Cheswick Oak Avenue/Oakleaf Plantation Parkway Corridor Study

UPWP Task 5.4

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Purpose and Need

North central Clay County is a rapidly growing area that is experiencing significant changes with the completion of SR-23 (First Coast Expressway). The development pressure and need for access to essential community resources like fire, rescue and police are important challenges within the community. Clay County population grew 12.5% from 2010 (190,865) to 2022 (225,553).

This growth is increasing the demand for mobility. The population is anticipated to grow to 285,400 people by 2050 and new projects are needed to address this demand.

The area east of the First Coast Expressway, south of Argyle Forest Boulevard near Cheswick Oak, and northwest of Blanding Boulevard is currently undeveloped, with new development planned. Argyle Forest Boulevard is the nearest east-west route and the nearest interchange on SR-23. It is located about 2.5 miles north from the interchange of SR-23 and the Oakleaf Plantation Parkway interchange. This limits the ability for travelers to move east-west through this section of the county between SR-23 and SR-21 (Blanding Boulevard). Argyle Forest Boulevard is highly congested, making travel time even longer during peak periods. Based on the North Florida Transportation Planning Organization (TPO)'s Strategic Safety Plan, it is also a corridor that experiences more frequent fatal and serious crashes than other roadways of similar classifications throughout the region.

Cheswick Oak Avenue and Oakleaf Plantation Parkway are separated by only 1.7miles, but it is a 7.5-mile drive from the end Cheswick Oak Avenue to the SR-23 interchange as shown on Figure 1.

This circuitous route limits emergency services, such as fire/rescue, police and hospitals, and access to the growing area east of SR-23 and south of Cheswick Oak Avenue. This study was performed to address the needs within this area and provide a new roadway to enhance system connectivity.

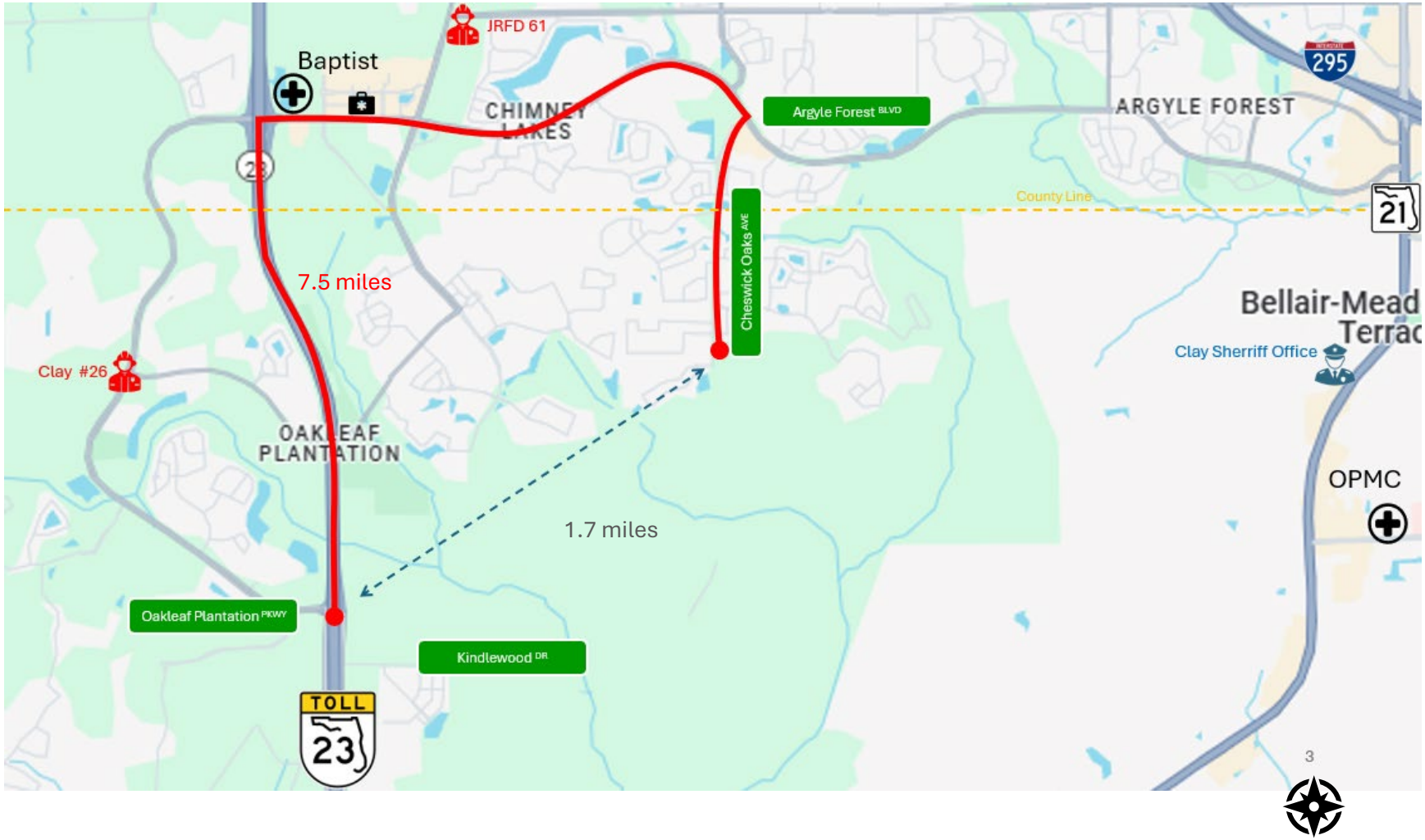
Old Jennings Road is the next closest east-west route near the project location. It is located about 3.15 miles south of the SR-23 Oakleaf Plantation Parkway interchange which is too remote to provide relief for this demand.

Florida's Turnpike Enterprise is evaluating operational and safety improvements at the SR-23 interchange with Oakleaf Plantation Parkway to accommodate future demand associated with extending the Oakleaf Plantation Parkway to the east.

This project is in the Branan Field Master Plan and the need for a new east-west roadway connecting SR-23 to Cheswick Oak Avenue is identified as needed in the County's 2040 Comprehensive Plan.

The Florida Department of Transportation (FDOT) is currently preparing a study to evaluate the need for improvements with the extension of Cheswick Oak Avenue.

Figure 1. Location Map



Alternatives Considered

No Build Alternative

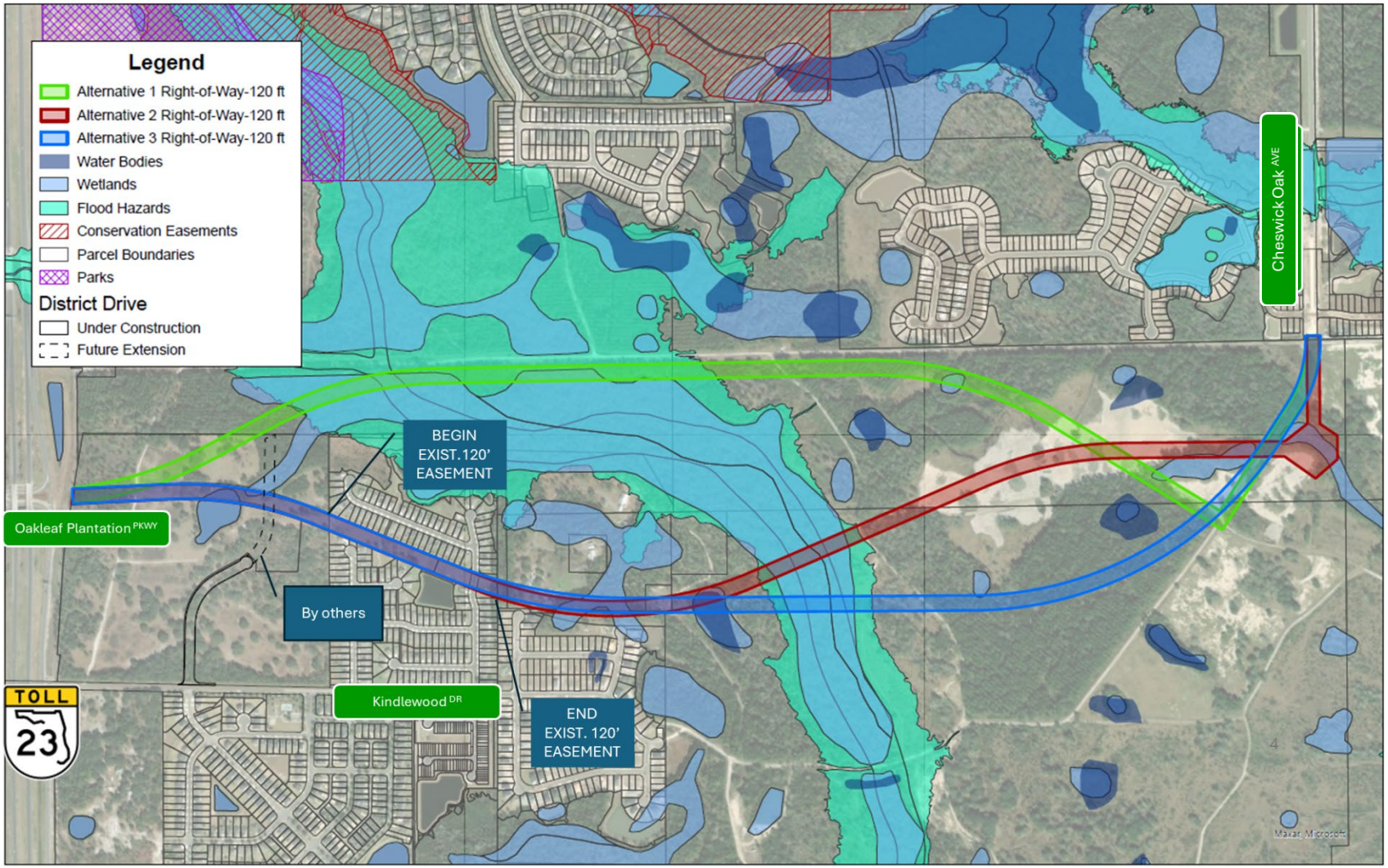
A No-Build, or no-action alternative was analyzed to determine the potential impacts of any new road construction.

Build Alternatives

Three "build" alternative corridors were developed to meet this need and are shown on Figure 2.

- Alternative 1 (Green Corridor) connects the SR-23 interchange at Oakleaf Plantation Parkway with Cheswick Oak Avenue by traversing north to along an existing FPL power easement. This alternative is about 1.82 miles long. Once to the east of the Double Branch Creek floodway, the alignment connects to an existing unpaved roadway before following that alignment north to create a continuous Cheswick Oak Avenue corridor. In the concept shown, the Right of Way (R/W) consistent with a signalized intersection at the location is shown, but a roundabout could be constructed instead.
- Alternative 2 (Red Corridor) connects the SR-23 interchange at Oakleaf Plantation Parkway with Cheswick Oak Avenue by traveling east-west and then turns southeast along an existing 120-ft easement set aside for transportation purposes. It crosses Double Branch Creek to the south at a narrower location and then connects at the existing unpaved road. In this corridor concept, the R/W required for construction of a roundabout is shown but a signal could be constructed instead.
- Alternative 3 (Blue Corridor) follows Alternative 2 through the existing 120-ft easement but crosses Double Branch Creek to the south and curves to make a continuous route instead of an intersection with the unpaved road to connect with Cheswick Oak Avenue.

Figure 2. Corridor Alternatives



Project Traffic

Travel demand forecasting analysis was performed considering the existing and planned developments in Clay County by the year 2045 using the Northeast Florida Regional Planning Model – Activity Based (NERPM-AB)Question – is this now NERPM 2020, not AB? adopted by the North Florida TPO. The 2045 NERPM-AB was updated to include the planned development for the year 2045 and completion of SR-23. The socio-economic data in 40 of the traffic analysis zones in Clay County were updated using information provided by Clay County.

Future traffic demand was analyzed with the Cheswick Oak Avenue-Oakleaf Plantation Parkway project as a standalone project and with the CR-224 (College Drive) Extension (also known as the Cleveland Connector) from SR-21 to the proposed Cheswick Oak Avenue/Oakleaf Plantation Parkway Extension as shown on Figure 3. The College Drive Extension was considered since it is part of the County's Comprehensive Plan and is identified in their Future Land Use Map.

Construction of the College Drive extension will not have a significant impact on the demand for the Cheswick Oak Avenue-Oakleaf Plantation Parkway Connector. If the College Drive Extension were constructed (it is currently unfunded), a two-lane east-west segment of the proposed project will meet the demand for the project by 2045. A four-lane corridor is proposed for analysis in this study. Cheswick Oak from the intersection with a new east-west road is anticipated to need to be six-laned by 2040 if the connector is constructed.

Construction of the new road will relieve congestion on Argyle Forest Boulevard between Old Middleburg Road and Cheswick Oak Avenue, and on Oakleaf Plantation Parkway from Plantation Oak Boulevard to the Duval County line reducing the traffic Level of Service (LOS) from an existing LOS F to LOS C through the year 2045. The analysis is summarized in Table 1.

Figure 3. Clay County Comprehensive Plan Corridor Alignment

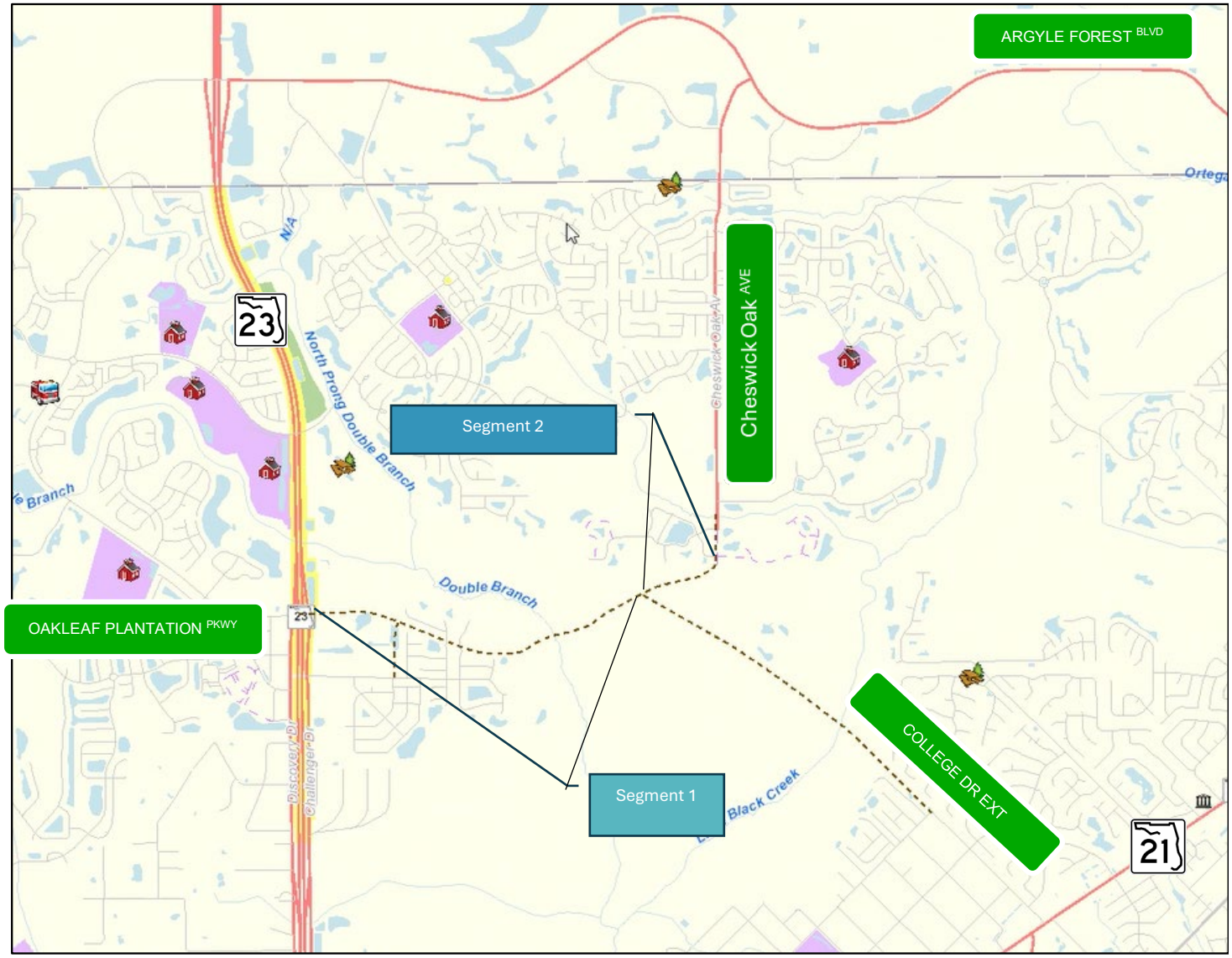


Table 1. Level of Service (LOS) Analysis

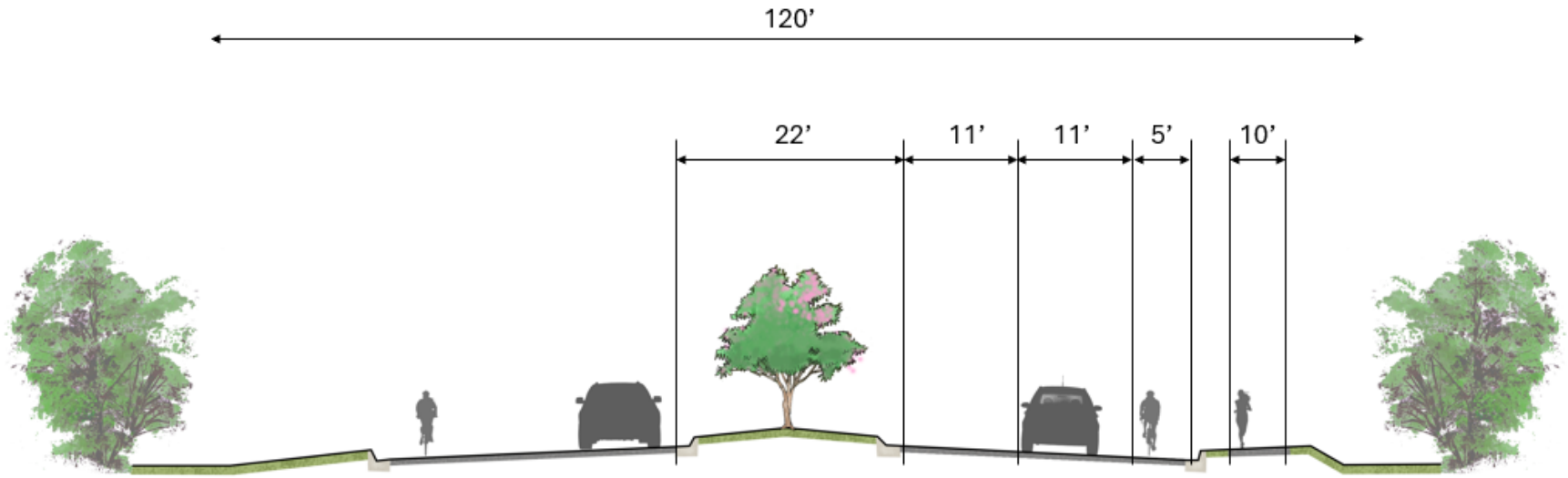
Road	From	To	Class	2023 Existing AADT	2023 Existing LOS	2045 No Build AADT	2045 No Build LOS	2045 Build AADT	2045 Build LOS	Change
SR-23 (Mainline)[1]	SR-21 Blanding Boulevard	Oakleaf Plantation Parkway	LA	24,400	B	45,000	B	37,000	B	(8,000)
	Oakleaf Plantation Parkway	Oakleaf Plantation Parkway	LA	22,300	B	49,000	B	46,500	B	(2,500)
Argyle Forest Boulevard[1]	SR-23	Old Middleburg Road	C3R[3]	38,500	F	53,400	F	44,400	F	(11,000)
	Old Middleburg Road	Cheswick Oak Avenue	C3R[3]	38,500	F	53,400	F	28,800	C	(24,600)
Old Middleburg Road	Oakleaf Plantation Parkway	Argyle Forest Boulevard		22,300	B	30,100	C	28,800	C	(1,300)
Oakleaf Plantation Parkway[2]	Plantation Oak Boulevard	Duval County Line	C3R[3]	38,000	F	40,400	F	23,600	C	(16,800)
	SR-23	Plantation Oaks Boulevard	C3R[3]	14,200	C	27,800	C	19,800	C	(8,000)
Proposed 4-Lane Connector	SR-23	Cheswick Oak Avenue	C3R[3]	-	-	-	-	21,300	C	21,300
Cheswick Oak Avenue[4]	Proposed Connector	Argyle Forest Boulevard	C3R[4]	(4)	C	14,000	C	22,400	D	8,400

(1) AADT and LOS for are from the FDOT D2 LOS Map for the existing and build condition.
(2) AADT and LOS for existing and Build are FDOT AADT shape file in the GIS Hub for the existing and build condition.
(3) Maximum Service Volume for C3R with four-lanes is 34,300 at LOS C and 37,300 at LOS D per FDOT Generalized LOS Table. Volumes above 37,300 are considered LOS F.
(4) Maximum Service Volume for C3R with two-lanes is 19,600 for LOS C and 22,400 for LOS D per FDOT Generalized LOS Table. The existing volume is not known currently. Future volumes are estimated using NERPM-AB.

Typical Section

A four-lane roadway is needed to meet the traffic demand anticipated by the year 2045. The proposed typical section consists of two travel lanes (11-ft) and a bike lane (5-ft) in each direction divided by a raised median (22-ft) with a shared-use path (10-ft) on one side of the road as shown on Figure 4.

Figure 4. Proposed Four-Lane Typical Section



Design Criteria

Table 2 summarizes the design criteria selected for this project which were based on the criteria established in the 2023 FDOT Manual for Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, commonly called the Florida Greenbook.

Table 2. Design Criteria

Criteria	Selected Value
Design Speed	45 MPH
Lane Width	11-ft
Roadway Shoulder Type	Curb and gutter
Bridge Shoulder	5-ft outside* 8-ft outside for bridge > 500’
Bike Lane Width	5-ft
Median Width**	22-ft
Median Type	Curb and gutter
Shared Use Path Width	10-ft min
Superelevation Rate	6% maximum
Minimum Horizontal Curve Radius	643-ft 6,830-ft for normal crown 540-ft intersection curves
Stopping Sight Distance	360-ft
Vertical Grade	6% maximum
Cross Slope	3%
Vertical Clearance	17-ft minimum
Clear Zone	20-ft
Design Storm for Bridge Hydraulics	100-year
Bridge freeboard (vertical clearance)	2-ft

(*) Matches bike lane width proposed and AASHTO criteria for curb-to-curb width of the street minimum bridge width.

(**) Median on the bridge matches the roadway median. A median barrier may be used in final design that could reduce the median width from 22to 18feet or add to the shoulder width.

Alignment Analysis

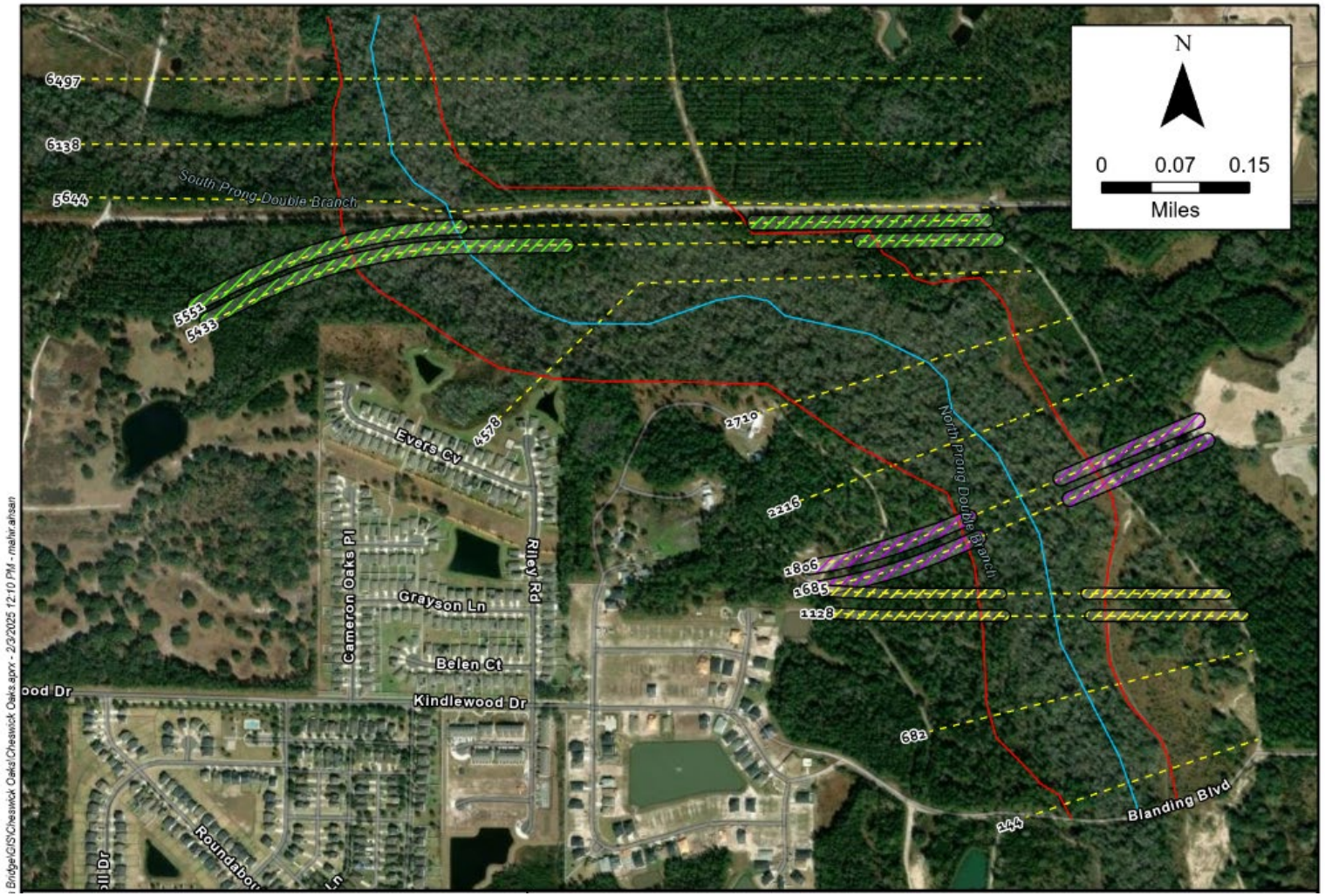
The horizontal alignment proposed for this corridor meets the design criteria in **Table 2**. A Digital Elevation Model (DEM) was prepared using LiDAR data for the year 2020 from the US Geological Survey to develop a project plan, profile and preliminary alignments. The DEM was used to prepare a conceptual profile for the project to estimate construction costs for roadway earthwork.

Appendix A provides the conceptual alignment for the project.

Bridge Hydraulics

The DEM was used to perform conceptual bridge hydraulic analysis to estimate the bridge length, span, and elevation requirements. The project is located within FEMA FIRMs 12019C0065E & 12019C0070E (eff. date 3/17/2014) and all alignment alternatives pass through a designated FEMA floodway. Boundary conditions were set for the model using information obtained from the latest FEMA FIS study 12019CV001A & 12019CV002A (eff. date 03/17/2014) for the area with the upstream flow and tailwater conditions being taken from the Double Branch. Figure 5 shows the HEC-RAS model developed for the project. The model boundary conditions are summarized in Table 3. Additional detail is provided in Appendix B.

Figure 5. HEC-RAS Model



Each of the numbers shown on the alignment are features identifiers generated in HEC-RAS model.

Table 3. HEC-RAS Model Boundary Conditions

Location	Flow Conditions (cfs)			Tailwater Location Conditions (ft) (NAVD 88)		
	50-year	100-year	500-year	50-year	100-year	500-year
Upstream near mouth of North and South Prong Branch	1,410	1,700	2,450	-		
Upstream of Blanding Blvd	-			17.33	18.00	18.79

Table 4. Bridge Hydraulics Analysis Results (100-Year Storm)

Item	Alt.1 Green	Alt. 2 Red	Alt. 3 Blue
Design High Water (ft)	25.46	20.15	18.68
Vertical Clearance (ft)	2.0	2.0	2.0
Bridge Length (ft)	1,200	450	400
Structure Depth (ft)	4.5	4.5	4.5
Roadway Elevation (ft)	32.38	27.07	25.60

Water Quality

Treating stormwater runoff to remove pollutants is required in accordance with St. Johns River Water Management District (SJRWMD) regulations.

The Double Branch Creek within this area is part of the Reclaimed Water Service Area associated with Spencer's Crossing and Oakleaf and is permitted under Consumptive Use Permit 416 and 137335. Coordination with SJRWMD will be required and special treatment and attenuation design criteria may be needed for this project.

Floodplains

The runoff is also required to be attenuated so that the flow will not exceed existing conditions which could result in flooding. These rules are addressed in Chapter 40C of the Florida Administrative Code and the SJRWMD Applicant Handbook.

Constructing the proposed roadway will result in "fill" sections within existing floodplains. This reduces the capacity of the floodplains to store runoff during a storm event and will need to be mitigated during the design. With the limited scope for this study, no detailed evaluation was conducted. The floodplain compensation and stormwater ponds can be combined to provide efficient solutions. To estimate the R/W needed for stormwater treatment and floodplain compensation ponds, an area of 20% of the impervious area to be constructed by the project was assumed.

Intersections

No intersection design concepts were developed because of the limited scope of this project.

A separate project is being developed to identify improvements at the SR-23 interchange with Oakleaf Plantation Parkway that could impact the intersection alignment.

Preliminary traffic analysis was performed for the T-intersection of the Oakleaf Plantation Parkway extension to the Cheswick Oak Avenue extension with Alternatives 1 and 2. Either a roundabout or traffic signal is anticipated to provide an acceptable solution. Additional detail analysis is needed to determine the final configuration.

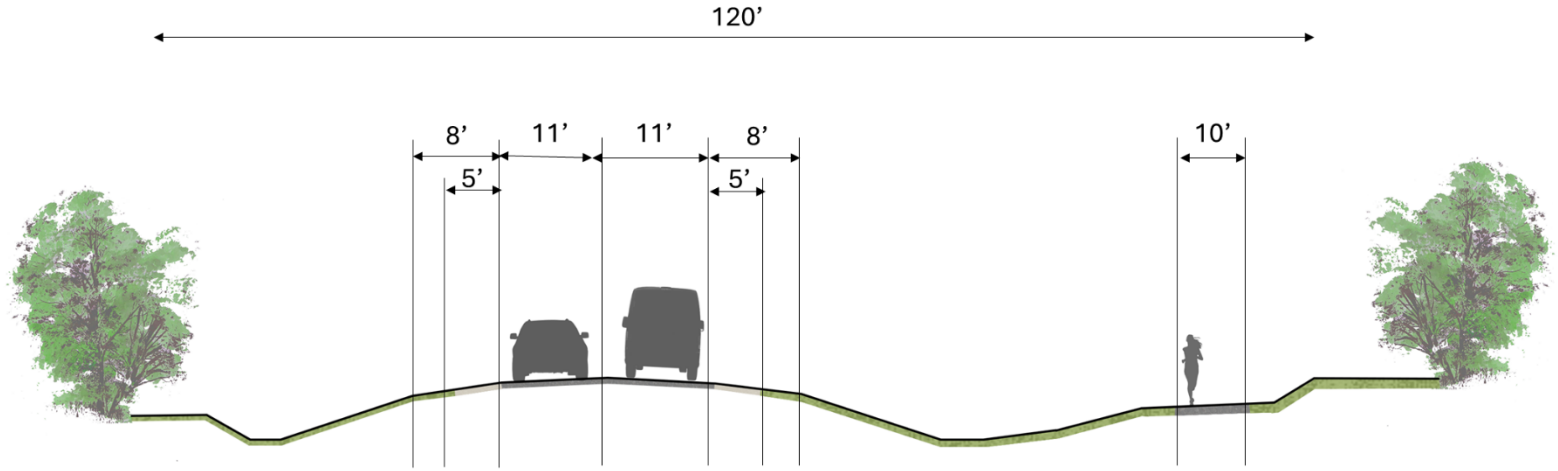
Two-Lane "Interim" Alternative

This alternative proposes constructing the roadway in a phased approach that makes the future widening from two to four lanes the least expensive and most efficient. It will construct bridges at the width required for four lanes. Stormwater ponds and other components of the roadway will be constructed as needed for the future four-lane road.

The typical section is shown in Figure 6.

No detailed analysis of this alternative was performed but this "interim" alternative has an opportunity lower cost by constructing two bridges instead of one and constructing a narrower bridge initially.

Figure 6. Two-Lane Typical Section



Environmental Considerations

Social and Economic Analysis

Existing land uses in the vicinity of the proposed corridor are largely undeveloped. The study area is part of the Branan Field Planned Unit Development Corridor Master Plan. The area of the proposed alignment is dominated by the features associated with the Double Branch Creek which include wetlands, conservation areas and floodplains.

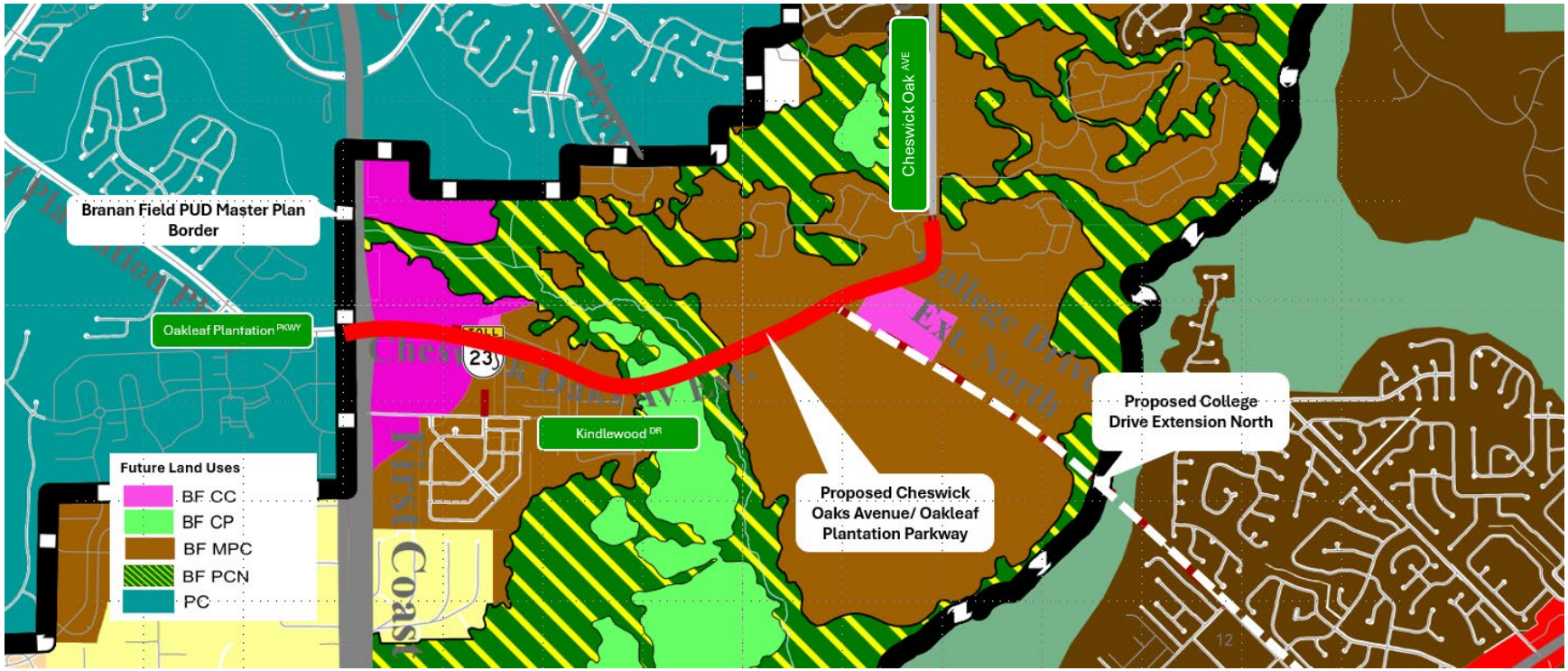
The proposed Cheswick Oak Avenue/ Oakleaf Plantation Parkway corridor is shown on County's Future Land Use Map and the County's Comprehensive Plan allows construction of transportation projects that are identified in the plan within the floodplains, wetlands and proposed conservation areas. The map currently shows alignments that are consistent with Alternatives 2 and 3, but this does not preclude construction of Alternative 1.

Future land uses identified in the 2040 Clay County Comprehensive Plan Future Lan Use Map are summarized in Table 5.

Table 5. Land Use Codes

Code	Name	Description
BC CC	Branan Field Community Center	Community-scaled residential, restaurant, office and commercial facilities, including grocery stores, but excluding "big box" stores
BF MPC	Branan Field Master Plan Community	Mix of residential, commercial and other uses
BF PCN	Branan Field Primary Conservation Network	Protected land that includes regulations about building heights and setbacks
BF CP	Countryside Preservation	Protect areas consistent with the Forest and Farms Land Conservation goals
PC	Planned Commercial	Mixed uses of office and retail

Figure 7. Future Land Use Map



The potential effect of the proposed corridor will include improved access to undeveloped properties and greater connectivity between communities to the north and west. This connectivity will improve access to work, schools and essential services like fire/rescue, police and hospitals. The corridor will also enhance access to potential recreational uses within the Double Branch Creek basin.

The project will enhance the mobility for all users within the area by providing a more direct route between communities. Bicycle lanes and a shared-use path are proposed to enhance access for non-driving population groups including the elderly, young and disabled.

Landscaping along the corridor is anticipated and there are opportunities to create stormwater parks – providing trails and recreational opportunities as part of the R/W acquired for stormwater ponds.

Alternatives 2 and 3 have the potential to result in two residential relocations and the removal of three buildings. Comparable housing opportunities are available in this area.

Cultural Resources

A Cultural Resource Assessment Survey (CRAS) is recommended for this project. The Florida Master Site File included the following information:

- Seven cultural and historic resources surveys were previously completed in the project area.
- Eight cultural resources were identified. Seven of these have been determined to be ineligible for the national register.
- One resource (a cemetery) was identified but will not likely be impacted by the project and has insufficient information to make an eligibility determination.

The cultural resources shown Table 7 are located within one mile of the project. None have been surveyed.

Other Potential Socio-Cultural Issues

- No community groups will be impacted by the project.
- No farmland is involved.

Table 6. Prior Cultural Resource Assessment Studies

Survey #	Name	Date	FID#	Sponsor
7832	Argyle West Tower Site	2000	5069	Bellsouth Mobility
10064	An Archaeological and Historical Assessment for the Proposed Branan Field Cellular Tower, Clay County, Florida	2004	6929	URS
10326	Assessment of Potential Effects Upon Historic Properties: Proposed 199-Foot Brannan Field Baptist Church, Inc. Wireless Telecommunications Tower, Clay County, Florida	2004	7111	Dynamic Environmental Associates, Inc.
12173	Cultural Resource Assessment Survey of the Proposed Extension of College Drive (CR 224) From South of State Road 21 (Blanding Boulevard) to State Road 23 (Branan Field-Chaffee Road) in Clay County, Florida	2005	8705	FDOT District 2
16090	Cultural Resource Assessment Survey of Six Ponds along State Road 23 Clay County, Florida	2008	11959	FDOT District 2
26018	Phase I Cultural Resource Assessment Survey of the Oakleaf Solar Farm, Clay County, Florida	2018	19472	Oakleaf Solar, LLC
26285	A Cultural Resource Assessment Survey of the Cameron Oaks Development Tract, Middleburg, Clay County, Florida	2018	19688	Hart Resources LLC.

Table 7. Known Cultural Resources

FID#	Site #	Name	Type	Eligible for NR
4628	CL00379	South Prong	Architectural	No
312	CL00380	Federal Hill Cemetery	Cemetery	Insufficient Info
4703	CL00795	Amber Lynne Site	Architectural	No
4704	CL00796	Benny Site	Architectural	No
4705	CL00797	Zax Site	Architectural	No
4706	CL00798	Garret Site	Architectural	No
4715	CL00897	Branan Outlying Manding Field	Landscape	No
4778	CL01124	Branan Field Bombing Range	Landscape	No

Natural Resources

This study did not include a detailed evaluation of the potential involvement of the natural resources that could be involved in this project. The following are known issues based on general knowledge of the project area.

Species

Clay County is home to threatened and endangered species, including the Florida black bear, gopher tortoise, red-cockaded woodpecker, and swallow-tailed kite. Other species like sandhill cranes and the Black Creek crayfish, which were recently listed as an endangered species, may also be present within the project area.

Investigations will be needed prior to permitting the project construction and mitigation may be required.

Wetlands, Floodplains and Other Surface Waters

Wetlands and other surface waters are involved in this project based on a GIS analysis using the National Wetland Inventory and Florida Emergency Management Agency (FEMA) databases. No Uniform Mitigation Analysis Method (UMAM) score is calculated.

Based on observations from residents near the project, the extent of the floodplains may not be as significant as included in FEMA's maps today. An evaluation to determine if the designated floodplain limits should be changed may be warranted.

The estimated impacts reflect the total area within the limits of construction.

Other Potential Natural Resource Issues

This is no involvement with essential fish habitat, aquatic preserves, or waterways classified as Outstanding Florida Waters, or Wild and Scenic Rivers.

Physical Resources

No impacts associated with noise, air quality, contaminated sites or railroads are anticipated.

Alternative 1 is contiguous with the Florida Power and Light (FPL) distribution line R/W. Opportunities for joint use of the utility R/W should be explored during subsequent phases to reduce the R/W required for this project.

Temporary construction impacts will occur - such as sediment control and wetland during construction of the proposed bridges over the Double Branch Creek. Best management practices will be implemented to mitigate these impacts and will be developed in subsequent phases of the project.

Summary of Alternatives Analysis

The Cheswick Oak Avenue and Oakleaf Plantation Parkway corridor will provide significant benefit to travelers in Clay and Duval counties. The project will

- Enhance emergency services access
- Provide system connectivity
- Reduce congestion
- Ensure planning consistency

Three alternative corridor alignments were evaluated in this study. Alternative 1 (green) is aligned to the north contiguous with the FPL easement. Alternatives 2 (red) and 3 (blue) are aligned more east-west along the existing Oakleaf Plantation Parkway but shift to the south to minimize the crossing of the Double Branch Creek associated floodplains.

The project will result in the need for R/W acquisition and impact floodplains, wetlands and other surface waters that will need additional evaluation to understand the significance of the impact.

Construction costs were estimated using historic average costs and planning level assumptions for the design. A 10% allowance for project unknowns was considered. Engineering and professional services required to develop and design the project were estimated. The costs for R/W were estimated based on information provided by the Clay County Property Appraiser and experience with other projects. Environmental costs to mitigate wetland impacts were also estimated based on experience with related projects. The project is estimated to cost between $90 and $100 million to construct a four-lane roadway. An alternative for an interim, or phased solution was also identified that will cost between $73 and $82 million. The cost estimate is provided in Appendix C.

A summary of the potential impacts and costs for each alternative are summarized in Table 8.

The project is not funded in the North Florida Transportation Planning Organization’s 2050 Long Range Transportation Plan.

Table 8. Project Evaluation Summary

Issue	No Build	Alternative 1 (Green)	Alternative 2 (Red)	Alternative 3 (Blue)
Emergency Access	🔴	🟢	🟢	🟢
System Connectivity	🔴	🟢	🟢	🟢
Reduce Congestion	🔴	🟢	🟢	🟢
Land Use Consistency	🔴	◔	🟢	🟢
Conservation Areas	-	🟢	◔	◔
Wetlands (acres)	-	5.04	6.03	4.08
Other Surface Waters (acres)	-	0	0.42	0.72
Floodplains (acres)	-	9.21	2.41	2.19
Right of Way				
Parcels	-	4	10	9
Area (acres)	-	33.44	30.84	29.37
Non-residential Building Impacts	-	-	3	3
Residential Relocations	-		2	2
Costs Four Lane	-	**$100.6**	**$90.6**	**$94.5**
Costs Two Lane		**$68.0**	**$73.7**	**$76.7**

🔴	Poor	🟢	Very Good
◔	Fair	◔	Good
-	Not appliable or none		

Next Steps

If federal or state funding is authorized, the project can move to the Project Development and Environment (PD&E) phase which is described in the Florida Department of Transportation's (FDOT) PD&E Manual.

PD&E Phase

During the PD&E, the following issues identified in this study will need to be addressed in greater detail:

- Alternatives 2 and 3 impact areas designed as part of the Branan Field Primary Conservation Network. A Section 4(f) determination may be required. However, these areas are not being actively used, and the proposed project is shown in the Land Use Element of the Comprehensive Plan. A *de minimums* or no impact is likely.
- Coordination with the Fish and Wildlife Service on potential involvement of protected species.
- Floodplain compensation will be required and coordination.
- A water quality impact evaluation is required since the project is in the Spencer's Crossing-Oakleaf Reclaimed Water Service Area.
- A CRAS and coordination with the State Historic Preservation Office is needed to determine if there are any impacts to cultural resources by the project.
- A relocation assistance plan will need to be prepared if relocations are required.

A class of action determination will be needed to determine the type of environmental document that is needed.

- If federal funds are used, the project could be classified as an Environmental Assessment since it involves new road construction.
- If state funded, and no federal funding is authorized or anticipated to be in future phases of the project, the state environmental impact report process can be used.

Public involvement is required as part of the PD&E Phase.

Coordination with the Florida Turnpike Enterprise's evaluation of improvements at the SR-23 interchange with Oakleaf Plantation Parkway and the proposed development in this area is recommended during the PD&E Phase to preserve R/W for use on the project. During the PD&E Phase, the project may advance to 60% plans and right-of-way maps.

Final Design

Following the PD&E phase, the project can enter final design, permitting and construction.

Prior to construction beginning, an Environmental Resource Permit from the St. Johns River Water Management District will be required before construction can begin. This permit process includes coordination with the US Army Corp of Engineers for wetland permitting.

R/W Acquisition

If federal funds are used, R/W acquisition cannot occur until the PD&E study is complete. All R/W, including temporary construction easements, must be completed before construction can begin in the area that is needed. If federal funding is used, the project must follow the Uniform Relocation and Assistance Act.

Construction

Once R/W is acquired, construction can begin.