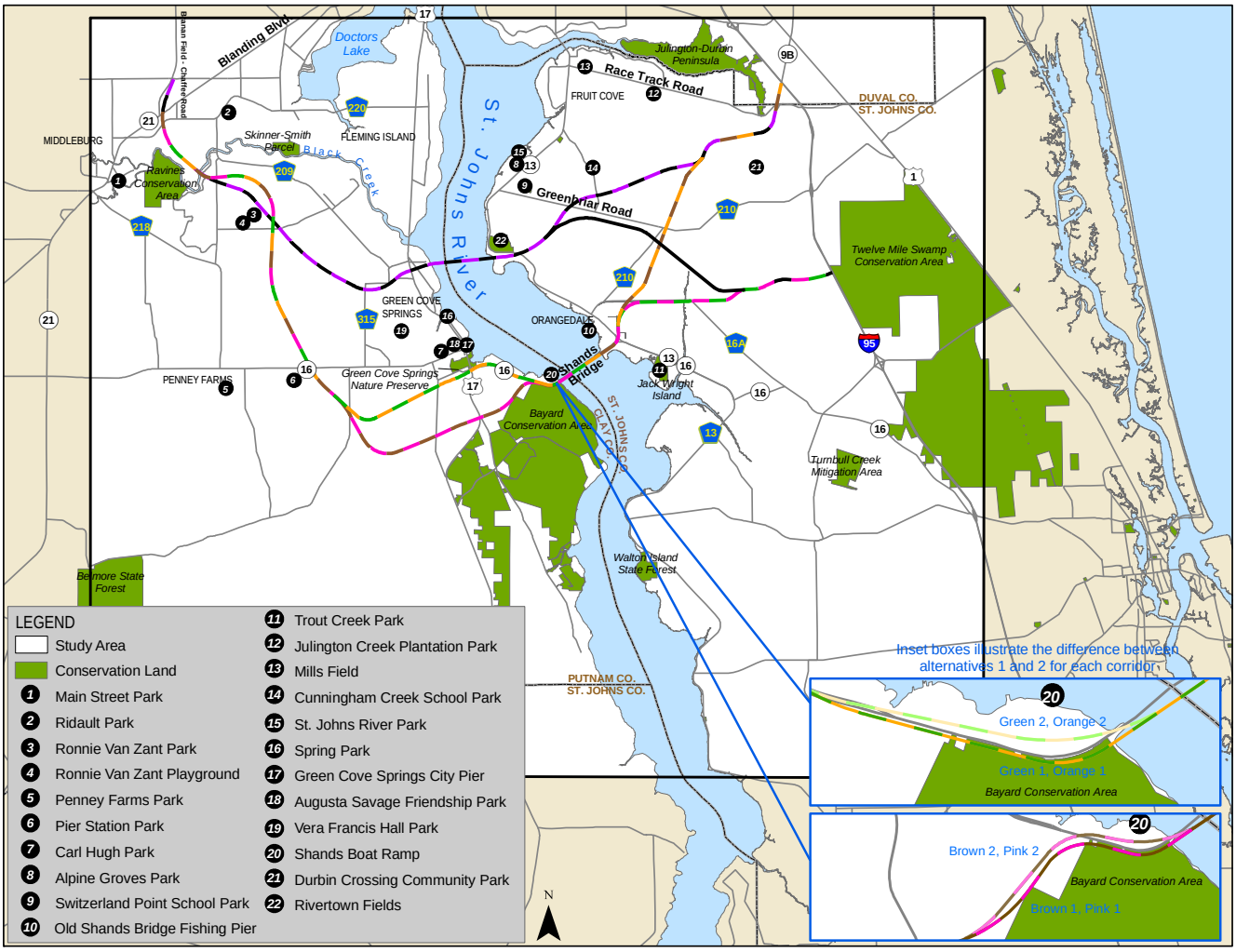
3.10.2 What Section 4(f) parks and recreational resources are located in the study area?

FDOT completed a GIS survey of Section 4(f) properties that had the potential to be impacted by the project. Then they assessed the project's potential impacts on the identified resources by comparing the alternatives to the location of the properties.

Ten conservation areas and 22 parks were identified within or near the St. Johns River Crossing Project study area (**Exhibit 3-36**).

FDOT identified six of these as Section 4(f) properties that had the potential to be impacted by the Build Alternatives. The characteristics, features, and attributes of these properties that make them significant properties under Sec-

Exhibit 3-36: **Recreation and Conservation Area Resources**



tion 4(f) protection are summarized below. The Draft Section 4(f) Evaluation on the enclosed CD provides more detailed description and maps of these properties.

GREEN COVE SPRINGS NATURE PRESERVE

The Green Cove Springs Nature Preserve was brought to FDOT's attention during the public review of the Draft EIS through a comment submitted by Clay County. The Green Cove Springs Nature Preserve is located north of the intersection of US 17 and SR 16 and spans from the St. Johns River to Melrose Avenue. The land purchase began in 2004 and consists of approximately 130 acres with nature trails, canoe launches and parking. This property does not yet have a master plan.

BAYARD CONSERVATION AREA (BCA)

This conservation area is located along the western bank of the St. Johns River southeast of Green Cove Springs, approximately 12 miles south of Jacksonville. It comprises 10,320 acres and is owned and operated by the St. Johns River Water Management District (SJRWMD). The area's proximity to the St. Johns River magnifies its importance, as it plays a key role in providing flood storage and preservation of water and natural resources in the river basin.

The BCA provides recreational activities including bank fishing, hiking, bicycling, horseback riding, primitive camping and wildlife viewing. Existing facilities include approximately 10.5 miles of multi-use trails, two picnic areas, two designated camping sites, restrooms, an observation tower, and a caretaker residence. Seasonal hunting is also permitted, and both boating and canoeing opportunities are available on the St. Johns River although there are no public launches.

A Land Management Plan was developed and approved by the SJRWMD Governing Board in December of 2006 (SJRWMD, 2006). The district has an agreement with the Florida Fish and Wildlife Conservation Commission (FWC) to manage the site and the adjacent conservation easement as a Type II Wildlife Management Area (WMA) for seasonal hunting.

Kiosk in the Bayard Conservation

Bayard Conservation Area Trailhead near SR 16

Twelve Mile Swamp Conservation Area

TWELVE MILE SWAMP CONSERVATION AREA (TMSCA)

This conservation area is located in St. Johns County, approximately five miles north of St. Augustine. A 378-acre recreation area is part of the larger 21,898-acre tract that is under a long-term timber reservation. FWC manages the larger portion of the property as a WMA and opens it for public hunting season. Currently, the only facility developed for recreation is a parking area at Nine-Mile Road, and most of the SJRWMD's land management responsibilities focus on maintaining public access and recreation opportunities until the termination of the surface-rights lease by Rayonier Woodlands L.L.C in 2025 (SJRWMD, 2003). Future plans include installing a kiosk and interpretive material at the parking area, utilizing existing timber roads for a trail system to accommodate hiking, bicycling, and horseback riding, and developing a silviculture interpretive trail with Rayonier.

RIVERTOWN FIELDS

The Rivertown Fields park is part of the Rivertown DRI. Four ball fields have already been constructed on the property. Although not yet completed, Rivertown Fields will also include a community park and a 100-acre active recreation park consisting of four multi-purpose fields, a designated picnic area, and approximately one mile of paved trails. The four existing ball fields and the planned picnic area are located at the western end of the property and the four multi-purpose fields will be located at the eastern end of the property. A paved trail system will traverse the property, serving as a connection between each of the different facilities. The St. Joe Company constructed the existing park facilities as part of the Rivertown DRI and conveyed them to St. Johns County for use by all county residents. They will also convey future park amenities to St. Johns County for management and operation.

OLD SHANDS BRIDGE FISHING PIER

This pier is located west of SR 13, at the terminus of CR 16 in St. Johns County. It is approximately 550 feet long and includes a parking area approximately 1.6 acres in size. The park is located in the community of Orangedale along the eastern bank of the St. Johns River in St. Johns County. The pier was created from the remains and is in the location of the original Alvin Shands Bridge, which was demolished in 1962. The sole function of the property is to serve as a fishing pier. No other activities are provided or permitted.

Rivertown Fields Site Plan

Old Shands Bridge Fishing Pier

Shands Boat Ramp

SHANDS BOAT RAMP

This boat ramp is located east of Green Cove Springs, north of CR 16 in Clay County. The Shands Boat Ramp property includes a boat ramp, fishing pier, and a parking area for both vehicles and boat trailers. The fishing pier was created from the remains and is in the location of the original Alvin Shands Bridge, which was demolished in 1962. Located about 2000 feet north of the existing Shands Bridge, the pier is approximately 1600 feet long and the parking area and boat ramp are approximately 2.7 acres in size. The boat ramp is located on the south side of the fishing pier and is recommended by the county for watercraft and boats under 16 feet in length. Fifteen spaces for vehicle and boat trailer parking are located along Shands Pier Road. Usage of the fishing pier has increased due to the county's prohibiting fishing from the banks of the St. Johns River near the existing Shands Bridge.

3.10.3 What historic properties are located in the study area?

As described previously under Cultural Resources, FDOT identified a number of historic structures and archaeological sites that are eligible or potentially eligible for listing on the NRHP. These resources were shown in **Exhibit 3-35** in the previous Cultural Resources section, and are included in the summary of Section 4(f) impacts at the end of this section.

As described in the Cultural Resources section, FHWA has determined that the Preferred Alternative (Pink 1) will not have any adverse effect on any known historic property.

3.10.4 How will the alternatives affect Section 4(f) resources?

Purple and Black Alternatives

The Purple and Black Alternatives each will impact five known cultural resources that are potentially eligible for listing on the NRHP. (FHWA has completed an evaluation of one of the historic properties for these alignments, the potentially eligible Jacksonville, Tampa, and Key West rail segment. The project will have no adverse effect on this resource because the alternatives will bridge over it (refer to Section 3.9, Cultural Resources). Therefore, it is not included in this discussion of impacted Section 4(f) historic properties.) Two of the resources found on the Purple and Black Alternatives are archaeological

sites. One is a prehistoric habitation and historic fort that has been determined potentially eligible for the NRHP. Section 4(f) protection would not apply to those sites that are important for their information and research potential; however, it could apply to those rare sites that are important for preservation in place. The other archaeological site is a lithic scatter and early historic period site; it has not yet been evaluated, but it is thought to be unlikely that this site would need to be preserved in place.

Predictive modeling indicates that the Purple and Black Alternatives also have potential for the presence of unknown archaeological sites (refer to Cultural Resources section). FDOT will treat any yet-to-be-discovered historic properties as protected resources under the discovery provisions outlined in the Section 4(f) regulations.

Neither the Purple nor the Black Alternative will result in a direct use or a constructive use of any recreational or wildlife/waterfowl refuge Section 4(f) properties in the study area. The nearest resource to these corridors is Rivertown Fields. Although both the Purple and Black Alternatives approach this resource, they will remain sufficiently distant that proximity impacts (constructive use) from noise are not expected. At least 200 feet of a natural vegetation buffer would remain in place, further reducing noise impacts and protecting the park from visual impacts associated with the proposed project. A detailed map of the Purple and Black Alternatives in relation to Rivertown Fields is included in the *Section 4(f) Evaluation and de Minimis Finding Report* located on the enclosed CD.

Brown 1 and 2, Orange 1 and 2, Green 1 and 2 and Pink 1 and 2 Alternatives

The Orange 1 and 2 and Green 1 and 2 Alternatives will impact four known historic resources that are potentially eligible for listing on the NRHP. (As stated previously, the potentially eligible Jacksonville, Tampa and Key West rail corridor is not included in this discussion because it has been determined that the project will have no adverse effect on this resource.) The Brown 1 and 2 and Pink 1 and 2 Alternatives will not impact any known historic properties because the only potentially eligible resource within the APE of these alternatives is the Jacksonville, Tampa, and Key West rail corridor, determined to have no adverse effect from the project. The Orange 1 and 2 Alternatives have the highest probability of containing unknown archaeological sites while the Pink 1 and 2 have the least potential for impacts.

The Pink 1 and 2 and Green 1 and 2 Alternatives approach the Twelve Mile Swamp Conservation Area (TMSCA) at the intersection with I-95, but would not result in any direct use of the TMSCA because the alternatives intersect I-95 which forms the western border of this portion of the conservation area. A detailed map of the alternatives in relation to the TMSCA is provided in the *Section 4(f) Evaluation and de Minimis Finding Report* .

The alternatives will not result in any constructive use or proximity impacts related to noise or visual resources in the TMSCA. The junction of the Pink and Green Alternatives with the I-95 corridor lies adjacent to the conservation area. Since there are no facilities present in this area, and therefore no sensitive receptors, it is not expected that there would be any additional noise impacts on the TMSCA, particularly with the existing I-95 alignment bordering the property. Due to the existence of I-95, no project-related visual impact was identified in this area.

The Brown 1, Orange 1, Green 1, and Pink 1 Alternatives will have impacts on the BCA. Detailed maps of these alternatives in relation to the BCA property are included in the *Section 4(f) Evaluation and de Minimis Finding Report* located on the enclosed CD. The Brown 1 and Pink 1 Alternatives will have a direct use of 34.5 acres of the BCA, two parking areas, a caretaker residence, and the northern end of three unpaved trails. The alternatives will also have proximity impacts of increased noise and decreased visual quality, but these impacts will not impair the property's activities, features or attributes so they will not be a constructive use. The Orange 1 and Green 1 Alternatives will result in the use of 23.6 acres of the BCA, one parking area, caretaker residence, and the north end of three unpaved trails. These alternatives will have proximity impacts similar to those of Pink 1 and Brown 1, which will not be a constructive use.

The Brown 2, Orange 2, Green 2, and Pink 2 Alternatives will not result in any Section 4(f) use or constructive use of the BCA.

The Green 1 and 2 and Orange 1 and 2 Alternatives would involve a direct use of 5.0 acres of the Green Cove Springs Nature Preserve located at the US 17 intersection. The alternatives would also have proximity impacts of increased noise. However, without a master plan, it cannot be determined if there would be a constructive use. Avoidance alternatives were not developed for the Green 1 and 2 and Orange 1 and 2 Alternatives since the preserve was not discovered until after the publication of the Draft EIS, and the Pink 1 Alterna-

tive has been selected as the Preferred Alternative. As currently designed, the Green 1 and 2 and Orange 1 and 2 Alternatives could not be selected as the Preferred Alternative because there are prudent and feasible avoidance alternatives. Should one of these alternatives later be reconsidered as the Preferred Alternative, avoidance options would be designed.

The Pink 1 and 2 and Brown 1 and 2 Alternatives are located approximately 1.5 miles away, and would not result in any direct or constructive use of the Green Cove Springs Nature Preserve.

Summary of Impacts to Section 4(f) Resources

Exhibit 3-37 summarizes the potential project effects to Section 4(f) resources in the study area. This table includes the recreational resources affected (as described above), as well as historic properties that may be impacted and that are eligible or potentially eligible for listing on the NRHP. These historic resources are detailed in the *Cultural Resource Overview Survey Technical Memorandum* and the Cultural Resource Assessment Survey Update for the project, and are only summarized here by quantity.

Exhibit 3-37: **Summary of Effects on Section 4(f) Resources**

Alternative	Known Historic Properties Impacted [1]	Green Cove Springs Nature Preserve - Acres Impacted	Bayard Conservation Area				
			Section 4(f) Use Impacts		Proximity Impacts		
			Acreage	Facility Impacts	Visual	Noise	Constructive Use
Brown 1 & Pink 1 Alternatives	0	N/A	34.46	Two parking areas, caretaker residence and three unpaved trails	Yes	Yes	No
Brown 2 & Pink 2 Alternatives	0	N/A	0	None	No	No	No
Green 1 & Orange 1 Alternatives	4	5.0	23.60	One parking area, caretaker residence and three unpaved trails	Yes	Yes	No
Green 2 & Orange 2 Alternatives	4	5.0	0	None	No	No	No
Black & Purple Alternatives	5	N/A	N/A	N/A	N/A	N/A	No
No Build Alternative	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1] Known historic properties listed here are potentially eligible resources that may be impacted by the Build Alternatives. Section 4(f) protection would apply to eligible historic sites and to archeological sites that are important for preservation in place. The APE of all the Build Alternatives includes a segment of the potentially eligible Jacksonville, Tampa and Key West rail corridor; however, this resource is not included in Exhibit 3-37 because all Build Alternatives would bridge over the rail line and FHWA has determined there would be no adverse effect to this resource.

The only recreational Section 4(f) resource that could potentially be impacted by the St. Johns River Crossing Project would be the BCA (**Exhibit 3-38**). The project alternatives did not come close enough to any of the other recreational resources analyzed to result in any anticipated use or constructive use.

3.10.5 De Minimis Impact Finding for the Preferred Alternative

Section 6009(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Pub. L. 109-59, amended existing Section 4(f) legislation at Section 138 of Title 23 and Section 303 of Title 49, United States Code, to simplify the processing and approval of projects that have only *de minimis* impacts on lands protected by Section 4(f). This revision provides that once FHWA determines that a transportation use of Section 4(f) property results in a *de minimis* impact on that property, after consideration of any impact avoidance, minimization, and mitigation or enhancement measures, an analysis of Avoidance Alternatives is not required and the Section 4(f) evaluation process is complete. For parks and recreation areas, a *de minimis* impact is one that would not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f). The Preferred Alternative is only using land from the Bayard Conservation Area.

In the Draft EIS, FDOT noted its intent to pursue a *de minimis* finding for the Pink 1 Alternative which was identified as the Locally Preferred Alternative (LPA) in the Draft EIS and has been selected as the Preferred Alternative in this Final EIS. Since publication of the Draft EIS, FDOT and FHWA conducted further consultation with the Official with Jurisdiction for the BCA (SJRWMD), and solicited and received public and agency comments on the potential Section 4(f) impacts of the project. These efforts are summarized in this section, and discussed in more detail in the *Section 4(f) Evaluation and de Minimis Finding Report* on the enclosed CD.

FHWA has determined that the Preferred Alternative will have minimal impacts to existing facilities at the BCA but will not interfere with the primary function of the BCA. SJRWMD agrees that the mitigation and enhancement measures agreed upon and committed to by FDOT will not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f). Therefore, FHWA has made a *de minimis* determination for the Preferred Alternative.

Coordination with the Official with Jurisdiction over the BCA

Coordination regarding the BCA has been conducted with the SJRWMD (Official with Jurisdiction) prior to the early phases of the PD&E, beginning with the development of the 2000 BCA Land Management Plan. The Plan acknowledges that the St. Johns River Crossing Project may impact the boundary of the BCA in the future.

The SJRWMD and other agencies have had the opportunity to comment on the impacts to the conservation property through the ETDM process, scoping meetings, agency coordination meetings and other public involvement opportunities. The FDOT has worked closely with the SJRWMD to develop the mitigation and enhancement measures discussed above and agree that:

- The use of the property will not adversely affect the activities, features and attributes of the property,
- The project includes all possible planning to minimize harm, and
- The net result is an overall improvement and enhancement of the property when compared to the No-Build Alternative and present condition of the property.

A letter from the SJRWMD stating their concurrence with the above mentioned statements and mitigation plan is included in the *Section 4(f) Evaluation and de Minimis Finding Report* on the enclosed CD. In their letter dated April 16, 2010, SJRWMD stated that they consider the current location of the parking and security facilities as suboptimal and would consider reconstruction as an enhancement to the BCA. SJRWMD also stated that the multi-use path FDOT is committing to construct will enhance access for residents of Clay and St. Johns Counties.

In addition to the SJRWMD, the Florida Wildlife Federation also stated their support for FDOT's minimization, mitigation and enhancement efforts. In a letter dated March 15, 2010, the Florida Wildlife Federation stated their preference for avoiding impacts to the BCA, but added that if an alternative is selected that impacts the BCA, FDOT should mitigate those impacts above and beyond the value of the lands that will be converted. The mitigation measures FDOT has committed to will be above and beyond the BCA's current value by increasing the amount of land (net increase of 39.35 acres), improving access, and providing connectivity to the other facilities. A copy of the Florida Wildlife Federation's letter is included in the *Section 4(f) Evaluation and de Minimis Finding Report* .

Public Comments and Coordination

The alternatives evaluated in the PD&E study that impact the BCA were presented to the public early in the process beginning with public meetings held in the fall of 2005 and 2006. The LPA and all other alternatives that potentially impact the BCA were also presented and made available for public comment during the public hearings held in February and March 2010. Potential impacts to the BCA and other Section 4(f) properties were discussed during the presentation and all alternatives were shown in detail on display boards. Eleven comments related to Section 4(f) impacts were received during the public hearing comment period. Eight of the comments stated a preference for an alignment south of SR 16 (impacting the BCA) and three stated preference for an alignment north of SR 16 (avoiding the BCA). These comments are included in the *Section 4(f) Evaluation and de Minimis Finding Report* on the enclosed CD.

Information on the alternatives and their impacts have also been available to the public at the North Florida Transportation Planning Organization (TPO) subcommittee meetings, the St. Johns and Clay County Board of County Commissioner meetings, the Northeast Florida Regional Council (NEFRC) meetings, and other small group meetings. In addition, the public was given the opportunity to submit comments and view maps, environmental documents, and other project information through the project's website (www.sjrbridge.com).

The intent to pursue a *de minimis* finding for the impacts to the BCA was also documented in the Draft EIS. It was stated that this would occur after further consultation with the Official with Jurisdiction and after soliciting public comment on the potential Section 4(f) impacts. The document was approved for circulation by FHWA in December 2009 and has been available for public review at the local libraries and through the project website.

Throughout the study process, the local governments have acknowledged the potential impacts to the BCA but have shown support for an alternative in that location. The City of Green Cove Springs, which is located north of and adjacent to BCA, passed a resolution supporting the Pink Alternative on August 3, 2004. The resolution specifically states, "A minor impact to the Bayard Conservation Area would be more desirable than impacting residential property." In early 2006, the St. Johns County Board of County Commissioners and the Clay County Board of County Commissioners also passed resolutions stating their support

for a new highway corridor that crossed the St. Johns River near the existing Shands Bridge and acknowledging the Section 4(f) use of the BCA.

3.10.6 What measures are proposed to minimize effects to Section 4(f) resources during construction and operation?

FDOT attempted to design and refine project alternatives to minimize impacts to the BCA throughout the project. Several alternatives identified and evaluated during the initial stages of the project bisected the BCA (Alternatives A, B, C, D, J and K). These alternatives were either dropped from consideration or further refined to cross the BCA along its northern boundary, south of SR 16. Impacts were further minimized by reducing the proposed right-of-way for all alternatives from 400 feet to 324 feet in width. These modifications resulted in a reduction of approximately 14.5 acres of impacts to the BCA from the Preferred Alternative and other alternatives crossing the BCA.

Several coordination meetings between FDOT and the SJRWMD have also taken place during the course of the PD&E Study to discuss impacts to the BCA and potential mitigation and enhancement measures. Based on these discussions, FDOT has committed to implementing the following measures to mitigate and minimize harm to the BCA. These mitigation and enhancement measures will be in place before impacts occur, making the facilities available throughout the land transfer and replacement effort:

- **73.81 acres of land adjacent to the conservation area will be conveyed to the SJRWMD for incorporation into the BCA, resulting in a net increase of 39.35 acres**. The 73.81 acres of adjoining land includes a golf course which is fertilized on a regular basis. The golf course was not designed per the new SJRWMD stormwater rules and thus has direct runoff to the St. Johns River. The 73.81 acres will be converted to a conservation use and restored to an environmentally acceptable condition. As stated by the SJRWMD during discussions, this conveyance of land will allow the proposed limited access roadway to serve as a barrier between existing development and the conservation area, thereby making the BCA more manageable. Conveyance of the land is also consistent with the primary goals of the BCA Land Management Plan, which includes the acquisition of additional adjacent land.

- **Existing unpaved trails expected to be impacted by the project will be bridged.** Bridging the unpaved trails will allow access to the unpaved trails to be maintained. Mitigation and enhancement measures will be in place prior to impacts. Other methods to soften the appearance of the structure including selective clearing, screening and coloration of the structure materials will be considered during the design phase and coordinated with the officials with jurisdiction.

- **The two (of the four total) impacted unpaved parking areas will be consolidated into one parking lot and reconstructed in an area south of the proposed roadway along with the north caretaker residence (1 of 2).** During discussions, the SJRWMD expressed concern over the existing location of the parking lots and the caretaker residence and stated their interest in consolidating the parking areas. By combining the parking areas and caretaker residence, access to the BCA from SR 16 can be better controlled and security for the property can be more easily provided. This action will enhance the management of this area for recreation. The proposed consolidated parking area and the caretaker residence will be accessed from the existing driveway location off SR 16. This access point currently serves the existing caretaker residence and one of the unpaved parking areas. FDOT will coordinate with the SJRWMD in the future to determine the size of the new parking area and other enhancements to the existing access road.

  FDOT's mitigation plan for the impacted parking areas is also consistent with FHWA's guidance for *de minimis* impacts. Based on FHWA's Questions and Answers on the Application of the Section 4(f) De Minimis Impact Criteria, encroachment on a parking area may be deemed *de minimis* as long as the public's ability to access and use the site is not reduced.

- **A multi-use trail will be constructed along the north side of the conservation area, adjacent to the roadway**. The multi-use trail will add 0.6 mile of paved trails, connecting the BCA to the St. Johns River. The new trail will also connect directly to the multi-use path that will be part of the new bridge across the river. This system will allow users direct access to the conservation area and will enhance the connectivity between the conservation area, the nearby fishing pier and other recreational opportunities available across the river in St. Johns County.

- **Incorporate elements into the design to help minimize visual effects, where feasible and practical, including consideration of the following:**
    - ***Selective Clearing:*** Clearing only the vegetation required to construct the project, particularly trees.
    - ***Landscaping:*** Incorporation of trees and groundcover to add visual interest to the roadway.
    - ***Screening:*** Screening can be achieved with landscape materials or by using permanent construction materials such as metal and concrete walls.

As noted previously, the Preferred Alternative may also have noise impacts to the BCA. However, a noise barrier analysis cannot be conducted for this area until the relocation of the parking lot and site access has been determined. Therefore, FDOT has committed to reanalyzing this site during final design when relocation data is available.

Cultural Resources

There are no known historic properties that would be affected by the Preferred Alternative. Any yet-to-be-discovered historic properties will be treated as protected resources under the discovery provisions of the Section 4(f) regulations.

3.11 PUBLIC SERVICES AND UTILITIES

This section summarizes the analysis of public and emergency services and utilities. See the *Public Services and Utilities Discipline Report* located on the enclosed CD for more information.

Kindred Hospital in Green Cove Springs

Clay County Sheriff's Office Substation

3.11.1 How were public services and utilities identified and evaluated?

Local governments, utility districts, and occasionally private companies provide public services and utilities to residents within the study area. FDOT identified utilities including electricity, natural gas, water, wastewater collection, and telecommunications. They also identified public services that could be affected including community centers, emergency medical services, fire and police protection, government offices, religious facilities, and schools.

The team gathered information by reviewing the comprehensive plans for Clay and St. Johns Counties (Clay County, 1998; St. Johns County, 2000), examining their websites, and through GIS data created by agencies such as FDOT, SJRWMD, and the Florida Department of Environmental Protection (FDEP). They then mapped these services and overlaid them onto an aerial photograph to determine those facilities and utilities crossed by the alternatives or that had the potential to be affected.

3.11.2 What public services and utilities are located in the study area?

Fire Departments: Ten fire stations currently serve the study area (**Exhibit 3-38**). St. Johns County plans to add three new stations in the area based on population growth by the year 2014. Although Clay County does not plan to build any new stations, they do plan to expand the Green Cove Springs Station.

Emergency Medical Services: The Kindred Hospital-North Florida in Green Cove Springs is the only hospital facility located in the study area. There are several other hospitals in the project vicinity, including the Orange Park Medical Center, approximately three miles north of the study area in Clay County; Flagler Hospital, about five and a half miles to the southeast; and Baptist Medical South, approximately two miles north of the study area in Duval County. St. Vincent's is approved for a new hospital facility on Branan Field-Chaffee Road, just north of Blanding Boulevard.

Law Enforcement Services: The Clay County Sheriff's Office, the Green Cove Springs Police Department, and the St. Johns County Sheriff's Office serve residents in the study area (**Exhibit 3-38**).

Schools: In Clay County, several school facilities are clustered near the Branan Field-Chaffee Road/Blanding Boulevard interchange in the northwest portion of the study area and along SR 16 in Green Cove Springs. In St. Johns County, schools are clustered near the segment of Greenbriar Road between SR 13 and CR 210. The study area contains 31 schools and more are planned to accommodate the anticipated growth in population. Clay County has plans to develop ten new schools within the project area over the next 20 years, and St. Johns County plans to construct at least three new schools.

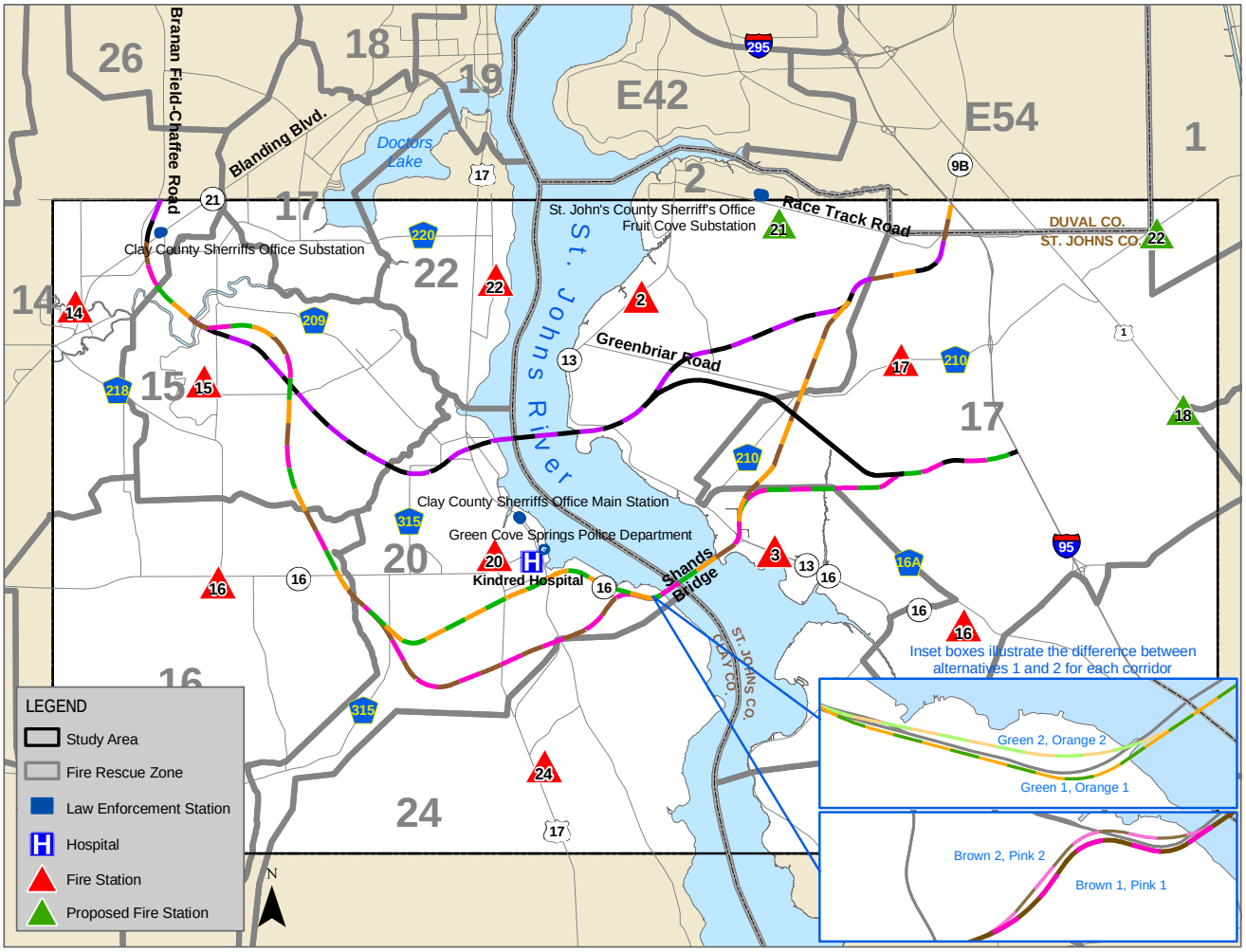
Religious Facilities: Clay County churches are primarily located along the existing major roadways, including SR 21, SR 16, US 17 and CR 220. In Green Cove Springs, they are generally located within the different neighborhoods. Several churches in St. Johns County are located along SR 13, north of the Build Alternatives. Altogether, there are over fifty churches and other religious institutions serving the counties in the study area.

Other Public Service Facilities: Three libraries are in the study area: the William Bartram Public Library in Fruit Cove, the Green Cove Springs Public Library, and the Headquarters Library on Fleming Island. Clay County post offices include the Green Cove Springs Post Office, the Middleburg Post Office located on Main Street, and the Penney Farms Post Office. There is no main post office in the St. Johns County portion of the study area, but the residents are served by a post office facility located in Switzerland. Two community centers serve the residents in the study area: the Middleburg Community Center in Clay County and the Trout Creek Park Community Center in St. Johns County. Other public service facilities include three senior centers and the Paul E. Reinhold Agricultural Fairgrounds, located just west of Green Cove Springs.

Utilities: The following public and private agencies provide utilities services to the study area:

- *Electric:* Florida Power and Light, Green Cove Springs Utilities Services, Clay Electric Cooperative, and Jacksonville Electric Authority.
- *Telephone:* Bellsouth and Auglink Communications Inc.
- *Cable:* Time Warner and Comcast.

Exhibit 3-38: **Emergency Services**



- *Water and Sewer:* Clay County Utility Authority, Green Cove Springs Utility Services, Jacksonville Electric Authority, Fruit Cove Properties, St. Johns County Utilities, and the City of St. Augustine.
- *Natural Gas:* Teco Peoples Gas, Domestic Gas, and Sawyer Gas.

3.11.3 Will the alternatives affect any public services and utilities?

No schools, libraries, hospitals, medical or fire facilities, or law enforcement facilities will be directly affected by the proposed project. Any of the Build Alternatives will enhance mobility in the area and generally decrease emergency response times for fire, police, and medical rescue since emergency vehicles will have a less congested route option. Similarly, a new roadway facility will improve residents' travel times and their access to public service facilities. **Ex-**

hibit 3-39 provides a comparison of potential impacts to public services and utilities that would occur with each of the alternatives.

A church facility, Living Waters of Middleburg located on Blanding Boulevard, will be impacted by all of the Build Alternatives. The relocation of five to seven power lines will be needed, depending on the alternative (**Exhibit 3-39**).

The Black, Purple, Brown 1 and 2, and Orange 1 and 2 Alternatives will all impact some portion of the Blacks Ford Swamp, a 311-acre effluent disposal site operated by the Jacksonville Electric Authority (JEA) in St. Johns County. If the approximately three to nine acre impact impaired the ability of JEA to continue using this facility for effluent discharge, a new location will have to be identified and permitted.

The Black and Purple Alternatives will also require the relocations of the Church of God, north of Green Cove Springs, and a wireless service tower.

The Build Alternatives are not anticipated to cause an increase in demand for public services or utilities in excess of their capabilities, as the rapid growth in the area is expected to continue with or without the project. Counties and other service providers are aware of this growth and are already planning for it.

Although the No Build Alternative will not directly impact any public service or utilities facilities in the study area, it will not improve traffic flow between and within Clay and St. Johns Counties. In the future, residents will experience increased travel time as population builds and traffic increases. This could result in increased response times for emergency services.

Living Waters Church of Middleburg, located on Blanding Boulevard

3.11.4 How will construction activities affect public services and utilities in the study area?

Construction activities will result in temporary lane closures on some roads, potentially increasing congestion and slowing emergency response times while also limiting emergency vehicle access to those areas. Although FDOT will develop a health and safety plan, the potential for construction-related accidents could result in an increased need for emergency medical aid. Any such impacts are expected to be temporary and minor.

During construction, pile-driving and earth-moving activities may affect some utilities. There may be a need to temporarily reroute utility lines or cables, resulting in outages. These outages are anticipated to be short term and intermittent. The exact locations of utilities will be reviewed with those providers during final design.

Exhibit 3-39: **Public Services and Utility Impacts**

Resources	Alternatives					
	Black	Purple	Brown 1 and 2	Orange 1 and 2	Green 1 and 2	Pink 1 and 2
Religious Facilities	2	2	1	1	1	1
Service Towers	1	1	0	0	0	0
Blacks Ford Swamp (acres)	3.5	3.5	9.3	9.3	0	0
Power Line Crossings	5	5	7	7	7	7

3.11.5 What measures are proposed to avoid or minimize effects to public services and utilities during construction?

A key to avoiding unnecessary negative effects of project construction activities is coordinating with all service providers, including emergency services, and utility providers during final design to ensure that access is maintained and alternate routes are developed. Potential mitigation measures include:

- Design the Preferred Alternative to minimize impacts on utilities.
- Notify and coordinate with the fire departments for waterline relocations that may affect water supply for fire suppression and establish alternate supply lines prior to any breaks.
- Notify and coordinate with the fire departments during construction to ensure all calls can be handled by developing plans for alternate routes.
- Provide emergency service providers and police departments with advance notification of construction schedules and any planned street closures.
- Coordinate with school officials during construction. Also schedule evening construction, where allowed, to reduce congestion during peak hours and have less effect on school bus routes.
- Field-verify the exact locations and depths of underground utilities prior to construction.
- Notify neighborhoods of utility interruptions by providing a schedule of construction activities to the public in those areas.
- Prepare a consolidated utility plan consisting of key elements such as existing locations, potential temporary locations, and potential

Telecommunications tower located on US 17

Green Cove Springs Church of God

new locations for utilities; sequence and coordinated schedules for utility work; and detailed description of any service disruptions. This plan will be reviewed by and discussed with affected utility providers prior to the start of construction.

3.12 VISUAL QUALITY

This section summarizes the analysis of visual quality and aesthetics. For more information, see the *Visual Quality Discipline Report* located on the enclosed CD.

Measuring Visual Impacts

While many factors contribute to a landscape's visual quality, they can ultimately be grouped under three headings:

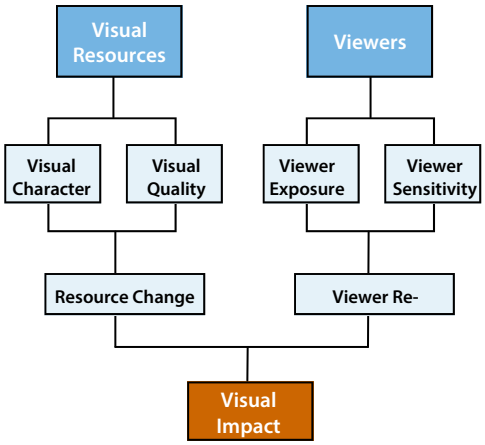
Intactness – The integrity of visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment.

Unity – The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern.

Vividness – The memorability of the visual impression received from the contrasting landscape elements as they combine to form a striking and distinctive visual pattern.

The degree of change in visual resources and the viewer's expected response to those changes is predicted based on a **Viewshed,** which includes 1) all the surface areas visible from an observer's viewpoint, and 2) surface areas from which a critical object or viewpoint is seen.

THE VISUAL ENVIRONMENT



FHWA 1989

3.12.1 How were visual resources identified and evaluated in the study area?

FDOT reviewed a variety of planning documents for Clay and St Johns Counties to identity areas of scenic value or visual quality. The team studied the corridor management plan prepared for SR 13 (William Bartram Scenic and Historic Highway) by the William Bartram Scenic Highway Corridor Group and St. Johns County, in particular, for information related to visual quality at the two locations where the project would cross that facility. They used GIS data, maps, aerial imagery and conceptual engineering drawings to determine the project footprint in relation to visual resources that had been identified. The project team then conducted a field review of the alternatives.

The methodology for analyzing the impacts followed FHWA guidance (FHWA 1989). FDOT used the following six-step process to determine the probable visual impact of the St. Johns River Crossing Project:

Identify the study area and project characteristics: This involves establishing a baseline from which alternatives are compared: geography, buildings, vegetation and water bodies, etc.

Determine the viewshed: This step identifies the views, both to and from the proposed project that may be affected. Viewsheds combine with the landscape to define the visual assessment unit.

Evaluate the affected environment: The concepts used to establish the visual quality for the project are *intactness*, *unity* and *vividness*. Creating a matrix that numerically ranks the units based on these concepts helps to rank the impacts. The team also needed to identify the exposure of viewer groups to the proposed project and their sensitivity to determine viewer characteristics. It is important to include both views to and from the road when determining viewer groups.

Identify the impact: The visual resource change and predicted viewer response combine to determine the overall visual impact of the project.

Rank the impact: Quantifying the visual resource change is similar to determining the quality of the visual assessment unit earlier in the process, evaluating new elements added into the landscape and existing elements that are altered to determine the project's compatibility with the original landscape's visual character. Photographic simulations were used as tools in this step. Anticipated viewer response is predicted by comparing viewer characteristics with the visual resource changes.

Propose visual impact mitigation options: By comparing the numbers in the matrix for visual quality and visual impact, the team could identify high contrast areas and explore mitigation options.

FDOT based the study area for each alternative on the proposed right-of-way width (324 feet wide) and the visual resources that could be affected by the alternative. This viewshed was primarily the area adjacent to the right-of-way, as the landscape in northeast Florida is relatively flat; however, there were exceptions to this rule. For example, roadways and creeks that cross the alternatives can offer views to and from the proposed roadway for a longer distance. Especially along the St. Johns River, the views to and from the existing and proposed bridge spans offer vistas for several miles in either direction. At these locations, the viewsheds were expanded to account for all potential visual impacts.

3.12.2 What visual resources were identified?

Given the length of the alternatives, the proposed St. Johns River Crossing Project crosses various natural and built communities. Natural areas include the St. Johns River, creeks, forested areas and wetlands and undeveloped areas like pastureland; developed areas include suburban residential developments. The St. Johns River is the most prominent natural feature along any of the alternatives and is designated as an American Heritage River. All of the Build Alternatives will cross the river, offering scenic views to the north and south.

William Bartram Trail along SR 13

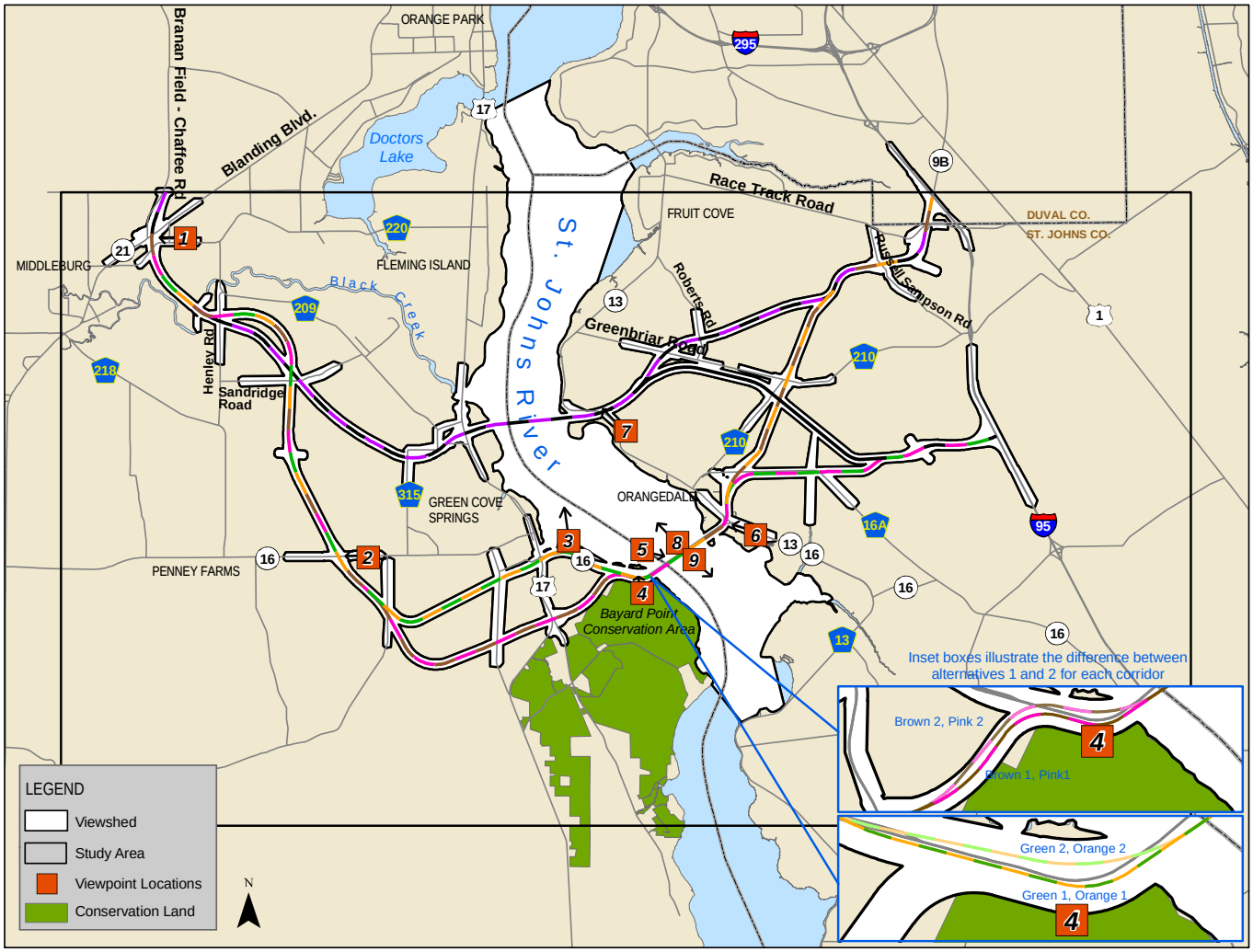
In Clay County, the Bayard Conservation Area (BCA) is adjacent to four of the Build Alternatives, along with smaller recreation areas such as fishing piers and boat ramps. In St Johns County, the William Bartram Scenic and Historic Highway (SR 13) runs along the east bank of the St Johns River. All the Build Alternatives cross this scenic highway but no interchange is proposed. Along this stretch of road, large live oak canopies and views to the St Johns River are among the many natural scenic resources that make this a valuable visual resource.

All Build Alternatives pass through residential areas, many of which are parts of existing or proposed DRIs.

3.12.3 How will the alternatives affect visual resources?

Nine viewpoints were chosen to represent the areas that will be repeatedly affected throughout the various Build Alternatives (**Exhibit 3-40**). By gauging the visual impact to these areas, FDOT evaluated the alternatives based on the occurrence of these viewpoint types along each particular corridor.

Exhibit 3-40: **Viewsheds and Viewpoint Locations**



Middleburg Area – Connection with SR 21

MIDDLEBURG AREA – CONNECTION WITH SR 21 (BLANDING)/BRANAN FIELD-CHAFFEE ROAD (VIEWPOINT #1)

The area includes a relatively new neighborhood of moderately priced homes. Existing visual quality is moderately low, and residents would likely have high sensitivity to visual changes. Visual quality for this viewpoint will decrease to low because of the further encroachment and breakdown of visual unity since trees behind these homes will be removed and the interchange ramps will be built.

PIER STATION/FAIRGROUNDS AREA – INTERSECTION WITH SR 16(VIEWPOINT #2)

Existing visual quality for this section of SR 16 is moderately high. Since motorists will have unobstructed views of the new road crossing while traveling in either direction, they would likely have a moderately high sensitivity. Visual quality for this viewpoint will decrease to moderately low because of the encroachment and disjoining effect on the existing view.

Simulation of the crossing over SR 16 in the Pier Station Area.

PROPOSED RIVER CROSSING AT POPO POINT (VIEWPOINT #3)

Existing visual quality for the river view is high, and residents would likely have high sensitivity to the visual changes associated with the new roadway and bridge. Visual quality for this viewpoint will decrease to average because of the intrusion of a large structure spanning the river at this point.

Simulation of the roadway passing the Bayard Conservation Area

BAYARD CONSERVATION AREA (VIEWPOINT #4)

The existing visual quality for this area is high. Trail users are likely to have high sensitivity to visual change. Visual quality for this viewpoint will decrease to moderately low for the Brown 1, Orange 1, Green 1 and Pink 1 Alternatives because of the visual encroachment of the roadway and resulting breakdown of visual unity. For the Brown 2, Orange 2, Green 2 and Pink 2 Alternatives, visual quality will remain high, as there will be no encroachment and therefore no impact on the conservation area for the Orange 2 and Green 2 Alternatives, and minimal encroachment on the northern edge of the BCA, away from the trail heads, for the Brown 2 and Pink 2 Alternatives..

Simulation of new bridge across the river near the existing Shands Bridge

ST. JOHNS RIVER AT EXISTING SHANDS BRIDGE (VIEWPOINT #5)

Existing visual quality for this river and bridge view is moderately high. Residents would likely have high sensitivity to the visual changes in this area. Although the higher span of the new bridge will result in a larger visual impact, there will be fewer columns than exist now to obstruct views under the bridge, so the overall visual quality will not change for this viewpoint.

Simulation of the intersection with SR 13 south of Orangedale.

INTERSECTION WITH SR 13 NEAR EXISTING SHANDS BRIDGE, SOUTH OF ORANGEDALE (VIEWPOINT #6)

The existing visual quality for this section of SR 13 is moderately low, but the adjacent residents are likely to have a high level of sensitivity to visual changes. Visual quality for this viewpoint will decrease to low because of the vertical scale of the raised roadway and removal of a large quantity of trees.

Simulation of the intersection with SR 13 near Popo Point.

Simulation of pedestrian fencing along the proposed Shands Bridge

INTERSECTION WITH SR 13 NEAR POPO POINT RIVER CROSSING, SOUTH OF SWITZERLAND (VIEWPOINT #7)

Existing visual quality for this section of SR 13 is moderately high. The surrounding residents are likely to have a high level of sensitivity to visual changes in this area. The visual quality for this viewpoint will decrease to moderately low because of the increased encroachment and disjoining effect the project would have on the existing view and the scenic drive.

NORTHERN VIEW OF ST JOHNS RIVER FROM EXISTING SHANDS BRIDGE (VIEWPOINT #8)

The visual quality for this panoramic river view is high. Motorists on the bridge would likely have a moderately high level of sensitivity. Visual quality for this viewpoint will decrease to moderately low because of the obstructed view caused by the pedestrian safety fencing.

SOUTHERN VIEW OF ST JOHNS RIVER FROM EXISTING SHANDS BRIDGE LOCATION (VIEWPOINT #9)

The existing visual quality for this panoramic river view is high. Motorists on the bridge would likely have a moderately high level of sensitivity to visual changes. Visual quality will remain high for retaining its unspoiled views of water and wooded shoreline with very little manmade encroachment.

3.12.4 Are any scenic highways located within the study area?

As mentioned in Section 3.12.2, the project will involve overpassing the William Bartram Scenic and Historic Highway, also known as SR 13 and CR 13, located in St. Johns County. The scenic highway extends 17.3 miles from the Julington Creek Bridge (northern terminus) to the intersection of SR 16, which intersects the scenic highway from the east at Wards Creek (southern terminus). The scenic highway parallels the St. Johns River, passing through the communities of Fruit Cove, Switzerland and Orangedale (Cornwell 2005).

There are two potential overpass locations associated with the Build Alternatives. The northern potential overpass location associated with the Black and Purple Alternatives is south of Switzerland, just north of Popo Point and the southern potential overpass location associated with the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives is south of Orangedale, at the existing intersection of SR 13 and SR 16. Existing develop-

ment at both potential overpass locations is primarily a combination of low density residential and undeveloped land. Intrinsic resources within the proposed crossing areas include wooded areas, particularly in the north, that contribute to the canopied roadway views, rural ambiance and driving experience.

The J.C. Penney Memorial Scenic Highway was declared eligible for designation on February 20, 2008. This highway includes the segment of SR 16 from Paso Fino Road to just west of Penney Farms and the loop through Penney Farms for a total of 2.85 miles. The Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives propose an interchange with SR 16 approximately 1.5 miles east of this scenic highway.

3.12.5 How were scenic highways evaluated?

Scenic highways were evaluated through public and intergovernmental coordination and preparation of an impact assessment. For this project, FDOT used the William Bartram Scenic and Historic Highway Corridor Management Plan (CMP), the St. Johns County Comprehensive Plan and site visits to assess the existing conditions and impacts of the project on scenic highways. The J.C. Penney Memorial Scenic Highway does not have a CMP because at the time of this Final EIS, it has not been designated a scenic highway.

Public and intergovernmental coordination began during project development. The scenic highway designation process and CMP development occurred concurrently with the Regional Transportation Planning Study and subsequent alternatives analysis. Early coordination resulted in the decision not to provide an interchange at the William Bartram Scenic and Historic Highway, but instead to provide an overpass. The potential for adverse effects from the northern crossing was reiterated by the Chairperson for the Corridor Management Entity (CME) in both written and verbal public comments during the spring 2005 and fall 2006 public meetings.

3.12.6 How will the project affect scenic highways?

Black and Purple Alternatives

The most noticeable impact of crossing the William Bartram Scenic and Historic Highway as proposed by the Black and Purple Alternatives will be the change in views for the users of the roadway. There are large curves on the north and southbound approaches of SR 13 and the overpass location for both alternatives occurs on a curve. These curves prevent views of the proposed

structures until southbound travelers get within approximately 4,200 feet and northbound travelers get within approximately 2,100 feet. In addition to the interruption of the view, the removal of most, if not all of the existing vegetation within the 324' right-of-way will likely be required for the construction of the bridges and adjacent roadway sections, further impacting the existing rural ambiance at this location. The travelers on the roadway, mostly local citizens who use the roadway on a daily basis, will be impacted both during and after construction.

Additionally, there are existing homes on both sides of SR 13 to the north of the potential crossing location. These homes will likely experience the same visual impacts described above.

Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives

The most noticeable impacts of crossing the William Bartram Scenic and Historic Highway as proposed by the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives will be the change in views and traffic flow for the users of the roadway. The approaches to the potential crossing areas are relatively flat and straight, offering views of the proposed overpass for a long distance in either direction. These straight approaches allow views of the proposed structures for approximately 4,480 feet traveling southbound and approximately 8,000 feet traveling northbound. In addition to the structures, the removal of most, if not all of the existing vegetation within the 324' right-of-way and the existing triangular-shaped wooded area located at the SR 13 / SR 16 intersection will likely be required for the construction of the bridges and adjacent roadway sections, reducing the somewhat open feel of this section of roadway. The Build Alternatives do not include a connection at SR 13, reducing the amount of traffic using this corridor south of CR 210. The CME members and other stakeholders, mostly local citizens who use the roadway on a daily basis, will be impacted both during and after construction with visual changes and changes in traffic flow.

Additionally, there are existing homes on both sides of SR 13 to the north and south of the potential crossing location. Residents fronting on the east side of SR 13 within the proposed right-of-way will need to be relocated for the con-

struction of the crossing in this location. The remaining residents will likely experience the same visual impacts described above. Several remaining homes on the east side of SR 13 will have direct views of the new overpass and roadway. Additionally, homes fronting on the St. Johns River will have additional visual impacts related to the potential river crossing at this location.

Because the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives are approximately 1.5 miles away from the J.C. Penney Memorial Scenic Highway, no impacts are anticipated.

Summary of Visual Effects

FDOT used a visual effects matrix to calculate the visual quality difference based on photo-simulations of the viewpoints. Then the team performed a representative visual effects comparison for the alternatives to determine the additive visual impact of each. Impact ratings were based on visual impacts from residential areas, river crossings, crossing of SR 13 and other major roads, and parks and conservation areas as described above. Because of the length and number of Build Alternatives studied for this project, the comparison is based on representative numbers, intended only to provide a broad comparison of the Build Alternatives; not based on an exhaustive visual analysis of each.

The visual quality was rated higher for views of natural areas, such as unobstructed river views and roadways through undeveloped and scenic areas. Accordingly, the post-construction visual quality difference will be higher for those areas. The viewer sensitivity would also be high for those areas as well as for recreation and residential areas.

Exhibit 3-41 summarizes the results of the visual quality analysis, indicating the overall visual impact rating for each alternative. Alternatives shown with higher scores indicate a higher impact on the visual quality of the identified sensitive viewpoints (See the *Visual Quality Discipline Report* located on the enclosed CD for more detail on the analysis and impact rating system used for this analysis.) As shown, the Orange 1 Alternative rates the highest for overall visual impacts, and the Pink 2 Alternative rates the lowest.

Exhibit 3-41: **Summary of Visual Impact Ratings**

Alternative	Impact Rating Based on Visual Quality Changes from Sensitive Viewpoints					Cumulative Visual Impact
	River Crossings	SR 13 Crossing	Major Roads	Residential	Parks and Conservation Areas	
Black	2.0	2.0	24.0	9.1	N/A	37.1
Purple	2.0	2.0	22.0	7.8	N/A	33.8
Brown 1	N/A	1.3	24.0	13.0	2.7	41.0
Brown 2	N/A	1.3	24.0	13.0	N/A	38.3
Orange 1	N/A	1.3	24.0	14.3	2.7	42.3
Orange 2	N/A	1.3	24.0	14.3	N/A	39.6
Green 1	N/A	1.3	18.0	14.3	2.7	36.3
Green 2	N/A	1.3	18.0	14.3	N/A	33.6
Pink 1	N/A	1.3	18.0	13.0	2.7	35.0
Pink 2	N/A	1.3	18.0	13.0	N/A	32.3

Higher impact rating indicates higher visual impact. The Impact scoring criteria and calculations are provided in the *Visual Quality Discipline Report.*

3.12.7 What measures are proposed to minimize the visual effects of the project?

A variety of methods could be employed to mitigate the visual impacts of the project. Some examples of commonly used methods include:

- *Selective Clearing* – Clearing only the vegetation required to construct the project, particularly trees.
- *Landscaping* – Incorporation of trees and groundcover to add visual interest to the roadway, compliment existing roadside vegetation or screen undesirable elements.
- *Screening* – Screening can be achieved with landscape materials or by using permanent construction materials such as metal and concrete walls.

3.12.8 What measures are proposed to avoid or minimize effects to visual quality during construction?

Roadway construction projects, particularly improvements or alterations to existing roadways, cause temporary visual impacts. Although the vast majority of the proposed alternatives consist of new roadway footprints, there are several crossings of existing roadways and instances where the new roadway will run parallel with existing roads. The most noticeable visual effects during construction will be:

- *Vegetation Removal* - This visual change will be especially noticeable around already developed areas such as neighborhoods, public spaces such as parks and schools, and existing roadway crossings. Vegetation removed during construction could be replaced or allowed to regenerate, depending on the location and safety considerations.
- *Erosion Control* - Silt fences, temporary sediment basins, and other erosion control measures will be visible for most of the construction process. Although unsightly, they are temporary and will be removed once construction was complete.
- *Demolition of Old Roadways and Bridges* - Demolition where the project crosses existing roads will create temporary visual changes. Equipment, dust, debris and demolished material staging areas will likely be visible from adjacent properties and the roadway. Although the demolition of the Shands Bridge will likely take several months, these impacts will be temporary.
- *Construction Equipment and Staging/Stockpiling areas* - One of the most noticeable visual changes associated with construction is the presence of construction equipment and materials. The location and extent of equipment and staging areas will vary greatly throughout the construction operations, and, as construction is completed, these potentially large visual impacts will diminish.

Steps can be taken to lessen the impacts of construction. For instance, the location of equipment and material staging areas could be located out of sight from the roadway or screened from view. A clean and orderly work site gives the appearance of order to an otherwise visually chaotic atmosphere. Dust control will enhance visual clarity and further contribute to an orderly appearance of the construction activities.

3.13 AIR QUALITY AND CLIMATE CHANGE

3.13.1 How was air quality evaluated for the project?

This section describes the air quality assessment performed for the proposed project. For more information, refer to the *Air Quality Technical Memorandum* and *Climate Change Technical Memorandum* located on the enclosed CD.

Carbon Monoxide

Carbon monoxide (CO) results from the incomplete combustion of gasoline and other fuels, and is a common air pollutant in areas that suffer from traffic congestion. In small doses, it can cause headaches and dizziness, and in large doses, asphyxiation and death.

Criteria Air Pollutants

The Clean Air Act (CAA) and 1990 CAA Amendments required the United States Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants considered to be harmful both to public health and the environment. The USEPA set forth standards for six principal pollutants – particulate matter, sulfur dioxide, carbon monoxide, ozone, oxides of nitrogen, and lead. Generally, when levels of pollutants do not exceed the annual average standards and do not exceed the short-term standards more than once per year, USEPA considers an area in attainment of the NAAQS. An area that does not meet the NAAQS for one or more pollutants is known as a "non-attainment area." An area that was formerly in non-attainment and now meets the NAAQS is known as a "maintenance area" for a period of 20 years.

FDOT used their air quality screening model, CO Florida 2012, to analyze the Build and No Build Alternatives for potential air quality impacts. This model incorporates the USEPA's MOVES version 2010a to evaluate interchanges. The screening model predicts carbon monoxide (CO) concentrations at varying distances using conservative, worst-case assumptions about the meteorology, traffic and site conditions. The team then estimated one-hour and eight-hour concentrations at default air quality receptor locations. If the predicted levels of CO were to exceed 35 parts per million (ppm) for a one-hour period or 9 ppm for an eight-hour period, the project would exceed the NAAQS for CO. Should this occur, a more thorough air quality analysis using the complete MOVES model would be needed for the project.

All ten Build Alternatives and the No-Build Alternative were analyzed for both the opening year (2025) and the design year (2045), but the interchange forecasted to have the highest total approach traffic volume varied with each alternative. FDOT used their Northeast Regional Planning Model 2030 to obtain directional design hour traffic volumes. The team ran the model using the default receptors, located 10 to 150 feet from the edge of the roadway. These distances are representative of the various air receptors throughout the alternatives.

Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, USEPA also regulates emissions of so-called air toxics, some of which are also classified as hazardous air pollutants (HAP) under the CAA. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources, area sources (such as dry cleaners), and stationary sources (such as factories or refineries). FHWA has prepared guidance on the analysis of mobile source air toxics (MSAT) for highway projects (FHWA, 2012). In this guidance, FHWA recommends no analysis, qualitative analysis, or quantitative analysis, depending on the magnitude of project-related traffic. A qualitative analysis is appropriate for this project because design year traffic is projected to be less than 140,000 AADT.

Water truck applying water for dust control

MSATs are a subset of the 188 HAPs identified under the CAA. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. (See Document No. EPA420-R-00-023, December 2000).

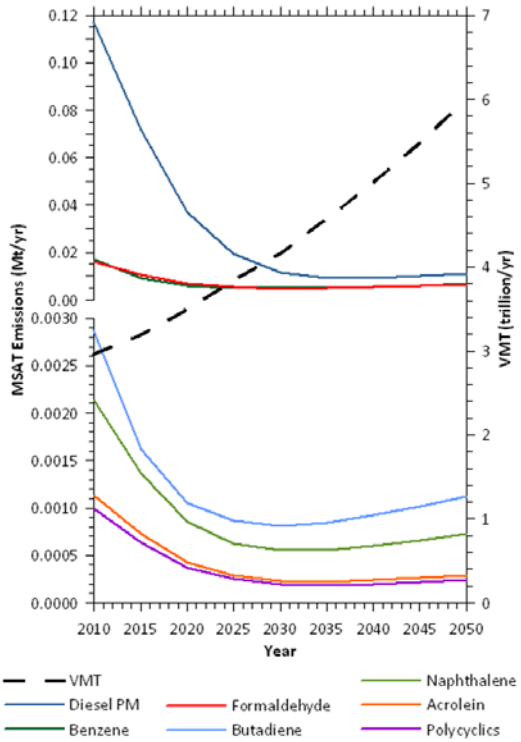
USEPA is the lead Federal Agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. The USEPA issued a major rule on the Control of HAPs from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System. In addition, USEPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment. These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future USEPA rules.

Based on an FHWA analysis using USEPA's MOVES2010b model, as shown in **Exhibit 3-42**, even if vehicle-miles travelled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSATs is projected for the same time period.

According to USEPA estimates, the lifetime cancer risk from all sources of air pollution ranges from one to 25 cases per million people in rural areas, and

from 25 to 50 cases per million people in urban areas. These risks compare with an overall lifetime cancer risk from all causes of 333,000 cases per million people. Although little is known about the existing levels of MSATs in the study area, it is apparent, based on the nationwide reductions forecast by USEPA, that MSAT concentrations and associated risks generally should decline in coming decades, even with substantial growth in mobile and stationary source activity.

Exhibit 3-42: **National MSAT Emission Trends 1999-2050 for Vehicles Operating on Roadways**



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

Source: EPA MOVES2010b model runs conducted during May - June 2012 by FHWA. (http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm, retrieved June 17, 2013)

For each alternative in this EIS, the amount of MSAT emitted would be proportional to the VMT assuming that other variables such as fleet mix are the same for each alternative. Any increase in VMT would lead to higher MSAT emissions for that alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the routes with lower VMT. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to USEPA's MOVES2010b model, emissions of all of the priority MSAT decrease as speed increases. Because the estimated VMT under each of the alternatives are nearly the same, it is expected that there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may

differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

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

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

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

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

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

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

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

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

3.13.2 What air quality issues affect the study area now?

There are no recognized air quality concerns in the study area. Both Clay and St. Johns Counties are designated as being in attainment for all the NAAQS.

3.13.3 How will the alternatives affect air quality?

Results from the screening test indicated that the highest project-related CO 1 -hour and CO 8-hour levels will not exceed the NAAQS for CO under any of the Build Alternatives or the No-Build Alternative. As such, the project passes the screening model for all alternatives.

3.13.4 How will construction affect air quality?

As with any construction project, earth moving, excavating, laying gravel, and similar activities are likely to generate localized dust issues. In addition, running heavy construction equipment results in localized odors from diesel exhaust. These concerns are expected to be temporary and short-term and should not exceed any of the NAAQS criteria.

3.13.5 What measures are proposed to avoid or minimize effect to air quality during construction?

Potential effects of construction on local air quality will be addressed in accordance with FDOT's most current edition of *Standard Specifications for Road and Bridge Construction (Florida, 2007).* In addition, the contractor will be required to implement the following specific best management practices (BMPs):

- Appropriate fugitive dust suppression controls, such as spraying water on haul roads adjacent to construction sites, daily street sweeping, covering loaded trucks, and washing haul trucks before leaving the construction site.
- Re-vegetate disturbed areas with native grasses as soon as possible after construction activities are completed in order to minimize windblown dust.
- Shut off construction equipment when not in direct use in order to reduce idling emissions.
- Properly maintain and inspect construction equipment to ensure that required pollution control devices are in working condition.
- Preserve existing vegetation to the maximum extent practical.
- Route heavy truck traffic away from schools and residences when feasible.

All construction sites (including any unpaved roads and parking and storage areas) will be watered during dry weather or at least once daily to minimize fugitive dust emissions.

3.13.6 How were climate change and sea level rise evaluated for the project?

Climate change is an important national and global concern. While the earth has gone through many natural changes in climate in its history, there is general agreement that the earth's climate is currently changing at an accelerated rate and will continue to do so for the foreseeable future. Global climate can be affected by many factors, and in recent years, concerns have been expressed that mankind's emissions of greenhouse gases (GHGs) may warm the climate, possibly affecting precipitation patterns as well.

FDOT's technical team for climate assessment included atmospheric scientists who have reviewed extensive literature on this subject, including reports produced by a United Nations agency known as the Intergovernmental Panel on Climate Change (IPCC), journal papers, and various publications by a variety of governmental agencies. This section briefly summarizes the current science as it relates to climate change and provides the team's conclusions regarding the potential effects of global climate change and sea level rise on the Build Alternatives.

The issue of climate change and the related issue of sea level rise are complex and the science is still emerging. There are many uncertainties inherent in the global climate modeling being done, and in the specific dynamics of climate science itself. The *Climate Change Technical Memorandum,* located on the enclosed CD, provides additional detailed technical information on the most current and prominent climate studies, the uncertainties involved in the science, and the various possible scenarios that may unfold over the next century. The discussion below is a very abbreviated discussion focused on the assessment of potential project effects on climate change, and climate change effects on the proposed project. The assessment of climate change was done for the Northern Build Scenario and the Southern Build Scenario, representing the two northern river crossings (Black and Purple) and the eight southern crossings (Brown 1& 2, Green 1 & 2, Orange 1 & 2 and Pink 1 & 2). This simplifies the discussion because the individual alignment differences in the north or south do not substantively change estimation of potential effects.

3.13.7 How might the proposed project affect climate change?

The Proposed Action's main potential contribution to global climate change would be through the emission of GHGs, primarily carbon dioxide (CO_2). As shown in the Energy section later in this chapter, all Build Alternatives would use less energy for project operation than the No Build Alternative. Therefore, from a climate change standpoint, whatever impact the project's GHG emissions would have on climate change is less than the No Build Alternative's GHG emission impact.

This analysis does not consider the GHG emissions due to the production of construction materials such as steel and concrete for the Build Alternatives, or the construction equipment engine CO_2 emissions. Over the life of the project, these emissions are expected to be minimal compared to operation-related emissions. Any of the Build Alternatives would generate temporary air pollutant emissions from constructions, including GHG, mainly resulting from the combustion of fuels by construction equipment. Project-specific construction equipment types and schedules have not been determined at this stage of the project. GHG emissions from construction equipment can be minimized by implementing best management practices for equipment with a goal of reducing fuel use.

The net annual change in CO_2 emissions due to the proposed project would be a minor fraction of the total CO_2 emissions in the world. The proposed project would contribute between 0.0005 percent (Northern Build Alternative) and 0.0007 percent (Southern Build Alternatives) to the global CO_2 emissions in 2030, assuming no increases in total world annual GHG emissions between 2005 and 2030. In 2005, the global total annual CO_2 emissions were estimated to be 28,193 million metric tons (Energy Information Administration 2008.)

Over time periods of a year or longer, it can be assumed that CO_2 is essentially evenly distributed throughout the atmosphere across the globe. Because CO_2 is a minor contributor to the greenhouse effect in comparison to water vapor and clouds, and because mankind's emissions of CO_2 are a minor fraction of total CO_2 in the atmosphere, the project's possible contribution to manmade global climate effects would be much smaller than even the very small percentages stated above. FHWA has concluded, based on the nature of GHG emissions and the exceedingly small potential GHG impacts of the proposed action, that the GHG emissions from the proposed action will not result in "reasonably foreseeable significant adverse impacts on the human environment" (40 CFR 1502.22(b)). The GHG emissions from the project build alternatives will be insignificant, and will not play a meaningful role in a determination of the environmentally preferable alternative or the selection of the preferred alternative.

3.13.8 How are global warming trends determined?

The IPCC has used computer-based mathematical models to simulate the climate's response to a wide range of GHG emissions scenarios. Carbon dioxide (CO_2), the primary anthropogenic (man-made) GHG, is used as the basis for these IPCC scenarios. IPCC has modeled various scenarios, including a scenario where CO_2 concentrations revert back to year 2000 levels and remain steady, as well as scenarios with increases over recent CO_2 levels ranging from a modest increase to an increase of nearly 5 times the recent rate of increase in CO_2 concentrations (see the *Climate Change Technical Memorandum* located on the enclosed CD for more detail).

In addition to these models, other primary sources of climate change data are observational data gathered through satellites and atmospheric CO_2 concentrations measured at Mauna Loa, Hawaii. Together, the modeled and observational data provide a range of projections on how climate may change over the next century.

Satellite observations of global temperature and increasing GHG concentrations confirm that there has been a steady rise in CO_2 over the last 30 years and much of the rise is due to fossil fuel use and deforestation.

The average temperature trend represented in the observational data analysis is an increase of approximately 0.13 degrees Celsius (C) per decade, or 1.3 degrees C per 100 years. The IPCC's temperature projections from modeling a "modest-increase scenario" are not at great odds with this trend shown over the past 30 years of satellite observations.

3.13.9 How is the climate affecting sea level rise?

Global Sea Level Change

The variation in mean sea level as a result of global climate change is of considerable interest in coastal regions. While observations of long-term changes in mean sea level can provide corroboration of global warming predictions by climate models, uncertainties in sea level change projections limit the ability to specify a best estimate of sea level change.

Sea level variations are primarily determined with two different methods: long-term averaging of tide gauge measurements, and satellite altimeter measurements combined with spacecraft orbits. The latter of these methods, in place

since 1992, has measured sea level on a global basis. One satellite currently records an estimate of global sea level every 10 days with an uncertainty of 3-4 millimeters (mm). Prior to 1992, eight different tide gauge estimate studies indicate a long-term annual sea level rise from 0.9 to 3.3 mm per year, depending on various factors (http://sealevel.colorado.edu). Generally, the long-term annual sea level rise during the period 1880 to 1980 is 1.8 mm per year (Douglas, 1991).

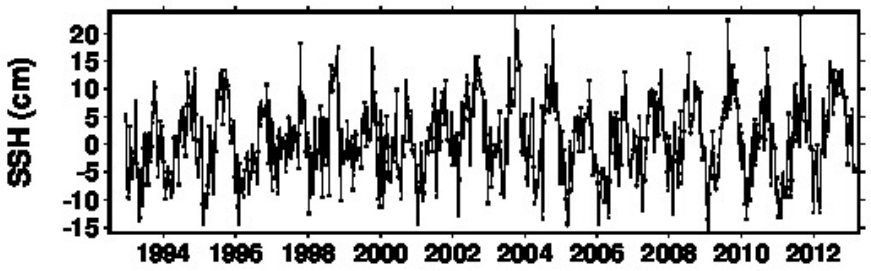
Regional Sea Level Change

Regional changes in sea level can be different from the global average due to regional variations in oceanic level change and geological uplift/subsidence (Nicholls et al. 2007). **Exhibit 3-43**, which was generated using the University of Colorado's online interactive sea level wizard, shows the sea surface height anomaly (relative to the average) measured by satellite at approximately the mouth of the St. Johns River at the Atlantic Ocean. The period of record (1992 to present) indicates no noticeable trend from the average. However, given the relatively short period of record, it is possible there could have been a slight increase in sea level that is not obvious in the figure. Based on the rate of global rise measured from satellite data discussed above, there should have been approximately 5 centimeters of sea level rise over the period of record shown in **Exhibit 3-43**.

The *IPCC Fourth Assessment Report (AR4)* (2007) projected an increase of 0.18-0.59 meter (7.1-23.2 inches) global average sea level by year 2100 due to thermal expansion and land ice changes, based on model results (Meehl et al. 2007). Due to uncertainties in sea level rise projections, a best estimate cannot be made.

Given the lack of departure from the average for the local area as shown above, the IPCC projections provide a reasonable range of potential sea level rise for use in the assessment of the project area. The St. Johns River Water Management District published a St. John's River water supply impact study in July 2012, part of which included a section on sea level rise. Using the observed record at Mayport, the authors state that the localized average rate of sea level rise is 2.4 mm per year over the time period 1928 to 2010 (7.75 inches, total, over the period cited). The authors further state that the relative sea level rise is presently estimated at 4 mm per year (equal to 15.75 inches over a 100 year period), citing a 2007 paper by Stefan Rahmstorf. All of these values are within the range of IPCC projections cited.

Exhibit 3-43: **Sea Surface Height Anomaly (via Satellite) at the Mouth of the St. Johns River**



Source: http://sealevel.colorado.edu/wizard.php?dlon=279&dlat=30&map=v&fit=n&smooth=n&days=60

Storm Surge

The St. Johns River is a shallow river which is under the influence of the Atlantic Ocean tides. It is also subject to storm surge resulting from hurricanes. Storm surge occurs as a result of water being pushed onshore by winds swirling around a storm. Storm surge is highest to the right of the center of an approaching storm, and when coinciding with normal high tide. The National Hurricane Center's Sea, Lake and Overland Surges from Hurricanes (SLOSH) models indicate the region's coastal counties could potentially experience storm surges in excess of 19 feet during a Category 5 event, while some areas of the inland counties along the St. Johns River could receive surges up to 10 feet (FDOT 2008a).

Under the IPCC sea level rise scenarios, the added sea level rise could potentially add on the order of 10 to 20 percent to maximum anticipated hurricane storm surge levels. This is speculation that global warming could increase the frequency and intensity of hurricanes, also exacerbating the effects of storm surges. However, data from the National Hurricane Center (NOAA 2008) indicate that, while there seem to be multi-decadal cycles in hurricane frequency and intensity, there is no clear trend toward greater hurricane intensity with the slight global temperature increase of the past 30 years (see the *Climate Change Technical Memorandum* located on the enclosed CD for more detail).

3.13.10 What are the expected impacts on the project from climate change and sea level rise?

Any of the Build Alternatives are expected to add a very small amount of CO_2 emissions to local, regional, national and global emissions of CO_2, in comparison to total anthropogenic emissions, and any of the alternatives would contribute less CO_2 emissions than the No Build Alternative. Therefore, any of the Build Alternatives would have less of an impact on climate change compared to the No Build Alternative.

The existing Shands Bridge has a vertical clearance of 45 feet from the mean high water mark of the St. Johns River. Under the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives, the Proposed Action would result in a new bridge with a vertical clearance of 65 feet. Under the Purple and Black Alternatives, a new bridge crossing of the river would also have a 65-foot vertical clearance. The IPCC has projected a sea level increase of 0.18-0.59 meter (7.1-23.2 inches) between 1980 to 1999 and 2090 to 2099. Assuming that a rise in sea level elevation would result in an equivalent rise in the St. Johns River, the 20-foot difference in bridge height is sufficient to allow for a potential two-foot increase in sea level elevation due to climate change for any of the Build Alternatives.

The bridge approaches on either side of the St. Johns River are currently at an elevation of approximately six feet above sea level. The conceptual plan for any of the Build Alternatives assumes five feet of fill; therefore, the approaches to a new bridge structure across the St. Johns River would be at approximately 11 feet above sea level. Based on the potential sea level increase of up to two feet, the proposed elevation of the bridge approaches and roadway at the edge of the river would be sufficient to protect against the potential for sea level rise.

In summary, storm surge effects could increase slightly due to continued sea level rise. However, the modest projected increases in sea level over the present century are not expected to be enough to substantially affect the levels of storm surge such that the proposed bridge Build Alternatives would be dysfunctional.

3.14 WATER RESOURCES

This section summarizes the analysis of surface water resources and water quality.

For more information, see the *Stormwater and Water Quality Technical Memorandum* located on the enclosed CD.

Groundwater resources are addressed later in this document under Geology and Soils.

3.14.1 How were water resources evaluated for the project?

As Florida's forests and grasslands have been developed over the years to create housing and transportation infrastructure, water quality has decreased due to the introduction of oil, fuel, nutrients and other pollutants. The resulting roadway construction and number of cars on the roads have increased the amount of pollution carried by stormwater runoff into Florida's streams and waterways.

The purpose of the Clean Water Act is to protect the quality of the nation's water, and subsequent amendments have further supported that effort. Stormwater management criteria for the study area are governed by FDEP, which is given authority by the USEPA to oversee five water management districts. FDEP has in turn granted those districts authority to protect natural resources and mange water quality and flood control. The St. Johns River Crossing Project is located within the jurisdiction of the SJRWMD.

The study area for the water resources evaluation is the group of basins that the Build Alternatives intersect (**Exhibit 3-44**). This group of basins represents those that would be directly impacted by the stormwater runoff from the proposed project.

State of Florida Water Classification System

All surface waters of the State are classified according to their designated use, as follows:

Class I: Potable Water Supplies

Class II: Shellfish Propagation or Harvesting

Class III: Recreation, Propagation and Maintenance of a Healthy, Well - Balanced Population of Fish and Wildlife

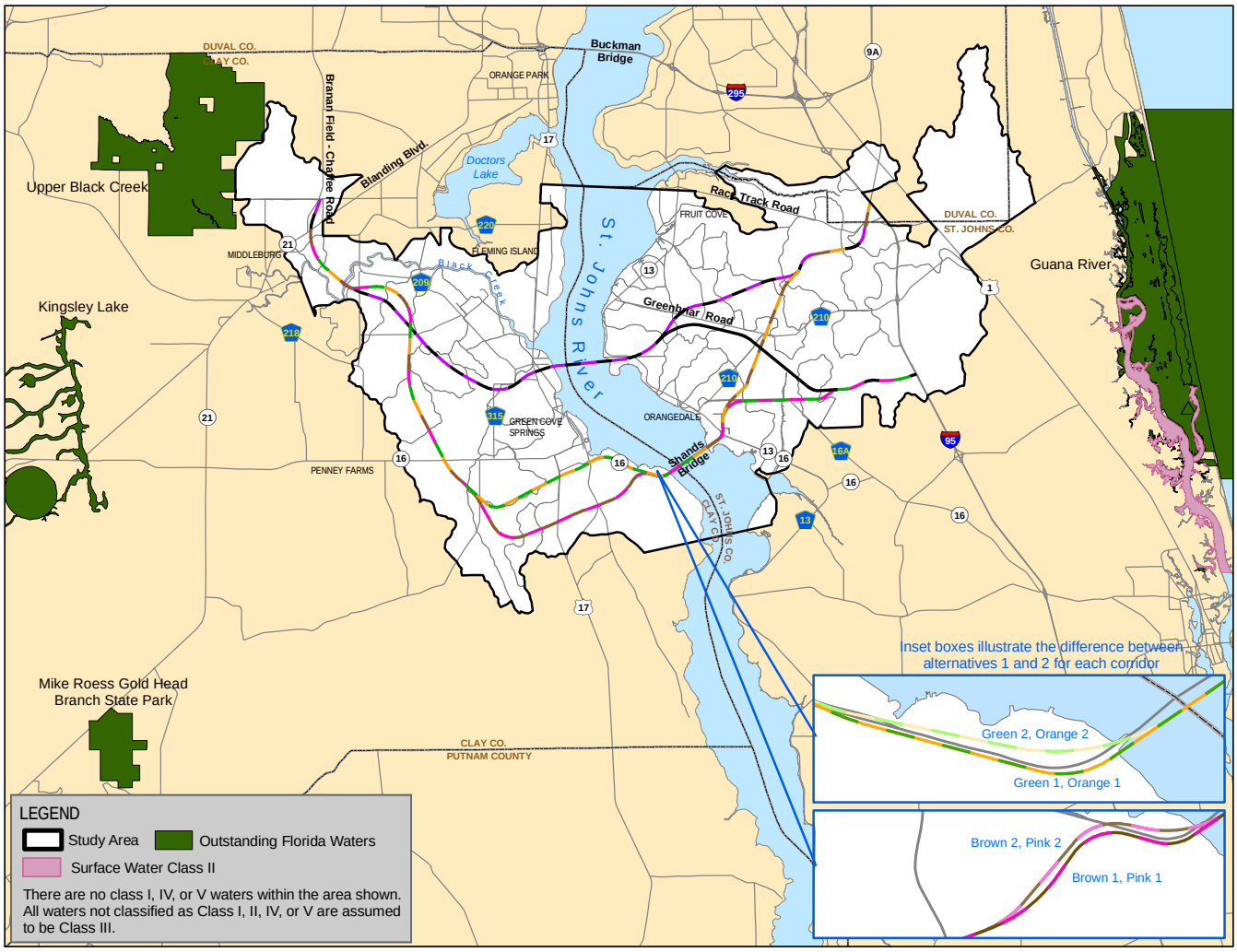
Class IV: Agricultural Water Supplies

Class V: Navigation, Utility, and Industrial Use

3.14.2 What water resources are found in the study area?

Water quality designated use is determined by Subsection 406.061[10], Florida Statutes as the "present and future most beneficial uses" of the waters of the State. The Integrated Water Quality Assessment for Florida: 2006 305(b) Report and 303(d) List Update (Florida, 2002) defines the designated use categories in order of water quality criteria required. Class I waters describe potable water supplies and Class V waters describe navigation and industrial uses, with Classes II through IV falling between for uses such as shellfish propagation, recreation use and agricultural water supply. All waters not classified as Class I, II, IV or V are assumed to be Class III. Within the study area, all surface waters are classified as Class III waters. The nearest Class II water is the Guana River, located to the east of the study area.

Exhibit 3-44: **Water Resource Use Categories and Outstanding Florida Waters**



FDEP designates Outstanding Florida Waters (OFW) as those waters that have been determined to be sensitive to water quality issues. Within the study area, there are no waters designated as OFW.

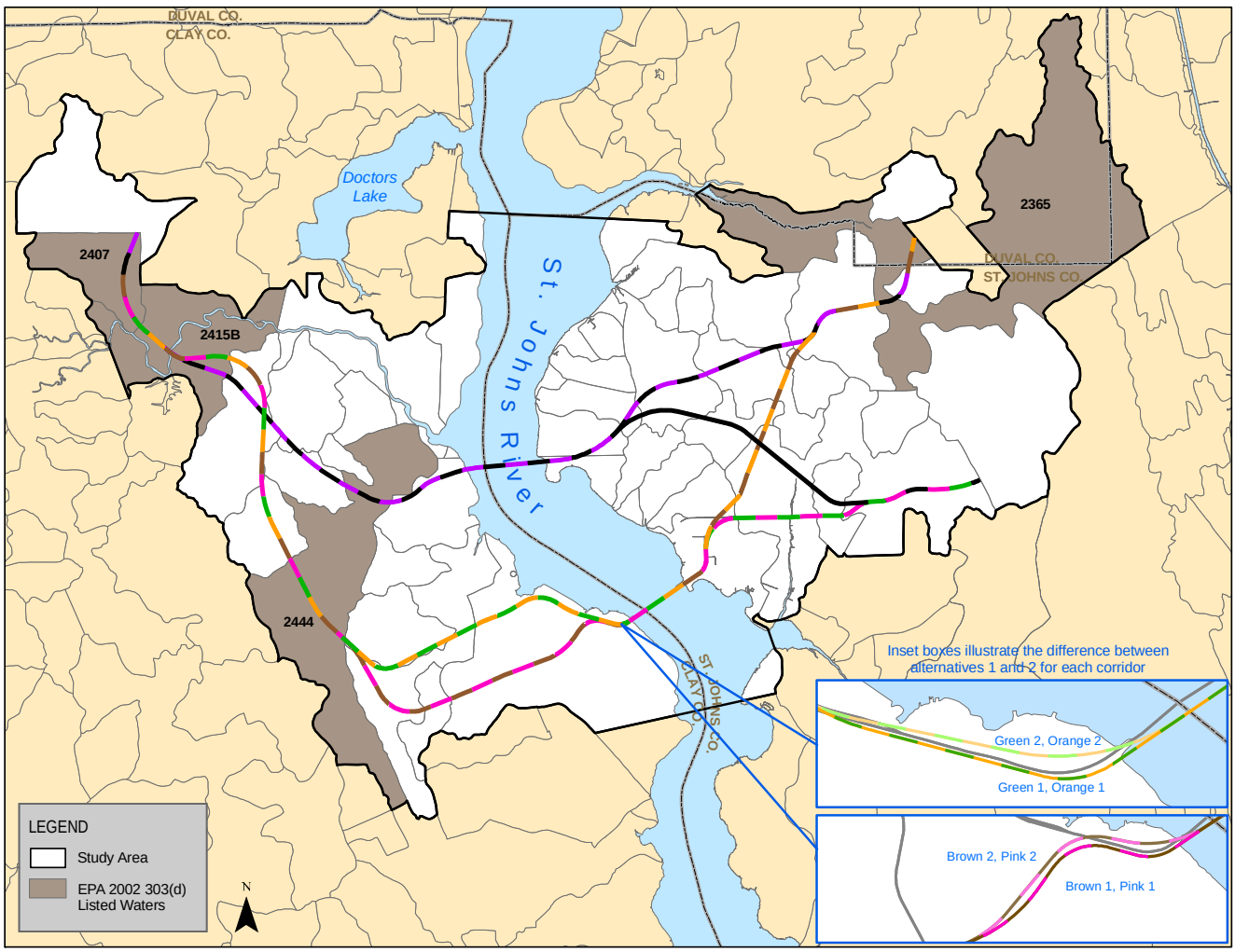
The St. Johns River is not listed in the National Park Service Nationwide Rivers Inventory and, therefore, the coordination requirement for the Wild and Scenic Rivers Act does not apply to this project.

A water body is defined as impaired by the State of Florida if it does not meet the applicable water quality standards due to pollutant discharges from various

sources. Based on the USEPA's 2002 list of 303(d) verified impaired waters (which is the current list accepted by the USEPA), there are four such impaired basins within the project area (**Exhibit 3-45**):

- Black Creek (Water Body ID: 2415B)
- Durbin Creek (Water Body ID: 2365)
- Grog Branch (Water Body ID: 2407)
- Peter's Creek (Water Body ID: 2444)

Exhibit 3-45: **Clean Water Act Section 303(d) Impaired Waters in the Study Area**



3.14.3 What are the requirements for managing stormwater runoff?

Florida became the first state in the country to require stormwater from new development to be treated as part of the FDEP Nonpoint Source Management Program in 1982. To enforce water quality, new construction projects must obtain an Environmental Resource Permit requiring that the stormwater runoff from the project area be collected and treated before being discharged into the natural surface waters. This ensures that the effects of the project are not different than conditions were before construction.

Stormwater management systems for the St. Johns River Crossing Project will also meet SJRWMD design criteria. These include reducing the rate of stormwater discharge after project implementation to be equal to or less than it was before the project for each outfall basin. A stormwater pollution prevention plan would also be part of the permitting requirements, as well as a documented stormwater management and maintenance plan.

FDEP is actively pursuing both regulatory and non-regulatory strategies for preserving water quality in Florida, including the establishment of Total Maximum Daily Loads (TMDL) for Section 303(d) impaired waters. Projects within basins where TMDLs have been established need to demonstrate that the proposed project does not exceed the TMDL requirements for a particular nutrient in a given basin. This analysis is done on the basin level, evaluating the entire basin's ability to process. The drainage design will follow state law that requires the project's annual discharge of nitrogen to be equal or less than the current discharge level to an impaired water body.

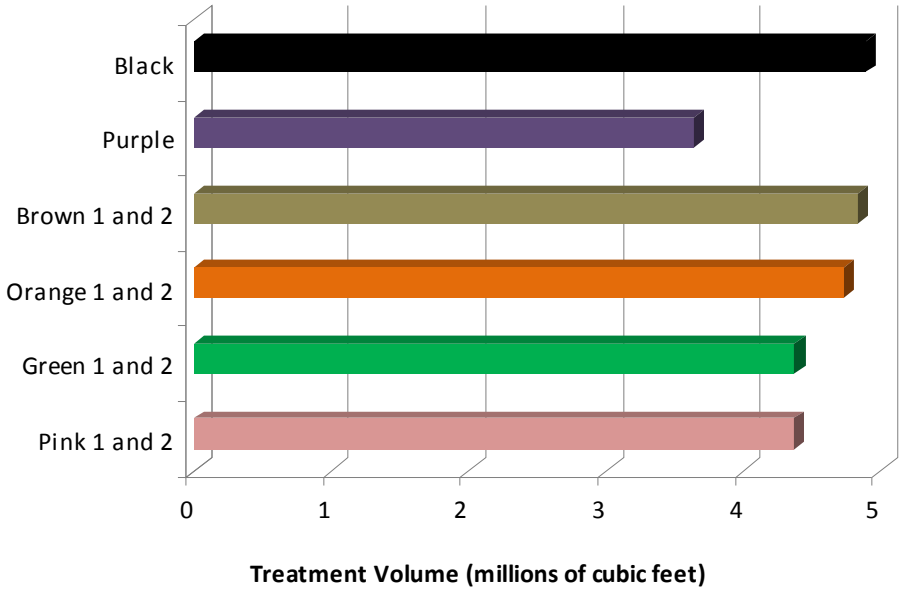
3.14.4 How will the alternatives affect water resources?

The proposed project could impact the water quality in the study area based on the amount of stormwater runoff generated by each of the Build Alternatives and the treatment volumes that would result. Using the mainline length for each Build Alternative and the typical section for the project**,** FDOT estimated the required treatment volumes by calculating the greater of one inch over the total surface area of the drainage area or two and a half inches over just the impermeable surface, such as concrete. Typically, for a rural highway like the proposed project, one inch over the total drainage area results in the greater volume.

Water Quality

The proposed stormwater facility design will include, at a minimum, the water quantity requirements for water quality impacts as required by the St. Johns River Water Management District according to Chapter 40C-4, 40C-42 and 40C-400, Florida Administrative Code.

Exhibit 3-46: **Stormwater Runoff**



The estimated treatment volumes for the alternatives are shown in **Exhibit 3-46**. Although the treatment volumes vary among alternatives, the type of water quality impacts will be the same, consisting of pollutants from fuel or oil and particulates on the roadway that are washed off by stormwater. Since the SJRWMD and FDEP permitting requirements are the same regardless of the volume, the only difference between Build Alternatives will be level of effort required to design, install and maintain the appropriate treatment facilities, which will be proportional to the volume of stormwater needing treatment.

All of the Build Alternatives will cross 303(d) listed basins (refer to **Exhibit 3-44**). The Black, Purple, Brown 1 and 2, and Orange 1 and 2 Alternatives all will cross four of the 303(d) listed basins, and the Green 1 and 2 and Pink 1 and 2 Alternatives will impact three of the listed basins. As part of the permitting effort for any of the Build Alternatives, FDOT will demonstrate that the proposed project does not exceed the TMDL requirements for those basins.

3.14.5 What measures are proposed to avoid or minimize effects to water resources from the proposed roadway facility?

Measures will be incorporated into the design of the project to ensure that permit requirements for water quality are met. Such design measures typically include grass ditches to carry stormwater to the treatment facilities, stormwater treatment ponds for settling and storage, and measures to convey stormwater from either end of the bridge as it drains from the bridge deck to on-land treatment, which is currently not done for the existing Shands Bridge.

3.14.6 What measures are proposed to avoid or minimize effects to water resources during construction?

Permitting requirements for new construction projects set forth by FDEP and the SJRWMD have had a beneficial impact on the quality of stormwater runoff around the state. These requirements have led to the development of Best Management Practices (BMPs) and technologies to keep sediment and other pollutants out of the water. Some of these practices that could be employed on the St. Johns River Crossing Project are discussed in the side text. FDOT will address the effects of construction on water quality in accordance with their most current edition of *Standard Specifications for Road and Bridge Construction* (Florida, 2007).

FDOT will consult with the FDEP and the SJRWMD regarding the status and development of TMDLs and Basin Management Action Plans (BMAPs) for water bodies that are impaired and that are impacted by the project.

Typical silt fence

Best Management Practices (BMPs)

Best management practices (BMPs) followed during construction may include:

- Using containment measures during shaft drilling and installation to keep potentially contaminated river bottom sediments from reaching other parts of the river
- Placing staging and stockpiling areas far away from rivers and streams
- Limiting the area of exposed soil at any given time during construction
- Controlling erosion and sediment through mulching, matting, and netting; filter fabric fencing; covering of stock-piled soils; placing quarry rock entrance mats to reduce tracking dirt from construction vehicles; regular sweeping and washing of adjacent roadways; sediment traps and ponds; and surface water interceptor swales and ditches

3.15 WETLANDS

This section summarizes the analysis of wetlands in the study area. See the *Wetlands Evaluation Report* located on the enclosed CD for more information.

Typical wetland

What is a Wetland?

For regulatory purposes under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

3.15.1 How were wetlands identified in the study area?

FDOT performed a wetlands assessment to identify potential impacts associated with the Build Alternatives to state and federal jurisdictional wetlands, and to assess their function and value. Based on FDOT and FHWA guidance (FDOT, 1999; FHWA 1987), the project team:

- Identified and classified wetlands,
- Delineated wetlands on aerial orthophotographs with limited ground-truthing,
- Determined factors such as the wildlife habitat values and hydrologic functions of project wetlands; and
- Assessed functions and values of project wetlands.

The team identified wetlands by using aerial photography, GIS interpretation, USGS topography maps and soil surveys, United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, Clay and St. Johns County soil surveys, and on-site investigations. They determined wetland limits within the study area based on aerial photo interpretation and limited field-truthing, or field visits, during the winter of 2007 and spring of 2008. They then transferred the estimated limits of wetland jurisdiction onto the aerial photographs and digitized. A baseline characterization of each wetland was performed by determining its size, vegetative structural diversity and composition, wildlife habitat value, hydrologic functions, and integrity.

3.15.2 What wetlands are located in the study area?

The team used three parameters to identify and classify wetlands: vegetative composition, hydrologic regime, and soil classification (Cowardin, et al., 1979; FDOT, 1999; USACE, 1987; Gilbert, et al., 1995). They identified a total of eight different general wetland types and submerged aquatic beds within the Build Alternatives:

Stream and Bottomland Sloughs: Generally associated with creek and stream crossings that eventually connect to the St. Johns River, e.g. Trout Creek and Black Creek.

Mixed Wetland Hardwoods: Typically larger systems that contain few pine elements and can include red maple, black gum, laurel oak, cypress, and water oak.

Cypress Swamp: Low-lying areas dominated by cypress that are generally less than ten acres and connected to other wetlands.

Wet Pine Flatwoods / Plantation: The soil in these areas has been formed into furrowed rows and usually planted with pine, although some natural pine and other trees may grow as well.

Wetland Forested Mixed: Natural wetlands where neither hardwoods or conifers dominate.

Wetland Scrub: These low-lying wetlands generally appear in areas historically cleared of all trees with poorly drained soil.

Freshwater Marshes: Usually confined to relatively level, low-lying areas, these wetland do not include areas which have a tree cover.

Submerged Aquatic Vegetation: These submerged vegetative beds are located in the shallower waters of the St. Johns River and are comprised mainly of eel grass.

3.15.3 How will the alternatives affect wetlands?

To determine the category and quantity of impacts of each Build Alternative, the team overlaid the proposed right-of-way of each alternative on the wetland boundary maps. Impacts were quantified according to whether they were considered direct, dredge or fill; direct, no dredge or fill; and/or would impact surface waters. **Exhibit 3-47** compares the total wetland impacts of each of the Build Alternatives. **Exhibit 3-48** shows impacts for each Build Alternative by the type of wetland being affected (this exhibit does not include other surface waters). The *Wetlands Evaluation Report* located on the enclosed CD, provides more detail on direct, dredge or fill and direct, no dredge or fill impacts by type of wetland.

The United States Army Corps of Engineers (USACE) and the SJRWMD will claim jurisdiction over most of the identified wetlands. As a result, a jurisdictional determination for wetlands will be needed during the project design phase. In compliance with Section 404 of the Clean Water Act, 1972 as amended in 1979, and Section 10 of the Rivers and Harbor Act of 1899, an individual permit application will be prepared for the USACE. In addition, an Environmental Resource Permit will be completed for the SJRWMD.

Wetland Categories

Wetland impacts for the St. Johns River Crossing Project were divided into three categories:

Direct, Dredge or Fill – Impacts due to the dredging or filling of wetlands.

Direct, No Dredge or Fill – Impacts due to the reduced functional value of the wetlands from light and noise.

Surface Water – Impacts to open water areas.

Exhibit 3-47: **Wetland Impacts**

Alternative	Type of Impact (acres, rounded)			
	Surface Water	Direct, Dredge or Fill	Direct, No Dredge or Fill	Total
Black	88	748	976	1,812
Purple	85	477	601	1,163
Brown 1	72	502	666	1,240
Brown 2	70	487	653	1,210
Orange 1	67	484	642	1,194
Orange 2	65	476	629	1,170
Green 1	69	501	687	1,257
Green 2	67	493	674	1,234
Pink 1	74	518	713	1,305
Pink 2	72	504	702	1,278

Exhibit 3-48: **Wetland Impacts by Type**

Alternative	Wetland Type Impacted							
	Stream and Bottomland Sloughs	Mixed Wetland Hardwoods	Cypress Swamp	Wet Pine Flatlands / Plantation	Wetland Forested Mix	Wetland Scrub	Freshwater Marsh	Submerged Aquatic Vegetation
Black	5.96	452.07	132.40	338.03	766.59	9.52	18.25	0.91
Purple	5.96	194.28	118.19	215.24	518.43	9.52	15.29	0.91
Brown 1	19.84	273.45	159.16	266.26	426.95	4.15	18.26	1.04
Brown 2	19.55	247.20	159.16	266.23	426.93	4.15	17.03	0.39
Orange 1	19.84	290.78	141.74	259.03	395.33	4.15	14.42	1.04
Orange 2	19.55	268.01	141.74	259.05	397.72	4.15	14.42	0.39
Green 1	19.84	356.45	57.12	214.95	501.61	4.15	33.12	1.04
Green 2	19.55	333.68	57.12	214.94	503.93	4.15	33.12	0.39
Pink 1	19.84	339.12	74.54	222.16	533.23	4.15	36.96	1.04
Pink 2	19.55	312.78	74.54	222.16	536.76	4.15	35.72	0.39

NOTE: These impacts do not include Other Surface Waters as shown previously on Exhibit 3-47.

In February 2004, the State of Florida adopted a statewide Uniform Mitigation Assessment Methodology (UMAM) (373.414 (18) Florida Statutes) to determine the amount of mitigation required to offset impacts to wetlands and other surface waters. USACE has recently accepted UMAM as a suitable qualitative wetland assessment methodology.

UMAM provides a standardized procedure for assessing the functions provided by wetlands, the amount that those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset that loss.

This methodology is applied by using an assessment matrix that analyzes three variables indicating wetland function:

- Location and Landscape,
- Water Environment, and
- Vegetative Community Structure.

Each of these variables yields an overall score for a wetland ranging from 0 to 10, based on the level of function that benefits fish and wildlife. The matrix determines an ecological numerical value for each of the three variables.

Using the baseline UMAM scores together with scientific evidence and professional experience, the team also derived scores for the post-construction wetland value. To evaluate the total proposed loss of wetland function, they compared the "without project" and "with project" scores to produce an overall debit value (**Exhibit 3-49**).

Nine of the ten alternatives are similar in the amount of estimated wetland impacts and the anticipated mitigation required. These nine alternatives are all within approximately 10 percent of the alternative with the lowest anticipated impacts. The only exception is the Black Alternative, which is approximately 60 percent higher.

3.15.4 What measures are proposed to avoid or minimize project effects on wetlands?

In accordance with Executive Order 11990, FDOT evaluated wetlands relative to potential impacts and options for avoiding and minimizing such impacts. Wetlands were avoided to the extent practicable. FDOT attempted to design and refine project alternatives to avoid and minimize impacts to wetlands

Exhibit 3-49: **Uniform Mitigation Assessment Methodology (UMAM) Functional Loss**

Alternative	Estimated UMAM Functional Loss (debits, rounded)		
	Direct, Dredge or Fill	Direct, No Dredge or Fill	Total
Black	575	68	643
Purple	366	42	408
Brown 1	383	46	430
Brown 2	371	46	417
Orange 1	368	45	413
Orange 2	362	44	406
Green 1	387	48	435
Green 2	380	47	427
Pink 1	401	50	450
Pink 2	389	49	438

throughout the project. FDOT first reduced the proposed right-of-way for all alternatives from 400 feet to 324 feet in width. Adjustments to the alignments were then made to avoid major wetlands systems. The Pink 1 & 2 and Green 1 & 2 Alternatives were shifted in St. Johns County to minimize environmental impacts to Trout Creek. The Pink 1 & 2 and Brown 1 & 2 Alternatives were shifted to the west where they approach SR 16 in Clay County in order to minimize impacts to the Peters Creek wetland system. The Black and Purple Alternatives were adjusted in St. Johns County after crossing the river to dip to the south to avoid impacts to Rivertown including its wetland systems. All of the alternatives were adjusted in Clay County near Blanding Boulevard to minimize impacts to the Black Creek wetland system. Where wetland impacts could not be completely avoided, they were minimized to the extent practicable.

USACE and SJRWMD regulate impacts to wetlands. Therefore, after FDOT addresses avoidance and minimization based on final design of the selected alternative, mitigation may be required pursuant to Chapter 373, Florida Stat-

utes. Coordination with USACE and SJRWMD will be necessary during the design phase to establish the extent of mitigation before final permits will be issued.

3.15.5 What measures are proposed to mitigate for unavoidable impacts on wetlands?

Wetland impacts which will result from the construction of this project will be mitigated pursuant to S. 373.4137 F.S. to satisfy all mitigation requirements of Part IV Chapter 373, F.S. and 33 U.S.C.s 1344.

On April 30, 2008 and October 9, 2008, FDOT met with SJRWMD to discuss the First Coast Outer Beltway project and potential mitigation strategies. In addition to the meetings, coordination has been ongoing with SJRWMD throughout the project to address the initial concerns raised during the ETDM process. FDOT also held an agency coordination meeting on October 14, 2010 with SJRWMD, EPA, FWC, USACE, USFWS, NMFS and FHWA to discuss comments received on the Draft EIS regarding the desire to formulate a regional wetland mitigation plan for the project (see the *Agency Coordination Memorandum* located on the enclosed CD for more details). The agencies expressed an interest to have a plan that identified existing regional natural resources and to work with FDOT in identifying locations that are regionally significant, are under demonstrated development pressures, and that are beneficial to the establishment of high quality, uninterrupted habitat linking natural and preserved areas throughout the northeast Florida region. As a result of the discussions, FDOT compiled an inventory of existing natural resources in the region as shown in **Exhibit 3-50 and 3-51**. The exhibits use existing conservation lands as their basis, including lands currently managed by SJRWMD and lands previously acquired through the Preservation 2000 / Florida Forever program. The exhibits also identify existing mitigation basins, existing wetland mitigation banks and lands targeted for acquisition under the Florida Forever program. **Exhibit 3-50** also shows existing wetlands as identified in the National Wetlands Inventory and **Exhibit 3-51** shows Strategic Habitat Conservation Areas (SHCA) as identified by FWC. The inventory of existing natural resources will serve as the foundation for a regional mitigation plan and the mapping effort will serve as a basis and working document for future coordination between FDOT and the agencies when identifying future mitigation possibilities.

Exhibit 3-50: **Regional Resources—Existing Wetlands**

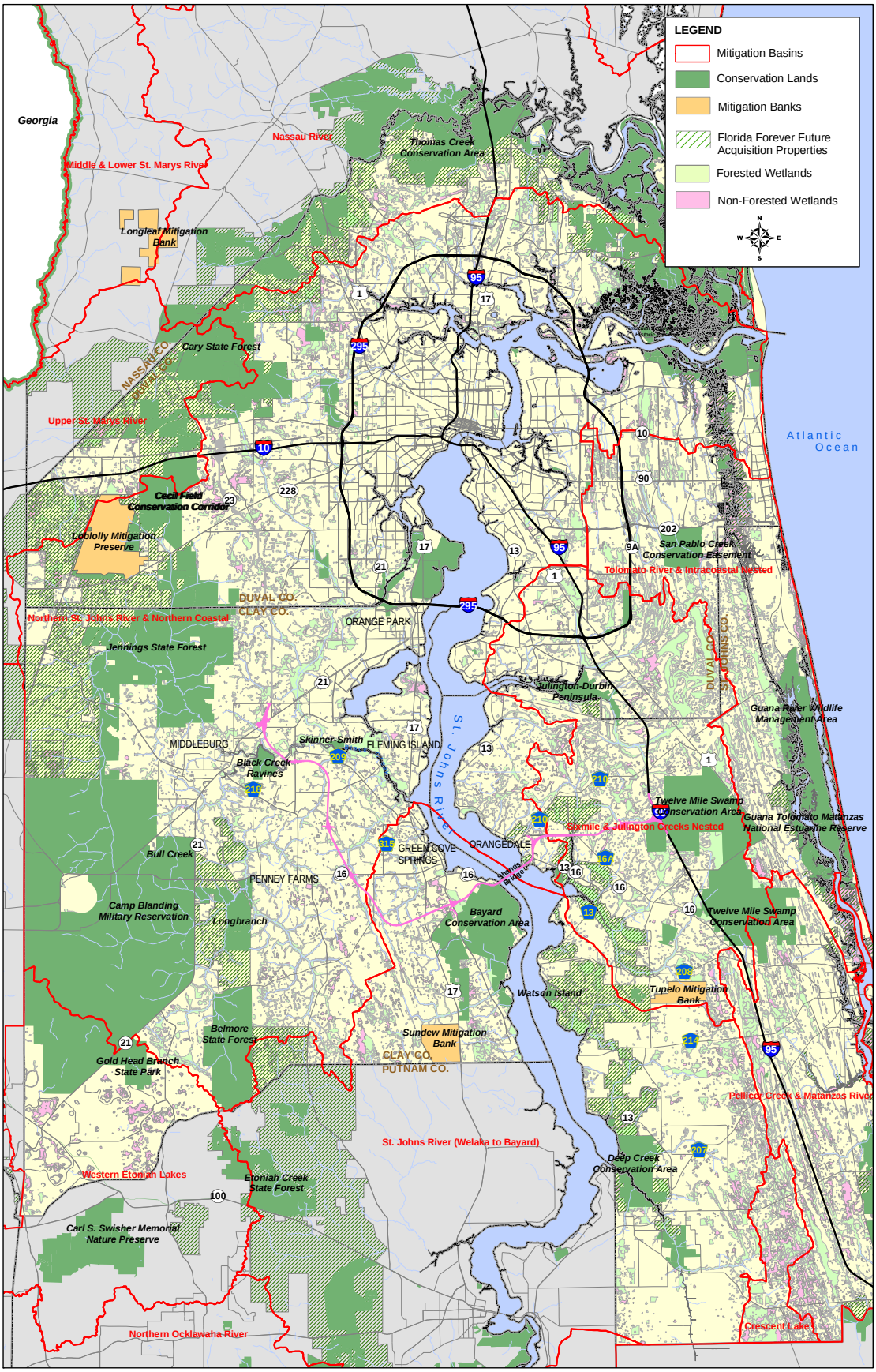
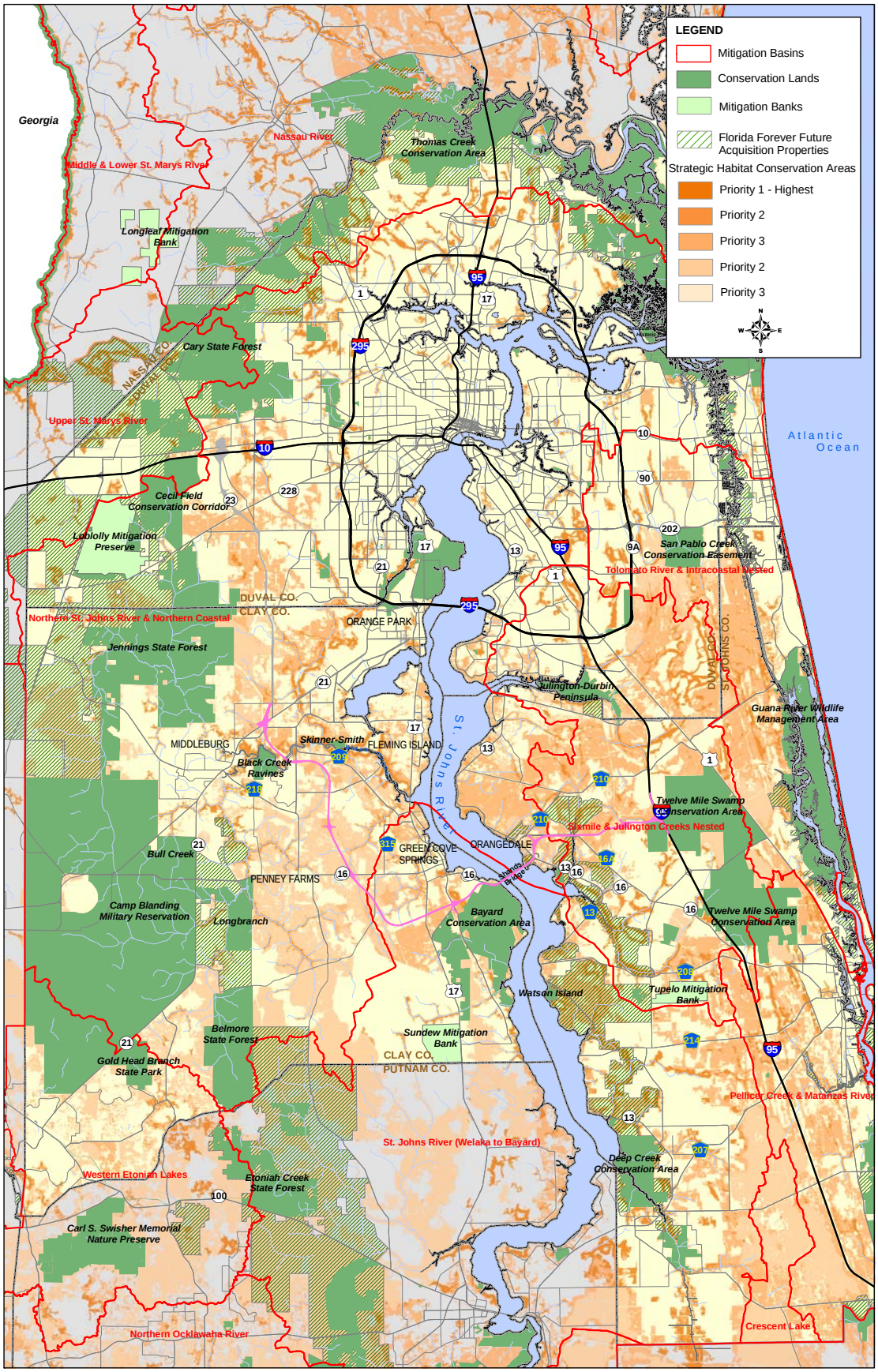


Exhibit 3-51: **Regional Resources—Strategic Habitat Conservation Areas (SHCA)**



FDOT is committed to working with the agencies and developing a regional wetland mitigation plan as the project progresses into the design phase. The plan will establish procedures, guidelines and responsibilities to implement regionally significant mitigation for unavoidable impacts caused by the St. Johns River Crossing Project and other future FDOT projects within the jurisdictional boundaries of SJRWMD. FDOT will continue to coordinate with the resource agencies in developing the framework for a regional wetlands mitigation plan.

Benefits of this regional, umbrella approach to mitigation include:

- Reducing cumulative wetland losses within identified basins.
- Providing a comprehensive planning tool for mitigation instead of a "piecemeal," "postage-stamp" approach.
- Early planning and interagency involvement in selection of mitigation projects.
- Early identification of high-priority or desirable mitigation projects.
- Lessening of permitting demands and decreased turn-around-time when permits are needed.
- Providing a schedule for the release of functional mitigation units for each basin within the SJRWMD.
- Allowing for upfront expenditures on mitigation projects prior to impact occurrence.
- Allowing for multiple projects to be combined into larger mitigation projects to enhance overall success.
- Providing for long-term monitoring and efficient reporting to permitting agencies.
- Providing an umbrella, watershed-based approach to include any reasonable off-site mitigation option for all present and future FDOT projects including public and private mitigation banks, state and federal lands or other conservation lands.
- Dovetailing with the Efficient Transportation Decision Making (ETDM) planning process, and avoidance and minimization permitting activities.

FDOT's proposed mitigation will be from a combination of banks and other mitigation projects that may include preservation, restoration and/or creation.

FDOT contacted wetland mitigation banks with service areas consistent with the proposed project area to determine the availability of mitigation credits. The banks listed in **Exhibit 3-52** responded to FDOT's inquiry, providing the amount of mitigation credits currently available. (Note that the credits listed below are based on the Wetland Rapid Assessment Procedure (WRAP) methodology, rather than the UMAM methodology. Converting WRAP units to UMAM units is not a standardized formula; instead, the conversion ratio is something that is negotiated with the regulatory agencies on a case by case basis. FDOT's experience with previous projects has shown that a typical conversion ratio is approximately 1 UMAM credit/debit to 2.5 WRAP credits/debits).

Facilities and work space outside the right-of-way, such as stormwater treatment ponds and construction staging areas, will be designed and sited during final design for the selected alternative. These types of facilities and work spaces will be sited to avoid and minimize impacts to wetlands.

Based upon the above consideration, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

Exhibit 3-52: **Sample of Wetland Mitigation Credits Available**

Mitigation Bank (basin bank is located in)	Total WRAP Credits *	Amount of WRAP Credits Available*
Loblolly Mitigation Bank (Basin 4)	2,507	1,004
Longleaf Mitigation Bank (Basin 4)	1,026	759
Tupelo Mitigation Bank (Basin 45)	618	485
Sundew Mitigation Bank (Basin 48)	931	33

NOTE: As of October 31, 2010. See text for discussion of WRAP credits in relation to UMAM credits.

3.16 WILDLIFE AND HABITAT

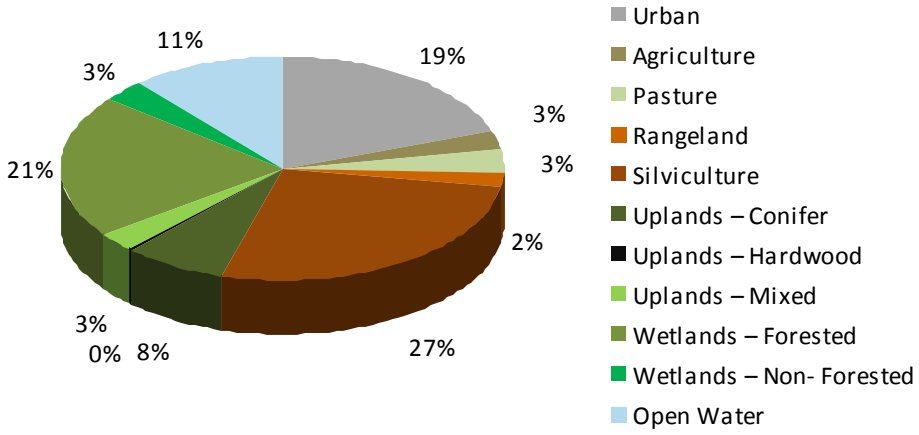
This section summarizes the analysis of wildlife and habitat issues. For more information, see the *Wildlife and Habitat Discipline Report* and the *Endangered Species Biological Assessment* located on the enclosed CD.

Great Egret

3.16.1 How were wildlife and habitats identified and evaluated in the study area?

To identify the types of wildlife and habitat that could potentially be impacted by the proposed St. Johns River Crossing Project, FDOT identified the limits of a study area representing not only the habitat directly impacted by the project alternatives, but also a larger, contiguous area that provides a comprehensive look at the land uses and potential habitats in the project vicinity as well. The team then mapped land use using GIS and the SJRWMD's 2009 Land Use/Land Cover data (**Exhibit 3-54**). They calculated the acreage and percent of the study area for each land use to identify how much of each habitat type exists within the study area (**Exhibit 3-53**). Although some wildlife use urban areas as habitat, the team considered only non-urban land uses as potential habitat within the study area.

Exhibit 3-53: **General Land Uses in Wildlife Study Area**



Once they identified the habitat, they next determined what potential wildlife species used those habitats. FDOT developed a list of wildlife species that may occur in the study area by searching data sources, including the Florida Natural Areas Inventory (FNAI) Tracking List (FNAI, 2012) for Clay, St. Johns and Duval Counties and the FWC Florida's Endangered Species, Threatened Species, and Species of Special Concern (FWC, 2012). They also checked the USFWS Threatened and Endangered Species System on-line database for Federally-listed species information (USFWS, 2012). Finally, the team

conducted a ground survey during the spring of 2006 and the fall/winter of 2007 to identify habitat and search for evidence of listed species. In addition, FDOT conducted several specific analyses for sandhill habitat (discussed later in this section), submerged aquatic vegetation (discussed in the next section, Fish and Aquatic Resources), red-cockaded woodpecker, and Florida scrub jay, based on agency input. These latter two surveys found no suitable habitat for the red-cockaded woodpecker or any significant scrub habitat in the study area. A review of the current *ESA 5 Year Review for the Florida scrub-jay*, published by the USFWS in 2007, indicates that the Florida scrub jay has been extirpated / functionally extirpated from Clay and St Johns Counties. FDOT combined the ground-survey information and the land use data to characterize the affected environment within the study area and determine the potential for the Build Alternatives to impact wildlife and habitat.

The presence of wildlife movement corridors was also considered in the assessment of potential impacts. Site-specific database information on movement corridors was not available, so this study assumed that potential corridors are present in any large open areas, parks and reserve areas, creeks and riparian areas in undeveloped settings.

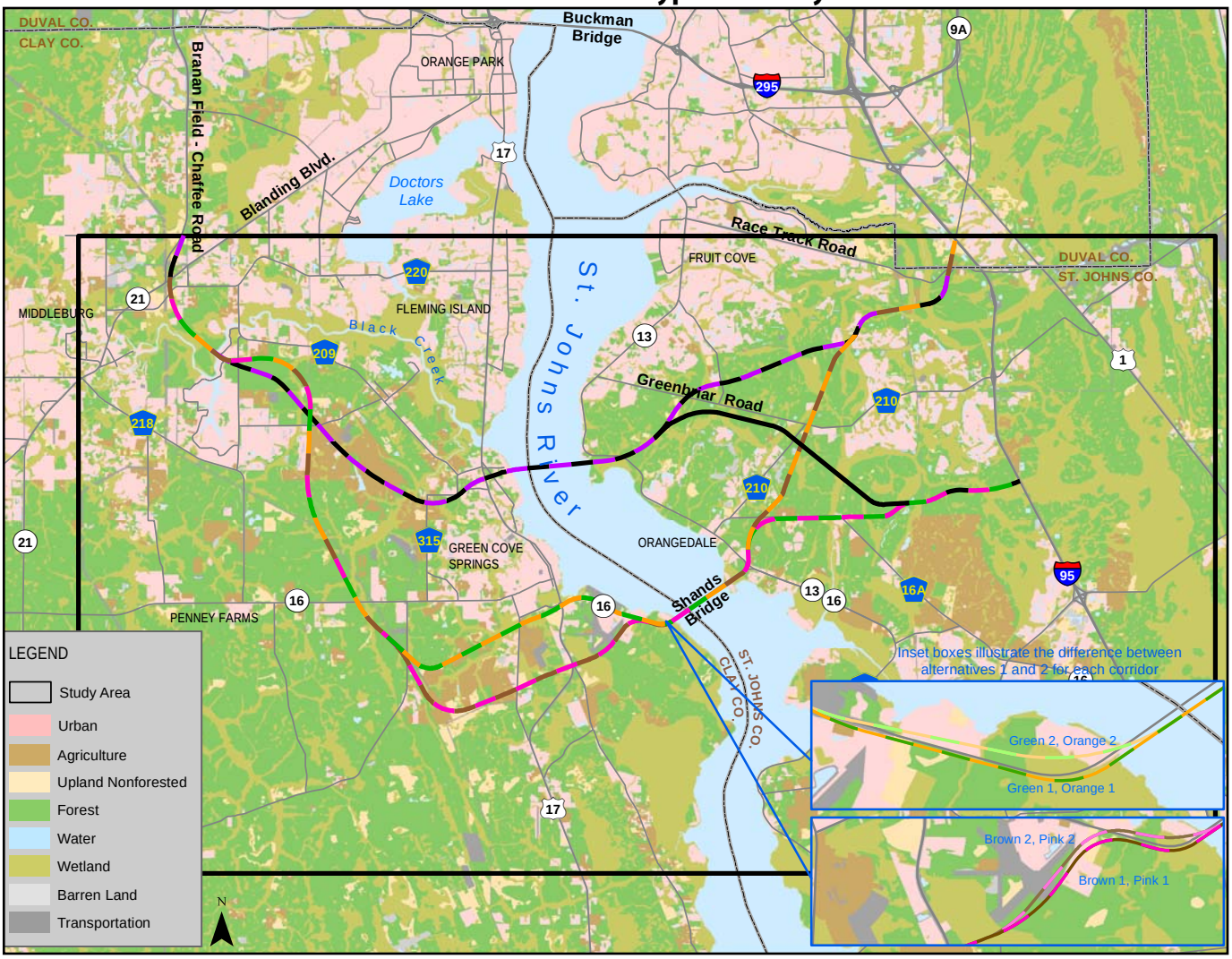
Agency coordination has been ongoing since the beginning of the project through the Efficient Transportation Decision Making process (see Chapter 2). The team compiled agency comments to add to the body of information and to address agency concerns. FDOT also held a field visit on July 1 and 2, 2008, for agency review of the survey effort, and will continue to coordinate with Federal and state agencies throughout the project. In a letter dated January 23, 2013, the USFWS concurred with the determination of effect for each species and commitments outlined in the *Endangered Species Biological Assessment*. The letter is contained in Appendix B of the *Endangered Species Biological Assessment* located on the enclosed CD.

3.16.2 What types of wildlife and habitats are found in the study area?

Study Area Overview

Exhibit 3-54 depicts the habitat types mapped within the study area. The physical geography of eastern Clay County includes three general regions. The Duval Upland is located in the central part of the county. Slash pine flatwoods dominate the lower areas, while the higher elevations also include longleaf pine, sand pine, turkey oak, post oak and live oak. The Peoria Hill region includes natural areas at higher elevations that are canopied with longleaf pine, sand pine, turkey oak, bluejack oak, post oak and live oak. Cypress and pine

Exhibit 3-54: **Habitat Types in Study Area**



dominate the lower elevations. The Eastern Valley extends to the St. Johns River and includes the watershed of the river. The natural areas of this region are primarily flatwoods and swamps. Slash pine, longleaf pine and palmetto dominate the flatwoods while hardwoods and cypress dominate the swamps. Drainage patterns are generally indistinct except for a few streams flowing westward into the St. Johns River.

St. Johns County is in the lower part of the Atlantic Coastal Plain. The county is divided into four regions, only one of which lies within the study area -- the Eastern Valley, as described above.

The St. Johns River is a slow-flowing, meandering river that is brackish and tidal. Low topography dominates the river basin and the low gradient causes

complex flow patterns, including tidal currents that roll far upstream. Green Cove Springs in the central portion of the study area is one of the few spring features along the river's length.

Numerous streams and creeks exist in the Clay County portion of the study area. Black Creek drains more than 430 square miles of Clay County. Other major creeks in Clay County include Grog Branch, Bradley Creek, Peters Creek and Governor's Creek. In the St. Johns County portion of the study area, major creeks include Mill Creek, Trout Creek and Durbin Creek.

Black Creek

Urban land uses, including built-up land, barren land, and infrastructure, encompass almost 20 percent of the study area. These areas dominate the land use in the northern portion of the study area, surrounding the St. John's River near Orange Park, Fleming Island, Fruit Cove, and Green Cove Springs. Urban areas are also dominant in the western portion of the study area surrounding Middleburg.

Osprey

Non-urban areas are described below. Within these areas, there is the potential for a diverse population of wildlife. FDOT identified seven fish species, nine reptiles and amphibians, 24 bird species, and seven mammals as having the potential to occur in the study area. There are also areas that may serve as wildlife movement corridors, including large open areas, large park and conservation areas, and creeks and riparian areas in undeveloped settings.

Agricultural Lands

Agricultural lands within the study area include cropland, pastureland, and feeding operations. Four large areas of pastureland exist, two of which are in St. John's County just east of Shands Bridge and near Race Track Road. The other two areas are located in Clay County, just west of the Shands Bridge and to the northwest of Green Cove Springs.

Diverse species of wildlife potentially utilize pastureland as habitat. FNAI historical element occurrence records on pastureland within the study area included the bald eagle, a state-listed threatened species. Other records in the project vicinity included the state-threatened gopher tortoise, the state-threatened southeastern American kestrel, and the state-listed species of special concern snowy egret. Potential wildlife could also include the federally and state-threatened eastern indigo snake, the eastern diamondback rattlesnake, the common kingsnake and the merlin.

Rangeland

Rangeland within the study area includes dry prairies, shrub and brushland,

and mixed rangeland. Many of the same wildlife species that use pastureland also utilize this habitat. There were several FNAI historical element occurrence records of state-listed plant species within the study area, including the state-endangered St. John's blackeyed susan, the state-endangered lakeside sunflower, and several occurrences of the state-endangered Bartram's ixia. There were also records in the vicinity for the eastern indigo snake, the state-listed species of special concern gopher frog, and several gopher tortoises, eastern diamondback rattlesnakes, and bald eagles. Other wildlife potentially using rangeland as habitat in this area could include the common kingsnake, the southeastern American kestrel and the painted bunting.

Silviculture

Silviculture is the most dominant non-urban land use in the study area. These areas primarily include planted pine forests and some forest regeneration areas. There were three FNAI historical element occurrence records of wildlife using silviculture lands, including gopher tortoises and the southeastern weasel. In addition, there were records in the project vicinity for three amphibians and reptiles: the state-listed species of special concern Florida pine snake, the gopher frog, and the striped newt. Birds in the project vicinity included the federally and state-endangered wood stork, the federally endangered and state-listed species of special concern bald eagle and Bachman's sparrow, and the federally endangered, state-threatened red cockaded woodpecker. Mammals included two state-listed species of special concern: the Florida mouse and the Sherman's fox squirrel.

Eastern Diamondback Rattlesnake

State-listed plant species that have documented FNAI historical element occurrence records within the study area include the state-endangered St. John's blackeyed susan, the state-endangered lakeside sunflower, the state-endangered Bartram's ixia, the state-threatened hartwrightia, and the state-threatened Florida mountainmint.

Other wildlife species that may also have a potential to use silviculture lands include the eastern indigo snake, the eastern diamondback rattlesnake, the common kingsnake, the southeastern American kestrel, and the hairy woodpecker.

Painted Bunting

Uplands

The upland forest areas primarily include coniferous forests dominated by pine flatwoods and longleaf pine. There are also some areas of hardwood forests

dominated by xeric oak and mixed forest areas. Many of the species potentially occurring on these lands are also associated with silviculture land uses, as discussed above. Specifically, there have been FNAI historical documented occurrences of gopher tortoise, Florida pine snake, and bald eagle within the study area, as well as a historic element occurrence record of the state-threatened Florida black bear.

Within the project vicinity there have also been records for eastern indigo snakes, gopher tortoises, gopher frogs, red-cockaded woodpeckers, Florida scrub jay, southeastern American kestrels, bald eagles, Bachman's sparrows, Florida black bear, the Florida mouse, Sherman's fox squirrels, and southeastern weasel.

State-listed plant species that have FNAI historical element occurrence records within the study area include the state-threatened hartwrightia and seven state-endangered species: St. John's black-eyed susan, purple honeycomb head, lakeside sunflower, Florida toothache grass, Curtis's loosestrife, ciliate-leaf tickseed, and Bartram's ixia.

Wetlands

Wetlands

The majority of the wetlands in the study area are considered forested wetlands, and they include bay swamps, cypress, pond pine, hydric pine flatwoods and other mixed forested wetlands. Many are associated with the St. John's River or its tributaries. Within the study area, there are FNAI historical occurrence records for the striped newt and the bald eagle. Within the project vicinity there are also records for the gopher frog, the eastern indigo snake, the Bachman's sparrow, the swallow-tailed kite, and the great egret.

Wetlands

Many of the non-forested wetlands in the study area are associated with larger forested wetland systems. These non-forested wetlands include freshwater marshes, wet prairies, and emergent aquatic vegetation. There are no FNAI historical element occurrence records for these areas. However, in the vicinity of the study area, there are historic element occurrence records for wood stork as well as the other species discussed above for forested wetlands.

Within the study area, there were also records for some state-listed plant species in forested and non-forested wetlands, including the state-threatened Florida mountainmint, and four state-endangered species: St. John's black-eyed susan, pondspice, Chapman's sedge, and Bartram's ixia.

There are other wildlife species that may also be associated with either forested or non-forested wetlands in this area. These species include the state-endangered peregrine falcon, the swallow-tailed kite, the least bittern, the black rail, and the osprey. The potential also exists for a number of wading birds in these wetlands, including four state-listed species of special concern; the little blue heron, the snowy egret, tricolored heron, and the white ibis, as well as the yellow-crowned night heron, the black-crowned night heron, and the glossy ibis.

Open Water

The open water within the study area consists primarily of the St. John's River, including its tributaries and lakes. FNAI historical element occurrence records for species found include the federally and state-endangered manatee. Other species that have the potential to occur in the study area include the federally and state-endangered shortnosed sturgeon, the mountain mullet, the snail bullhead, the river goby, the dusky shiner, the sea lamprey and the spotted turtle.

Public Conservation / Managed Areas

Public conservation lands are managed for, among other things, wildlife use and the protection of rare habitats. The lands provide large tracts with little human disturbance and impact. These public lands are generally interconnected to provide wildlife linkages and corridors for wildlife movement. This is especially important for animals requiring large areas such as the eastern indigo snake, black bears and other large mammals. (Refer to **Exhibit 3-36** in the Section 4(f) Resources section for the map of conservation areas in the study area and vicinity.)

3.16.3 What is the probability of threatened and endangered species occurring within the Build Alternatives?

Wildlife species identified as potentially occurring within the Build Alternatives include both federally and state-listed protected species. **Exhibit 3-55** shows the listed and protected species, and the probability of their occurrence within the Build Alternatives. These species are further described below. It should be noted that a high probability of occurrence does not necessarily mean there will be an adverse effect on a species (see sidebar to **Exhibit 3-55**, and later discussions of findings of effect). Of the federally listed and protected species potentially occurring within the Build Alternatives, only the bald eagle and

Exhibit 3-55: **Protected Species Potentially Occurring within the Build Alternatives**

Species	Federal Status	State Status	Potential to Occur in Study Area
MAMMALS			
Florida black bear	--	T	High
Florida mouse	--	SSC	Low
Sherman's fox squirrel	--	SSC	Moderate
West Indian manatee	E	E	Moderate
BIRDS			
bald eagle	P	T	High
limpkin	--	SSC	Moderate
little blue heron	--	SSC	High
red-cockaded woodpecker	E	SSC	Low
snowy egret	--	SSC	High
southeastern American kestrel	--	T	Moderate
tricolored heron	--	SSC	High
white ibis	--	SSC	High
wood stork	E	E	High
FISH			
shortnosed sturgeon	E	E	Low
Atlantic sturgeon	E	SSC	Low
AMPHIBIANS AND REPTILES			
striped newt	C	N	Moderate
eastern indigo snake	T	T	Moderate
Florida pine snake	--	SSC	Moderate
gopher frog	--	SSC	Moderate
gopher tortoise	C	T	Moderate
DECAPODS			
Black Creek crayfish	--	SSC	Moderate
PLANTS			
Bartram's ixia	--	E	High
Canby's wild indigo	--	T	Low to Moderate
Chapman's rhododendron	E	E	Low
Florida mountainmint	--	T	Low to Moderate
lakeside sunflower	--	E	Low to Moderate
St. Johns black-eyed Susan	--	E	Low to Moderate

E- Endangered
T - Threatened
SSC - Species of Special Concern
P - Protected
N—Not Listed
C-Candidate

Potential for Wildlife Occurrence

Low Potential: No recent element occurrence records; no project field sightings; minimal quantity of habitat present.

Moderate Potential: Element occurrence records in the vicinity; no project field sightings; moderate quantity of habitat present.

High Potential: Recent element occurrence records and/or project field sightings; large quantity of habitat present.

Wetland-Dependent Species

Wetland-dependent species with a high potential to occur within the Build Alternatives may not be adversely affected by the proposed project, due to their high mobility and wide-ranging use of available habitat in the geographical area. Wetland mitigation will compensate for habitat lost in the project corridor.

wood stork were observed during field visits. The remaining federally listed species have a low to moderate probability of occurring within the Build Alternatives.

Protected Mammals

Florida Black Bear: A 1986 FNAI Element Occurrence record identified a black bear in the western portion of the study area. There is a *high potential* for the black bear in the study area and within the Build Alternatives.

Florida Mouse: The five 1993 FNAI Element Occurrence records identified this species primarily within the Camp Blanding managed area, southwest of the study area. There is a *low potential* for the Florida mouse in the study area and within the Build Alternatives.

Sherman's Fox Squirrel: Three 1993 FNAI Element Occurrence records identified this species within the study area. There is a *moderate potential* for the Sherman's fox squirrel in the study area and within the Build Alternatives.

West Indian Manatee

West Indian Manatee: There are no aggregate areas of manatee in the study area, but there are occasional sightings of manatees in the St. Johns River. There is a historical FNAI Element Occurrence Record for the manatee within the study area. There is a *moderate potential* for the manatee in the study area and within the Build Alternatives.

Protected Birds

Bald Eagle: Although the bald eagle has been delisted as a federally threatened species, protection will continue under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act as well as state law by FWC. The team observed bald eagles within the study area during field visits. Active eagle nests are documented in the study area as well: 8 in Clay County and 8 in St. Johns County. A bald eagle nest is located less than one mile south of the Black and Purple Alternatives . However, no active eagle nests are documented within 660 feet of any Build Alternative. There is a *high potential* for the bald eagle in the study area and a *moderate potential* within the Build Alternatives.

Limpkin: No FNAI Element Occurrence records document the species within the study area. There is a *moderate potential* for the limpkin in the study area and within the Build Alternatives.

Little Blue Heron, Snowy Egret, Tricolored Heron and White Ibis: Historical FNAI Element Occurrence records generally documented these species within the vicinity of large wetlands and conservation areas, including Twelve Mile Swamp and Camp Blanding. There is a *high potential* for wading bird forage occurrences in the study area and a *moderate potential* for nesting within the Build Alternatives.

Red-cockaded Woodpecker: Populations are small and highly fragmented and are found primarily on federally managed lands with some state-owned and private lands supporting smaller populations. All historical FNAI Element Occurrences are located in Camp Blanding west of all the Build Alternatives. Due to a lack of old-growth pine forests and suitably managed pine forests, there are no known populations in the study area. There is a *low potential* for the red-cockaded woodpecker in the study area and within the Build Alternatives.

Southeastern American Kestrel: The subspecies that breeds in Florida is listed, while the wintering northern migrant is not. No FNAI Element Occurrence records document this species within the study area; however, there are several records in the Camp Blanding Wildlife Management Area directly west of the study area. There is a *moderate potential* for the southeastern American kestrel in the study area and within the Build Alternatives.

Wood Stork: One historically documented rookery occurred just north of CR 220 in Clay County, but it is no longer active. However, there is one additional rookery recently documented with Core Foraging Areas (CFA) within the footprint of the Black, Purple, Orange 1 and 2 and Brown 1 and 2 Alternatives. The CFA is a 13-mile radius zone surrounding the colony boundary. The rookery is located in the extreme northeastern corner of the study area. There is a *high potential* for foraging wood storks in the study area and within the Build Alternatives.

Protected Fish

Shortnosed and Atlantic Sturgeon: Although the sturgeon migrates long distances upstream during spawning, these species do not have any existing breeding population in Florida and occurrences of the sturgeon in the project vicinity have not been documented. There is a *low potential* for the sturgeon in the study area and within the Build Alternatives.

Limpkin

Southeastern American Kestrel

Shortnosed Sturgeon

Protected Amphibians and Reptiles

Eastern Indigo Snake: The eastern indigo snake is found throughout Florida, but is rare in most areas. Historical FNAI Element Occurrences are restricted to managed areas within the project area. There is a *moderate potential* for the indigo snake in the study area and within the Build Alternatives.

Florida Pine Snake: A 1972 FNAI Element Occurrence documented this species within the western portion of the study area in Camp Blanding. There is a *moderate potential* for the pine snake in the study area and within the Build Alternatives.

Gopher Frog: Several 1993 FNAI Element Occurrence records documented this species within the study area. There is a *moderate potential* for the gopher frog in the study area and within the Build Alternatives.

Gopher Tortoise: The gopher tortoise is a candidate species for federal listing. A dozen historical FNAI Element Occurrence records documented this species within the study area. There is a *moderate potential* for the gopher tortoise in the study area and within the Build Alternatives.

Striped Newt: The striped newt is currently not listed but included here because it is a candidate species. It is found in xeric upland communities and there are FNAI documented occurrences in the study area. There is a *moderate potential* for the striped newt in the study area and within the Build Alternatives.

Gopher Tortoise

Protected Decapod

Black Creek Crayfish: There are known populations in the Camp Blanding Training Site to the west of the study area. A 1998 FNAI element occurrence documented the crayfish in the Black Creek Ravines Conservation Area less than a mile south of the alternatives. There is a *moderate potential* for the Black Creek crayfish in the study area and within the Build Alternatives near the Black Creek crossing.

Protected Plant Species

Bartram's Ixia: This spring-blooming member of the iris family has been historically documented by FNAI in all Build Alternatives. There is a *high potential* for this species to exist within any of the Build Alternatives.

Canby's Wild Indigo: This species is documented by historical FNAI Element Occurrence records in the Brown 1 and 2 and Pink 1 and 2 Alternatives. There is a *low to moderate potential* for this species to exist within any of the Build Alternatives.

Chapman's Rhododendron: A single known population (possibly cultivated) occurs in Camp Blanding to the west of the project area in Clay County; no known populations are documented in St. John's County. There is a *low potential* for the Chapman's rhododendron in the study area and within the Build Alternatives.

Florida Mountainmint: This species is documented by historical FNAI Element Occurrence records in all Build Alternatives. There is a *low to moderate potential* for this species to exist within any of the Build Alternatives.

Lakeside Sunflower: A single historical FNAI record documents the occurrence of this plant in the Brown 1 and 2 and Pink 1 and 2 Alternatives. There is a *low to moderate potential* for this species to exist within any of the Build Alternatives.

St. John's Black-Eyed Susan: The St. John's black-eyed susan is documented by historical FNAI Element Occurrence records in all Build Alternatives. There is a *low to moderate potential* for this species to exist within any of the Build Alternatives.

Chapman's Rhododendrum

Mountainmint

Black-Eyed Susan

3.16.4 How will the alternatives affect wildlife, habitat and protected species?

Within the study area, there is a mosaic of habitats supporting both non-listed and listed wildlife species. **Exhibit 3-56** summarizes the potential habitat impacts for each of the Build Alternatives. As described earlier, these habitat impacts were derived primarily from GIS databases. FDOT also conducted a specific GIS analysis to identify sandhill habitat, using the GFC Habitat and Land Cover Grid data developed by the FWC. Within both the Black and Purple Alternatives, approximately 2.5 acres of sandhill habitat were mapped. For

Exhibit 3-56: **Habitat Impacts**

Habitat Type	Alternatives (acres of impact)									
	Black	Purple	Brown 1	Brown 2	Orange1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
Agriculture	173	161	158	160	137	136	131	130	152	154
Rangeland	160	151	173	173	178	178	87	87	81	82
Water	87	84	61	59	61	59	68	66	68	66
Wetlands	453	293	412	392	413	400	366	353	365	345
Upland Forests	1,171	706	1,036	1,033	962	957	939	935	1,013	1,010
Total Acreage	**2,044**	**1,395**	**1,840**	**1,817**	**1,751**	**1,731**	**1,609**	**1,571**	**1,679**	**1,657**

All numbers are rounded. Habitat areas include all land uses except urban and barren lands, utilities and infrastructure. Wetlands habitat type is based on GIS habitat data, and is not intended to correspond to the wetland impact numbers in the Wetlands section of Chapter 3. Those data were derived from different databases and were field delineated.

the Green 1 and 2 and Orange 1 and 2 Alternatives, approximately 101 acres were mapped within each corridor. Approximately 108 acres were mapped within each of the Brown 1 and 2 and Pink 1 and 2 corridors. During the AN and ETDM processes, a number of agencies noted concerns about the amount of high-quality sandhill habitat within the southern alternative corridors (see the *Agency Coordination Memorandum* located on the enclosed CD).

In addition to reductions in habitat, project construction could cause fragmentation of open spaces which may create isolated islands of wildlife habitat. A new linear barrier through open areas may also disrupt wildlife movement and migration patterns.

FDOT also completed an Endangered Species Biological Assessment and additional wildlife surveys (see attached *Wildlife and Habitat Discipline Report* and the *Endangered Species Biological Assessment* located on the enclosed CD). These documents discuss in detail the federally listed species and the potential effects of the St. Johns River Crossing Project on these species and their habitat. Seven federally listed threatened or endangered species have some probability of occurring in the study area (refer to **Exhibit 3-55**). There is no critical habitat

as defined by the USFWS. Based on the distribution of habitat within the study area, all the Build Alternatives have an equal probability of affecting both federally and state-listed species.

Based on their likelihood of occurring along the Build Alternatives or the availability of appropriate habitat in the study area, the following findings regarding these seven federally listed species apply to all Build Alternatives:

"May affect, not likely to adversely affect" – *the appropriate conclusion when effects on a listed species are expected to be discountable, insignificant, or beneficial:*

- *Eastern indigo snake* – This snake has a large home range and uses seasonal habitats. Due to the wide ranging nature of this species, there is the potential to encounter it in natural habitats almost anywhere in Florida. The mobile nature combined with the large home range results in the possibility of the project being involved with the eastern indigo snake. Therefore, the finding is "May affect, not likely to adversely affect."
- *West Indian manatee* – The West Indian manatee is known to frequent the St. Johns River and its tributaries in the project area. There is the potential for the project to affect manatee habitat at bridge locations. Special consideration during construction, and mitigation for lost habitat, will ensure that no harm to the manatee results from the proposed project. Therefore, the finding is "May affect, not likely to adversely affect."
- *Wood stork* – The wood stork is a colonial wading bird. It forages across a wide area in wetlands, preferring areas that fluctuate in hydrology, concentrating prey in shallow spots. In north Florida, the area over which nesting storks will travel to forage is primarily within a 13-mile radius. The Preferred Alternative is not within a core foraging area; but, the Black, Purple, Brown 1 and 2 and Orange 1 and 2 Alternatives fall within the core foraging area of two documented, active wood stork rookeries (nesting areas). However, the abundance of suitable foraging habitat and mitigation of project impacted wetlands within the core foraging areas results in a "May affect, not likely to adversely affect" finding.

"No effect" – *the appropriate conclusion when it is determined that the proposed action will not affect a listed species or critical habitat:*

- *Red-cockaded woodpecker*
- *Chapman's rhododendron*
- *Short-nosed and Atlantic sturgeon*

No direct or indirect impacts to listed species or their habitats are associated with the No Build Alternative. The project is consistent with the Endangered Species Act.

3.16.5 What measures are proposed to avoid or minimize project effects to wildlife and habitat?

Construction activities for the proposed St. Johns River Crossing Project will have air, noise, and water quality impacts on wildlife and associated habitats within the immediate vicinity of the Build Alternatives.

Air quality impacts will be temporary, the primary source being emissions from construction equipment and dust. FDOT will minimize air pollution by watering or the application of calcium chloride in accordance with their *Standard Specifications for Road and Bridge Construction* (FDOT, 2007).

Noise and vibration impacts will result from heavy equipment movement and construction activities, including pile driving and vibratory compaction of embankments. Noise control measures will follow those contained in FDOT *Standard Specifications for Road and Bridge Construction* (FDOT, 2007).

FDOT will minimize water quality impacts resulting from erosion and sedimentation by the application of BMPs described earlier under Water Quality.

Construction of the roadway and bridges will require the excavation of unsuitable material and muck, placement of embankments, and the use of materials such as lime rock, asphaltic concrete, and Portland cement concrete. Demucking is anticipated at many of the wetland sites and is regulated under Section 120 of the FDOT *Standard Specifications for Road and Bridge Construction* (FDOT, 2007). Disposal will be on-site in detention areas or off-site. Removal of structures and debris will be in accordance with local and state regulatory agencies. The contractor will be responsible for controlling pollution on haul roads, borrow pits, and areas used for disposal of waste materials from the project. Temporary erosion control features as specified in Section 104 of the FDOT *Standard Specifications for Road and Bridge Construction* (FDOT, 2007) will consist of temporary grassing, sodding, mulching, sandbagging, slope drains, sediment basins, sediment checks, artificial coverings, and berms. Should petroleum contaminated soil and/or groundwater be encountered, procedures specifying

the contractor's responsibilities are set forth in the FDOT *Standard Specifications for Road and Bridge Construction* (FDOT, 2007).

FDOT will design and construct the proposed project to provide wildlife passage across the corridor to reduce habitat fragmentation, prevent genetic isolation, and limit direct mortality on the roadway. Wildlife passage will be accomplished by designing appropriate bridge lengths, culvert locations, signage, and construction of dedicated wildlife crossings where justified. These efforts will follow the FDOT *Wildlife Crossing Guidelines* (see Appendix E of the *Endangered Species Biological Assessment* located on the enclosed CD). Specific recommendations for location and design of wildlife crossings that are provided by the FWC, the USFWS, and other regulatory agencies will be incorporated during the design and permitting phase.

FDOT narrowed its original alternative corridor width from 400 feet to 324 feet to reduce impacts to all habitat areas and wetlands. During final design of the selected alternative, FDOT will continue examining feasible design modifications to reduce these impacts further.

FDOT will undertake a number of actions to avoid or minimize impacts to federally listed species. These are summarized below. The *Endangered Species Biological Assessment* and its appendices located on the enclosed CD contain more detail on specific contract provisions that will be put in place for the protection of federally listed species.

- Use special provisions for protection of the shortnosed sturgeon during construction to ensure that no sturgeons are harmed. Use drilled shaft pile construction if determined by FDOT to be prudent and feasible. As described in Chapter 2, no explosives will be used in bridge demolition.
- Conduct surveys for gopher tortoise burrows within two years of the construction start date.
- Utilize the USFWS *Survey Protocol for the Eastern Indigo Snake Drymarchon couperi, in North and Central Florida*, if applicable.
- Implement the standard USFWS protection measures for the eastern indigo snake and an eastern indigo snake education plan prior to and during construction.
- Conduct a detailed Eastern indigo snake habitat impact analysis during the Final Design and Permitting phases in close coordination with USFWS and FWC during this process.

- Mitigate the impacts to Eastern indigo snake habitat through the purchase and conservation of appropriate upland habitat as determined by the *Endangered Species Biological Assessment* during the Final Design/Permitting/Right-of-Way phases. Furthermore, the FDOT is committed to close coordination with USFWS and FWC during this process.
- Use special provisions for the protection of manatees during construction to ensure that no manatees are harmed. Trained personnel will conduct surveillance of in-water work areas during construction. Erosion and turbidity control measures will be installed and maintained around in-water work areas. No explosives will be used for bridge demolition.
- Follow the Standard Manatee Protection Construction Conditions for In-Water Work (FWC, 2009) for the Florida manatee during implementation of the project, and TSPs will be incorporated into the contractor's bid documents.
- Develop and utilize a manatee watch plan specific to this project during the Permitting phase, at which time the USFWS will be provided the opportunity to provide input and approval.
- Implement water quality improvement initiatives as an additional mitigation option for impacts to submerged aquatic vegetation. A draft plan is contained in Appendix D of the *Endangered Species Biological Assessment.*
- Restore near-shore areas upon the removal of the existing Shands Bridge.
- Should the striped newt or gopher tortoise be listed prior to the time construction commences, an effects determination will be made in coordination with USFWS. Furthermore, compliance with all applicable state and Federal regulations, guidelines, survey protocol, etc., will be adhered to.
- Where the proposed project will alter wetlands, wetland compensation will include a temporal-lag factor to account for time required for successful mitigation with type-for type-mitigation and comparable hydroperiod, to compensate for potential adverse effects to the wood stork foraging area.
- Design and construct the proposed project to provide wildlife passage across the project corridor to reduce habitat fragmentation, prevent genetic isolation, and limit direct mortality on the roadway. Wildlife passage will be accomplished by designing appropriate bridge lengths, culvert locations, signage, and construction of dedicated wildlife crossing where justified. These efforts will follow the FDOT Wildlife Crossing Guidelines. Specific recommendations for location and design of wildlife crossings that are provided by the FWC, the USFWS and other regulatory agencies will be incorporated during the design and permitting phase.

3.17 FISH AND AQUATIC RESOURCES

This section summarizes the evaluation of fish and aquatic habitats. See the *Essential Fish Habitat Discipline Report* located on the enclosed CD for more information.

3.17.1 How were fish and aquatic resources identified and evaluated in the study area?

FDOT used wetlands identified in the *Wetlands Evaluation Report* in conjunction with NWI mapping to determine essential fish habitat (EFH) associated with the wetlands in the tidally influenced waterways including portions of Black Creek, Bradley Creek, Peters Creek, Governors Creek, Hallowes Cove, Trout Creek, Mill Creek, Durbin Creek, Cunningham Creek and the St. Johns River. Due to the geographic extent of the study area, the number of Build Alternatives under study, lack of existing high resolution elevation data (land and water) and technical level of data required to estimate/calculate potential EFH impacts, it was determined that utilizing a 20 foot topographic contour line as a starting point for determining the extent of potential EFH wetlands was reasonable. All palustrine forested wetlands which exhibit a hydrologic connection to the St. Johns River and/or its tributaries and are located within/below the 20 foot contour were selected as potential EFH wetlands. Using the same methodology, the wetland areas within each proposed Build Alternative, as identified in the WER, were then selected as being potential direct EFH wetland impacts. Wetlands and open waters determined to be EFH are depicted in **Exhibit 3-57**.

Additionally, FDOT conducted a GIS desktop analysis using 2004 data from the SJRWMD and field visits to the project area to assess submerged aquatic vegetation (SAV). In February 2007 and January 2008, the team established transects perpendicular to the shoreline within the area of the proposed St. Johns River bridge crossings. To identify areas of SAV, the field team conducted surveys at low tide using a small skiff. They logged the locations of these points and collected and identified vegetation. They also field-verified the SJRWMD SAV data. The team used visual observation and bottom sampling to verify the presence or absence of SAV. Based on this field effort, FDOT determined that the GIS data was an accurate representation of the areas that contain SAV within the Build Alternatives and could be used to quantify potential impacts. SAV within the bridge areas are shown for the Northern and Southern Build Alternatives in **Exhibits 3-58 and 3-59**.

Exhibit 3-57: **EFH in the Project Study Area**

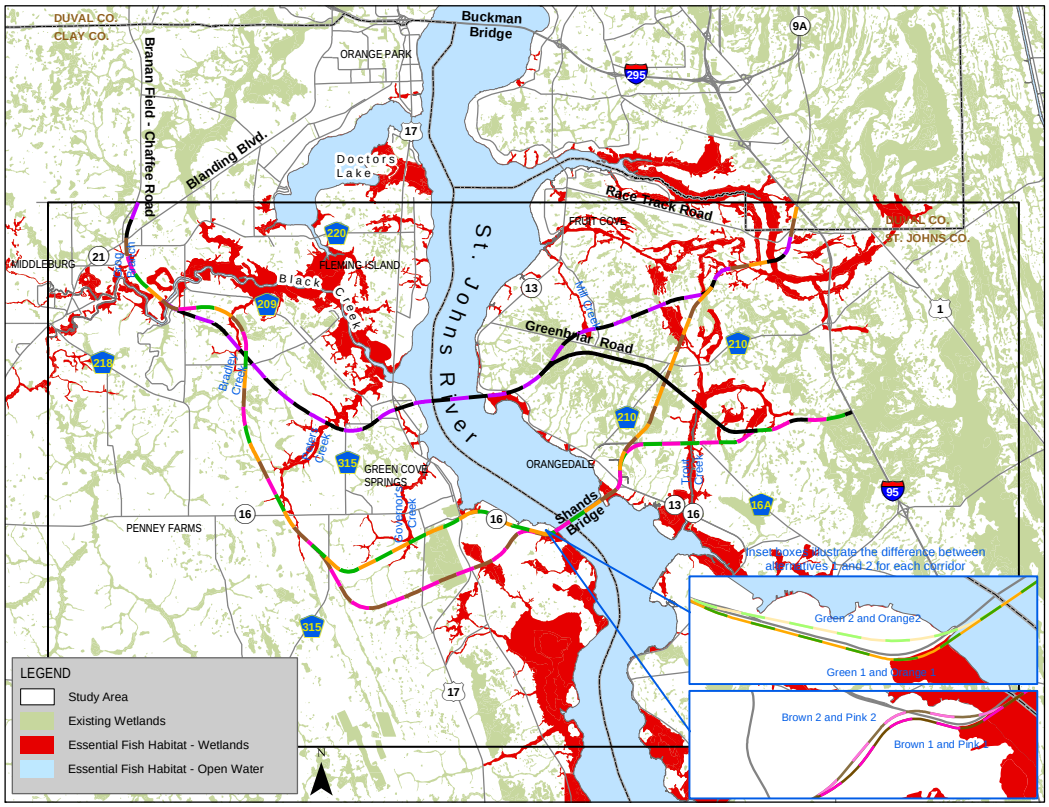


Exhibit 3-58: **Northern Alignment SAV Survey**

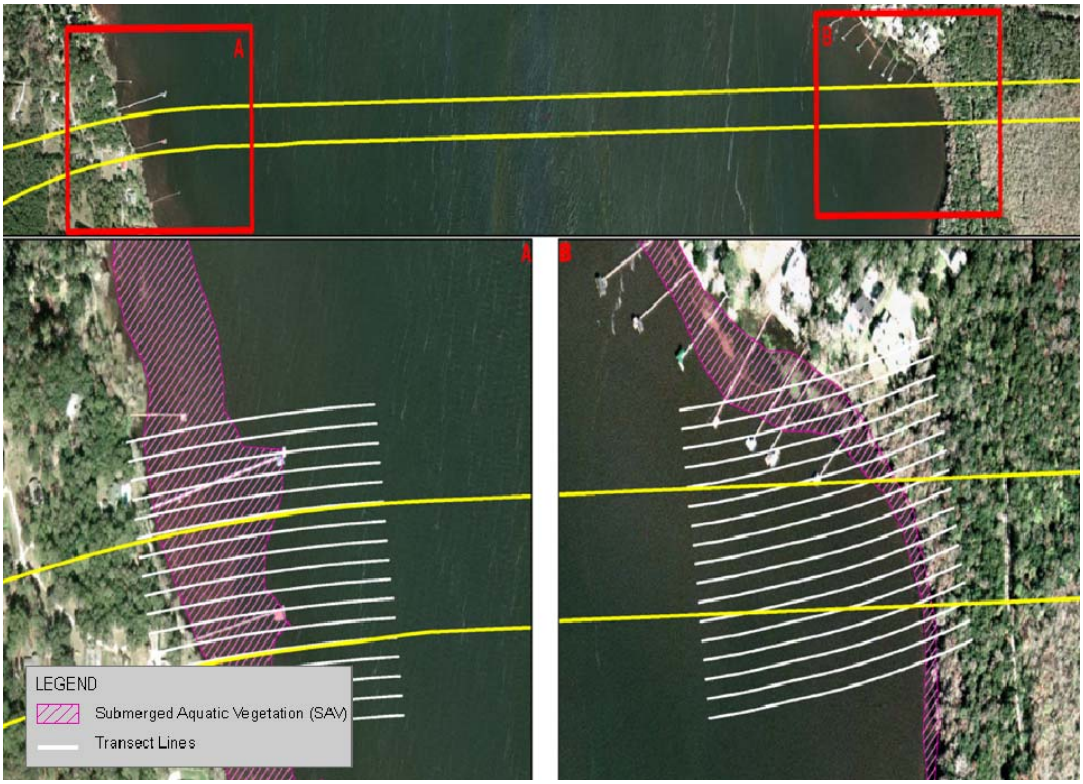
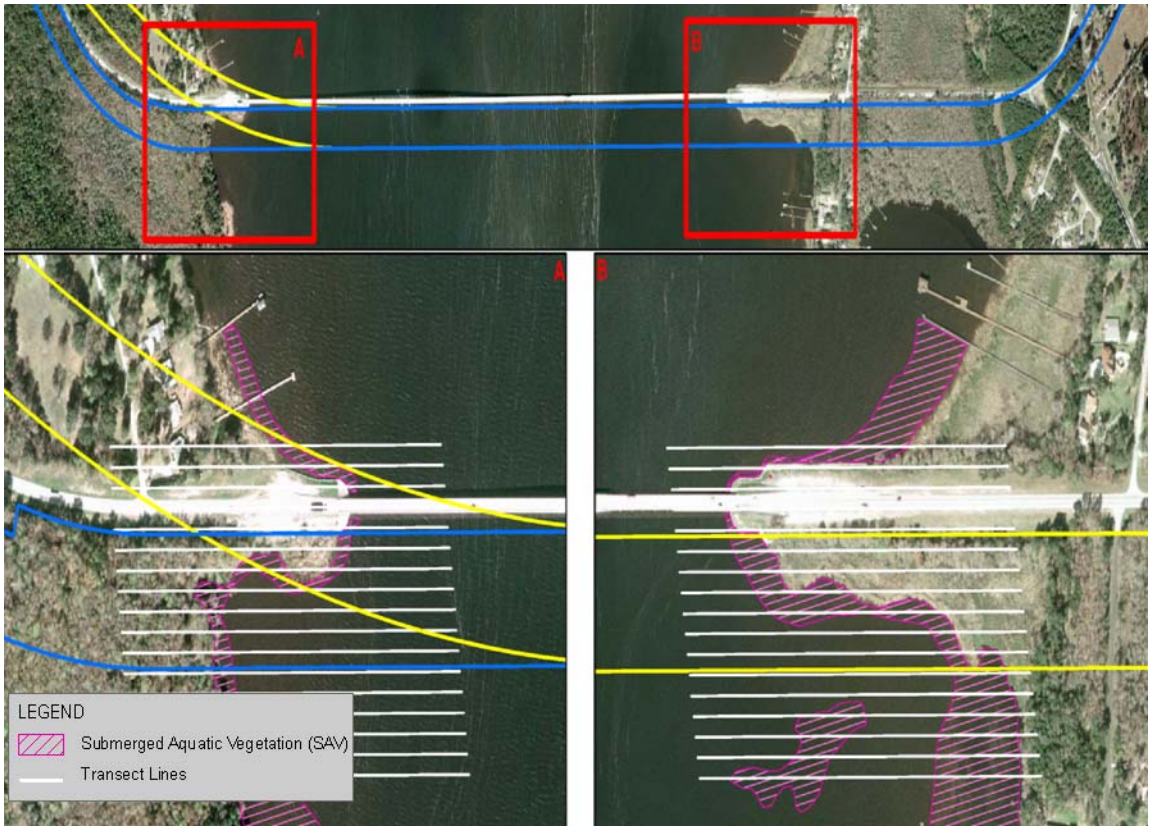


Exhibit 3-59: **Southern Alignment SAV Survey**



3.17.2 What rivers and streams are in the study area and what is their condition now?

The St. Johns River system provides spawning, foraging, and nursery habitat for a diverse and economically important mix of estuarine fish and shellfish species. Plant materials and organic matter produced in the wetlands contribute to food webs that support fish and invertebrates. The SAV also provides cover. In addition to habitat value, these wetlands improve water quality, contribute to pollutant and sediment removal, and aid wave attenuation.

The field sampling effort indicated SAV occurring in water depths from approximately five feet to less than one foot with greater abundance at the shallower depths in the near-shore areas. Sampled vegetation included tidally influenced freshwater species: Southern naiad, tape grass, muskgrass, coontail, pondweed, and water lily, as well as green and brown filamentous algae.

In an Advance Notification response letter dated October 28, 2005, addressed to FDOT, NMFS confirmed that the St. Johns River supports EFH as identified by the South Atlantic Fishery Management Council. They identified several

Atlantic Croaker

Atlantic Menhaden

categories of EFH occurring within the project area, including palustrine forested, herbaceous, and emergent wetlands as well as submerged aquatic vegetation and estuarine water column and bottom. NMFS indicated that the proposed project will adversely impact these EFH resources. Those impacts have the potential to reduce the quality and productivity of these fishery resources.

3.17.3 What kinds of aquatic resources occur in the study area?

The tidally influenced portions of the St. Johns River and associated Black Creek serve as a nursery for commercially and recreationally important species, including Atlantic croaker, spot, Atlantic menhaden, and striped mullet. These fish in turn serve as the food source for other fishes such as the snappers and groupers as well as migratory species like tuna and sharks, also managed by NMFS. According to NMFS, the study area supports anadromous species that migrate from salt to freshwater to spawn such as the hickory shad, river herring and shortnosed sturgeon. In an Advance Notification response letter dated October 19, 2005, FWC noted that the Hallowes Cove area, located south of the proposed river crossing of the Black and Purple Alternatives, has substantial near-shore grassbeds and has been identified by their fisheries biologists as an important fisheries nursery area.

Portions of the St. Johns River Crossing Project study area are designated as EFH for the brown shrimp. While adult brown shrimp are most abundant in offshore waters, data suggests that postlarvae spend the winter in offshore bottom sediments and then migrate into estuaries in the spring. These nursery areas are generally dominated by smooth cordgrass, like the near-shore grassbeds found in Hallowes Cove. Portions of the St. Johns River Crossing Project study area are also designated as EFH for the white shrimp and pink shrimp. White shrimp spawn somewhat later than brown shrimp, with recruitment of shrimp to the inshore areas peaking in May and June. White shrimp move furthest upstream, with many migrating to a point south of Palatka (Joyce 1963). Juvenile white shrimp also tend to move into the upper reaches of estuaries to seek out low salinity water more so than either pink or brown shrimp (Williams 1958). Unlike white and brown shrimp, pink shrimp spawn year-round, with a peak in early spring. Spawning generally occurs at 12-52 feet with postlarvae migrating to similar grassbeds as brown shrimp in late spring and early summer.

Juvenile and adult bluefish may also occur in the water column, but they are highly migratory; the juveniles occurring in estuaries May through October and the adults April through October.

Essential Fish Habitat (EFH)

On October 11, 1996, Congress passed the Sustainable Fisheries Act (Public Law 104-297). It calls for direct action to stop or reverse the continued loss of fish habitats. Toward this end, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance this habitat. The Act requires cooperation among the National Marine Fisheries Service (NMFS), the Fishery Management Councils, and Federal agencies to protect, conserve, and enhance "essential fish habitat". Congress defined essential fish habitat for federally managed fish species as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

3.17.4 Are there threatened and endangered aquatic resources in the study area?

As mentioned in the previous section (Wildlife and Habitat), the federally endangered shortnosed sturgeon and Atlantic sturgeon spend most of their life cycles in the lower portions of large rivers, including the St. Johns River. Although the sturgeon migrates long distances upstream during spawning, these species do not have any existing breeding population in Florida and occurrences of the sturgeon in the project vicinity have not been documented.

3.17.5 How will the alternatives affect aquatic resources?

All of the impacts to EFH from the Build Alternatives are associated with the construction of new bridge crossings. The eggs and larvae of pink, brown and white shrimp may be minimally impacted, but the impacts will be localized to areas of bridge construction. Bridge construction will impact wetlands and open water EFH associated with Bradley Creek, Peters Creek, Governors Creek, Hallowes Cove, Trout Creek, Mill Creek, Durbin Creek, Cunningham Creek and the St. Johns River. **Exhibit 3-60** provides a summary of EFH identified within the Build Alternatives and a comparison of the types and acreages of impacts each alternative will have on both wetland and open water EFH. These impacts are further described below.

The western end of the proposed bridge crossing for the Purple and Black Alternatives is primarily urban build-up, barren land and infrastructure with no natural land use elements. The exceptions are the crossing of Black Creek and two of its tributaries (Peters Creek and Bradley Creek), all palustrine forested wetlands. The bridge crossing for the Black and Purple Alternatives will result in moderate EFH involvement with tidally influenced freshwater submerged aquatic vegetation existing in a relatively wide but varying band (250-500 feet) within the shallow water area. There are no freshwater emergent wetlands in this area, and the estuarine water column and bottom would be minimally affected. The eastern terminus at Popo's Point traverses a sand ridge flatwoods knoll primarily dominated by slash pine (*Pinus elliottii*) with scattered oaks (*Quercus spp.*) and sweetgum (*Liquidambar styraciflua*). Moving east in St. Johns County, the Black and Purple Alternatives involve some palustrine forested wetlands connected to Mill Creek, Trout Creek, Cunningham Creek, and Durbin Creek. The southern segment of the Black Alternative will have additional impact to wetlands associated with Trout Creek.

The Pink 1 and 2, Brown 1 and 2, Orange 1 and 2 and Green 1 and 2 Alternatives all cross Black Creek and two of its tributaries (Peters Creek and Bradley Creek), toward their western terminus. The Orange 1 and 2 and Green 1 and

Essential Fish Habitat Adverse Effects

An EFH Assessment was prepared and consultation was initiated in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). It has been determined that this project will have adverse effects to Essential Fish Habitat. FDOT will continue to coordinate with NMFS as the Preferred Alternative is selected and moves through the subsequent phases.

2 Alternatives take a more northern route after SR 16 and cross palustrine forested wetlands associated with Governor's Creek. The Pink 1 and 2 and Brown 1 and 2 travel further south impacting palustrine wetlands associated with the St. Johns River. All the alternatives skirt the southern fringe of Green Cove Springs, involving tidally influenced palustrine forested wetlands. The proposed western right-of-way limits for all of the southern alignments are adjacent to the BCA and John P. Hall Nature Preserve. This approach for the Brown 1, Orange 1, Green 1 and Pink 1 Alternatives will terminate in the palustrine, deciduous forested wetland associated with the conservation area. In this area, sparse patches of cordgrass fringe the riverine edge. There will be moderate EFH involvement with SAV and little to no involvement with emergent wetlands; the estuarine water column and bottom would be minimally affected. The Brown 2, Orange 2, Green 2 and Pink 2 Alternatives would minimize impacts to SAV and tidally influenced palustrine forested wetlands because these alignments shift slightly north.

Adult Brown Shrimp

The east end of the bridge for the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives would terminate in an upland hardwood mixed forest transitioning to riverine bottomland mixed hardwood floodplain. Sparse clumps of pickerelweed and sedges fringe the river edge in this area. There would be moderate EFH involvement with SAV and minimal involvement of emergent wetlands. The estuarine water column and bottom would be minimally affected.

Bluefish

After the bridge crossing on the east side, the Pink 1 and 2 and Green 1 and 2 Alternatives continue east, crossing and impacting the palustrine forested wetlands of Trout Creek. The Brown 1 and 2 and Orange 1 and 2 Alternatives continue northeast crossing and impacting palustrine forested wetlands associated with Trout Creek, Cunningham Creek and Durbin Creek.

There are no unique qualities, functions, or values associated with the potentially affected EFH area of any of the Build Alternatives. There will be no significant effect – short term or long term – on the stability and quality of the large St. Johns River system.

3.17.6 How will construction affect aquatic resources?

Regardless of the alternative selected, any new bridge will likely have minimal temporary construction-related impacts to wetland vegetation. The localized distribution of SAV, with no seagrass beds identified, and lack of emergent wetlands in the immediate vicinity reduces the potential for effect. The deep-

Exhibit 3-60: Potential **EFH and SAV Involvement**

Location	Alternatives (acres of impact)									
	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
Black Creek	39.77	39.77	42.05	42.05	42.05	42.05	42.05	42.05	42.05	42.05
Bradley Creek	13.39	13.39	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07
Peters Creek	8.35	8.35	23.43	23.43	23.43	23.43	23.43	23.43	23.43	23.43
Governors Creek	0.00	0.00	0.00	0.00	17.46	17.46	17.46	17.46	0.00	0.00
St. Johns River	64.86	64.86	77.20	65.89	50.76	42.92	50.76	42.92	77.20	65.89
Trout Creek	44.21	6.25	21.29	21.29	21.29	21.29	34.19	34.19	34.19	34.19
Mill Creek	22.8	22.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Durbin Creek	46.31	46.31	46.31	46.31	46.31	46.31	0.00	0.00	0.00	0.00
Cunningham Creek	21.26	21.26	22.50	22.50	22.50	22.50	0.00	0.00	0.00	0.00
Total Impacts to EFH Wetlands =	**260.96**	**223**	**236.85**	**225.54**	**227.87**	**220.03**	**171.96**	**164.12**	**180.94**	**169.63**
St. Johns River	3.7	3.7	2.5	2.3	2.5	2.3	2.5	2.3	2.5	2.3
Total Impacts to Open Water EFH =	**3.7**	**3.7**	**2.5**	**2.3**	**2.5**	**2.3**	**2.5**	**2.3**	**2.5**	**2.3**
Total Impacts to EFH =	**264.66**	**226.7**	**239.35**	**227.84**	**230.37**	**222.33**	**174.46**	**166.42**	**183.44**	**171.93**

water habitat of the St. Johns River will be temporarily affected as piles are placed during construction. As stated in Chapter 2, no explosives will be used for the demolition of the existing Shands Bridge for the southern alternatives.

If there were any disturbance of the near-shore grassbeds in Hallowes Cove, south of the Purple and Black Alternatives, it could impact the eggs and larvae of brown shrimp, pink shrimp and white shrimp. However, these potential impacts will be localized and considered minimal.

In responses to the Advance Notification (AN) for the project, the Florida Department of Environmental Protection noted that crossing the St. Johns River at the existing Shands Bridge location would minimize impacts to surface waters and state-owned sovereignty submerged lands (see AN responses in the *Agency Coordination Memorandum* located on the enclosed CD).

3.17.7 What measures are proposed to avoid or minimize the effects to aquatic resources?

Federal and state agencies that permit, fund, or undertake activities that may adversely impact EFH must undertake an EFH consultation with the NMFS. Coordination with NMFS for this project began with the Advance Notification process and the NMFS response letter dated October 28, 2005. This co-

ordination continued on July 1 and 2, 2008, when a project field review was attended by FDOT environmental and permitting staff, NMFS, USACE, USFWS, and FWC to look at the various land uses and habitat types within the alternative corridors. Black Creek will also be reviewed with FWC via boat to assess the SAV and EFH associated with that portion of the study area.

Further informal coordination efforts have been made since the circulation of the Draft EIS. In an effort to adequately address NMFS Draft EIS comments, FDOT and NMFS conducted numerous informal meetings to further refine the methodology and process for estimating and assessing potential impacts to EFH for the Build Alternatives. These efforts culminated in a teleconference on May 13, 2011 in which both FDOT and NMFS agreed to the assessment methodology as presented in this Final EIS. Coordination and consultation with NMFS will continue as the project progresses toward the final design and permitting phase.

Though it is unlikely that shortnosed or Atlantic sturgeon occur in the study area, FDOT will include provisions for their protection in the construction specifications, (refer to Appendix C of the *Endangered Species Biological Assessment* located on the enclosed CD).

FDOT is committed to the following actions to avoid, minimize or mitigate for EFH impacts:

- Evaluating, considering, and implementing design/construction techniques which lead to the continued avoidance and minimization of wetland impacts, to include EFH impacts.
- Mitigating all wetland impacts to include EFH impacts as a result of the construction of the Preferred Alternative.
- Working with the agencies and developing a regional wetland mitigation plan as the project progresses into the design phase. The plan will establish procedures, guidelines and responsibilities to implement regionally significant mitigation for unavoidable impacts caused by the St. Johns River Crossing Project and other future FDOT projects within the jurisdictional boundaries of SJRWMD. FDOT will continue to coordinate with the resource agencies in developing the framework for a regional wetlands mitigation plan.
- Mitigating for SAV impacts through water quality improvement initiatives. A draft plan is contained in Appendix H of the *Essential Fish Habitat Report.*
- Restoring the near-shore areas upon the removal of the existing Shands Bridge.

3.18 GEOLOGY AND SOILS

3.18.1 What is the geology in the study area?

This section summarizes the geology, hydrogeology and soils characteristics of the study area. See the *Geology and Soils Technical Memorandum* located on the enclosed CD for more information.

Two aquifer, or water bearing, systems are present within the study area: the deep Floridan aquifer and the shallow surficial aquifer. Both of these serve as potential drinking water resources, although the majority of the area uses the Floridan aquifer.

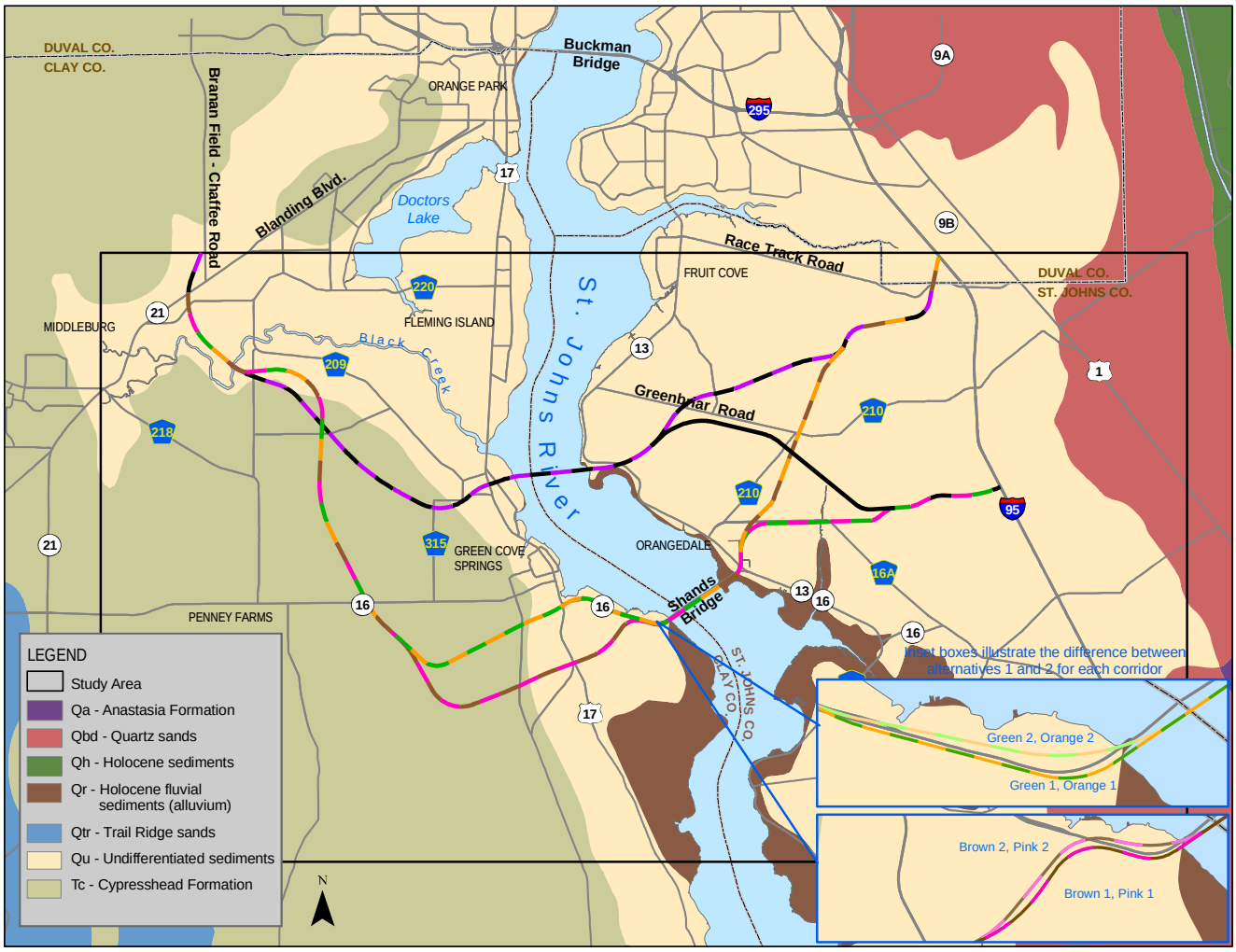
The surficial aquifer consists of sand, silt, clay and limestone at the bottom, with the limestone layer being the principal water-producing portion. It ranges from 50 to 200 feet thick (Fairchild, 1972). The water from this aquifer serves primarily for irrigation and to supply individual homes. Groundwater within the surficial aquifer generally flows from higher areas of land to lower ones. Rainwater recharges the groundwater in the aquifer by infiltration. Water leaves the aquifer through evaporation near the surface, pumping from wells, and water flowing from the aquifer to the St. Johns River and its tributaries.

Between the surficial aquifer and the deeper Floridan aquifer is a less permeable (confining) layer of clay and limestone (Fairchild, 1972). The average thickness of this layer ranges from 250 to 500 feet thick in the study area.

Below that confining layer is the Floridan aquifer, the principal source of groundwater in northeast Florida. The Floridan aquifer consists of the Eocene Ocala Group, Avon Park, and the Oldsmar Formation. It is present at a depth of approximately 360 feet below land surface and averages approximately 1,500 feet thick. The Floridan aquifer is the primary source of publicly and privately provided water within the study area. Municipally owned water plants use over 90 percent of the water pumped from this aquifer (Phelps and Spechler 1997). The recharge zone is located to the west of the project where the Ocala, Avon Park and Oldsmar formations outcrop.

There are no significant structural geologic features located within the study area. The surface soils in Clay and St. Johns Counties consist of unconsolidated sediments, loose deposits that have not been formed into rock. **Exhibit 3-61** shows the Build Alternatives overlying the surficial geologic deposits observed within the study area. Those areas crossed by the alternatives are discussed as follows.

Exhibit 3-61: **Surficial Geology of the Study Area**



Clay County

CYPRESSHEAD FORMATION

All Build Alternatives pass through the same surface soils in Clay County, the Cypresshead Formation (Scott 1988). This formation consists of quartz sands with quartz pebbles and some clay is also found here. In this portion of the study area, the Cypresshead formation is also the surficial aquifer.

UNDIFFERENTIATED QUATERNARY SEDIMENTS

The Purple and Black Alternatives cross the St. Johns River approximately five miles north of the southern alternatives which cross near the existing Shands Bridge. All the alternatives will be constructed through undifferentiated Quaternary sediments (Scott 1988), consisting of sand and clay. Generally, these sediments are not more than 20 feet thick and they make up the surficial aquifer in this area.

St. Johns County

UNDIFFERENTIATED QUATERNARY SEDIMENTS

Located east of the St. Johns River are undifferentiated Quaternary Sediments similar to those found near the Shands Bridge in Clay County. All Build Alternatives will cross these soils in the study area between the river sediments and the western terminus of the proposed project. These soils consist of sand and clay (Scott 1993) and are generally not more than 20 feet thick.

Clay and St. Johns Counties

ST. JOHNS RIVER SEDIMENTS

The lowlands along the St. Johns River are called fluvial sediments. These sediments consist of fine sand, silt, clay and marl, a mud rich in calcium carbonate (limestone). Peat and other organic-rich materials are also often found here (Scott 1988). All alternatives will cross the river through these fluvial sediments in both Clay and St. Johns Counties.

3.18.2 How will the proposed project affect geologic features?

By covering over parts of the surficial aquifer with less permeable materials, all of the Build Alternatives will limit the amount of rainwater recharge in areas where the proposed highway is constructed. However, these impacts will be minor and limited to the areas that are paved and designed to handle runoff, both during construction and operation of the project.

As with any construction project, FDOT will excavate and remove surficial soils with any of the Build Alternatives. Since these soils are common to the area, these impacts are expected to be minimal.

3.18.3 What measures are proposed to avoid or minimize the effects to geology and soils?

The contractor will be responsible for methods of controlling pollution in borrow pits where fill is removed, and in areas used for the disposal of waste soils from project construction. The contractor will control impacts from the placement of soils for embankments through the same BMPs employed to protect soil erosion for air and water quality, including temporary grassing, sodding, mulching, sandbagging, slope drains, sediment basins, sediment checks, artificial coverings, and berms.

3.19 ENERGY

This section describes the energy consumption associated with project construction and operation. See the *Energy Technical Memorandum* located on the enclosed CD for more information.

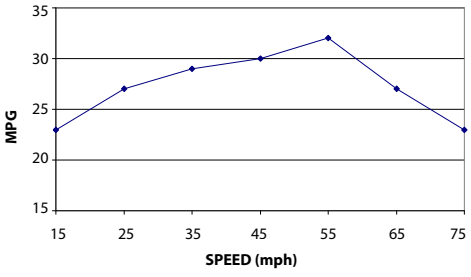
August 2008 gas prices

3.19.1 How was energy evaluated for the project?

To determine energy consumption for construction, FDOT converted its projected construction costs to energy consumption, based on the procedures described in the United States Department of Transportation (USDOT) *Energy Requirements for Transportation Systems* (USDOT, 1980). The factor they used to estimate energy consumption during construction was derived by the California Department of Transportation (CALTRANS) 1983 urban freeway widening formula (CALTRANS, 1983).

For operational energy consumption, FDOT determined energy consumption rates for vehicles driving on the roadway by comparing changes in traffic operations, as measured by VMT, and changes in traffic speed throughout the study area. Fuel efficiency is proportional to travel speed, and increases up to about 55 miles per hour, after which it decreases. Cars generally use the least amount of fuel when they can drive consistently at that speed (CCAP, 2005; USDOT, 1980). For the purposes of this analysis, the average speed in the corridor was estimated to be 60 miles per hour for each of the alternatives, including the No Build.

Fuel consumption also depends on the fuel efficiency or fuel usage rate of each vehicle. In 2005, passenger cars traveled an average of 22.9 miles per gallon (mpg). Vans, pickup trucks, and sport utility vehicles traveled an average of 16.2 mpg, and heavy-duty trucks had an average fuel rate of 5.8 mpg (USDOT, 2006). Based on the percentage of each type of vehicle currently on the road, the average fuel rate for all vehicles was 19.2 mpg.



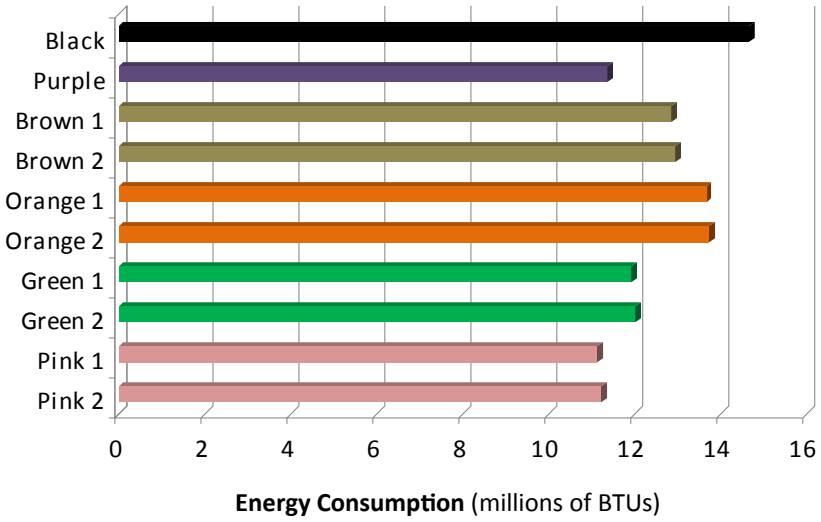
A car is most fuel efficient when driving at about 55 miles per hour

3.19.2 How much energy will it take to build the project?

The energy consumed in constructing the project will be proportional to the cost or size of the project. Based on the CALTRANS urban freeway widening formula, energy consumption during construction is about 8.8 million British thermal units (BTUs) per thousand dollars of construction cost. (BTUs are a standard unit of measure regardless of fuel type, either diesel fuel or gasoline, and construction vehicles use both. As an example, one gallon of gasoline equals 0.13 million BTUs.)

Using this factor, FDOT projected construction of the St. Johns River Crossing Project to consume between 11.1 and 14.7 million BTUs of energy, depending upon the alternative (**Exhibit 3-62**).

Exhibit 3-62: **Energy Consumed During Construction**



The No Build Alternative will still require routine maintenance and minor safety improvements of existing transportation facilities, including short-term minor construction activities as necessary for continued operation. However, the energy consumption from such activities is expected to be minor.

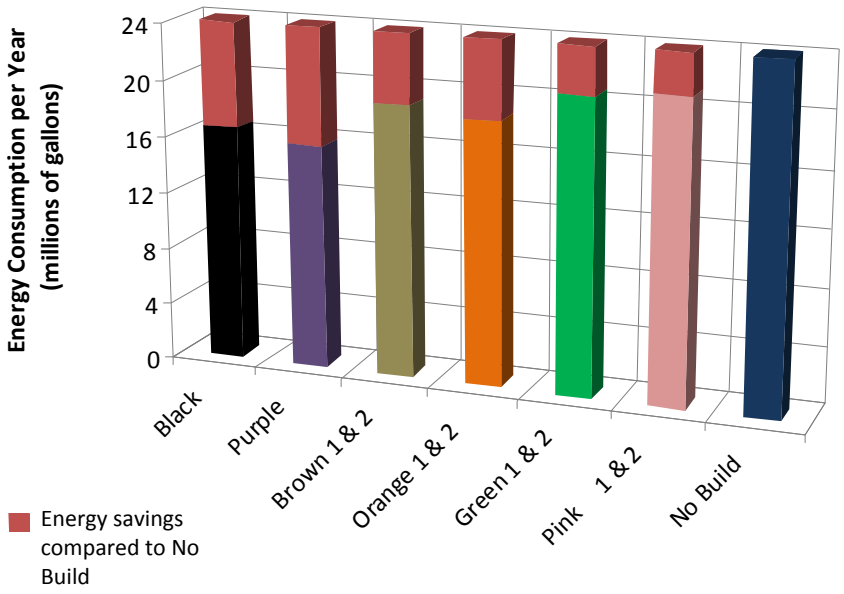
3.19.3 How will the project affect energy use?

FDOT has determined that traffic in the St. Johns River Crossing Project study area will increase whether the project is constructed or not. The Build Alternatives will provide additional capacity resulting in improved operational conditions, faster travel speeds, and vehicles spending less time in stop-and-go conditions.

The project team estimated operational energy consumption by calculating the fuel consumed by vehicles traveling through the study area on a daily basis (Wilbur Smith, 2008). They did this by first determining the VMT for the study area, and then dividing by the amount of fuel consumed per mile for a given speed. The total annual fuel consumption in 2030 for the various Build Alternatives ranged between 15.7 million gallons for the Purple Alternative and 24.1 million gallons for the No Build Alternative. **Exhibit 3-62** shows this information. By comparing the height of each Build Alternative bar in the

chart to the No Build Alternative bar, one can see how much energy will be saved; the longer the red portion of the bar, the more energy that alternative will save compared to the No Build Alternative.

Exhibit 3-63: **Estimated Energy Consumption and Savings**



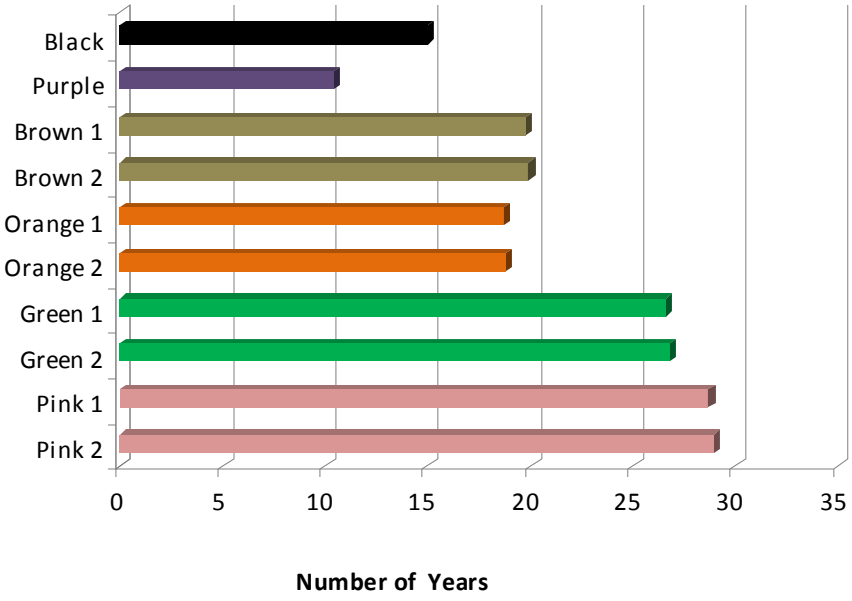
The St. Johns River Crossing Project will result in a fuel savings ranging from 2.9 million gallons (Pink 1 and 2 Alternatives) and 8.3 million gallons (Purple Alternative) when compared to the No Build Alternative energy consumption levels for 2030. All of the Build Alternatives will reduce annual fuel consumption when compared with the No Build Alternative.

For the No Build Alternative, the team calculated fuel consumed for the design year 2030 using the existing Shands Bridge as the alternative route. Since area-wide capacity will not be increased, the existing roadways will handle additional traffic, and roadway performance is likely to deteriorate over time. Traffic using the local roadways will experience reduced fuel efficiencies that will result in more energy consumption. Under the No Build Alternative, vehicles will consume about 24.1 million gallons of fuel each year traveling local routes in 2030.

By comparing the amount of energy required to construct each of the Build Alternatives with the estimated fuel savings per year, FDOT estimated the en-

ergy payback period, or how long it would take for the savings in fuel consumption resulting from a Build Alternative to make up for the amount of energy it took to build it. The energy payback period ranges from 10.5 years for the Purple Alternative to a maximum of 29 years for the Pink 2 Alternative (**Exhibit 3-64**).

Exhibit 3-64: **Estimated Energy Payback Period**



3.19.4 What measures are proposed to minimize energy usage?

Consumption of energy for the construction or operation of the St. Johns River Crossing Project is not expected to affect regional energy supplies, or result in any unavoidable adverse effects. Construction of the project will actually reduce the energy needs of vehicles operating in the project area by improving traffic flow and thereby increasing the efficiency of cars driving through these portions of Clay and St. Johns Counties. Thus, no additional mitigation measures for energy are needed.

Energy Payback

By comparing the amount of energy required to construct the project with the estimated fuel savings per year, it is possible to estimate the energy payback period, or how long it would take for the savings in fuel consumption resulting from the project to make up for the amount of energy it took to build it.

This section describes hazardous and contaminated sites and the associated risk. For more information, see the *Contamination Level 1 Screening Report* located on the enclosed CD.

3.20 HAZARDOUS SITES AND CONTAMINATED PROPERTIES

3.20.1 How were hazardous sites or contaminated properties identified and evaluated in the study area?

The objective of the contamination screening evaluation (CSE) was to identify and evaluate potential contamination impacts that may exist within or adjacent to the limits of the proposed right-of-way for the Build Alternatives, and to provide recommendations for further assessment, remediation, special handling, or potential contamination liability.

FDOT used data collected from a preliminary site reconnaissance, regulatory agency databases, and historical land use research to identify properties needing a detailed site visit. In general, they used a distance of 2,000 feet from the right-of-way limits for each Build Alternative to complete the primary search for facilities. However, for Federal Superfund sites, a search was performed on a county-wide level.

FDOT reviewed the following specific data sources as part of the CSE:

Property Ownership and Land Use: The team collected information from the Clay and St. Johns Counties Property Appraiser Internet websites, site visits, and the FDEP lists of registered facilities. They also used historical records to identify former ownership and land uses.

Business Activities: The team reviewed the type of past and present business activity conducted on each property for indications of suspected contaminants that may exist.

Regulatory Agency Records Review: The team reviewed State and Federal database records using USEPA, FDEP and various other Internet websites. They also obtained supplemental information for registered storage tank facilities with known contamination from the FDEP Northeast District office. These included:

- National Priorities List and Records of Decision (NPL/ROD) (Federal),
- Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) List (Federal),

- Toxic Release Inventory System (TRIS) (Federal),
- Resource Conservation and Recovery Act Informational System (RCRIS) including RCRA Generators and Treatment Storage and Disposal (TSD) Facilities (Federal),
- Regulated Storage Tank (RST) Inventory System – Facility/ Owner/Tank Contamination Information Report (State),
- Solid Waste Facilities Directory (State),
- Florida Sites List (State),
- Florida's State-funded Action Sites List (State),
- Drycleaner Sites (State),
- Site Investigation Section (State),
- Institutional Controls Sites (State), and
- Efficient Transportation Decision Making (ETDM) System (State).

Historical Aerial Photograph Review: The team placed the Build Alternatives over aerial photographs along with a 2,000-foot radius buffer to identify sites that may present conditions of concern as a result of visible past or present land uses.

Interviews with Local Agency Officials and Property Owner Representatives: The team contacted personnel in the FDEP Northeast District office for additional data identified by the review of regulatory agency database information. They also contacted the Clay County Port Authority Executive Director for information relative to the Reynolds Industrial Park and the USACE for specific information relative to each of the identified formerly used defense sites (FUDS) within proximity of the Build Alternatives.

Geologic Records Review: The team reviewed geologic records because geology and hydrology can indicate what direction contamination may migrate from a site of contamination onto other properties or into lakes and streams.

City Directory Information and other Historical Land Use Records: The team compared available directory listings with current conditions identified by site visits and with regulatory database listings to help identify sites that no longer exist.

Field Review: The team visited each facility where possible to confirm its location relative to each of the Build Alternatives and to classify its impact potential.

FDOT then evaluated each site identified by this process for its potential impact and assigned a rating of No, Low, Medium, or High risk. They rated former facilities that once existed within the Build Alternatives as High potential based on the lack of available documentation.

3.20.2 What contaminated sites are located in the study area?

FDOT did not identify any NPL/RODs or RCRA TSDs that would be affected by the alternatives. FDEP records did not identify any Florida Sites listings, any former State Funded Action Sites, drycleaning facilities, Site Investigation Sites or other facilities with recorded Institutional Controls within appropriate search distances. Site reconnaissance, historical records review and interview information did identify eight facilities that are not registered or listed but are suspected to have the potential for impacts.

The facilities identified as being within an alternative are shown in **Exhibit 3-65** and listed below with a description of known conditions, site status, and which alternatives are affected by each site. Alternatives affected are shown in brackets. Some contaminated sites are listed below under more than one risk category, based on its distance from various alternatives. For example, one site may be a high-potential risk for the Green 1 Alternative, and a medium-potential risk for Green 2 because it is farther away from Green 2.

Hazardous Site Risk Categories

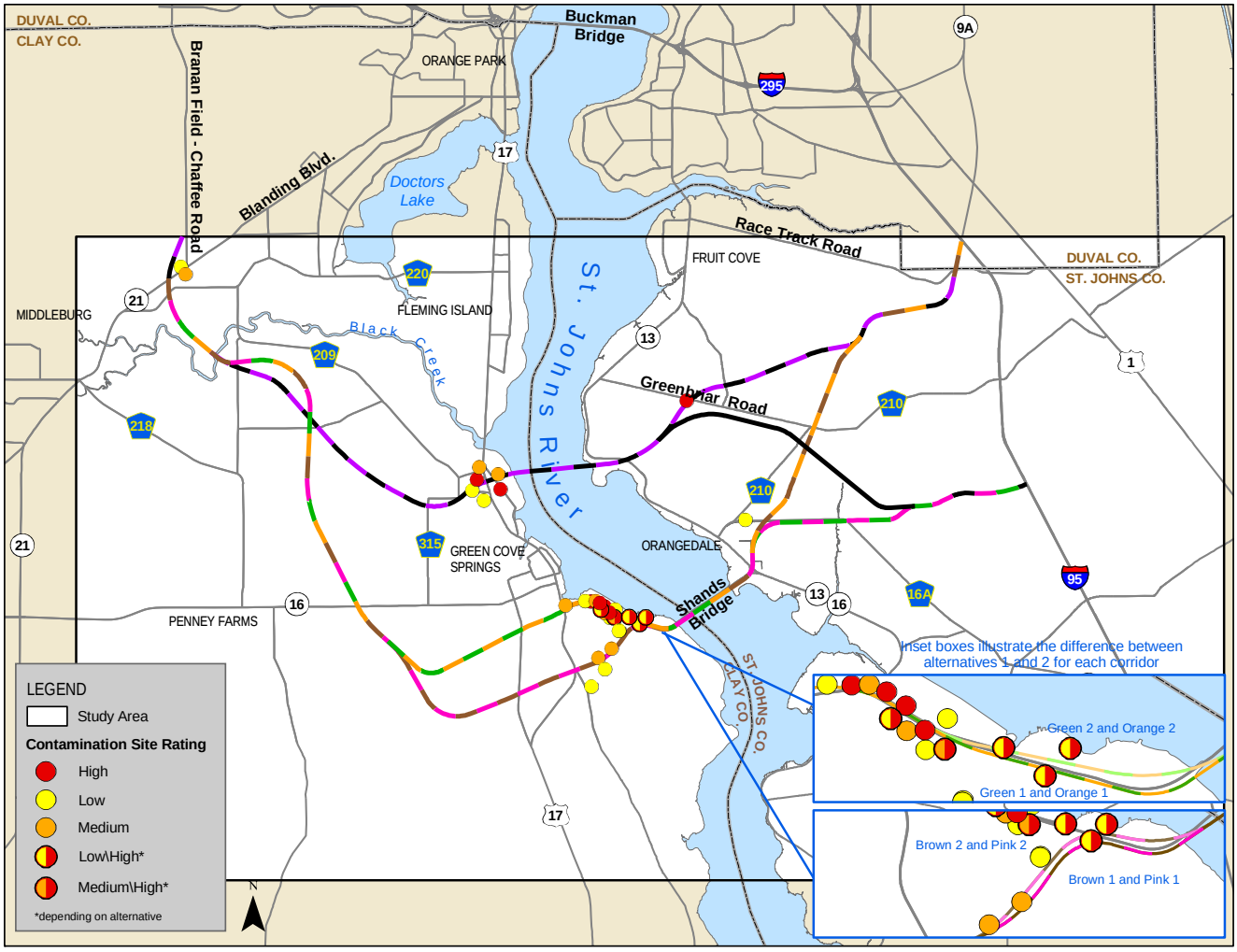
NO: No potential contamination impact identified. Operations that may receive this rating include closed gas stations that have a clean closure assessment or a retail outlet that handles hazardous materials for resale, such as paint.

LOW: The operation has a hazardous waste generator identification number or deals with hazardous materials, but no reason exists to indicate contamination. This is the lowest possible rating an operating gas station could receive.

MEDIUM: Reviews identified known soil and/or water contamination, but that the problem does not need cleanup, is being cleaned up, or is being monitored. A recommendation should be made regarding the property's acceptability for use within the proposed project.

HIGH: Available information indicates a potential for contamination problems. Further assessment would be required to determine the actual presence and/or levels of contamination and the need for cleanup. A recommendation must be included for what further investigation is required. Old gas stations that have not been investigated would receive this rating.

Exhibit 3-65: **Potentially Contaminated Sites**



High Risk-Potential Sites

Site E03-5: Gate-Studebakers **– [Black and Purple]:** A former gas station facility that is currently listed as a Leaking RST (LRST). The facility has been abandoned. A Contamination Assessment Report (CAR) in December 2007 indicated that while soil impacts are only on-site, groundwater impacts are migrating offsite. While additional assessment would not be warranted, dewatering in this area would be an issue.

Site E03-6: Emmitt's Auto Repair **– [Black and Purple]:** Although this auto repair facility is not registered, the use of solvents and gasoline along with the likely accumulation of waste automotive fluids suggest potential contaminant impact. A contamination assessment is recommended.

Gate –Studebakers – 3248 US 17, Green Cove Springs

Site F04-5: Former Johns-Manville Asbestos Pipe Landfill – **[Orange 1 and 2, Green 1 and 2]:** Records indicate this area was a landfill for asbestos waste from as early as the mid-1960s. A contamination assessment is recommended along with the likely need for site cleanup, unless the area is avoided.

Site F04-10: Tarmac, Inc. – **[Orange 1 and 2, Green 1 and 2]:** A former concrete batch plant listed on the FDEP list of LRST facilities. A Limited Contamination Assessment Report (LCAR) showed that soil and groundwater impacts are only on-site. Limited knowledge of this site and the age of the LCAR suggest the need for additional assessment.

Site G04-25: Former Creek Craft Mfg. **– [Orange 1 and Green 1]:** A former tenant of the Reynolds Industrial Park, once located at 990 Roland Avenue, that was suspected of not registering as a RCRA generator. The Clay County Port Authority commissioned the completion of an Environmental Site Evaluation in 1999 while the tenant still occupied the facility. The potential for solvent impacts to both soil and groundwater suggests the need for additional investigation.

Site G04-26: Former Lee Field FUDS Underground Fuel Pipeline – **[Orange 1 and 2, Green 1 and 2]:** This underground pipeline was purged and capped in 1993, and a subsurface soils investigation completed in 1994 only identified impacts on the eastern end. However, the potential for direct impact to construction suggests the need for further evaluation of the potential for impact.

Site G04-27: Cattail Creek Golf Course Maintenance Facility – **[Orange 1, Green 1]:** Although the team did not inspect the facility directly, the use of pesticides/herbicides and petroleum products is likely. A contamination assessment is recommended.

Site G04-28/G05-1: Cattail Creek Golf Course Facility – **[Brown 1 and 2, Orange 1, Green 1, and Pink 1 and 2]:** The golf course in Reynolds Industrial Park has the potential for long term use of pesticides and herbicides, in particular arsenic, and is recommended for assessment.

Site G04-35: Former Lee Field FUDS Pyridine/Burn Area – **[Brown 1 and 2, Pink 1 and 2]:** Beginning in 1946, the site was occupied by an incinerator and used for the disposal of material from mothballed ships. A pool of pyridine was reported to have been cleaned up, but additional contamination was identified in 2004. Based on the presence of known contamination to both soil and groundwater, additional assessment is needed.

Site G05-3: Mobro Marine – **[Orange 2 and Green 2]:** This facility was identified in the RST/LRST database listings. Various assessments and remediation records exist. Additional assessment does not appear to be warranted.

Site G05-4: Former Gas Station Facility – **[Brown 2, Orange 1 and 2, Green 1 and 2, Pink 2]:** This facility appears to be abandoned, but at least one UST may still be present. The potential for direct impacts to construction warrants a subsurface investigation.

Site G04-39/G05-5: Red Bay Marine **– [Orange 2 and Green 2]:** This facility on Red Cove Road at the corner of SR 16 has existed for many years for the repair of marine engines and boats. Visual evidence suggested that the use of petroleum products and possibly solvent compounds may have occurred. The absence of available information suggests the need for additional investigation.

Site D05-1: Switzerland Bomb Target FUDS – **[Black and Purple]:** During World War II, this site was an auxiliary airfield and then re-designated in 1947 for use as a bomb target. The site was cleared of ordnance in 1964 and again in 1978. The dangers of unexploded ordnance suggest that the site should be avoided.

Medium Risk-Potential Sites

Site G04-25: Former Creek Craft Mfg. – **[Described above; Medium-risk potential for Orange 2 and Green 2]**.

Site D03-1: Pantry-Sprint #1228/Lil' Champ #228 – **[Black and Purple]:** This active gas station is a listed LRST and a RCRA generator. Reported releases occurred in 1991 and 2003. A contamination assessment in 2007 identified soil and groundwater contamination and a source removal occurred in 2008. There is no need for additional assessment.

Lee Field FUDS UST Area 2 – SR 16 and Reynolds Boulevard

Lee Field FUDS Bulk Fuel Containers – Reynolds Boulevard and Roland Avenue

Mobro Marine – 606 SR16 East

Site D03-2: Allen's Auto Electric **– [Black and Purple]:** This service repair facility is a RCRA generator. Although a site visit did not identify any noticeable conditions of concern, being a RCRA generator would suggest the use of possible solvents and accumulation of waste fluids. This potential for impact warrants additional assessment.

Site F04-2: Hess #09547 **– [Orange 1 and 2, Green 1 and 2]:** This active gas station is listed as a LRST and RCRA generator. A gas station has been on this site since the 1950s. A release occurred in 1988 and assessments performed in 1993 and 2005 identified impacts to soil and groundwater. The need for additional assessment does not appear warranted.

Hess #09547 – 1010 SR 16, Green Cove Springs

Site F04-9: Salter Specialty Marine **– [Orange 1 and 2, Green 1 and 2]:** This marine repair facility and registered RCRA generator was formerly located at 990 Roland Avenue as Creek Craft Manufacturing. This former business suggests an ongoing use of solvents and a contamination assessment may be warranted.

Site F04-20: Reynolds Industrial Park **– Orange 1 and 2, Green 1 and 2]:** The site is currently listed on the FDEP list of RST facilities. Given that the environmental conditions are unknown, the need for additional assessment is warranted.


Salter Specialty Marine – 803 SR 16 East

Site G04-37: Former Lee Field FUDS Small Arms Range **– [Brown 1 and 2, Pink 1 and 2]:** Although impacted soils that form the earthen berm were excavated for off-site disposal in 2004, still lead exceeded the standard for hazardous waste. A groundwater investigation in 2005 identified high nickel concentrations. Although soil and groundwater impacts may have been remediated, additional confirmatory testing should be completed.

Low Risk-Potential Sites

Site G04-27: Cattail Creek Golf Course Maintenance Facility **– [Described above; Low-risk potential for Orange 2 and Green 2].**

Site G04-28/G05-1: Cattail Creek Golf Course Facility **– [Described above; Low-risk potential for Orange 2 and Green 2].**


Reynolds Industrial Park – 954 Martin Avenue

***Site G04-39/G05-5: Red Bay Marine* – [Described above; Low-risk potential for Orange 1 and Green 1].**

***Site A01-1: Middleburg Out-Lying Field (OLF)* – [All Build Alternatives]:** This site was used as an auxiliary landing strip during 1941-1947. A site survey in 1992 did not identify any conditions of concern. Additional assessment is not warranted.

***Site E03-3: Clay County Fire and Rescue* – [Black and Purple]:** This county-owned facility is a RCRA generator. Since any areas of potential concern appear located well away from the Black and Purple Alternatives, no further assessment is warranted.

***Site E03-4: Hess #09533* – [Black and Purple]:** This active gas station is a listed LRST with a reported release from 2005 with ongoing cleanup. Contamination assessment is complete. No additional assessment is warranted.

***Site F04-7: Former Johns-Manville Facility Sludge Landfill* – [Orange 1 and 2, Green 1 and 2]:** Two open pit ponds existed here for an unknown use. They appeared to have been filled in 1984. No additional assessment is warranted.

***Site F04-19: Lee Field FUDS UST Area 2* – [Orange 1 and 2, Green 1 and 2]:** This site appears to have been a gas station when the base was in use. The USTs and impacted soils were removed in 1997 and no additional contamination was identified. No additional assessment is warranted.

***Site G04-13: Lee Field FUDS Bulk Fuel Containers* – [Orange 1 and 2, Green 1 and 2]:** No documentation regarding the conditions of this storage area was available, but the Clay County Port Authority reported that an assessment did not identify contamination. No additional assessment is warranted.

***Site G05-3: Mobro Marine* – [Described above; Low-risk potential for Brown 2, Orange 1, Green 1, Pink 2].**

***Site B01-3: Lee's Cycle Center* – [All Build Alternatives]:** Other than site registration as a RCRA generator, no other records were available for this former vehicle repair facility. Although the use of solvents or gasoline suggests a potential concern, no additional assessment appears warranted.

Hess #09533 – 3254 US17, Green Cove Springs

Lee Field FUDS Landfill Area 3 – CR 209 and US 17

Site G04-33: Lee Field FUDS Landfill Area 3 **– [Brown 1 and 2, Pink 1 and 2]:** This area was documented to have been used for disposal of domestic waste in the 1950s. Assessment has identified the presence of diesel components in soil and volatile compounds in groundwater. Based on known conditions, additional assessment does not appear to be warranted.

Site G04-36. Lee Field FUDS Landfill Area 1 **– [Brown 1 and 2, Pink 1 and 2]:** The site was documented to have been used from the 1940s through 1990. Contaminants include polychlorinated biphenyls, and pesticides in soil and organic chemicals in the groundwater. Based on known conditions associated with the site, no additional work is recommended.

Site E05-1: Nelson's Store **– [Brown 1 and 2, Orange 1 and 2, Green 1 and 2, Pink 1 and 2]:** This apparent former gas station facility is currently listed as a RST. Although its hazard potential was not considered higher due to its location outside the Build Alternatives, additional assessment is warranted.

No Risk-Potential Sites and Other Contamination Concerns

Based on the current status and distances from the Build Alternatives, the team determined that 69 listed sites will have no potential risk associated with the St. Johns River Crossing Project. FDOT reviewed a FDEP listing of all known cattle dipping vats to identify any other potential risk associated with pesticide uses. In addition to the two specific sites identified already, another site was listed on the Gustafson Dairy property, and since the location could not be identified, additional efforts are recommended.

Known conditions of concern associated with the accumulation of pesticide compounds on historical agricultural lands have been well documented, particularly in St. Johns County. However, this review did not identify any former agricultural land uses associated with row crop farming in any of the proposed alignments.

Another concern is former dumpsites that are typically found in remote areas. With the exception of one located outside any alternative's buffer zone, no other potential dumpsites were identified.

Although this analysis included FDEP listings for registered drycleaner facilities, these facilities are not required to register. Those identified are usually in the state-funded drycleaner solvent cleanup program. However, the review of historical city directory information and site reconnaissance did not identify any other suspect facilities.

3.20.3 How will these sites affect the proposed project?

Exhibit 3-66 summarizes the numbers of Low, Medium and High potential risk sites impacted by the various Build Alternatives. The Green 1 and 2 and Orange 1 and 2 would involve the highest number of sites in all of the risk categories. The Preferred Alternative would involve the lowest number of high and medium risk sites and the lowest number of total sites of all of the Build Alternatives. Prior to final design, the sites potentially affecting the Preferred Alternative will need to be fully evaluated to determine the extent of contamination and the full impact they could have on the project.

Exhibit 3-66: **Contaminated Site Impacts**

Alternatives	Number of Contaminated Sites by Risk Potential		
	High	Medium	Low
Black	3	2	4
Purple	3	2	4
Brown 1	2	1	5
Brown 2	3	1	6
Orange 1	7	3	8
Orange 2	6	4	8
Green 1	7	3	8
Green 2	6	4	8
Pink 1	2	1	5
Pink 2	3	1	6

The State of Florida has evaluated the proposed right-of-way and has identified potentially contaminated sites for the various proposed alternatives. A site assessment of the Preferred Alternative will be performed to the degree necessary to determine levels of contamination and, if necessary, evaluate the options to remediate along with the associated costs. Resolution of problems associated with contamination will be coordinated with appropriate regulatory agencies and, prior to right-of-way acquisition, appropriate action will be taken, where applicable.

3.20.4 What hazardous materials may be used during construction?

During the course of site reconnaissance, the team noted numerous small, portable above-ground storage tanks in many locations along the length of the study area. These "skid" tanks are commonly used to store fuel on a project site. In each case, the locations were evaluated for their potential risk to any of the alternatives. No tanks of this type were identified within any of the alternatives, and no conditions that represented a potential risk were noted.

In addition, construction equipment contains lubricants and other petroleum based compounds that could be hazardous to the environment if spilled.

3.20.5 What measures are proposed to avoid or minimize the effects of hazardous materials during construction?

Potential impacts from those sites identified along the Preferred Alternative will be fully characterized. FDOT will discuss the results of that assessment work with the contractor and develop appropriate response plans to either avoid or remove known areas of contamination. A response plan developed prior to construction and approved by FDEP will cover contaminants that may be unexpectedly encountered or accidentally spilled during construction. FDOT will also notify the state of any unanticipated discoveries or spills during construction, and coordinate cleanup with FDEP staff.

Based upon the above considerations, it is determined that there is no practical alternative to the proposed action and that all practicable measures have been included to eliminate or minimize all possible impacts from contamination involvements.

3.21 NAVIGABLE WATERWAYS

This section describes the navigation issues associated with the proposed project. See the *Navigable Waterways Discipline Report* located on the enclosed CD for more information.

3.21.1 How were navigation issues evaluated for the study area?

FDOT obtained specific information on marine traffic and navigation issues in the navigable waterways study area (**Exhibit 3-67**) through telephone interviews with local waterway users and other parties with maritime interests in the area (see Appendix A of the *Navigable Waterways Discipline Report*). The team determined the list of contacts based on comments received as well as references obtained during the interviews themselves. Some of the local authorities that were contacted included representatives of the USCG Sector Jacksonville, the Seventh USCG District Office Bridge Administration staff, the Jacksonville Port Authority, and Putnam County. Some of the marine interests contacted included representatives of the Jacksonville Marine Transportation Exchange, the privately operated Clay County Port, and marine industrial facilities and towing companies in the study area.

The navigable waterways analysis focused on gathering information on the waterways themselves, existing navigation conditions and marine operations in the study area, and on identifying what potential adverse impacts or benefits relative to marine traffic and navigation might be associated with the proposed project. An attempt was also made to identify the types and volumes of marine traffic that use the waterway, with particular emphasis on the nature of transportation in the study area immediately below the existing Shands Bridge and that passing the bridge, as well as traffic on Black Creek.

What is a Navigable Waterway?

The United States Coast Guard defines navigable waterways as those waters that are subject to the ebb and flow of the tide shoreward to the mean high water line and/or are presently used, or have been used in the past or may be susceptible to transport of interstate or foreign commerce (33 CFR Part 329).

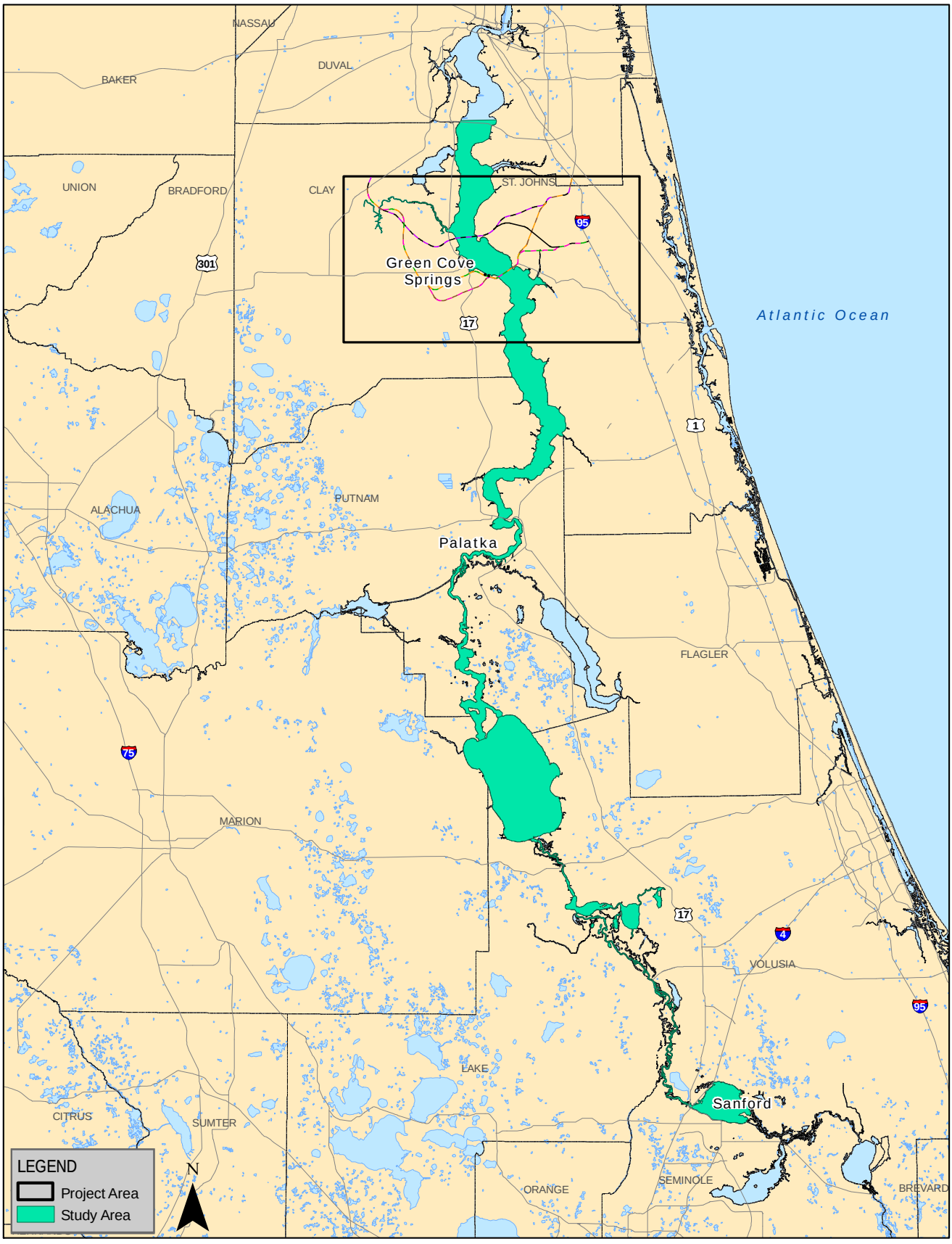
3.21.2 What role does navigation play in the study area?

Between the I-295/Buckman Bridge and the Shands Bridge

With few exceptions, no seagoing vessels can go south of the I-295/Buckman Bridge. A few vessels in the 300-foot to 450-foot size range can pass under the bridge's vertical clearance of 65 feet and through the horizontal clearance of 150 feet. However, in many cases, the vessels must lower or remove their masts and stacks. The 65-foot clearance also prevents large sailing vessels from going upriver. But the clearance is adequate for the majority of marine traffic, primarily industrial vessels heading to the Green Cove Springs area. There are no other bridges crossing the river between the I-295/Buckman Bridge and the Shands Bridge. In this area, there is no commercial waterfront

Mobro Marine

Exhibit 3-67: **Navigable Waterways Study Area**



activity until reaching Green Cove Springs, where a substantial amount of marine waterfront development exists along the west bank between Green Cove Springs and the Shands Bridge.

There are two major marine facilities in this area:

CLAY COUNTY PORT/ARLINGTON MARINA

A privately operated marina at Green Cove Springs that serves primarily as a lay-up facility for inactive vessels, as a staging area for dredging equipment and other industrial vessels, and as a light marine industrial facility. The infrastructure includes 12 piers, 11 of which are 1,840 feet long, as well as ancillary structures. The facility also accommodates a large number of private yachts and recreational vessels.

MOBRO MARINE, INC.

A marine terminal just east of the Clay County Port that is the base for a construction firm staging crane barges and other equipment at the site and supporting a wide range of industrial activity.

Several smaller industrial activities are also in this area, along with several small vessel-fleeting moorings and a limited amount of waterfront residential development, with most residences having private piers.

The Shands Bridge and Southward

The Shands Bridge crosses the St. Johns River approximately one-half mile south of Green Cove Springs. The bridge has a vertical clearance of 45 feet and a horizontal clearance of 91 feet. Local waterway users indicated that the vertical clearance at the Shands Bridge is the primary limiting factor for marine traffic traveling from the Atlantic Ocean to Palatka, Sanford, and other communities to the south since bridges farther upstream either have a vertical clearance of 65 feet or are bascule bridges which, when open, have no vertical limit. The Shands Bridge horizontal clearance of 91 feet is not a significant concern due to the nature and volume of traffic as well as the moderate river currents.

Clay County looking east towards the Shands Bridge

The most prevalent traffic passing under the Shands Bridge are tugs pushing single barges laden with fuel for a paper mill at Palatka, and crane/construction barges for waterfront industrial work. On average, that traffic

consists of just one or two tows per week. Marine constructors heading upstream must select the equipment for each project on the basis of what can pass under the bridge.

The Putnam County Public Works Department oversees the County Barge Port operations at Palatka. This is the largest facility south of the bridge, with a 300-foot dock that serves primarily as a transshipment point for construction materials from barges to trucks. A large marina serving recreational vessels is located just south of the port.

Keith Marine, Inc., in operation since 1977, constructs large yachts at a shipyard adjacent to the County Barge Port. The company has been in operation since 1977. The company previously had built commercial vessels and currently builds yachts up to 200 feet long with beams up to 44 feet, typically with three vessels under construction at any time. The yard has the capacity to build larger vessels, but the size is limited by the height of the Shands Bridge. At present, they must move the yachts from the yard to moorings at Green Cove Springs before the final superstructure elements and appurtenances (antennae, etc.) can be installed. Once complete, the vessels cannot return to the yard. The company offers repair services but is limited to vessels that can pass under the bridge with no or little modification.

There are several commercial marine facilities south of the Shands Bridge:

St. Johns Ship Building, Inc.

PDM Bridge, LLC

ST. JOHNS SHIP BUILDING, INC.

This facility builds offshore supply vessels, tugs, barges, and landing craft at its yard in Palatka. The height of the Shands Bridge limits the sizes of vessels that can be built or repaired at the yard. Some new vessels have to be completed at Green Cove Springs and some vessels going in for repairs must have portions of their superstructures removed and later reinstalled.

PDM BRIDGE, LLC

This corporation makes bridge structural components at a facility adjacent to the County Barge Port. Although they are most often shipped by truck, components too large for over-the-road transport are moved by barge. To date, the bridges in the region, including the Shands Bridge, have not limited their shipments.

Other smaller commercial businesses in the Palatka area and beyond also rely on marine transportation: small tug and barge operators, industrial facilities, and a barge scrapping facility. The vessels involved are faced with the same limiting dimensions of the bridges as those described above.

In addition to these commercial vessel operations, there is a high level of recreational traffic on the St. Johns River, and several marinas exist in Palatka and further south to serve them. Sailboats more than 35 feet long tend to have masts higher than 45 feet, and such boats must stop when they reach the bridge or have their masts and rigging removed or lowered if they are to pass. Although large powerboats are also limited by the bridge, the level of effort needed to lower masts and antennae is less than for sailboats.

Marine Operations on Black Creek

Standard navigation charts do not show Black Creek and the channel is not maintained. Local waterway users indicated that there is no commercial vessel traffic and no substantial navigation issues on it. There is residential waterfront development at various locations along the creek, including in the vicinity of the proposed crossing, and a substantial amount of waterfront residential development further upstream at Middleburg. As a result, there is some recreational vessel traffic. However, an existing bridge located at CR 209/Russell Road, below the proposed crossing location, currently limits marine traffic.

3.21.3 How would the alternatives affect navigation?

Brown, Orange, Green and Pink Alternatives

The Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives will construct a new bridge adjacent to the existing Shands Bridge. Afterward, FDOT will remove the old bridge with its 45-foot vertical clearance. The new bridge will not be a signature bridge and will not require any special security measures.

The new bridge will have a vertical clearance of at least 65 feet, similar to the I-295/Buckman Bridge, and will have a horizontal clearance of at least 200 feet. Costs associated with constructing a bridge with a 65 foot vertical clearance and 200 foot horizontal clearance were factored into the construction costs cited in Chapter 2, **Exhibit 2-40**. Since all of the bridges upstream of the

Shands Bridge either have a vertical clearance of 65 feet or are bascule bridges, the existing vessel height constraint will be gone. This will allow vessels with heights up to 65 feet to travel from the Atlantic Ocean to Lake George, provided vessel draft and other conditions are suitable. This is expected to result in additional development along the waterway south of the study area, which also increases the potential for adverse effects of that development on the environment and on existing communities.

Any structure in a navigable waterway presents at least a minor risk of a collision with a passing vessel that could result in damage to the bridge or vessel involved, or a release of cargo or fuel, as well as injury to the crews. However, similar risks already exist with the current Shands Bridge, and a new bridge with a greater horizontal clearance could reduce the potential for an accident.

Black and Purple Alternatives

A new bridge constructed as part of the Black and Purple Alternatives will have a vertical clearance of at least 65 feet. USCG guidance recommends that it also have a horizontal clearance of at least 200 feet, greater than that of the I -295/Buckman Bridge downstream. Costs associated with constructing a bridge with a 65 foot vertical clearance and 200 foot horizontal clearance were factored into the construction costs cited in Chapter 2, **Exhibit 2-40**. The new bridge will not be a signature bridge and will not require any special security measures.

These alternatives will place an additional bridge in the heavily trafficked area between Green Cove Springs and the I-295/Buckman Bridge, thus adding a new potential impediment to navigation. This will be in addition to similar risks associated with the I-295/Buckman Bridge and the Shands Bridge, which would remain on the river.

Constraints on vessel size imposed by the Shands Bridge will remain, and the potential for larger vessels to go upstream will be precluded. While this could limit the potential for economic development further upstream, it will also remove the potential for adverse impacts associated with such development.

All Alternatives – Black Creek

A new bridge with similar clearances to those that already exist on the creek will not result in any additional restrictions on navigation. The distance between the proposed bridge and the closest existing bridge is large enough to avoid any adverse effect on navigation.

No Build Alternative

Under the No Build Alternative, no new bridge will be constructed between Green Cove Springs and Jacksonville, and so any potential adverse impacts of a new bridge will be avoided. The Shands Bridge will remain in place as the lowest bridge on the St. Johns River and the primary constraining factor for marine traffic going south of Green Cove Springs. Any potential development upstream that would be dependent on larger vessels will be precluded, along with any potential adverse effects of such development. No new bridge across Black Creek will be constructed, and navigation patterns and practices on both waterways will remain as they are.

Bridge piers under construction

3.21.4 What measures are proposed to avoid or minimize effects to navigation from the project?

The most significant design measure will be to provide vertical and horizontal clearances that are acceptable to the maritime community, i.e. the waterway users and marine operators, and to local development interests. Although USCG has recommended guide clearances, the overarching criterion is meeting the reasonable needs of navigation. FDOT will obtain a USCG permit for this project.

The proposed design calls for the vertical clearance of a new bridge over the St Johns River to be 65 feet, which is the existing minimum clearance for other bridges on the waterway. For the Purple and Black Alternatives, a design that provides the same minimum horizontal clearance as the I-295/Buckman Bridge will ensure that it is no more restrictive than the existing downstream bridges. For any of the Brown, Orange, Green or Pink Alternatives, a clearance that is no less than that of the Shands Bridge will ensure that the new bridge is no less restrictive than the existing structure, although USCG guidance would be 100 feet in that area. A new bridge crossing Black Creek should have clearances consistent with other bridges on that waterway.

In addition to the clearance dimensions, USCG will pay particular attention to other design features for each bridge, including the protective structures around bridge piers. The permit process will also address lighting and markings for the bridge. Maintenance of these safety features will be the responsibility of the bridge owner.

3.21.5 What measures are proposed to avoid or minimize effects to navigation during construction?

Any party undertaking activities that could result in blockage of a channel or interruptions in traffic flow are required to contact the USCG and obtain authorization. USCG typically tasks marine construction firms with providing traffic management assistance to waterway users during the course of a project, often as a condition of the permit. They also require the contractor to keep them and local users advised of construction schedules, blockages of the waterway, and other activities that could affect traffic. USCG would then provide relevant information to mariners on the river through information sharing programs, including working groups on harbor safety and port security. They also use written, broadcast, and Internet-based versions of Local Notices to Mariners to provide information to waterway users. Local maritime organizations, such as the Jacksonville Maritime Transportation Exchange, are also valuable assets in keeping local waterway users apprised of conditions affecting navigation. Ensuring wide dissemination of information in advance of starting the work as well as during the project will reduce the potential for adverse impacts and minimize their severity.

3.22 FLOODPLAINS

This section summarizes the evaluation of floodplains in the study area. For more information, see the *Location Hydraulic Report* located on the enclosed CD.

3.22.1 What floodplains are located in the study area?

Executive Order 11988 (1977), *Floodplain Management*, defines floodplains as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year," i.e., those areas that would be inundated by a 100-year flood. A floodplain is an area next to a river, stream, or creek that may be covered with water following heavy rainstorms. This plain holds the excess water allowing it to be slowly released into the river system and seep into groundwater aquifers. Floodplains also give time for sediment to settle out of floodwaters, thereby keeping it out of water bodies. Floodplains often support important wildlife habitat and are frequently used by humans as recreation areas.

Building on floodplains increases the risk of property damage and life threatening situations. Diverting stormwater into channels and easing its path to bodies of surface water forces water to flow faster. There are also other factors that increase flooding:

- The removal of stabilizing vegetation around stream banks and rivers.
- Erecting structures that deflect or inhibit the flow of floodwaters. This modifies flow paths and can spread flooding problems and increase erosion.
- Constructing bridges, culverts, buildings, and other structures that encroach on the floodplain. These developments reduce the storage area available for floodwaters and restrict water movement causing an increase in flood elevations.
- Building drainage systems that feed stormwater quickly into the receiving body.
- Straightening meandering watercourses to hasten drainage. This transfers flooding problems downstream and also alters habitat.
- Filling and dumping in floodplains. Floodwaters can transport this debris, which may interfere with the movement of the floodwater causing increased flood elevations.

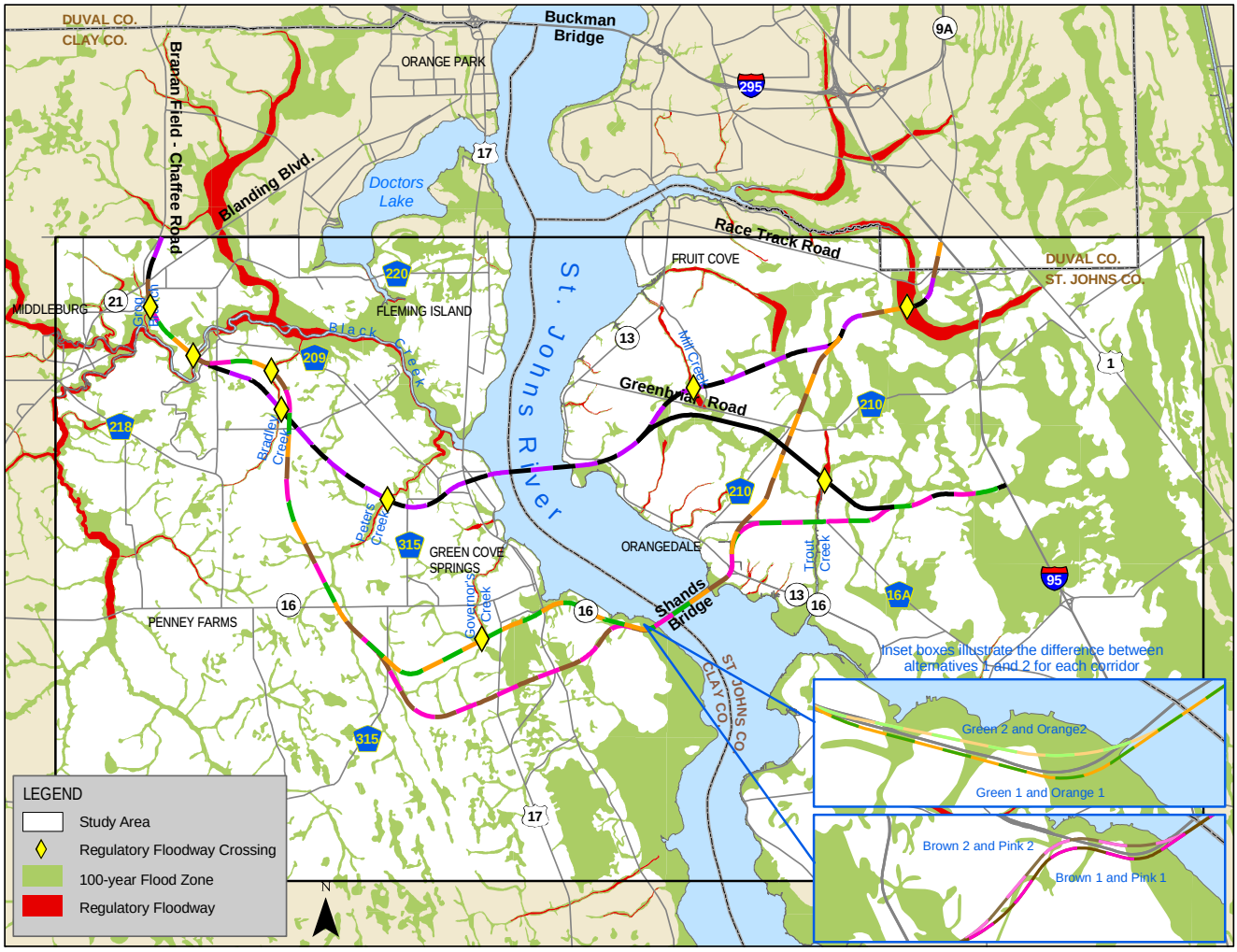
The 100-Year Floodplain

The 100-year floodplain is the land that will be covered with water during a 100-year storm flood event, and is the accepted limit for protection. The 100-year storm flood is a flood event that has a 1% change of being equaled or exceeded within a one year period.

St. Johns River at Popo Point

FDOT prepared a *Location Hydraulic Report* to document any severe impacts to floodplains that could be caused by the proposed St. Johns River Crossing Project (FDOT, 2008). All of the Build Alternatives will cross various waterways, including the St. Johns River and Black Creek. Other major creeks that are crossed by one or more alternatives include Grog Branch, Bradley Creek, Peters Creek, Governor's Creek, Mill Creek, Trout Creek, and Durbin Creek. The Federal Emergency Management Agency (FEMA) has established regulatory floodways at the proposed crossings of Grog Branch, Black Creek, Bradley Creek, Peters Creek, Governor's Creek, Mill Creek, Trout Creek, and Durbin Creek for one or more of the alternatives (**Exhibit 3-68**).

Exhibit 3-68: **Floodplains and Floodways**



3.22.2 How will the alternatives affect floodplains?

It is not anticipated that the proposed project would encourage any floodplain development due to local floodplain regulations and management from the SJRWMD.

Although all Build Alternatives would encroach on regulatory floodways, the crossings will be designed such that there will be no significant increase in the Base Flood Elevation (BFE). FDOT has determined that floodplain impacts do not vary significantly among the southern alternatives, however, the Black and Purple Alternatives will have a significant impact due to one longitudinal crossing. **Exhibit 3-69** summarizes the number of transverse and longitudinal crossings of 100-year floodplains and regulatory floodways.

Exhibit 3-69: **Floodplain and Floodway Crossings**

Alternative	Number of Transverse Crossings		Number of Longitudinal Crossings	
	Floodplain Crossings	Regulatory Floodway Crossings	Floodplain Crossings	Regulatory Floodway Crossings
Black	13	8	1	0
Purple	6	7	1	0
Brown 1 / Brown 2	17	5	0	0
Orange 1 / Orange 2	15	6	0	0
Green 1 / Green2	14	5	0	0
Pink 1 / Pink 2	16	4	0	0

Pursuant to Executive Order 11988, "Floodplain Management", the proposed action was determined to be within the base floodplain. Impacts associated with the encroachment have been evaluated and determined to be minimal. Therefore, the proposed action will not constitute a significant encroachment.

3.22.3 What measures are proposed to avoid or minimize the effects of the project on floodplains?

The project's drainage design will comply with FDOT, SJRWMD, and FEMA standards to ensure that encroachments on the floodplains will be minimal. FDOT will do the following:

- Elevate any proposed new alignment above the 100-year floodplain. No roadway flooding is anticipated with any of the Build Alternatives.

Regulatory Floodways

FEMA's regulations (Section 9.4) state: "Floodway means that portion of the floodplain which is effective in carrying flow, within which this carrying capacity must be preserved and where the flood hazard is generally highest, i.e. where water depths and velocities are the greatest. It is that area which provides for the discharge of the base flood so the cumulative increase in water surface elevation is no more than one foot."

FEMA's standards allow for no more than a 1 foot increase in the base flood elevation and no increase on the regulatory floodway elevation as a result of a project.

- Ensure none of the Build Alternatives will have longitudinal encroachments on the floodplain.
- Design the project to ensure only transverse encroachments and minimal waterway crossings.
- Design the project to be consistent with FEMA, FDOT and SJRWMD design standards. No significant changes in BFE or flood limits will occur. Any impacts to regulatory floodways will be coordinated with SJRWMD with approval prior to construction. Drainage structures conveying non-regulatory floodplains will be sized to generate less than 0.1 feet of backwater during a 100-year flood event. Detailed volumetric floodplain calculations will be provided for all floodplain encroachments where encroachment volume exceeds 0.1% of the 100-year flood volume.
- Size all bridges and culverts to qualify for a FEMA Zero Rise for any regulatory floodway crossings.
- Final design will include appropriately sized cross drains to maintain the natural and beneficial floodplain values.
- Erosion and sediment control measures will ensure that the no sediment is carried downstream to clog channels and reduce their flood-carrying capacity.

3.23 INDIRECT EFFECTS

This section summarizes the analysis of indirect effects associated with the proposed project. For more detail, see the *Indirect and Cumulative Effects Discipline Report* on the enclosed CD.

3.23.1 What are indirect effects, and why do we study them?

In many cases, indirect effects would occur outside of the project right-of-way. As to the cause and effect relationship between the project and the indirect impact, CEQ states that indirect effects may include induced changes to land use resulting in resource impacts (40 CFR 1508.8). Other indirect effects include the potential alteration of or encroachment on the affected environment. Examples of this include fragmentation of a habitat or functional effects to water resources.

It is important to study the indirect effects of a proposed project because analyzing the direct effects alone does not tell the whole story of how a project would impact its study area. Considering the project on a larger scale in terms of both time and distance contributes to an understanding of how it influences, and is influenced by, the broader patterns of development in the area.

Indirect Effects

The CEQ defines indirect effects as:

"…effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. 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" (40 CFR 1508.8).

3.23.2 How did we evaluate indirect effects?

To determine the induced changes in land use resulting from the St. Johns River Crossing Project, the team conducted interviews with local land use planners from St. Johns and Clay Counties. Those planners are experienced and knowledgeable of their jurisdiction's growth patterns and plans. They were asked how development in their jurisdictions might occur if FDOT constructed either of two representative Build Scenarios compared to not constructing the project (No Build Scenario). This is an approach developed by the Texas Department of Transportation and subsequently adopted by FDOT and other state departments of transportation and accepted by FHWA.

For this analysis, the Build Scenarios consisted of the North Florida Transportation Planning Organization (TPO) 2030 Long Range Transportation Plan (TPO, 2005), existing land use, and two representative Build Scenarios. The Northern Corridor Build Scenario follows the Purple Alternative and represents the Purple and Black Alternatives. The Southern Corridor Build Scenario follows the Pink 1 Alternative (Preferred Alternative) and represents the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives. The selected alternatives are representative of a middle-range among the alter-

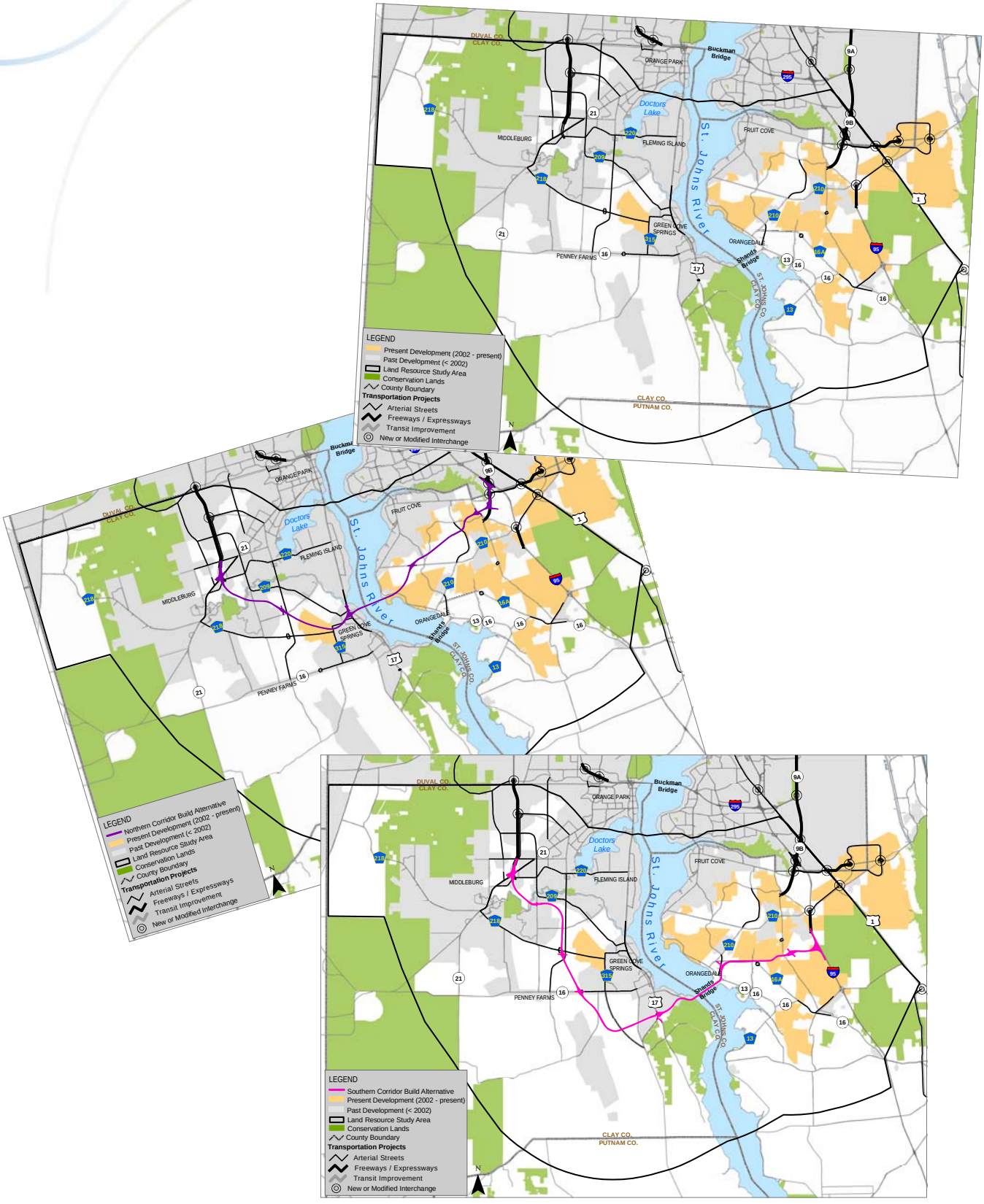


Exhibit 3-70: **Build and No Build Scenarios**

natives. The No Build Scenario is the North Florida TPO 2030 Long Range Transportation Plan and existing land use without any of the Build Alternatives.

The team presented figures showing the two representative Build Scenarios and the No Build Scenario to local planners to ascertain forecasted development under these three scenarios (**Exhibit 3-70**). Other than the existence of the Build Alternatives, the three scenarios shown to the local planners were identical. The team then conducted a series of interviews with the local planners to determine their estimate of where future development would be expected to occur within their jurisdictions under each of these three scenarios.

Where the local planners forecasted differences in development between the two representative Build Scenarios and No Build Scenario, the team overlaid the resulting "Indirect Effects Areas" on resource maps using GIS to estimate potential effects associated with each Build Scenario. The local planners indicated the forecasted development in these areas would be constricted by the lack of infrastructure and as a result, only discussed general areas anticipated to be developed rather than mapping specific locations where development would occur. The potential effects to resources associated with the Build and No Build Scenarios were evaluated to the extent practicable. However, it should be noted that the calculations provided here include the total amount of a resource mapped within the general areas anticipated to be developed, which is not equivalent to the total amount of those resources that would be impacted by future development.

This analysis also examined a second type of indirect effects: potential encroachment/alteration effects. Examples of these effects include habitat fragmentation and neighborhood cohesion. Where it was not possible to quantify indirect effects for a particular resource, indirect effects are described qualitatively.

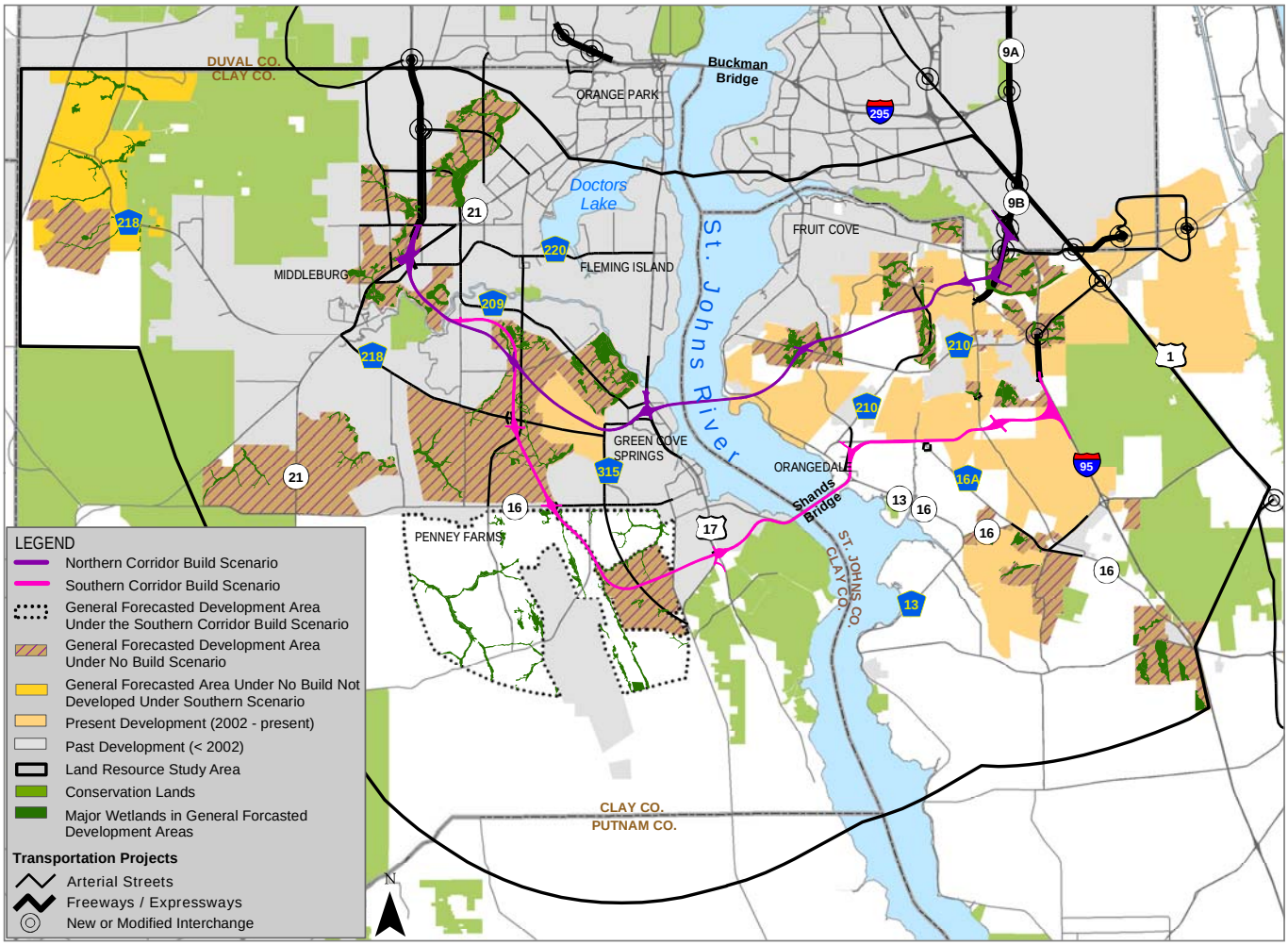
Results of the analysis of potential indirect effects are summarized below. More detail is provided in the *Indirect and Cumulative Effects Discipline Report* on the enclosed CD.

3.23.3 What are the project's potential indirect effects?

Land Use and Induced Growth

Exhibit 3-71 depicts the Resource Study Area (RSA) for indirect effects, and shows the forecasted development in that area under each representative Build Scenario. Details on how the RSA was determined are provided in the *Indirect and Cumulative Effects Discipline Report.*

Exhibit 3-71: **Forecasted Development**



In St. Johns County, planners predicted that development under either of the representative Build Scenarios and under the No Build Scenario will be similar and will be governed by the county's land use planning process.

In Clay County, the local planners predicted similar forecasted development between the No Build Scenario and the Northern Corridor Build Scenario. They predicted that development under either of these scenarios would occur largely in the northwest portion of Clay County, as shown on **Exhibit 3-70**. Under the Southern Corridor Build Scenario, they predicted that an area south of Penney Farms Road would develop, and said that this may represent a directional shift in development attributable to the Southern Corridor Build Scenario. The planners predicted that the Southern Corridor Build Scenario would make the area south of Penney Farms Road more desirable for development and, therefore, much of

the forecasted development in the northwest would shift south of Penney Farms Road. (The area of development predicted to shift from the northwest is shown in gold on **Exhibit 3-70**).

Actual development in this area south of Penney Farms Road would be constricted by lack of infrastructure and the actual extent of future development is unknown as plans have not been developed for this area.

Based on these discussions with local planners, changes to land use within the Land RSA would occur under either of the two representative Build Scenarios or under the No Build Scenario through the year 2030. They forecasted a total of approximately 61,000 acres of development would occur under the No Build Scenario by 2030. Under the Northern Corridor Build Scenario, the planners predicted that approximately 61,000 acres of development also would occur; in other words, they predicted that no development would be induced beyond what was forecasted under the No Build Scenario by 2030.

Under the Southern Corridor Build Scenario, the local planners forecasted that by 2030, development within an area of approximately 21,600 acres could occur south of Penney Farms Road, which includes a shift of approximately 9,900 acres of development forecasted in the northwest portion of the RSA under the No Build Scenario. (In other words, 9,900 of the acres in the northwest that would develop under No Build would *not* develop under the Southern Corridor Build Scenario.) Therefore, the net additional development forecasted by 2030 under the Southern Corridor Build Scenario is anticipated to be approximately 11,700 acres. While this represents the area of potential induced development associated with the Southern Corridor Build Scenario, the exact nature and timing of development forecasted by the local planners are unknown. Therefore, the 11,700 acres is considered a maximum potential development area under the Southern Corridor Build Scenario. Federal, State and local regulations would further constrain development in this area. Resources are quantified based on this conservative (maximum) development area, and potential indirect effects are discussed in the appropriate resource sections.

Since the planners predicted no substantive difference in forecasted development under the No Build and the Northern Corridor Build Scenarios, there are

no indirect effects from induced growth associated with the Northern Corridor Build Scenario. While no indirect effects from induced growth were forecasted for the Northern Corridor Build Scenario, encroachment/alteration effects may occur and are discussed in the appropriate sections, arranged by resource. Effects from the forecasted development under the No Build Scenario are considered in the analysis of Cumulative Effects later in this chapter.

Communities, Neighborhoods and Economics

In the northern portions of Clay and St. John's Counties, where residential and commercial land uses are prevalent, it is unlikely that forecasted development under either of the two representative Build Scenarios will result in a reduction of community cohesion. The construction of the Southern Corridor Build Scenario will increase the rate of the development of the more rural southern portion of Clay County, which may alter the sense of rural community that currently exists. However, the local planners expect development to occur closer to the currently developed metropolitan Jacksonville area first. This expectation is partially based on the fact that most of the southern portion of the Land RSA would need upgraded infrastructure, such as water, wastewater, and adjoining transportation facilities, to support new development. Therefore, changes to the southern part of the RSA would occur over a period of years, and indirect effects to community cohesion are not expected to be substantial.

The forecasted development under the Southern Corridor Build Scenario could increase business opportunities. Clay County planners confirmed that there is currently a lack of employment centers in Clay County; more employment opportunities currently exist in St. Johns County.

As a result of the additional development from the representative Southern Corridor Build Scenario, Clay County will experience an increase in income, employment and earnings opportunities, and additional tax revenues. Because development associated with the Northern Build Scenario is anticipated to be similar to the No Build Scenario, an long-term increase over the No Build Scenario in income, employment and earning opportunities, and additional tax revenues is not anticipated. It is likely that construction of either of the representative Build Scenarios would increase short-term economic stimuli in both St. Johns and Clay Counties due to spending during the 4-year construction period.

Another beneficial indirect effect that could result from the Southern Corridor Build Scenario is the increased use and ease of use of the St. Johns River for navigation. The existing Shands Bridge restricts the size of the vessels and barges that can be moved up and down the river between Lake George and the Atlantic Ocean, due to its vertical clearance of approximately 45 feet. A new bridge structure will have a vertical clearance of 65 feet. This could substantially improve commercial navigation in this area. Also, several large ship builders have stated that the low clearance of the existing bridge restricts the size of vessels they can build and move up the river. If FDOT removed this impediment to larger vessel traffic, these and other ship builders could construct larger vessels and expand their current operations. This could lead to the addition of new employees and create a positive economic stimulus to the regional economy.

Environmental Justice

Potential indirect impacts to minority and/or low-income populations could result from predicted development in the Land RSA. Area development under either of the representative Build Scenarios or the No Build Scenario could result in indirect impacts of increased property and rent values, causing further displacements for those not able to pay the increase. In addition, the St. Johns River Crossing Project could affect the historic cohesion achieved by generations of residents with an ethnic, cultural, or language-based identity because of an influx of immigrants, who are likely to be commuters, retirees, or others of diverse ethnic or racial backgrounds. This may be most evident in the future at the Pier Station community in southern Clay County. Pier Station has approximately 200 residents and is approximately 96 percent African American. The additional development estimated by the Clay County planners under the Southern Corridor Build Scenario would surround Pier Station. While this predicted, future development may change the character of this community over time, it would not represent a disproportionately high, adversely effect on minority or low-income populations (a disproportionately high and adverse effect means the impact is appreciably more severe or greater in magnitude on minority or low-income populations than the adverse effect suffered by the non-minority or non-low-income populations after taking offsetting benefits into account).

Beneficial effects could also accrue to minority and low-income populations. For example, induced land use development could create additional job opportunities and increased access to job opportunities through enhanced transportation infrastructure.

Wetlands and Other Surface Waters

Potential effects to waters of the US, including wetlands, include placement of fill and degradation of function through encroachment and as a result of increased runoff. Within the forecasted development area under either the No Build or the Northern Corridor Build Scenario, there are approximately 13,100 acres of wetlands, and 101 miles of other surface waters.

In the area forecasted for induced development associated with the Southern Corridor Build Scenario, there are approximately 2,700 acres of wetlands and 37 miles of other surface waters (e.g., streams and backwater sloughs). The area anticipated to be developed under the No Build Scenario that would shift to south of Penney Farms Road includes approximately 1,300 acres of wetlands and 18 miles of other surface waters. Therefore, compared to the No Build, the Southern Corridor Build Scenario could affect up to an additional 1,400 acres of wetlands and 19 miles of other surface waters, which account for 3.5 and 0.9 percent of the wetlands and other surface waters within the Land RSA, respectively. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be similar as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

The quantifications of these resources are likely an overstatement of the jurisdictional resources within the forecasted development area. The data source for quantifications included the National Wetland Inventory Maps by the US Fish and Wildlife Service (1992). This dataset may include features which may not be determined to be jurisdictional after field verification. For example, the other surface waters quantified may include water courses that are upstream of the jurisdictional limits of waters of the US.

In addition, it is unlikely that all waters of the US, including wetlands, within the forecasted development areas would be impacted. Most developments, including many in the Land RSA, typically leave open space areas and greenways where natural resources are left intact. Regardless of whether the forecasted development would be public or private, these developments would have to comply with Sections 404 and 401 of the Clean Water Act, which regulates the filling of and encroachment on these resources. The USACE administers Section 404 of the Clean Water Act and operates under a "no net loss" policy for wetlands, requiring avoidance and minimization of impacts, and compensatory mitigation for unavoidable impacts. Compensatory mitiga-

tion may include mitigation banking under specific criteria defined and approved by the Environmental Protection Agency (EPA) and the USACE.

Floodplains

Floodplains would pose a constraint to development under either of the two representative Build Scenarios or the No Build Scenario. This relates to the regulation of floodplains through both county and local ordinances. While these ordinances do not prohibit development within the floodplain, they try to limit development in an effort to eliminate or reduce the potential damage from future floods.

There are approximately 12,400 acres of 100-year floodplain mapped within the forecasted development area for the No Build Scenario. Within the additional development area under the Southern Corridor Build Scenario, there are 3,400 acres of 100-year floodplain mapped; however, there are approximately 1,400 acres of 100-year floodplain in the area anticipated to be developed under the No Build Scenario that would shift to the area south of Penney Farms Road. Therefore, compared to the No Build Scenario, the Southern Corridor Build Scenario induced-development area includes an additional 2,000 acres of 100-year floodplain, which accounts for 1.4 percent of the 100-year floodplain areas in the Land RSA. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Potential indirect effects to floodplains essentially relate to the natural values provided by floodplains, such as wildlife habitat, wetlands and water quality protection (described in other sections herein). Executive Order 11988 (1977), *Floodplain Management*, and county and local ordinances would minimize floodplain encroachment, to the extent allowable within the regulations, thereby preserving some of a floodplain's natural values.

The acres of floodplains noted above represent total acres of floodplains present, and not acres that are actually anticipated to be impacted. The stringent floodplain development regulations in place in this area are expected to prevent major impacts to floodplains from development.

Water Quality

Development under the two Build Scenarios and the No Build Scenario will result in some adverse effects to water resources through degradation of surface

water quality. These effects are not expected to be substantially different under the Southern Corridor Build Scenario than those from the No Build Scenario. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario). Development effects that result in water quality degradation include increased impermeable surface and increased non-point source pollution, such as pollution from fertilizers, pesticides, sediments, nutrients and vehicle residues. The indirect effects of development can include increased stormwater runoff velocities and pollutant loads leading to impacts to surface waters and, subsequently, groundwater. Future roadways and subdivision streets associated with forecasted development could contribute to these effects; however, the density and composition of future development within the area will determine the amount and type of the runoff.

Water quality protection is mandated by numerous federal, state and local ordinances within the Land RSA. Forecasted development within the Land RSA will be required to meet all water quality standards, some of the most stringent in the country. Because of the regulatory controls in place within the Land RSA, substantial impacts to water quality are not anticipated for either of the Build Scenarios or the No Build Scenario.

Vegetation and Wildlife Habitat

In addition to the wetland habitats described previously, four other types of habitat were evaluated: agricultural lands, barren lands, range lands and upland forests. While agricultural lands do not provide ideal habitat for wildlife, they are considered important for feeding and roosting. A majority of the upland forests within the Land RSA are comprised of commercial pine plantations. The upland forests in the area are less diverse and of lower value than natural woodlands; however, upland forests provide the important habitat component of cover for escape and concealment, particularly in areas subject to fragmentation due to development.

There are approximately 700 acres of agricultural land, 230 acres of barren land, 320 acres of range land and 14,700 acres of upland forest mapped within the Southern Corridor Build Scenario forecasted development area; however,

there are approximately 800 acres of agricultural land, 180 acres of barren land, 600 acres of range land and 4,700 acres of upland forest in the area anticipated to be developed under the No Build Scenario that would shift to the area south of Penney Farms Road. Therefore, compared to the No Build Scenario, the Southern Corridor Build Scenario induced-development area includes approximately 100 fewer acres of agricultural land, an additional 60 acres of barren land, 280 fewer acres of range land and an additional 10,000 acres of upland forest. The additional upland forested areas that could be affected account for approximately 5.0 percent of the upland forest mapped within the Land RSA.

Exhibit 3-72 summarizes the vegetation and habitat acreages within the development area forecasted under the No Build Scenario and the net increase (over the No-Build) for the Southern Corridor Build Scenario. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Exhibit 3-72: **Vegetation and Habitat Types in the Area of Indirect Effects**

Habitat / Vegetation Type	Acres in Development Area for No Build Scenario	Net Additional Acres in Development Area for Southern Corridor Build Scenario
Agricultural Land	6,100	-100
Barren Land	800	60
Range Land	2,000	-280
Upland Forest	33,000	10,000

[1] Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario. The No Build Scenario is shown here as a comparison with the Southern Corridor Build Scenario.

In addition to the potential loss of this habitat, future development could result in fragmentation of vegetation resources, and reduction of habitat connectivity in the larger area. Development plans that incorporate open spaces, trails, and greenbelts may reduce potential habitat fragmentation impacts, and could be used to maintain connectivity between larger habitat areas including nearby conservation lands where feasible.

Threatened and Endangered Species

There are 127 occurrences of 28 listed threatened, endangered and special-concern species recorded within the Land RSA (Florida Natural Areas Inventory Database, 2008). Of these, 26 species are state-listed as threatened, endangered or special status, and two are federally listed (American alligator and West Indian manatee). All but two of the 127 occurrences involve state-listed species. (See the *Indirect and Cumulative Effects Discipline Report* for a map of known occurrence locations.) Approximately half of these (within the Land RSA have been recorded within the conservation lands in the western portions of the RSA. These conservation lands are protected in perpetuity by the SJRWMD and provide a haven for many of these species.

Within the area projected to develop under the No Build Scenario, there are 11 documented occurrences for 5 state-listed threatened and endangered species: Bartram's ixia (6), Florida mountainmint (1), gopher tortoise (2), pondspice (1), St. Johns black-eyed Susan (1).

Within the area forecasted to be developed under the Southern Corridor Build Scenario, there are three additional documented occurrences for two state-listed species: Bartram's ixia (2) and Florida black bear (1). There is no critical habitat for these species mapped in the forecasted development area associated with the Southern Corridor Build Scenario. Indirect effects to these additional protected species could result from the area of induced growth associated with the Southern Corridor Build Scenario. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be similar to that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Federally listed species are protected under Section 7 of the Endangered Species Act (ESA). This section directs all Federal agencies to use their existing authorities to conserve threatened and endangered species, and in consultation with the USFWS, to ensure that their actions do not jeopardize the continued existence of listed species or significantly impact or adversely modify critical habitat. Section 10 of the ESA also provides protection to federally listed species from private development, and the State of Florida provides a system of protection to state-listed species. Therefore, all proposed development, public or private, will be subject to regulation under the ESA and state regulation.

Fish and Aquatic Resources

NMFS identified several categories of EFH as occurring within the St. Johns River in the project area. The tidally influenced portions of the St. Johns River also serve as a nursery for commercially and recreationally important species. The forecasted development area south of Penney Farms Road for the Southern Corridor Build Scenario does not border the St. Johns River, so this development would not affect those resources. (Potential indirect effects to waters of the US, including wetlands, were discussed previously.)

Aquatic habitat encroachment/alteration effects may occur under the Southern Corridor Build Scenario. The existing Shands Bridge has a vertical height of approximately 45 feet which is an impediment to navigation on the St. Johns River by larger vessels. Under the Southern Corridor Build Scenario, the Shands Bridge would be demolished and replaced by a new bridge structure with 65 feet of vertical clearance, which would match the height clearances of the bridges north and south between the Atlantic Ocean and Lake George. This larger bridge structure would allow for larger vessels to navigate this stretch of the St. Johns River. Larger vessels utilizing this stretch of the St. Johns River could impact EFH and the commercially and recreationally important species. The waves associated with these larger vessels could disrupt spawning areas in the near-shore grass beds and wetlands and cause erosion along the banks of the St. Johns River.

As described previously, local planners predicted that induced development under the Northern Corridor Build Scenario would be similar to that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario.

Cultural Resources

The effects to archaeological and historical resources from the forecasted development under either of the Build Scenarios or the No Build Scenario may be substantial if sites are eligible or potentially eligible for the NRHP. Depending on the type of development, these sites may not be subject to Federal or state protection.

Within the forecasted development area of the No Build Scenario, there are 70 recorded cultural resource sites, including 40 potentially eligible sites (recorded

sites that have not yet been evaluated are considered potentially eligible for this assessment).

Within the Southern Corridor Build Scenario forecasted development area, 26 cultural resource sites have been recorded, including 2 potentially eligible sites. In the area anticipated to be developed under the No Build Scenario that would shift to the area south of Penney Farms Road, there are 13 recorded cultural resource sites, all of which are potentially eligible. Therefore, compared to the No Build Scenario, the Southern Corridor Build Scenario could affect up to an additional 13; however, it includes 11 fewer potentially eligible sites. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Development forecasted under any of the scenarios could result in adverse effects to cultural resources. For archeological sites, it cannot be determined if the forecasted development will result in substantial effects because the quantity, location, and character of individual resources are unknown. In addition, the type of action (federal versus non-federal) would also dictate what level of protection, if any, is given to a particular cultural resource. For historic buildings, some of the development may fall under Federal or State regulatory resource protection review and, therefore, these historic properties may be protected or preserved. However, most of the development is residential and commercial development and would not fall under the Federal regulatory review process. Local permit application review processes vary by locality, and both St. Johns and Clay Counties have preservation ordinances that protect historic properties to varying degrees.

Section 4(f) Recreational and Conservation Resources

Based on the strong regulations protecting parkland and other recreational resources within the Land RSA, it is unlikely that forecasted development under either the No Build or the Southern Corridor Build Scenario would result in substantial adverse effects to recreation resources. Any potential impact to a recreational resource would be regulated and mitigated through the land de-

velopment process. However, indirect encroachment/alteration effects could occur as a result of the Southern Corridor Build Scenario. This Scenario represents all the southern crossing alternatives; as described in the Section 4(f) Resources discussion, the Brown 1, Pink 1, Orange 1 and Green 1 Build Alternatives would each require some acreage from the northern portion of the 10,320-acre Bayard Conservation Area. Because these alternatives would only take a small amount of the northern perimeter of the area (ranging from 23.6 acres to 34.5 acres), indirect encroachment/alternation effects would be considered minimal. SR 16 already borders the conservation area in the same location where additional right-of-way would be needed under this Build Scenario. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Summary

The indirect effects to resources presented in this section have been quantified where possible, based on development forecasted through 2030 by local planners and an evaluation of the difference of this anticipated development between the two representative Build Scenarios and the No Build Scenario. **Exhibit 3-73** provides a summary of the potential indirect effects from forecasted development and encroachment/alteration effect from the No Build Scenarios and the Southern Corridor Build Scenario. As previously mentioned, in some cases, such as waters of the US and floodplains, the potential effects presented in this section may represent an overstatement of effects, as inclusion of resource features within a geographically defined development area does not imply that all such resources will be adversely affected. Actual impacts to some of these resources are likely to be reduced, as Federal and State regulations and local ordinances regulate development affecting these resources.

The induced growth forecasted under the Southern Corridor Build Scenario is approximately 11,700 acres more than that forecasted under the No Build and the Northern Corridor Build Scenarios, which represents an increase in growth of approximately 2.4 percent of the Land RSA. Therefore, the induced growth and its resulting indirect effects from the Southern Corridor Build Scenario are not considered to be substantial in comparison to the No Build and Northern Corridor Build Scenarios.

Exhibit 3-73: **Summary of Potential Indirect Effects (Without Mitigation)**

Resource or Effect Parameter			Potential Effects of the No Build Scenario[1]	Potential Additional Effects of the Southern Corridor Build Scenario
Land Use Conversion to Developed Uses			▪ 61,000 acres could be converted to commercial & residential developed uses through 2030.	▪ An additional 11,700 acres could be converted to commercial & residential developed uses through 2030, for a total of about 72,700 acres.
Communities, Neighborhoods and Businesses			▪ No substantial effects to community cohesion anticipated as the area develops over time. ▪ Forecasted development will have an increased beneficial effect on local and regional economies.	▪ No substantial effects to community cohesion anticipated as the area develops over time. ▪ Additional forecasted development will have an increased beneficial effect on local and regional economies.
Environmental Justice			▪ Forecasted development has potential for increased property and rent values that could result in displacements for those not able to pay the increased amounts. EJ community cohesion could be affected. ▪ No disproportionately high adverse effects.	▪ Forecasted development has potential for increased property and rent values that could result in displacements for those not able to pay the increased amounts. EJ community cohesion could be affected; could be affected more in Pier Station than under the No Build due to development shifting to southern Clay County. ▪ No disproportionately high adverse effects.
Ecological Resources	100-Year Floodplains		▪ 12,400 acres of 100-year floodplain are located within the forecasted development area. ▪ Stringent floodplain development regulations will prevent major indirect effects to floodplains.	▪ An additional 2,000 acres of 100-year floodplain are located within the additional forecasted development area, for a total of about 14,400 acres. ▪ Stringent floodplain development regulations will prevent major indirect effects to floodplains.
	Water Quality		▪ Forecasted development and increases in impervious surface area could result in adverse effects to water resources through degradation of surface water quality. ▪ Because of the regulatory controls in place within the Land RSA, substantial impacts to water quality are not anticipated.	▪ Additional development induced by the Southern Corridor Build Scenario could result in some additional adverse effects to water resources through degradation of surface water quality; these potential effects are not expected to be substantially different than those under the No Build Scenario. ▪ Because of the regulatory controls in place within the Land RSA, substantial impacts to water quality are not anticipated.
	Vegetation and Wildlife Habitat	Wetlands	▪ 13,100 acres of wetlands are located within the forecasted development area. ▪ Existing Federal and State regulations are anticipated to minimize and mitigate impacts.	▪ An additional 1,400 acres of wetlands are located within the additional forecasted development area, for a total of 14,500 acres. ▪ Existing Federal and State Regulations are anticipated to minimize and mitigate impacts.
		Other Surface Waters	▪ 101 miles of other surface waters are located within the forecasted development area. ▪ Existing Federal and State regulations are anticipated to minimize impacts.	▪ An additional 19 miles of other surface waters are located within the additional forecasted development area, for a total of about 120 miles. ▪ Existing Federal and State Regulations are anticipated to minimize impacts.

[1] Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario. The No Build Scenario is shown here as a comparison with the Southern Corridor Build Scenario.

Resource or Effect Parameter			Potential Effects of the No Build Scenario[1]	Potential Additional Effects of the Southern Corridor Build Scenario
Ecological Resources	Vegetation and Wildlife Habitat	Agriculture	▪ 6,100 acres of agricultural land could be converted to developed uses.	▪ Approximately 100 fewer acres of agricultural land could be converted to developed uses, for a total of about 6,000 acres.
		Barren Land	▪ 800 acres of barren land could be converted to developed uses.	▪ Approximately 60 additional acres of barren land could be converted to developed uses, for a total of about 860 acres.
		Range land	▪ 2,000 acres of range land could be converted to developed uses.	▪ Approximately 280 fewer acres of range land could be converted to developed uses, for a total of about 1,720 acres.
		Upland Forest	▪ 33,000 acres of upland forest could be converted to developed uses.	▪ Approximately 10,000 acres of upland forest could be converted to developed uses, for a total of about 43,000 acres.
	Threatened and Endangered Species		▪ Forecasted development could lead to indirect encroachment-alteration effects and loss of suitable habitat. ▪ State and Federal regulations provide strong regulatory protections for threatened and endangered species, indirect effects to threatened and endangered species are expected to be avoided or mitigated.	▪ Additional development induced by the Southern Corridor Build Scenario could result in additional indirect encroachment-alteration effects and loss of suitable habitat. ▪ State and Federal regulations provide strong regulatory protections for threatened and endangered species, additional indirect effects to threatened and endangered species from the Southern Corridor Build Scenario are expected to be avoided or mitigated.
	Fish and Aquatic Resources		▪ Forecasted development could lead to indirect encroachment-alteration effects, through loss of breeding habitat and reduction in water quality. ▪ Federal, State and local regulations would minimize development within essential fish habitat and require water quality standards to be met	▪ Forecasted development could lead to indirect encroachment-alteration effects, through loss of breeding habitat and reduction in water quality. Raising vertical clearance of Shands Bridge could result in larger vessels disturbing aquatic habitat. ▪ Federal, State and local regulations would minimize development within essential fish habitat and require water quality standards to be met
Recreational and Cultural Resources	Archeological and Historic Sites		▪ Forecasted development area contains 70 recorded sites, including 40 eligible or potentially eligible sites.	▪ Additional forecasted development area contains 13 additional recorded sites, however 11 less potentially eligible sites, for a total of 83 recorded sites including 29 potentially eligible sites.
	Recreational Resources		▪ Based on the strong regulations protecting parkland and other recreational resources within the Land RSA, it is unlikely that forecasted development would result in substantial adverse effects to recreation resources. Minor encroachment or alteration effects such as noise and visual impact could occur to protected lands bordering development. ▪ Any potential impact to a recreational resource would be regulated and mitigated through the land development process.	▪ Based on the strong regulations protecting parkland and other recreational resources within the Land RSA, it is unlikely that the additional forecasted development under the Southern Corridor Build Scenario would result in substantial adverse effects to recreation resources. Minor encroachment or alteration effects such as noise and visual impact could occur to protected lands bordering development. ▪ Any potential impact to a recreational resource would be regulated and mitigated through the land development process.

[1] Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario. The No Build Scenario is shown here as a comparison with the Southern Corridor Build Scenario.

3.24 CUMULATIVE EFFECTS

This section summarizes the potential cumulative effects of the project in combination with other past, present, or future actions. See the *Indirect and Cumulative Effects Discipline Report* on the enclosed CD for more detail.

3.24.1 What are cumulative effects and why do we study them?

Cumulative effects include a project's direct and indirect effects, as well as other past, present and reasonably foreseeable actions that, while not caused by the project, will in combination with the project add to the overall effect, whether adverse or beneficial, on the environment.

Analyzing cumulative effects is important because what might appear to be minor impacts to resources, when combined with the impacts of numerous other past, present and reasonably foreseeable future projects, may add up to significant stress on a particular resource.

Cumulative Effects

The CEQ regulations for implementing the National Environmental Policy Act (NEPA) define Cumulative Effects as:

"the impact on the environment which results from the incremental impact of the action (project) when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR 1508.7)

3.24.2 How do we evaluate cumulative effects?

FDOT identified and assessed potential cumulative impacts based on an approach developed by the Texas Department of Transportation (TxDOT, 2006). This approach involves the following eight steps:

- Identify the resources to consider in the analysis;
- Define the study area for each affected resource;
- Describe the current health and historical context for each resource;
- Identify direct and the indirect impacts that may contribute to a cumulative impact;
- Identify other reasonably foreseeable future actions that may affect resources;
- Assess potential cumulative impacts to each resource;
- Report the results; and
- Assess and discuss mitigation issues for all adverse impacts.

The cumulative effects analysis considered the magnitude of the cumulative effect on the health of each resource in the study area. Health refers to the general overall condition, stability, or vitality of that resource and the trend of that condition. Therefore, the resource health and trend are key components of the cumulative effects analysis. Laws, regulations, policies, or other factors

that may change or sustain these resource trends are considered as well, to determine whether more or less stress on the resource is likely in the foreseeable future.

To determine the trends and historical context of each analyzed resource, the team catalogued representative past, present and reasonably foreseeable future actions within the Resource Study Area (RSA). They identified the reasonably foreseeable future actions during the interviews with local planners and by reviewing planning documents, including comprehensive plans and transportation plans. As with the indirect effects evaluation, the cumulative impact analysis was performed using two representative Build Scenarios; the Northern Corridor and the Southern Corridor Build Scenarios.

For resources where the analysis predicted an adverse cumulative effect, the team considered potential mitigation measures that might reduce those effects. Mitigation measures are not intended to be measures that FDOT or the lead or cooperating agencies would, or even has the authority to implement; rather, they are intended as suggested steps that could be taken by local, state and federal agencies and organizations to minimize potential cumulative effects. This includes measures that could, if implemented, improve the overall health of the resource.

3.24.3 What resources were evaluated in this cumulative effects analysis?

FDOT completed the evaluation of cumulative effects for resources that were found to be adversely affected by the project, either directly or indirectly. They did not consider resources that were found to not be directly or indirectly affected by the project in a substantive way. Geology, soils and air quality were not addressed because the proposed project will not have any substantive effect on these resources. Contamination sites were not addressed because the proposed project would generally result in a benefit due to remediation of any sites found within the right-of-way. Section 4(f) lands were not included in the cumulative impact evaluation because the strict regulations regarding recreational and conservation lands will preclude substantive cumulative development impacts to these areas. Noise and visual effects were not evaluated separately but were included in the analysis of communities, neighborhoods and businesses.

The cumulative effects analysis considered the following resources:

- Land Use Conversion
- Communities, Neighborhoods and Businesses (including Environmental Justice)
- Water Resources (including wetlands, other surface waters, 100-year floodplains and water quality)
- Wildlife Habitat and Vegetation
- Threatened and Endangered Species
- Essential Fish Habitat
- Cultural Resources

3.24.4 What was the study area for the cumulative effects analysis?

The cumulative effects analysis considered both geographic and temporal study limits. For the geographic analysis, a RSA was defined for each resource; this area was shown previously under Indirect Effects and is the area that encompasses the forecasted development areas in the project vicinity.

The team considered the temporal limits by establishing a time frame as the period from a past environmental reference point, in this case the year 1980, to the planning year for the project, 2030. They chose the early date because the rapid urbanization of the Jacksonville metropolitan area did not begin until after 1980. This established a development or urbanization baseline for the cumulative effects analysis; however, specific historical information was often not available for each resource.

3.24.5 What other projects were included in the cumulative effects analysis?

The catalog of past, present and future actions developed for the St. Johns River Crossing Project helps to characterize the types of actions that are representative of past, present, and future development in the RSA. This context helps explain the way development projects may be related to the current health of the land and the trends the resources are experiencing. This catalog also provides insight as to the effect of development on future resource stress and future trends.

There was no practical way of determining all past, present, and reasonably foreseeable future actions in the RSA. As previously stated, 1980 was selected as the baseline year for the cumulative effects analysis. However, in many cases, historic quantitative or geographically referenced information on the various resources (e.g., acres of a given resource, land use, or land cover type) for prior years was not available. In addition, a complete list of specific past actions is not available. CEQ guidance recognizes that this may not be practical and that the information may not be available, and so they do not require the compilation of this catalog (40 CFR 1500-1508). As a result, FDOT did not perform a quantification of individual past actions. However, they did consider past actions in describing the current health of each resource. The team considered past actions collectively as the development that had occurred as of 2002. They selected the year 2002 as the beginning year for present development because that was the date that FDOT conducted the Regional Transportation Planning Study that initiated the development of several conceptual alternatives for this project.

The following sections summarize the potential cumulative effects of the proposed project. The *Indirect and Cumulative Effects Discipline Report* located on the enclosed CD provides more detail on past, present and future actions considered, and the overall resource health and trends in the study area.

3.24.6 What are the project's potential cumulative effects?

Land Use

The potential cumulative effects on land use were derived by adding the existing development in the RSA, the potential development under the No Build

Exhibit 3-74: **Potential Cumulative Land Use Effects of the Representative Build Scenarios**

Representative Build Scenario	Land Use Conversion (acres)					Total Land within RSA
	Present Effects	Potential Effects under the No Build Scenario	Project		Potential Cumulative Effects	
			Direct Effects	Potential Indirect Effects		
Northern Corridor	30,000	61,000	1,301	--	92,301	473,000
Southern Corridor	30,000	61,000	1,661	11,700	104,361	473,000

All numbers are rounded

Scenario, and the direct and indirect land use conversions for the two representative Build Scenarios. Results are shown in **Exhibit 3-74**.

Under the Northern Corridor Build Scenario, the potential cumulative effect is the development of 92,301 acres, approximately 19.5 percent of the RSA. However, given that no indirect effects related to development are associated with this Build Scenario, it would contribute less than one percent to the direct and indirect conversion of land within the RSA.

Under the Southern Corridor Build Scenario, the cumulative development area includes approximately 104,361 acres (22 percent) of the Land RSA. Based on the induced-development area, the Southern Corridor Build Scenario could contribute to a maximum of 13,361 acres of development, which accounts for approximately 2.8 percent of the Land RSA.

The predicted conversion of undeveloped land under either Build Scenario will not substantively affect the conversion trend within the Land RSA. Other resources, however, will be affected as described in the following sections.

Communities, Neighborhoods and Businesses

Anticipated private development and associated infrastructure will require right-of-way acquisition and land to be purchased that could involve relocation of residents and businesses. Under the Northern Corridor Build Scenario or the No Build Scenario, development in the RSA is expected to increase by an estimated 61,000 acres by the year 2030, mostly in northwestern Clay County. Under the Southern Corridor Build Scenario, development is expected to increase by an estimated 72,700 acres of development within the RSA, mostly within southern Clay County, by 2030. Approximately 11,700 acres of this increase will be attributable to the Southern Corridor Build Scenario.

Local and regional governments have also prepared for and encouraged growth in many jurisdictions. Right-of-way acquisition and relocations have resulted from many past and present transportation projects. Projects typically attempt to minimize the number of relocations, and moving assistance and mitigation is typically required. Land use planning is an important tool in pre-

serving future corridors for transportation and utility uses and in minimizing relocations when funding for new facilities becomes available.

The cumulative effect of relocation and right-of-way acquisition is consistent with the general growth trend in the RSA. Required right-of-way acquisition and relocations due to forecasted future development with any of the alternatives is not expected to affect the overall quality of life in the northern part of the RSA. The quality of life could be affected to a greater extent as the forecasted development associated within the Southern Corridor Build Scenario would result in a transition from rural and undeveloped land uses to new residential and commercial land uses.

Other future development without the proposed project (the No Build Scenario) will result in increased population and employment opportunities in the RSA with corresponding increases in vehicular traffic, traffic noise, and visual intrusion. Depending on pre-existing conditions and proximity to new or augmented noise sources, these changes in ambient noise levels can affect the quality of life in existing communities, as can the added visual effects of residential and commercial development.

The traffic noise analysis for the two representative Build Scenarios determined where noise impacts will occur (direct impacts). Additional noise impacts and visual changes associated with induced development will most likely occur in the southern portion of the RSA, as a result of the Southern Corridor Build Scenario. This area has remained rural in nature and the predicted 11,700 acres of additional forecasted development, above that of the Northern Corridor Build Scenario and the No Build Scenario, would bring increases in noise levels, primarily associated with increased vehicular traffic on the expanded roadway system that would be required to accommodate the predicted growth in the area.

Future development associated with the No Build and the Northern Corridor Build Scenarios could also result in impacts to neighborhood and community resources in terms of increased noise levels and visual intrusion. These impacts would be more pronounced in the northwestern portion of the RSA. In addition to noise impacts to neighborhoods and residences in this portion of the RSA, there may also be noise impacts to the conservation lands in the area. Under the No Build and Northern Corridor Build Scenarios, local planners forecasted development surrounding the conservation lands in the northwest

portion of the RSA. Noise impacts may be noticeable to users of the conservation lands, as well as the wildlife of the area. Visual changes associated with surrounding development may also be noticeable to users.

Economic growth will continue whether the project is constructed or not, while additional economic development in the southern portion of the RSA is expected to occur under the Southern Corridor Build Scenario. Because of the land development policies in place in St. Johns and Clay Counties, this induced development in the south is consistent with local land development plans. Changes in the local economy of the southern portion of the RSA from agriculture to a regionally based economy may occur as a result of the Southern Corridor Build Scenario. The increases in economic output and employment associated with this development are considered beneficial cumulative effects.

Water Resources, Wetlands and Floodplains

As Florida's forests and grasslands have been developed over the years to create housing and transportation infrastructure, water quality has decreased due to the introduction of oil, fuel and other pollutants. The resulting roadway construction and number of cars on the roads has increased the amount of pollution carried by stormwater runoff into streams and waterways. Overall, streams in the RSA are in fairly stable condition, with localized areas of good resource condition as well as localized areas of degraded resource condition. Good conditions are generally found at streams or stream segments where native riparian vegetation is intact.

Prior to the onset of significant land development in the RSA, wetlands were a dominant landscape feature. The predevelopment extent of wetlands (based on the mapped distribution of hydric soils) is conservatively estimated to have been 83,320 acres (approximately 18 percent of the RSA) and may have covered as much as 118,443 acres (25 percent). Despite decades of development, overall loss of historical wetlands appears not to be substantial. Land use/land cover mapping by SJRWMD indicates the extent of wetlands in 2004 was comparable to the predevelopment estimate (110,315 acres, or approximately 23 percent of the RSA). However, the quality of these wetlands has very likely been diminished over time as a consequence of development, ditching, drainage, and groundwater withdrawal.

Under the Northern Corridor Build Scenario, the cumulative development area includes 25,163 acres of wetlands, 126 miles of other surface waters and 22,062 acres of 100-year floodplains. This represents approximately 17 percent of the total amount of wetlands, 24 percent of the total amount of other surface waters and 15 percent of the total amount of 100-year floodplains within the RSA.

Under the South Corridor Build Scenario, the cumulative development area includes approximately 26,705 acres of wetlands, 145 miles of other surface waters, and 24,039 acres of 100-year floodplains. This represents approximately 18 percent of the total amount of wetlands, 27 percent of the total amount of other surface waters and 17 percent of the total amount of 100-year floodplains within the RSA.

The potential indirect and cumulative effects to streams, wetlands and 100-year floodplains are considered to be an overestimate, because the quantifications shown above are based on a total-take of the resources. Existing regulations govern effects to water resources, which would minimize potential effects. Some of these resources are experiencing a declining trend in the RSA, but Federal, State, and local protection should aid in minimizing the cumulative impacts beyond project boundaries. In addition, mitigation measures for impacts to these resources are typically required within the regulatory framework, which governs public and private development, and are intended to offset degradation of water resources. As a result, cumulative effects to water resources are not anticipated to be substantial.

Cumulative effects to water quality will occur from the continued land conversion in the RSA. Anticipated effects to water quality could include the increase in pollutant loading into existing surface waters associated with increased impervious cover. However, potential cumulative effects to water quality will be reduced by the regulatory controls administered by FDEP and SJRWMD.

Habitat, Vegetation and Threatened and Endangered Species

The RSA was historically dominated by pine flatwoods and longleaf pine-xeric oak forests. Linear hardwood swamps followed the courses of Black Creek, Yellow Water Creek, Peters Creek, Durbin Creek, Trout Creek, Sixmile Creek,

Turnbull Creek, and some of the lesser streams in the St. Johns River watershed. The inter-fluvial uplands were dotted with numerous swamps and freshwater marshes. These wetlands drained to the St. Johns River via a network of tributary streams, most notably Black Creek and its tributaries.

The pine flatwoods are primarily mesic habitats that support a wide array of wildlife. In predevelopment times, pine flatwoods once accounted for approximately 50 percent of the RSA; most of these open forests have been converted to silviculture which rose to prominence in the region in the 1930s. By 2004, silviculture accounted for almost 30 percent of the RSA. The forested wetlands are home to numerous species and provide foraging habitat for still more.

Federally threatened and endangered species associated with the wetlands in the region include the threatened American alligator and the endangered wood stork. Listed species associated with the mesic range land and mesic upland forest include the threatened eastern indigo snake, the endangered Chapman's rhododendron and, in the old growth pine area, the endangered red-cockaded woodpecker. Federally listed species associated with the xeric upland habitat types include the eastern indigo snake and red-cockaded woodpecker; species within the St. Johns River include the short-nosed sturgeon, West Indian manatee and the Atlantic sturgeon. (See the *Wildlife and Habitat Discipline Report* for more complete listings of species in the project area).

The direct and indirect project impacts, when added to the past, present, and reasonably foreseeable future actions, will result in the loss of vegetation cover types and wildlife habitat in the RSA. The primary impacts are from the conversion of wildlife habitat to residential, commercial, and public infrastructure development, and potential fragmentation of habitat. For the purposes of quantifying potential cumulative wildlife habitat and vegetation, four types of habitat were evaluated: agricultural lands, barren lands, range lands and upland forests. Impacts to wetlands and other surface waters, which are also an important wildlife habitat, are discussed in the previous section.

Potential cumulative impacts to vegetation and wildlife habitat of the Northern and Southern Corridor Build Scenarios are summarized in **Exhibit 3-76** and discussed in the following paragraphs.

Exhibit 3-76: **Potential Cumulative Effects to Vegetation and Wildlife Habitat**

Habitat Type [1]	Present Effects	Potential Effects under the No Build Scenario	Project		Potential Cumulative Effects	Total Habitat Within RSA
			Direct Effects	Potential Indirect Effects		
NORTHERN CORRIDOR BUILD SCENARIO						
Agriculture (Acres)	4,200	6,100	161	N/A	10,461	24,600
Barren Land (Acres)	220	800	9	N/A	1,029	4,100
Range Land (Acres)	650	2,000	151	N/A	2,801	12,700
Upland Forest (Acres)	13,700	33,000	705	N/A	47,405	201,000
Total	**18,770**	**41,900**	**1,026**	**N/A**	**61,696**	**242,400**
SOUTHERN CORRIDOR BUILD SCENARIO						
Agriculture (Acres)	4,200	6,100	152	-100	10,352	24,600
Barren Land (Acres)	220	800	24	60	1,104	4,100
Range Land (Acres)	650	2,000	81	-280	2,451	12,700
Upland Forest (Acres)	13,700	33,000	1,012	10,000	57,712	201,000
Total	**18,770**	**41,900**	**1,269**	**9,860**	**71,619**	**242,400**

[1] Wetlands and water habitats are quantified in the previous section, Water Resources, Wetlands and Floodplains.

Potential cumulative effects associated with the Northern Corridor Build Scenario include approximately 42 percent of the agricultural lands, 25 percent of the barren lands, 27 percent of the range land and 24 percent of the upland forest habitats being converted to developed uses through 2030. However, the project's contribution to these cumulative effects under the No Build or Northern Corridor Build Scenarios would be approximately one percent or less each of the agricultural lands, barren lands, range lands and upland forest habitats being converted to developed uses.

Potential cumulative effects associated with the Southern Corridor Build Scenario include approximately 42 percent of the agricultural lands, 27 percent of the barren lands, 19 percent of the range land and 29 percent of the upland forest habitats being converted to development through 2030. However, the project's contribution to these cumulative effects under the Southern Corridor

Build Scenario would include the conversion of a maximum of less than 1 percent of the agricultural lands, 2 percent of the barren lands, 0 percent of the range lands and 5 percent of the upland forest habitats being converted to developed uses.

Most of these potential cumulative effects would involve converting existing undeveloped land, resulting in a decline in existing habitat along with a corresponding increase in habitat fragmentation.

Wildlife populations rely on available habitat for their existence. The majority of habitat is unregulated or unprotected. Therefore, this conversion of vegetation and wildlife habitat would result in a corresponding effect to wildlife populations reliant on those habitats. In addition to the loss of habitat, indirect and cumulative effects will also result from habitat fragmentation, which reduces the quantity and quality of remaining habitat for wildlife. Habitat fragmentation generally has the effect of reducing the populations of those species that are sensitive to "edge" effects, such as increased predation, while benefiting those populations that prefer "edge" habitat. This will result in a continuance of the current trend in the RSA of a transition to wildlife species that are tolerant of or thrive in human-altered urban and suburban environments.

Additional transportation projects are included in the catalog of reasonably foreseeable future actions. As more roads and highways are built and development increases, there will be a corresponding increase in wildlife vehicle collisions, which could result in increased mortality to wildlife.

Along with general wildlife, there are numerous threatened, endangered and other protected species that depend on the habitats in the RSA. Within the project area (the area of direct effects), there are 27 Federally and state-listed endangered, threatened or protected species with moderate to high probability of occurring within the area of all Build Alternatives (refer to **Exhibit 3-54** in Section 3.16, Wildlife and Habitat).

Within the cumulative effects Land RSA, there are 127 documented occurrences of 28 protected species. Approximately half of these occurrences have been recorded within conservation lands. In the area forecasted to be developed under the No Build Scenario, there are 11 documented occurrences for five protected species: Bartram's ixia (6), Florida mountain-mint (1), gopher tortoise (2), pondspice (1), and St. Johns black-eyed-susan (1).

In the area forecasted to be developed under the Southern Corridor Build Scenario, there are three additional documented occurrences for two protected species: Bartram's ixia (2) and Florida black bear (1). In addition to habitat loss, potential cumulative effects to these species include fragmentation of suitable habitat, and reduction of habitat connectivity in the larger areas.

No induced development is predicted under the Northern Corridor Build Scenario over that associated with the No Build. However, more of the development under the No Build and the Northern Corridor Build Scenarios would occur in the northwest part of Clay County than under the Southern Corridor Build Scenario. In the northwest area, local planners stated that the forecasted development is likely to surround the conservation lands in that part of the county. This could exacerbate habitat fragmentation and connectivity impacts because of the proximity of the development to the conservation lands.

Within the RSA, vegetation and wildlife habitat resources are reduced from historic levels, are stressed from the reduction in habitat acreage and fragmentation, and are experiencing a declining trend. Given this current trend and the estimated cumulative effects described here and for wetlands habitat in the previous section, there will be an adverse cumulative effect to wildlife habitat and vegetation in the RSA from either of the two representative Build Scenarios or from the No Build Scenario.

Protected species and their habitat are strictly regulated. There are approximately 70,000 acres of conservation lands, administered by SJRWMD within the RSA. A number of threatened and endangered species inhabit these conservation lands. Potential cumulative effects to protected species will be reduced due to the protection afforded by the Federal and state regulations and the amount of conservation land in the RSA.

Essential Fish Habitat

Potential direct and indirect impacts, when added to the past, present, and reasonably foreseeable future actions, will result in cumulative impacts to EFH. The major impact to fish and aquatic resources results from habitat alteration and fragmentation of wetlands and water quality degradation. The primary direct impact of either of the two representative Build Scenarios would be as-

sociated with the bridge structures over the St. Johns River. Both Build Scenarios would result in impacts within the ordinary high water mark of the river, and the bridge crossings will have some EFH involvement with submerged aquatic vegetation. No blasting will be used in the demolition of the existing Shands Bridge under the Southern Corridor Build Scenario.

Development along the St. Johns River could destroy or alter wetlands which provide EFH. Recreationally and commercially important species depend on EFH for their existence. Therefore, any degradation or alteration of that habitat will result in a corresponding effect to populations reliant on it. Induced development predicted under the Southern Corridor Build Scenario would occur south of Penney Farms Road and does not border the St. Johns River, so is not expected to affect EFH. Development predicted for the No Build and both Build Scenarios could fragment wetlands within the St. Johns watershed, thereby affecting EFH.

By increasing the vertical clearance of the existing Shands Bridge, the Southern Corridor Build Scenario would make it possible for larger vessels to utilize this portion of the St. Johns River. This could impact EFH through wave erosion of near-shore grassbeds and wetlands.

Regulatory controls, including the Clean Water Act and the Sustainable Fisheries Act, provide protection to EFH. Water quality in the RSA is regulated by SJRWMD and FDEP. Given current development trends and the estimated cumulative effects described here, there will be continued degradation to fish and aquatic resources and their habitat within the RSA through 2030. However, cumulative effects to fish and aquatic resources will be reduced by the regulatory controls administered by USACE, NMFS, FWC, FDEP and SJRWMD.

Cultural Resources

Previously recorded archeological sites and historic structures in the RSA were inventoried to estimate potential cumulative effects. It is expected that many more unknown sites exist within the area. **Exhibit 3-77** summarizes the potential cumulative effects to cultural resources in the RSA, based on known sites.

It is estimated that the Northern Corridor Build Scenario may result in cumulative effects to approximately 139 cultural resource sites, or 15 percent of the

Exhibit 3-77: **Summary of Potential Cumulative Effects to Cultural Resources**

Build Scenario	Present Effects	Potential Effects under the No Build Scenario	Project		Potential Cumulative Effects	Total Sites within RSA
			Direct Effects	Potential Indirect Effects		
CULTURAL RESOURCES (NUMBER OF KNOWN SITES)						
Northern Corridor	50	70	20	N/A	139	954
Southern Corridor	50	70	21	13	151	956

Note: This table includes all known cultural resource sites, regardless of eligibility status.

known cultural resource sites within the RSA. It is estimated that the Southern Corridor Build Scenario may result in cumulative effects to approximately 151 cultural resource sites or about 16 percent of the known cultural resource sites within the RSA.

It cannot be determined if forecasted development under the No Build or either Build Scenario will result in substantial effects to cultural resources because the quantity, location, and character of individual resources are unknown. In addition, the type of action (federal versus non-federal) would also dictate the level of protection given to a particular cultural resource. Cultural resource sites that are identified through the regulatory process would be protected or mitigated, thereby reducing the overall cumulative effect on the resource. Ultimately, site loss will continue to occur as development intensifies in the RSA.

Historic properties are most susceptible to projects and development that are not regulated by the Federal Section 106 process and that could cause the relocation, demolition, or physical alteration of the resource. These projects would primarily be residential, commercial, and industrial development within the RSA. However, Clay and St. Johns Counties include provisions that afford protection to cultural resources through their respective land development ordinances. Therefore, the potential cumulative impacts to cultural resources will be reduced through avoidance and mitigation strategies.

3.24.7 How can cumulative effects be minimized?

The analysis of cumulative impacts considered opportunities for the mitigation of adverse effects for each resource. Potential mitigation measures are described below, and are intended to disclose steps or actions that could be undertaken by local, state and federal agencies and organizations to minimize the potential cumulative effect on each resource health and trend.

Communities, Neighborhoods and Businesses

Many communities in the RSA have supported and planned for the proposed project as well as other future community improvements. Adopted land use plans and accompanying land use controls help to preserve future areas and prepare for orderly and controlled development. Land use planning, zoning, and local project review and approval also provide mechanisms to ensure that development and infrastructure projects avoid and minimize impacts to sensitive resources to the extent practicable. However, land use planning alone may not ensure complete avoidance and minimization of future development effects on communities, neighborhoods and businesses. Additionally, intergovernmental and public-private cooperative strategies and regional approaches could be employed. The relative success of small communities in retaining a measure of identity and cohesiveness in the face of spreading suburban growth depends on a number of factors, including the pace of new development and the commitment of residents to retain important elements, such as institutional practices, public facilities, cultural events, architectural styles, and economic patterns.

Water Resources

The USACE administers Section 404 of the Clean Water Act and operates under a "no net loss" policy for wetlands, requiring avoidance and minimization of impacts, and compensatory mitigation for unavoidable impacts. This may include mitigation banking under specific criteria defined and approved by USEPA and the USACE. The Federal regulatory framework will continue to positively affect the health of the resource. Impact awareness and public education seminars could be conducted to address the avoidance and minimization of permanent impacts to jurisdictional wetlands. This could also avoid the future degradation of wetland quality and functionality and help prevent alterations of stream sinuosity and water quality. In addition to public aware-

ness, land development policies administered by St. Johns and Clay Counties can incorporate methods to avoid or minimize impacts to these resources during the planning and design processes in order to preserve existing riparian vegetation, stream bank conditions, and other wetland features.

FEMA administers the National Flood Insurance Program and requires communities to adopt adequate land use planning and management measures to qualify for insurance in flood prone areas. In addition to these Federal requirements, local practices could include more stringent standards for developers in the RSA to incorporate flood control and storm water management into their projects to ensure that base flood elevations are not increased by alterations made to the landscape. Where locations in the RSA have experienced continued inundation or historical high water events, local entities or counties could purchase available lands adjacent to floodways and maintain the land as natural areas or parks where structural development or encroachment of the floodplain could be prevented. In addition, regulatory agencies could collaborate on approval of new development and limit the amount of impervious surfaces in a given area to reduce surface water run-off and the associated volume in drainage features.

Wildlife Habitat, Vegetation and Threatened and Endangered Species

SJRWMD owns and operates approximately 70,000 acres of conservation lands, which is about 15 percent of the total land within the RSA. These conservation lands not only help protect water resources, but they also provide habitat for wildlife, including many threatened and endangered species. The Florida Forever Act (FFA) provides for the issuance of up to $3 billion in bonds over a 10-year period, for land acquisition, water resource development, stormwater management, water body restoration, recreational facility construction, public access improvements, invasive plant control, and related projects. From 2006 to 2007, SJRWMD completed 36 transactions totaling 21,478 acres of land, and it will continue to acquire land within the RSA through funding provided by the FFA.

The acquisition and protection of land will become even more important as the region continues to grow and available habitat becomes more scarce.

Preservation of natural resources through expansion of public or private parks, wildlife management areas, and preserves or funding habitat improvement practices on these lands could help losses of natural resources within the same region. Clay and St. Johns Counties could develop ordinances that would encourage permanent preservation of open space, ranch and agricultural lands, woodlands and wildlife habitat, wetlands, and water bodies to promote interconnected green space and corridors. Landowners of tracts that exhibit specific environmental attributes could be eligible for financial or other incentives in return for voluntarily conserving sensitive portions of their property through a conservation easement. Design considerations for new development and infrastructure projects could maintain or enhance habitat linkages and wildlife movement between large tracts of public lands. Wildlife underpasses or culvert passageways could reduce habitat fragmentation and edge effects.

Timber lands within the RSA also provide important habitat for wildlife. The companies that operate these lands should be encouraged to manage them in ways that benefit wildlife, especially riparian and wetland areas that are not suitable for pine production. This could be accomplished by preserving portions of their land in a more natural state to encourage diversity.

There are land trust organizations that may be interested in preservation opportunities within the RSA. Such organizations involve a local, state, or regional nonprofit organization directly involved in protecting land for its natural, recreational, scenic, historical, or productive value. Private conservation groups are also interested in preservation efforts in this region. Such opportunities could involve land donations, fee acquisition, mitigation banks, land leases, or conservation easements.

Essential Fish Habitat

Efforts to reduce impacts to EFH could come from a variety of sources, including Federal, state and local government agencies and non-profit organizations. Efforts to protect EFH should focus on the preservation of riparian and aquatic habitats within the RSA and improvements to water quality. Organizations such as SJRWMD could make riparian areas within the RSA a priority for acquisition. Florida currently has one of the most stringent water quality standards in the U.S. Land development ordinances that encourage "setting-aside" riparian areas would help improve water quality by providing

vegetation filtration for run-off during storm events. Areas of substantial near-shore submerged aquatic vegetation within the St. Johns River could be protected by establishing "no anchoring or no wake" areas to protect the resource.

Cultural Resources

Future impacts to cultural resources could be mitigated through better awareness of the importance of these resources within the private sector. Loss of resources could be minimized to some extent through programs that would encourage voluntary preservation by developers. In addition, local archaeological societies or historic preservation societies are other organizations that could engage in public outreach and site salvage work. These groups could work with landowners toward site preservation, or if necessary, conduct salvage work at endangered sites. These groups could give public lectures and visit schools to promote cultural resource awareness. Increased funding of archaeological awareness programs could aid in future mitigation and protection for these resources through educational methods and increased public awareness.

Future impacts to historic properties could be mitigated through better awareness of the importance of historic properties and regulatory restrictions and review at the local level. Historic properties that may be impacted by private development, mainly residential and commercial developments, would not be subject to a regulatory review process and thus would have reduced protection. State and local programs for the identification of historic resources could help offset these impacts if properties have already been surveyed and evaluated.

3.24.8 Summary

The Land RSA and greater Jacksonville area are undergoing rapid population and employment growth with or without the proposed project. This growth is anticipated to continue under either of the two representative Build Scenarios or the No Build Scenario. Local and regional government agencies continue to plan for this growth and have adopted various land use and transportation plans for the area. The St. Johns River Crossing Project, combined with other

local and regional development efforts, would serve to accommodate present and planned growth and development. A number of regulatory mechanisms are in place to minimize potential adverse effects of social and economic growth.

The cumulative effects analysis attempted to determine the magnitude of the potential cumulative effects on the resources. Most cumulative effects assessed would not be substantial in the context of the RSA. However, vegetation and wildlife habitat would experience a substantial adverse cumulative effect from continued stress on the resource (loss of habitat and fragmentation) caused by development under any of the scenarios. It is unknown whether or not potential cumulative effects to archeological and historic resources would be substantial because sufficient information does not exist for the quality of the resource, the nature of the potential impact, or both. There would be beneficial cumulative effects to some socioeconomic and community issues, such as income and employment.

Mitigation measures required by regulation or that could be undertaken by local, state and Federal agencies and organizations will help to reduce potential cumulative effects in the RSA.

3.25 SUMMARY COMPARISON OF ALTERNATIVES

Exhibit 3-78 on the following pages provides a comparison of the alternatives evaluated in this Final EIS. The exhibit summarizes the impacts and benefits of each alternative. Impacts shown do not take into account the application of mitigation measures described in this chapter.

Exhibit 3-78: **Summary Comparison of Impact and Benefits of Project Alternatives**

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
ALTERNATIVES CHARACTERISTICS											
Length of Alternative (miles)	N/A	35.6	25.6	34.0	34.0	33.3	33.3	30.7	30.7	31.4	31.4
Number of Local Access Interchanges	N/A	8	6	9	9	9	9	7	7	7	7
Construction Cost ($ billions)	N/A	$1.57	$1.28	$1.45	$1.46	$1.54	$1.55	$1.33	$1.34	$1.24	$1.25
Right-of-Way Cost ($ millions)	N/A	$337	$269	$284	$359	$286	$314	$239	$265	$236	$313
Wetland Mitigation Costs ($ millions)	N/A	$85	$54	$57	$55	$55	$54	$57	$56	$59	$57
Total Cost ($ billions)	N/A	$2.39	$1.92	$2.15	$2.24	$2.27	$2.30	$1.96	$1.99	$1.84	$1.93
TRAFFIC AND TRANSPORTATION (Section 3.3)											
2035 Network Performance (volume/capacity)	0.878	0.822	0.824	0.819	0.819	0.813	0.813	0.823	0.823	0.825	0.825
2035 System Deficiency (% of roadway segments over capacity)	32%	28%	27%	27%	27%	26%	26%	27%	27%	27%	27%
2035 Network Travel Time Reduction (daily vehicle hours)	N/A	328,041	358,199	331,900	331,900	352,425	352,425	290,639	290,639	280,654	280,654
2035 Corridor Volume over St. Johns River (AADT)	N/A	72,600	74,200	63,900	63,900	65,500	65,500	63,300	63,300	65,100	65,100
2035 Annual Congestion Cost ($ billions)	$7.2	$5.2	$5.0	$5.2	$5.2	$5.1	$5.1	$5.4	$5.4	$5.5	$5.5
Emergency Evacuation Lane Miles West of River	82.0	102.62	103.01	125.69	125.69	124.03	124.03	124.03	124.03	125.69	125.69
Evacuation Effectiveness (vehicles in queue east of river, including the bridge)	65,419	59,977	59,874	53,886	53,886	54,324	54,324	54,324	54,324	53,886	53,886
NOISE (Section 3.5)											
Noise Impacts (number of sites)	N/A	37	37	46	43	57	55	47	46	48	46

Impacts shown do not take into account the application of mitigation measures.

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
LAND USE (Section 3.6)											
Number of Residential Parcels Converted to Right-of-Way	N/A	59	57	42	57	43	58	39	54	38	53
Number of Office/ Commercial Parcels Converted to Right-of-Way	N/A	9	9	3	3	6	6	6	6	3	3
Total Parcels Converted to Right-of-Way	N/A	273	219	206	221	227	245	183	201	162	177
Number of Residential Acres Converted to Right-of-Way	N/A	65	64	43	49	44	44	37	37	37	42
Number of Office/ Commercial Acres Converted to Right-of-Way	N/A	17	17	5	5	5	5	5	5	5	5
Agricultural Acres Converted to Right-of-Way	NA	1,000	596	893	893	972	972	920	920	841	841
Total Acres Converted to Right-of-Way	N/A	1,907	1,301	1,724	1,710	1,654	1,639	1,590	1,576	1,661	1,647
SOCIOECONOMICS (Section 3.7)											
Residential Displacements	N/A	42	41	28	38	28	38	29	39	29	39
Business Displacements	N/A	14	14	2	3	13	14	15	16	4	5
Religious Facility Displacements	N/A	2	2	1	1	1	1	1	1	1	1
Total Displacements	N/A	58	57	31	42	42	53	45	56	34	45
Number of New Physical Barriers in Existing Community	N/A	1	1	0	0	0	0	0	0	0	0
Consistency with Local Plans	N/A	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Existing & Proposed Developments Served by Proposed Interchanges (number within 2 miles)	N/A	10	8	12	12	12	12	8	8	8	8
Annual Tax Revenue Lost from Right-of-Way Conversion ($ thousands)	N/A	$989	$928	$815	$834	$860	$883	$181	$204	$137	$155

Impacts shown do not take into account the application of mitigation measures.

Exhibit 3-78: **Summary Comparison of Impact and Benefits of Project Alternatives (cont)**

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
ENVIRONMENTAL JUSTICE – MINORITY AND LOW-INCOME POPULATIONS (Section 3.8)											
Residential Displacements	N/A	0	0	2	12	3	13	3	13	2	12
Business Displacements	N/A	0	0	2	2	13	14	13	14	2	3
Potential Disproportionate Impacts from Displacements?	N/A	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Potential Disproportionate Impacts from Tolling?	N/A	No	No	No	No	No	No	No	No	No	No
CULTURAL RESOURCES (Section 3.9)											
Known Resources Potentially Eligible for NRHP Listing	N/A	6	6	1	1	5	5	5	5	1	1
Moderate to High Potential for Archeological Sites (percent of corridor)	N/A	22%	27%	30%	30%	32%	32%	20%	20%	18%	18%
SECTION 4(f) RECREATIONAL RESOURCES – BAYARD CONSERVATION AREA IMPACTS (Section 3.10)											
Direct Impacts – Right-of-Way Take (acres)	N/A	N/A	N/A	34.5	0	23.6	0	23.6	0	34.5	0
Direct Impacts to Facilities	N/A	N/A	N/A	2 parking areas, caretaker residence, north end of 3 unpaved trails	No	1 parking area, caretaker residence, north end of 3 unpaved trails	No	1 parking area, caretaker residence , north end of 3 unpaved trails	No	2 parking areas, caretaker residence north end of 3 unpaved trails	No
Proximate Impacts: Visual	N/A	N/A	N/A	Yes	No	Yes	No	Yes	No	Yes	No
PUBLIC SERVICES AND UTILITIES (Section 3.11)											
Blacks Ford Swamp Effluent Disposal Site (acres)	N/A	3.5	3.5	9.3	9.3	9.3	9.3	0	0	0	0
No. of Service Towers and Power Line Crossings	N/A	6	6	7	7	7	7	7	7	7	7
Emergency Response Times	Increase	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease

Impacts shown do not take into account the application of mitigation measures.

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
VISUAL QUALITY (Section 3.12)											
Additive Visual Impact Rating (higher numbers indicate higher impacts)	NA	37.1	33.8	41.0	38.3	42.3	39.6	36.3	33.6	35.0	32.3
AIR QUALITY (Section 3.13)											
Carbon Monoxide	No exceedances of the 1-hour or 8-hour National Ambient Air Quality Standards										
WATER RESOURCES (Section 3.14)											
Stormwater Runoff Treatment Volume Required (millions of cubic feet)	N/A	4.9	3.7	4.8	4.8	4.7	4.7	4.4	4.4	4.4	4.4
Clean Water Act Section 303(d) Basins Affected	N/A	4	4	4	4	4	4	3	3	3	3
WETLANDS (Section 3.15)											
Direct, Dredge or Fill (acres)	N/A	748	477	502	487	484	476	501	493	518	504
Direct, No Dredge or Fill (acres)	N/A	976	601	666	653	642	629	687	674	713	702
Surface Water (acres)	N/A	88	85	72	70	67	65	69	67	74	72
Total Acres	N/A	1,812	1,163	1,240	1,210	1,194	1,170	1,257	1,234	1,305	1,278
UMAM Debit	N/A	643	408	430	417	413	406	435	427	450	438
WILDLIFE AND HABITAT (Section 3.16)											
Agriculture (acres)	N/A	173	161	158	160	137	137	149	130	152	154
Rangeland (acres)	N/A	160	151	173	178	178	178	87	87	81	82
Water (acres)	N/A	87	84	61	59	61	59	68	66	68	66
Wetlands (acres) (from habitat databases)	N/A	453	293	412	392	413	400	366	353	365	345
Upland Forest (acres)	N/A	1,171	706	1,036	1,033	962	957	939	935	1,013	1,010
Total Acres	N/A	2,044	1,395	1,840	1,817	1,751	1,731	1,609	1,571	1,679	1,657
Protected Species Potentially Present	N/A	26	26	26	26	26	26	26	26	26	26
FISH AND AQUATIC RESOURCES (Section 3.17)											
Submerged Aquatic Vegetation (acres)	N/A	3.7	3.7	2.5	2.3	2.5	2.3	2.5	2.3	2.5	2.3
EFH Habitat (acres)	N/A	261	223	237	226	228	220	172	164	181	170

Impacts shown do not take into account the application of mitigation measures.

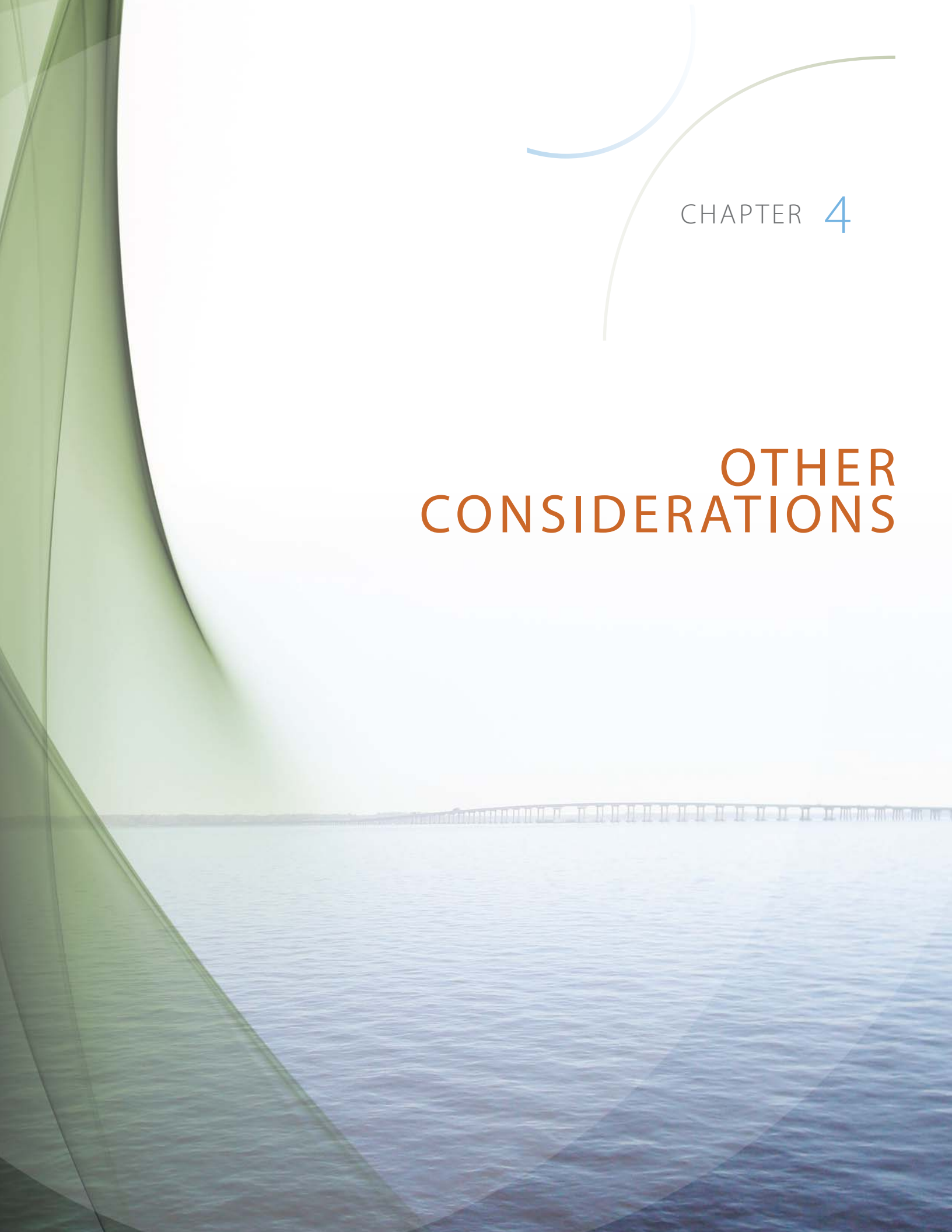
Exhibit 3-78: **Summary Comparison of Impact and Benefits of Project Alternatives (cont)**

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
GEOLOGY AND SOILS (Section 3.18)											
Aquifer Recharge	N/A	Minor impacts to recharge of the surficial aquifer; no impacts to the Floridan aquifer									
ENERGY (Section 3.19)											
Energy Used for Construction (millions of BTUs)	N/A	14,664,277	11,369,046	12,850,146	12,949,822	13,668,194	13,734,505	11,945,563	12,011,874	11,127,515	11,227,191
Energy Consumption per year (gallons)	24,058,431	16,565,796	15,727,365	19,077,523		18,471,795		20,622,414		21,088,620	
Energy Savings per Year over No Build (gallons)	0	7,492,635	8,331,066	4,980,908		5,586,637		3,463,017		2,979,071	
Energy Payback (years)	N/A	15.1	10.5	19.8	20.0	18.8	18.9	26.7	26.9	28.8	29.1
CONTAMINATED PROPERTIES (Section 3.20)											
Low-Risk Sites	N/A	4	4	5	6	8	8	8	8	5	6
Medium-Risk Sites	N/A	2	2	1	1	3	4	3	4	1	1
High-Risk Sites	N/A	3	3	2	3	7	6	7	6	2	3
Total Sites	N/A	9	9	8	10	18	18	18	18	8	10
NAVIGABLE WATERWAYS (Section 3.21)											
Vertical Restriction - St. Johns River	45' at Shands Bridge	45' at Shands Bridge	65' (as elsewhere on river)								
Horizontal Restriction - St. Johns River	91' at Shands Bridge	91' at Shands Bridge	200' (USGS clearance guide)								
In Channel Development – St. Johns River	None	New bridge at Popo Point	None								
Black Creek	None	No new restrictions									
FLOODPLAINS (Section 3.22)											
Transverse Crossings of 100-Year Floodplain	N/A	13	6	17	17	15	15	14	14	16	16
Transverse Crossings of Regulatory Floodways	N/A	8	7	5	5	6	6	5	5	4	4
Longitudinal Crossings of 100-Year Floodplain	N/A	1	1	0	0	0	0	0	0	0	0

Impacts shown do not take into account the application of mitigation measures.

CHAPTER 4

OTHER CONSIDERATIONS



CHAPTER 4

Other Considerations

This chapter looks at considerations other than project impacts: irreversible decisions the project would entail, tradeoffs between short-term resource use and long-term gains, permitting and adverse effects that cannot be mitigated.

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4.1 WHAT OTHER CONSIDERATIONS DID FDOT EXAMINE?

Beyond the potential impacts the proposed project may have on both the natural and built environment, the decision makers responsible for determining the Selected Alternative need to consider other matters as well. These can vary from project to project, and sometimes involve matters of local importance that may not be involved elsewhere in the analysis. This chapter examines some additional topics considered by the Florida Department of Transportation (FDOT) during their analysis of the St. Johns River Crossing Project.

4.1.1 What irreversible decisions or irretrievable resources would be committed to building the project?

Irretrievable resources that will be committed to this project include the acquisition and use of additional land both east and west of the St. Johns River. While the land could be converted to another use in the future if the project were not built, there is no basis at present to predict whether such a conversion would ever be necessary or desirable.

The St. Johns River Crossing Project will also expend fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material.. In addition, projects of this size use large amounts of labor and natural resources in the fabrication and preparation of non-retrievable construction materials. Recent demands in the years following Hurricane Katrina (fall of 2005) reduced the supply of some construction materials. This temporary shortage has resulted in increased construction cost estimates for the Build Alternatives. High demands from the expanding Chinese economy have also affected the availability of steel and other resources, including fossil fuels. However, it is not anticipated that the quantity of materials required to build the proposed St. Johns River Crossing Project will have an adverse effect upon the continued availability of these resources.

The residents and travelers in the area will benefit from the commitment of these resources and the improved quality of the transportation system, as the project will improve existing and future travel conditions, promote local economic development, and provide greater safety during times of emergency evacuation.

4.1.2 What are the tradeoffs between the short-term uses of environmental resources and long-term gains from the project?

The short-term costs of the St. Johns River Crossing Project will include a number of years of construction, creating noise, dust, and traffic congestion as well as the consumption of energy. The long-term cost of not improving the highway corridor and bridge crossing will be substantial and will result in worsening traffic congestion along with additional energy use, regional and local economic losses as residents continue commuting outside their home counties, and inadequate conditions during times of emergency evacuation.

4.1.3 What major permits would be needed to build the project?

The United States Army Corps of Engineers (USACE) and the St. Johns River Water Management District (SJRWMD) regulate wetlands within the study area. The United States Fish and Wildlife Service, the National Marine Fisheries Service, and the Florida Fish and Wildlife Conservation Commission (FWC) will review and comment on the wetland permit applications. It is currently anticipated that the major permits shown in **Exhibit 4-1** will be required for this project.

Exhibit 4-1: Major Permits Required

Permit	Agency
Environmental Resource Permit (ERP)	SJRWMD
Section 404 Dredge and Fill Permit	USACE
Section 10 Permit	USACE
National Pollutant Discharge Elimination System Permit (NPDES)	FDEP
Section 9 Bridge Permit	USCG
Gopher Tortoise Relocation Permit	FWC

The complexity of the permitting process depends greatly on the degree of impact. The SJRWMD requires an Environmental Resource Permit when construction of any project results in the creation of a water management system or isolated wetlands or an impact to "waters of the State." The district will require an individual permit along with mitigation since wetland impacts will be greater than one acre.

The USACE will require an individual permit in compliance with the Section 404(b)(1) guidelines of the Clean Water Act, including verification that:

- All impacts have first been avoided to the greatest extent possible,
- Unavoidable impacts have been minimized to the greatest extent possible, and
- Unavoidable impacts have been mitigated in the form of wetlands creation, restoration, and/or enhancement.

The USACE 2008 Final Compensatory Mitigation Rule established a mitigation preference hierarchy. The most preferred form of mitigation is mitigation bank credits. In-lieu, fee program credits are second in the preference hierarchy and permittee-responsible mitigation is the third preference. FDOT is committed to working with the agencies and developing a regional wetland mitigation plan as the project progresses into the design phase. FDOT's proposed mitigation will be from a combination of banks and other mitigation projects that may include preservation, restoration and/or creation.

The USACE will also require a Section 10 Permit in accordance with the Rivers and Harbors Act verifying that the project will not obstruct or alter navigable waters of the United States.

The Florida Department of Environmental Protection (FDEP) requires that any project that results in the clearing of five or more acres of land also obtain a National Pollutant Discharge Elimination System (NPDES) permit pursuant to 40 CFR parts 122 and 124. In association with this permit, they would also require a Stormwater Pollution Prevention Plan that would be implemented during the construction of the project. The primary functions of the NPDES requirements are to ensure that sediment and erosion during construction are controlled. These permits typically utilize Best Management Practices to ensure compliance.

A Section 9 Bridge Permit from the United States Coast Guard (USCG) is needed for construction of a bridge over navigable waters, which in this case would include the St. Johns River and Black Creek.

During construction, the contractor will likely use borrow pits in the project area to provide fill for roadway construction. In accordance with FDOT procedures, the contractor will be responsible for obtaining necessary permits for

such uses, which may vary depending on borrow sites selected. The contractor will be required to obtain appropriate cultural resources clearances for any borrow sites, including conducting any necessary site investigations and consultation with the State Historic Preservation Officer. In the case of threatened and endangered species clearances, however, FDOT will be responsible for these clearances, if necessary, including consultation with the appropriate resources agencies.

4.1.4 Are there any impacts that will remain even after mitigation?

Most transportation projects, even projects that provide substantial public benefits, have some negative effects on the natural and/or the built environment. FDOT and the Federal Highway Administration (FHWA) are strongly committed to avoiding, minimizing, and mitigating such effects whenever practicable. Nevertheless, the St. Johns River Crossing Project will have several adverse impacts that will remain even after the implementation of mitigation measures. These include:

- *Fill and shading impacts on the St. Johns River:* A new bridge will increase both fill and shading, particularly in the near-shore waters and wetlands areas, and could have the potential to reduce wetland and aquatic habitat. While these effects would be mitigated, the existing habitat would be altered.
- *Visual effects of the roadway and higher bridge structure:* The St. Johns River Crossing Project is considered a "greenfield" project, meaning that it will be built along a corridor where a road does not currently exist. Constructing it would make the area look considerably different than it does today. While existing vegetation will be left where possible adjacent to the highway to enhance aesthetics, some people will likely consider at least some of the visual changes created by the new highway to be adverse.
- *Residential and business relocations:* Although the Conceptual Stage Relocation Plan has determined that there are sufficient properties in the area to accommodate the relocations that will be needed for the project, having to move is always a hardship on a family or business, and will pose some issues that cannot be mitigated simply by providing a new residence or place of business.

- *Loss and fragmentation of wildlife habitat:* Construction of any project in this area will reduce and fragment existing habitat, and development in the project area will increase the rate at which this habitat degradation will occur.
- *Increases in noise:* Constructing a new roadway through areas of mainly rural development will increase noise levels throughout the project area. Although the construction of noise barriers was analyzed, none were found to be either prudent or feasible.
- *Impacts to community cohesion and changes to the social quality of the area:* The nature of the project area continues to become more residential, and this trend will continue regardless of whether the project is constructed. However, construction of the project could increase the rate at which this would occur. These changes will affect the feel of the various communities in the project area, ultimately changing their quality of life.

4.1.5 What are the future traffic impacts to I-95?

All of the Build Alternatives will connect to Interstate 95 (I-95) in St. Johns County at one or more locations. Potential traffic impacts to I-95 between the SR 16 interchange and I-295 were investigated by separating this section of I-95 into segments (See **Exhibit 4-3**). These segments were analyzed using the traffic from the *St. Johns River Crossing Traffic Analysis Report*, located on the enclosed CD. I-95 mainline was assumed an eight lane roadway north of International Golf Parkway based on the 2035 Long Range Transportation Plan (LRTP). The I-95 widening will be in place prior to or within a year of the opening of this project. The results of the analysis are shown in **Exhibit 4-2**. This table shows the last year that each segment of I-95 is at a particular level of service (LOS). For example, I-95 between International Golf Parkway and SR 16 will have a LOS C until year 2026 for the Orange 1 and 2 Alternatives. The dashes ("-") shown in the table indicate that the last year at that LOS is before 2025, which is the first traffic analysis year. The asterisks ("*") shown in the table denote that the last year at that LOS is beyond 2045, which is the last traffic analysis year. Since all of the segments have a LOS lower than LOS B by 2025, the table begins with LOS C. The data presented in **Exhibit 4-2** is presented graphically in Appendix C of the *St. Johns River Crossing Traffic Analysis Report*, included on the enclosed CD.

Exhibit 4-2: Future I-95 Levels of Service

I-95 Northbound		Alternative						
		No Build	Black	Purple	Brown	Orange	Green	Pink
SR 16	Int'l Golf Pkwy							
Last Year of Service	C	2025	-	-	2026	2026	-	-
	D	2036	2031	2031	2033	2033	2041	2041
	E	2045	2036	2041	2041	2041	2045	2045
	F	*	2045	2045	2045	2045	*	*
Int'l Golf Pkwy	CR 210							
Last Year of Service	C	2031		2032	2033	2033		
	D	2045		2045	2045	2045		
	E	*		*	*	*		
	F	*		*	*	*		
Int'l Golf Pkwy	SR 23							
Last Year of Service	C		2029				2034	2034
	D		2042				2045	2045
	E		2045				*	*
	F		*				*	*
SR 23	CR 210							
Last Year of Service	C		2031				-	-
	D		2045				2038	2038
	E		*				2045	2045
	F		*				*	*
CR 210	SR 9B							
Last Year of Service	C	2026	2030	2030	2032	2032	-	-
	D	2036	2043	2045	2045	2045	2032	2032
	E	2045	2045	*	*	*	2043	2043
	F	*	*	*	*	*	2045	2045
SR 9B	St. Aug Rd							
Last Year of Service	C	2027	-	2025	-	2025	-	-
	D	2037	2033	2034	2034	2034	2036	2036
	E	2045	2042	2045	2044	2045	2045	2045
	F	*	2045	*	2045	*	*	*
St. Aug Rd	I-295							
Last Year of Service	C	2025	-	-	-	-	-	-
	D	2034	2033	2034	2033	2033	2035	2035
	E	2045	2042	2045	2044	2044	2045	2045
	F	*	2045	*	2045	2045	*	*

"-" indicate that the last year at that level of service is before 2025 (the first traffic analysis year)

"*" indicate that the last year at that level of service is beyond 2045 (the last traffic analysis year)

NOTE: I-95 was analyzed as existing (8 lanes).

Exhibit 4-2: Future I-95 Levels of Service (cont)

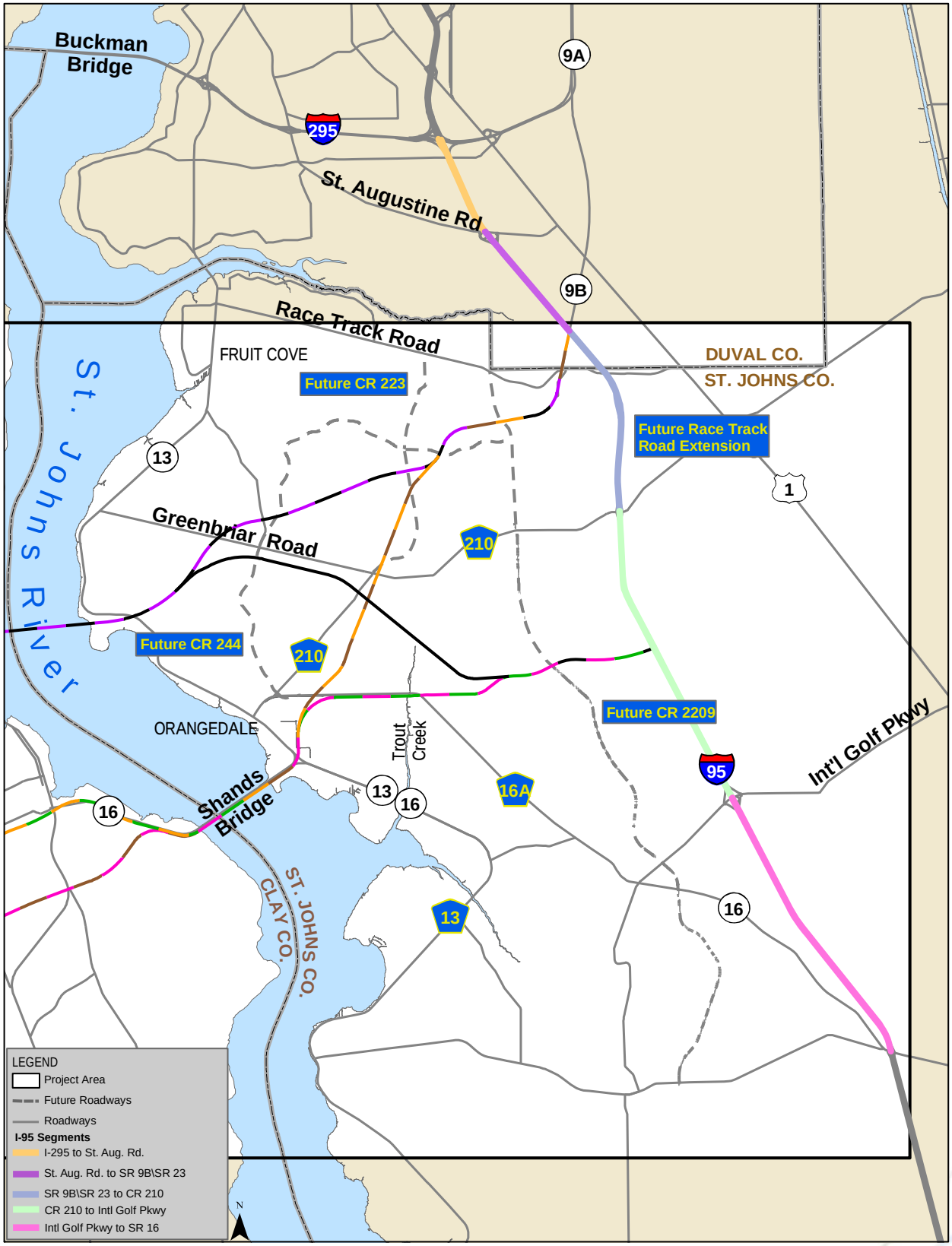
I-95 Southbound		Alternative						
		No Build	Black	Purple	Brown	Orange	Green	Pink
I-295	St. Aug Rd							
Last Year of Service	C	2025	-	-	-	-	-	-
	D	2034	2033	2034	2033	2033	2035	2035
	E	2045	2042	2045	2044	2044	2045	2045
	F	*	2045	*	2045	2045	*	*
St. Aug Rd	SR 9B							
Last Year of Service	C	2027	-	2025	-	2025	-	-
	D	2037	2033	2034	2034	2034	2036	2036
	E	2045	2042	2045	2044	2045	2045	2045
	F	*	2045	*	2045	*	*	*
SR 9B	CR 210							
Last Year of Service	C	2026	2030	2030	2032	2032	-	-
	D	2036	2043	2045	2045	2045	2032	2032
	E	2045	2045	*	*	*	2043	2043
	F	*	*	*	*	*	2045	2045
CR 210	Int'l Golf Pkwy							
Last Year of Service	C	2031		2032	2033	2033		
	D	2045		2045	2045	2045		
	E	*		*	*	*		
	F	*		*	*	*		
CR 210	SR 23							
Last Year of Service	C		2031				-	-
	D		2045				2038	2038
	E		*				2045	2045
	F		*				*	*
SR 23	Int'l Golf Pkwy							
Last Year of Service	C		2029				2034	2034
	D		2042				2045	2045
	E		2045				*	*
	F		*				*	*
Int'l Golf Pkwy	SR 16							
Last Year of Service	C	2025	-	-	2026	2026	-	-
	D	2036	2031	2031	2033	2033	2041	2041
	E	2045	2036	2041	2041	2041	2045	2045
	F	*	2045	2045	2045	2045	*	*

"-" indicate that the last year at that level of service is before 2025 (the first traffic analysis year)

"*" indicate that the last year at that level of service is beyond 2045 (the last traffic analysis year)

NOTE: I-95 was analyzed as existing (8 lanes).

Exhibit 4-3: Future I-95 Levels of Service Segments



Each section of I-95 is affected differently by each alternative. Some sections are benefited and some are impacted. For example, the I-95 mainline analysis for the Brown 1 and 2 Alternatives shows an improvement in LOS for the I-95 segment from CR 210 to SR 9B/SR 23 in comparison to the No Build Alternative, but a deterioration in the I-95 LOS from SR 16 to International Golf Parkway and from SR 9B/SR 23 to I-295. All of the alternatives would result in deterioration of the I-95 LOS in some segments. This could be mitigated for by adding additional mainline lanes or auxiliary lanes. The Pink 1 and 2 and Green 1 and 2 Alternatives show the least number of I-95 segments with LOS below the No Build Alternative and would require the least mitigation along I-95 to achieve the same or better LOS compared to the No Build Alternative. More detail about the mitigation required for each Build Alternative to achieve the same or better LOS as the No Build Alternative are contained in the *St. Johns River Crossing Traffic Analysis Report*, located on the enclosed CD.

4.1.6 What are the future impacts to I-10?

All of the Build Alternatives connect to Branan Field – Chaffee Road north of SR 21 (Blanding Boulevard). Branan Field – Chaffee Road begins just north of SR 21 in Clay County and ends at I-10 in Duval County. **Exhibit 4-4** compares the traffic for Branan Field – Chaffee Road (existing condition) with the toll traffic for the First Coast Outer Beltway, which includes the St. Johns River Crossing alternatives and Branan Field – Chaffee Road. It should be noted that the only consideration for Branan Field – Chaffee Road in this EIS is for the tolling of this road; therefore, toll design traffic was not developed for the Branan Field – Chaffee Road and the volumes used for comparison were taken from the Sketch Level Traffic and Revenue Study (a separate study) which reported $0.10/mile volumes. As shown in the table, the toll traffic for all of the Build Alternatives is lower than the free traffic for Branan Field – Chaffee Road. This means that the St. Johns River Crossing project will not adversely impact I-10; rather it will reduce the traffic on I-10.

4.1.7 Is the Project Consistent with the Coastal Zone Management Act?

FDEP has determined that this project is consistent with the Florida Coastal Management Program. FDEP indicated during the AN that the state's final

Exhibit 4-4: Branan Field - Chaffee Road Toll Traffic Comparison

Branan Field - Chaffee Road Segment		2035 No Build AADT*	2035 Toll AADT** by Alternative					
From	To		Black	Purple	Brown 1 and 2	Orange 1 and 2	Green 1 and 2	Pink 1 and 2
Blanding Boulevard (SR 21)	Oakleaf South (Frontage Ramps)	69,700	52,100	52,500	50,600	49,900	51,500	50,200
Oakleaf South (Frontage Ramps)	Argyle Forest Boulevard	80,500	63,400	63,500	64,300	63,800	65,100	63,500
Argyle Forest Boulevard	103rd Street	84,200	66,700	67,500	67,300	67,100	68,200	66,900
103rd Street	Normandy Boulevard (SR 228)	72,800	54,200	54,900	55,100	55,300	56,100	55,400
Normandy Boulevard (SR 228)	New World Ave	53,000	42,700	43,400	44,000	43,300	44,100	44,700
New World Ave	I-10	62,300	51,200	51,900	53,100	52,300	53,000	52,400

SOURCE: *Branan-Field Chaffee traffic (toll free); assumes St. Johns River Crossing is not built

SOURCE: **Interpolated from the First Coast Outer Beltway Planning Level Traffic and Revenue Analysis and Sketch Level Toll Traffic Forecast for the St. Johns River Crossing Alternatives, dated December 20, 2007. This report assumed a $0.10 per mile toll rate.

review of the project's consistency with the Florida Coastal Management Program will be conducted during the environmental permitting stage. FDEP's AN response is located in Appendix B of the *Agency Coordination Memorandum* located on the enclosed CD.

CHAPTER 5

COMMITMENTS & RECOMMENDATIONS

5.1 WHAT COMMITMENTS ARE BEING MADE?

During construction, all provisions of the Florida Department of Transportation's (FDOT) most recent version of the *Standard Specifications for Road and Bridge* Construction will be followed. In addition, FDOT is committed to the following measures for the St. Johns River Crossing project:.

5.1.1 Traffic and Transportation

FDOT will develop a traffic management plan that will be implemented by the contractor during construction. The plan will include traffic management and signage, access to local businesses and residences, detour routes, public notification and alternate routes, emergency services coordination, and project scheduling (Section 3.3.3).

Additionally, the widening of I-95 from six to eight lanes north of International Golf Parkway will be in place prior to or within a year of the opening of this project.

5.1.2 Noise

FDOT is committed to reevaluating feasible noise abatement measures during Final Design. Although no noise barriers are being proposed as mitigation at this time, a commitment to construct feasible and reasonable noise barriers will be contingent upon the following conditions:

- Detailed noise analysis during the Final Design process supports the need for abatement.
- Detailed noise barrier analysis indicates that the cost of the barriers will not exceed the cost reasonableness criteria.
- Community input regarding desires, types, heights, and locations of barriers is received by the FDOT and supports the construction of noise barriers.
- Preferences regarding compatibility with adjacent land uses, particularly as expressed by officials having jurisdiction over such lands, have been addressed.

- Safety and engineering aspects related to roadway users and adjacent property owners have been reviewed and any conflicts or issues resolved.
- Any other mitigating circumstances revealed during Final Design have been analyzed and resolved.

FDOT will also reanalyze the Bayard Conservation Area for the feasibility of noise barriers during Final Design when the relocation of the parking area and future site access has been determined.

5.1.3 Displacements

FDOT will carry out a Right-of-Way and relocation program in accordance with Florida Statute 339-09 and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646 as amended by Public Law 100-17).

5.1.4 Land Use

In case of any permanent barrier effects to communities or neighborhoods, the feasibility of maintaining access or connectivity will be examined during final design. Measures could include maintaining or restoring pedestrian crossings or informal pathways within communities, where feasible and safe.

Construction of the project could require the temporary use of some land outside the right-of-way for equipment staging areas and access roads. FDOT and its contractors will not use any properties that have not been purchased for the project without first consulting with those owners. These potential temporary land uses will be minor and short term, and all such property will be restored to its pre-construction condition immediately following construction.

5.1.5 Cultural Resources

FDOT and FHWA will develop an inadvertent discovery plan to address what steps will be taken if construction areas contain unexpected cultural resources and will mitigate any unavoidable loss of eligible or listed properties or structures under the terms of Section 106.

FDOT and FHWA will continue to consult with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation to determine the best methods of avoiding or mitigating unavoidable effects to historic resources. A Pond Siting Report will be completed once pond sites are determined. FDOT will submit design plans to the SHPO when the plans become available so that SHPO can confirm that the final design avoids an adverse effect on eligible or listed properties or structures.

5.1.6 Section 4(f) Resources

FDOT will implement the following measures in order to mitigate impacts, minimize harm, and enhance features and attributes of the Bayard Conservation Area as agreed upon with the St. Johns River Water Management District (SJRWMD):

- Approximately 73.81 acres of land adjacent to the BCA will be conveyed to the SJRWMD for incorporation into the conservation area. Sufficient funding will be provided to restore this area to an environmentally acceptable condition.
- Parking areas, trails and the caretaker residence will be reconstructed in an area south of the proposed roadway.
- A multi-use trail will be constructed along the north side of the conservation area, adjacent to the roadway.
- Funds will be provided for the restoration of the existing golf course to natural conditions.

5.1.7 Air Quality

Potential effects of construction on local air quality will be addressed in accordance with FDOT's most current edition of *Standard Specifications for Road and Bridge Construction (Florida, 2007).* In addition, the contractor will be required to implement the following specific BMPs:

- Appropriate fugitive dust suppression controls, such as spraying water on haul roads adjacent to construction sites, daily street sweeping, covering loaded trucks, and washing haul trucks before leaving the construction site.

- Re-vegetate disturbed areas with native grasses as soon as possible after construction activities are completed in order to minimize windblown dust.
- Shut off construction equipment when not in direct use in order to reduce idling emissions.
- Properly maintain and inspect construction equipment to ensure that required pollution control devices are in working condition.
- Preserve existing vegetation to the maximum extent practical.
- Route heavy truck traffic away from schools and residences when feasible.

All construction sites (including any unpaved roads and parking and storage areas) will be watered during dry weather or at least once daily to minimize fugitive dust emissions.

5.1.8 Public Services and Utilities

FDOT will coordinate with all service providers, including emergency services, and utility providers during final design to ensure that access is maintained and alternate routes are developed. FDOT is also committed to the additional following measures:

- Notify and coordinate with the fire departments for waterline relocations that may affect water supply for fire suppression and establish alternate supply lines prior to any breaks.
- Notify and coordinate with the fire departments during construction to ensure all calls can be handled by developing plans for alternate routes.
- Provide emergency service providers and police departments with advance notification of construction schedules and any planned street closures.
- Coordinate with school officials during construction. Also schedule evening construction, where allowed, to reduce congestion during peak hours and have less effect on school bus routes.
- Field-verify the exact locations and depths of underground utilities prior to construction.
- Notify neighborhoods of utility interruptions by providing a schedule of construction activities to the public in those areas.

- Prepare a consolidated utility plan consisting of key elements such as existing locations, potential temporary locations, and potential new locations for utilities; sequence and coordinated schedules for utility work; and detailed description of any service disruptions. This plan will be reviewed by and discussed with affected utility providers prior to the start of construction.

5.1.9 Water Quality

All stormwater runoff from the proposed roadway will be collected and treated before being discharged to surface waters. Typical BMPs such as staked hay bales, silt fences, mulching and reseeding, and use of buffer zones along water bodies will be used as appropriate.

FDOT will consult with the Florida Department of Environmental Protection (FDEP) and the SJRWMD regarding the status of development of Total Maximum Daily Loads (TMDLs) for surface water features or basins which appear on the 303(d) list and are crossed by the project. FDOT will also commit to working with FDEP to ensure that all construction activities and contaminants of concern are included in future TMDLs.

5.1.10 Wetlands

Wetland impacts which will result from the construction of this project will be mitigated pursuant to S. 373.4137 F.S. to satisfy all mitigation requirements of Part IV Chapter 373, F.S. and 33 U.S.C.s 1344.

All wetland impacts will be mitigated for within the mitigation basin in which they are impacted. FDOT will coordinate with the U.S. Army Corps of Engineers (USACE) and SJRWMD during the design phase to establish the extent of mitigation before final permits will be issued.

The USACE 2008 Final Compensatory Mitigation Rule established a mitigation preference hierarchy. The most preferred form of mitigation is mitigation bank credits. In-lieu, fee program credits are second in the preference hierarchy and permittee-responsible mitigation is the third preference. FDOT is committed to working with the agencies and developing a regional wetland

mitigation plan as the project progresses into the final design phase. The plan will establish procedures, guidelines and responsibilities to implement regionally significant mitigation for unavoidable impacts caused by the St. Johns River Crossing Project and other future FDOT projects within the jurisdictional boundaries of SJRWMD. Mitigation bank credits within the same basin will be used where possible and on-site mitigation will be used where banks are not available. Based on current day mitigation credits available, this approach will be used in developing the plan. If mitigation credits become unavailable before the permitting phase, project specific mitigation will be evaluated.

5.1.11 Wildlife and Habitat

FDOT will design and construct the proposed project to provide wildlife passage across the corridor to reduce habitat fragmentation, prevent genetic isolation, and limit direct mortality on the roadway. Wildlife passage will be accomplished by designing appropriate bridge lengths, culvert locations, signage, and construction of dedicated wildlife crossings where justified. These efforts will follow the FDOT *Wildlife Crossing Guidelines*. Specific recommendations for location and design of wildlife crossings that are provided by the Florida Fish and Wildlife Conservation Commission, the USFWS and other regulatory agencies will be incorporated during the design and permitting phase.

FDOT will undertake a number of actions to avoid or minimize impacts to federally listed species including the following:

- Use special provisions for protection of the shortnosed sturgeon during construction to ensure that no sturgeons are harmed. Use drilled shaft pile construction if determined by FDOT to be prudent and feasible. No explosives will be used in bridge demolition.
- Conduct surveys for gopher tortoise burrows will be conducted within two years of the construction start date.
- Utilize the USFWS *Survey Protocol for the Eastern Indigo Snake Drymarchon couperi, in North and Central Florida*, if applicable;
- Implement the standard USFWS protection measures for the eastern indigo snake and an eastern indigo snake education plan prior to and during construction.

- Conduct a detailed Eastern indigo snake habitat impact analysis during the Final Design and Permitting phases in close coordination with USFWS and FWC during this process.
- Mitigate the impacts to Eastern indigo snake habitat through the purchase and conservation of appropriate upland habitat as determined by the aforementioned analysis during the Final Design/ Permitting/Right-of-Way phases. Furthermore, the Department is committed to close coordination with USFWS and FWC during this process.
- Use special provisions for the protection of manatees during construction to ensure that no manatees are harmed. Trained personnel will conduct surveillance of in-water work areas during construction. Erosion and turbidity control measures will be installed and maintained around in-water work area.
- Follow the Standard Manatee Protection Construction Conditions for In-Water Work (FWC 2009) for the Florida manatee during implementation of the project, and TSPs will be incorporated into the contractor's bid documents.
- Develop and utilize a manatee watch plan specific to this project during the Permitting phase, at which time the USFWS will be provided the opportunity to provide input and approval.
- Implement water quality improvement initiatives as an additional mitigation option for impacts to submerged aquatic vegetation. A draft plan is contained in Appendix D of the *Endangered Species Biological Assessment.*
- Restore near-shore areas upon the removal of the existing Shands Bridge.
- Should the striped newt or gopher tortoise be listed prior to the time construction commences, an effects determination will be made in coordination with USFWS. Furthermore, compliance with all applicable state and Federal regulations, guidelines, survey protocol, etc., will be adhered to.
- Where the proposed project will alter wetlands, wetland compensation will include a temporal-lag factor to account for time required for successful mitigation with type-for type-mitigation and comparable hydroperiod, to compensate for potential adverse effects to the wood stork foraging area.
- Design and construct the proposed project to provide wildlife passage across the project corridor to reduce habitat fragmentation, prevent genetic isolation, and limit direct mortality on the roadway. Wildlife passage will be accomplished by designing appropriate bridge lengths, culvert locations, signage, and construc-

tion of dedicated wildlife crossing where justified. These efforts will follow the FDOT Wildlife Crossing Guidelines. Specific recommendations for location and design of wildlife crossings that are provided by the FWC, the USFWS and other regulatory agencies will be incorporated during the design and permitting phase.

5.1.12 Essential Fish Habitat

Coordination with the National Marine Fisheries Service (NMFS) has been ongoing and will continue regarding mitigation for essential fish habitat. FDOT is committed to mitigating all EFH impacts as a result of the construction of the Preferred Alternative. Blasting will not be used for demolition of the Shands Bridge.

FDOT is committed to the following actions to avoid, minimize or mitigate for EFH impacts:

- Evaluating, considering, and implementing design/construction techniques which lead to the continued avoidance and minimization of wetland impacts, to include EFH impacts.
- Mitigating all wetland impacts to include EFH impacts as a result of the construction of the Preferred Alternative.
- Working with the agencies and developing a regional wetland mitigation plan as the project progresses into the design phase. The plan will establish procedures, guidelines and responsibilities to implement regionally significant mitigation for unavoidable impacts caused by the St. Johns River Crossing Project and other future FDOT projects within the jurisdictional boundaries of SJRWMD. FDOT will continue to coordinate with the resource agencies in developing the framework for a regional wetlands mitigation plan.
- Mitigating for SAV impacts through water quality improvement initiatives. A draft plan is contained in Appendix H of the *Essential Fish Habitat Report.*
- Restoring the near-shore areas upon the removal of the existing Shands Bridge.

5.1.13 Contamination

FDOT will discuss the results of the contamination assessment work with the contractor and develop appropriate response plans to either avoid or remove known areas of contamination. A response plan developed prior to construction and approved by FDEP will cover contaminants that may be unexpectedly encountered or accidentally spilled during construction. FDOT will also

notify the state of any unanticipated discoveries or spills during construction, and coordinate cleanup with FDEP staff.

5.1.14 Navigable Waterways

FDOT will coordinate with the US Coast Guard to develop and implement marine traffic management plans during construction and to provide public information on construction activities that affect navigation.

FDOT will also provide vertical and horizontal bridge clearances in final design that are acceptable to maritime community. In addition, FDOT will commit to the following measures for the demolition / construction of the bridge across the St. Johns River:

Pre-Demolition/Construction

- Prior to beginning construction or demolition, the river bottom 500 feet upstream and downstream from the bridge centerline will be surveyed by multi-beam and side scan sonar to set baseline conditions for bottom elevation (multi-beam) and bottom material (side scan).
- Erosion and turbidity control measures will be installed and maintained around work areas.

Demolition Plan

- The existing bridge will be removed down to six inches above the mud line and disposed of offsite at a landfill or recycling facility. No demolition material will be discharged to the water way or disposed of onsite.
- No blasting will be used to demolish the bridge.
- The river bottom will be resurveyed after demolition if there are any concerns from the regulatory agencies concerning deposition (multi-beam) or remnant debris (side scan).
- In the event of an accidental spill of demolition materials or equipment, the Contractor will immediately notify SJRWMD and the USACE. Retrieval of the accidentally discharged material will

be initiated within seventy-two hours of approval from the regulatory agencies.

- The project will not involve excavation of the river bottom without the Contractor applying for and receiving a permit modification and mixing zone approval.

5.1.15 Visual Quality

FDOT will employ the following measures where feasible:

- *Selective Clearing* – Clearing only the vegetation required to construct the project, particularly trees.
- *Landscaping* – Incorporation of trees and groundcover to add visual interest to the roadway, compliment existing roadside vegetation or screen undesirable elements.
- *Screening* – Screening with landscape materials or by using permanent construction materials such as metal and concrete walls.

5.1.16 Floodplains

The project's drainage design will comply with FDOT, SJRWMD, and FEMA standards to ensure that encroachments on the floodplains will be minimal. FDOT will also commit to the following measures:

- Design the project to be consistent with FEMA, FDOT and SJRWMD design standards. No significant changes in BFE or flood limits will occur. Drainage structures conveying regulatory floodways will be sized to generate less than 0.005 feet of backwater during a 100-year flood event. Drainage structures conveying non-regulatory floodplains will be sized to generate less than 0.1 feet of backwater during a 100-year flood event. Detailed volumetric floodplain calculations will be provided for all floodplain encroachments where encroachment volume exceeds 0.1% of the 100-year flood volume.
- Size all bridges and culverts to qualify for a FEMA Zero Rise for any regulatory floodway crossings.
- Final design will include appropriately sized cross drains to maintain the natural and beneficial floodplain values.
- Erosion and sediment control measures will ensure that the no sediment is carried downstream to clog channels and reduce their flood-carrying capacity.

5.1.17 Tolling

FDOT will allow trips using the toll road solely to cross the river to remain toll -free.

5.2 WHAT IS THE FINAL RECOMMENDATION?

As a result of public input, agency coordination, and engineering and environmental analysis, the recommended alternative for the St. Johns River Crossing Project is the Pink 1 Alternative. The Pink 1 Alternative proposes to construct a new 31 mile limited access highway from the SR 21\Branan Field Chaffee Road interchange in Clay County to I-95 in St. Johns County. Reasons for selecting the Pink 1 Alternative are discussed in Chapter 2.

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Gerald W. Springstead II/American Acquisition Group LLC	Right of Way Cost Estimates	M.A. Real Estate & Urban Analysis B.S. Business Administration, Finance	19 years of real estate experience, including 9 years right of way cost estimates
James Patterson / RS&H	Environmental Scientist	M.S. Environmental Engineering Science	9 years environmental science experience and 6 years NEPA document preparation experience
Michele Myers / HDR	Sr. Graphic Designer	B.A. Graphic Design	10 years graphic design experience , with 8 year focus on engineering industry

LIST OF TECHNICAL DISCIPLINE REPORTS (LOCATED ON ENCLOSED CD)

Agency Coordination Memorandum

Air Quality Technical Memorandum

Client First Coast Outer Beltway Preliminary Traffic and Revenue Analysis

Climate Change Technical Memorandum

Conceptual State Relocation Plan

Contamination Level 1 Screening Report

Cultural Resource Overview Survey Technical Memorandum

Cultural Resource Assessment Survey Technical Memorandum Update

Economics and Land Use Discipline Report

Endangered Species Biological Assessment

Energy Technical Memorandum

Environmental Justice Discipline Report

Essential Fish Habitat Discipline Report

Evacuation Analysis Report

Geology and Soils Technical Memorandum

Indirect and Cumulative Effects Discipline Report

Location Hydraulic Report

Navigable Waterways Discipline Report

Noise Study Report

Public Involvement Program Discipline Report

Public Services and Utilities Discipline Report

Section 4(f) Evaluation and *De Minimis* Finding Report

Social Impacts Discipline Report

St. Johns River Crossing Traffic Analysis Report

Stormwater and Water Quality Technical Memorandum

Transportation Technical Memorandum

Visual Quality Discipline Report

Wetlands Evaluation Report

Wildlife and Habitat Discipline Report

FINAL ENVIRONMENTAL IMPACT STATEMENT DISTRIBUTION LIST

Federal Agencies

Advisory Council on Historic Preservation – Office of Cultural Resources Preservation

Colorado State University – The Libraries, Documents Librarian

Federal Aviation Administrator – Airports District Office

Federal Aviation Administration – Regional Director

Federal Emergency Management Agency – Assoc. General Counsel for Insurance and Mitigation

Federal Emergency Management Agency – Natural Hazards Branch, Chief

Federal Railroad Administration – Office of Economic Analysis, Director

U.S. Army Corps of Engineers – ETAT Member

U.S. Coast Guard – ETAT Member

U.S. Department of Agriculture – Natural Resources Conservation Services, State Conservationist

U.S. Department of Agriculture – U.S. Forest Service, ETAT Member

U.S. Department of Commerce – National Marine Fisheries Service – ETAT Member

U.S. Department of Health and Human Services – Center for Environmental Health and Injury Control

U.S. Department of Housing and Urban Development, Regional Environmental Officer

U.S. Department of Interior – Bureau of Indian Affairs – Office of Trust Responsibilities

U.S. Department of Interior – Fish and Wildlife Service, ETAT Member

U.S. Department of Interior – National Park Service – Southeast Regional Office

U.S. Department of Interior – Office of Environmental Policy and Compliance, Director

U.S. Department of Interior – U.S. Geological Survey Chief

U.S. Department of State – Office of Environment, Health and Natural Resources

U.S. Environmental Protection Agency – ETAT Member

U.S. Environmental Protection Agency, Washington, D.C.

State Agencies

Florida Department of Community Affairs – ETAT Member

Florida Department of Community Affairs, Florida State Clearinghouse

Florida Department of Environmental Protection – ETAT Member

Florida Department of Health

Florida Department of State – Division of Historical Resources – ETAT Member

Florida Fish and Wildlife Conservation Commission – ETAT Member

St. Johns River Water Management District – ETAT Member

Local Agencies

Florida Inland Navigation District

Putnam County Commissioners Chairperson

Clay County Board of County Commissioners, Chairperson

Clay County, Planning Department

Clay County, Public Works Department

Clay County, Superintendent of Schools

Clay County Sheriff's Office

St. Johns County Board of Commissioners, Chairperson

St. Johns County, Planning Department

St. Johns County, Public Works Department

St. Johns County Superintendent of Schools

St. Johns County Sheriff's Office

City of Green Cove Springs City Manager

City of Green Cove Springs Mayor

First Coast Metropolitan Planning Organization

Northeast Regional Planning Council

Other Interested Parties

Senator Marco Rubio (R) (District: Junior Seat), U.S. Senator

Senator Bill Nelson (D) (District: Senior Seat Office), U.S. Senator

Senator Aaron Bean, District 4 State Senator

Senator John Thrasher., District 6 State Senator

Senator Bob Bradley, District 7 State Senator

Senator Audrey Gibson, Sr., District 9 State Senator

Representative Daniel Davis, District 15 State Representative

Representative Charles McBurney, District 16 State Representative

Representative Ronad "Doc" Renuart, District 17 State Representative

Representative Travis W. Cummings, District 18 State Representative

Representative Charles E. Van Zant, District 19 State Representative

U.S. Representative Ted Yoho, 3rd Congressional District

U.S. Representative Ron DeSantis, 6th Congressional District

U.S. Representative John Mica, 7th Congressional District


St. Johns River Crossing