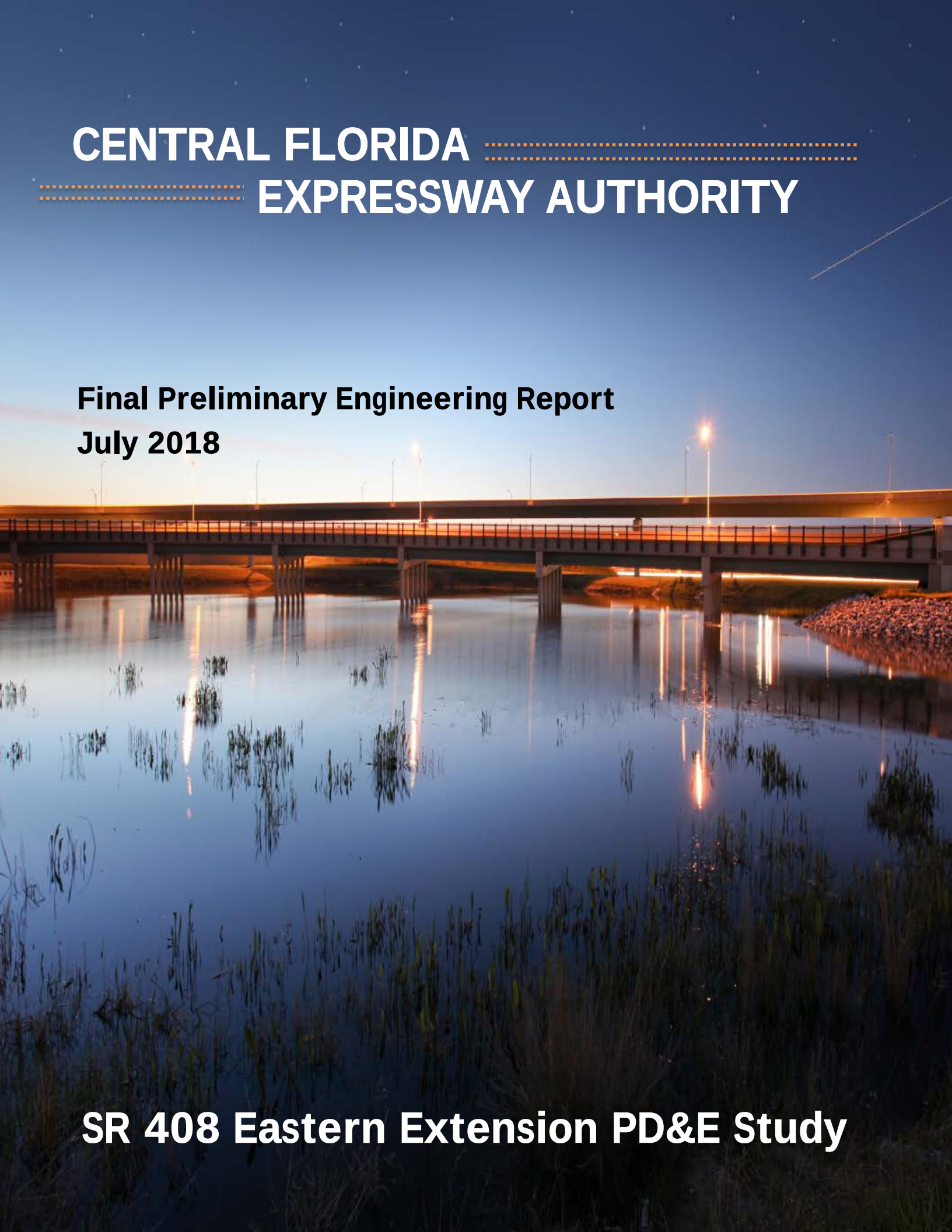


CENTRAL FLORIDA EXPRESSWAY AUTHORITY

Final Preliminary Engineering Report
July 2018

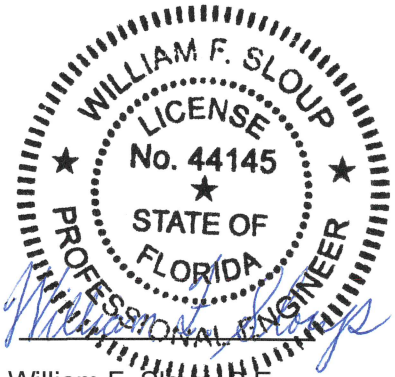
SR 408 Eastern Extension PD&E Study

PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Metric Engineering, Inc., authorized under the provisions of Section 471.023, Florida Statutes, to offer engineering services to the public through a Professional Engineer, duly licensed under Chapter 471, Florida Statutes, Certificate of Authorization (CA) No. 2294, by the State of Florida Department of Professional Regulation, Board of Professional Engineers, and that I have prepared or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for:

CFX Project Number:	**408-254**
Federal Aid Project No.:	**N/A**
Project:	**SR 408 Eastern Extension from SR 50 to SR 50/SR 520 Intersection**
County:	**Orange**
CFX Project Manager:	**Glenn Pressimone**

I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.



SIGNATURE: _____

Name: William F. Sloup, P.E.

P.E. No.: 44145

Firm: Metric Engineering, Inc.
615 Crescent Executive Ct.,
Suite 524
Lake Mary, FL 32746

Date: July 24, 2018

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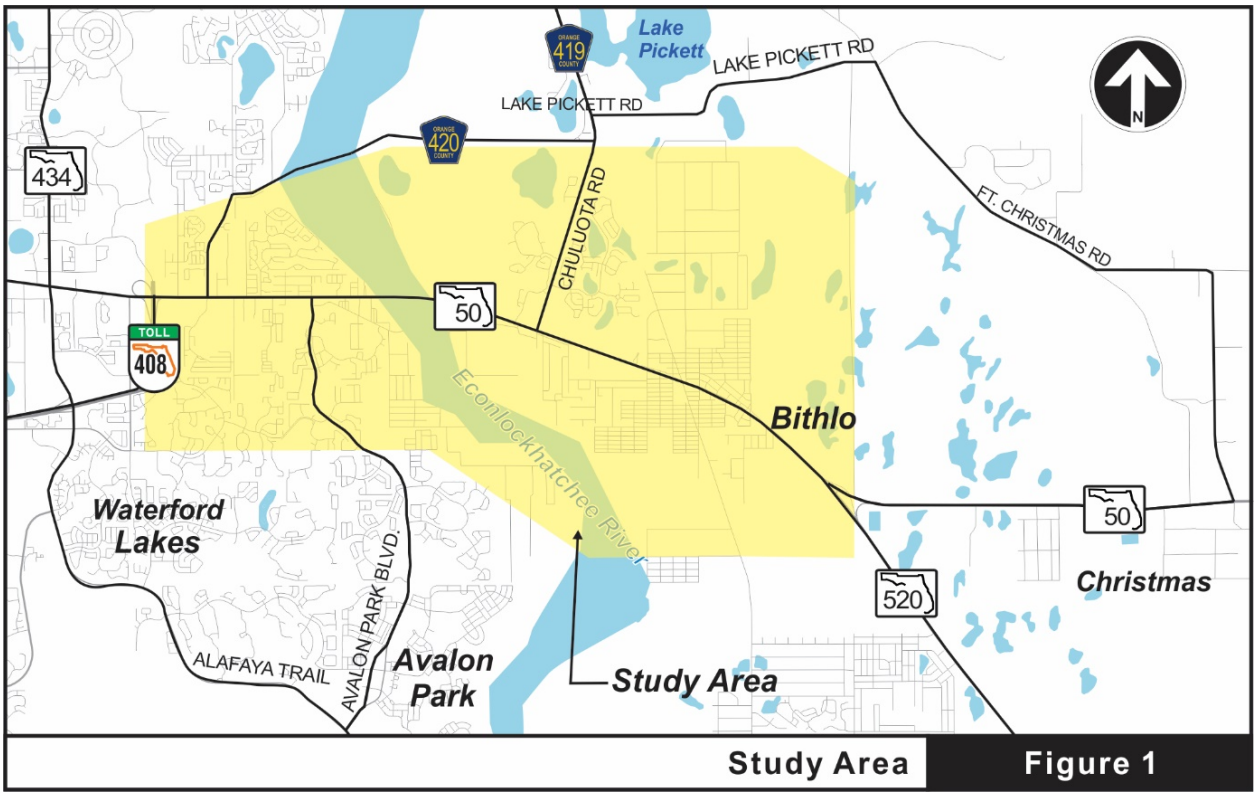
EXECUTIVE SUMMARY

Purpose

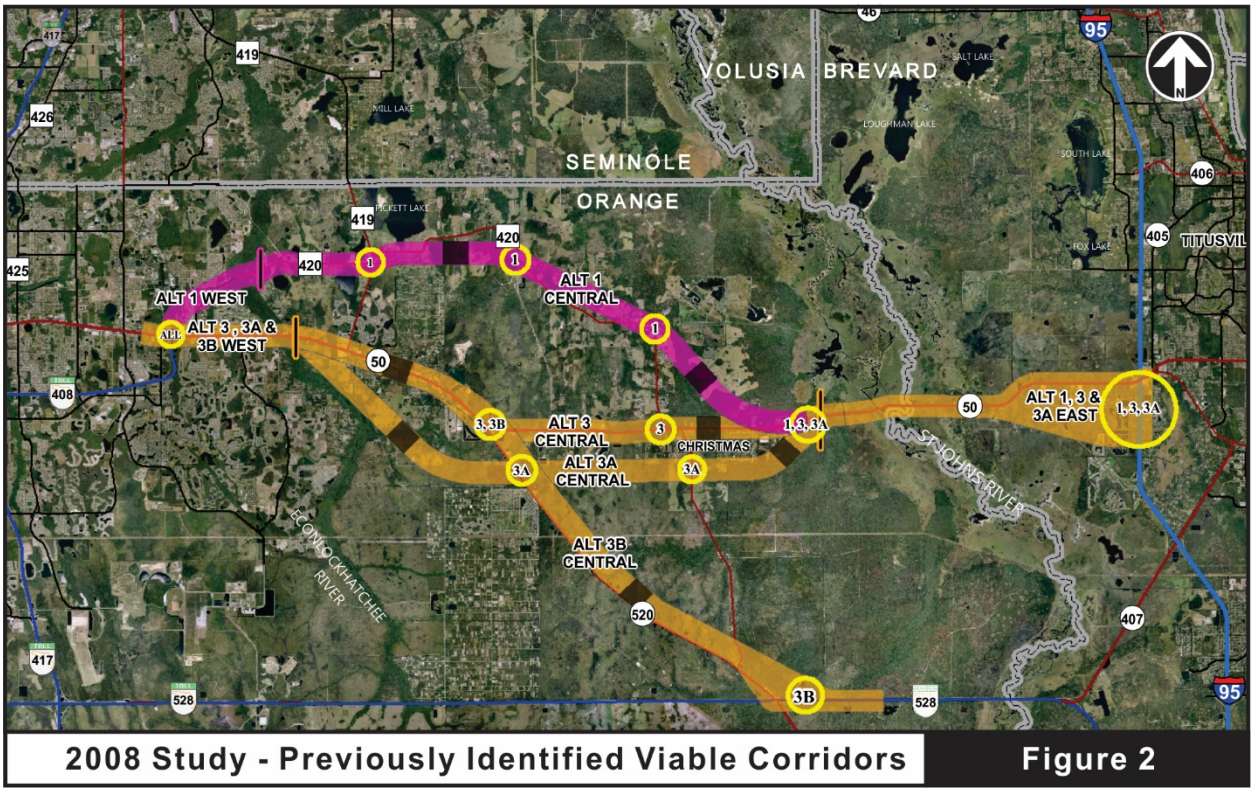
The purpose of the SR 408 Eastern Extension Project Development and Environment (PD&E) Study is to develop a proposed improvement strategy that is technically sound, environmentally sensitive and publicly acceptable. Emphasis has been placed on the development, evaluation and documentation of detailed engineering and environmental studies including data collection, conceptual design, environmental analyses, project documentation and the preparation of a Preliminary Engineering Report.

The Central Florida Expressway Authority (CFX) is presently evaluating the potential to extend State Road (SR) 408 from its current eastern terminus at SR 50, locally known as East Colonial Drive, to the vicinity of the SR 50 and SR 520 interchange in northeastern Orange County (see **Figure 1**). This new, approximately seven-mile eastern extension of SR 408 would constitute the first stage towards providing a east-west high-speed corridor with future connectivity to I-95, enhance safety, and increase capacity and mobility for the region and CFX's customers.



Project Description/Background

The vision of this enhanced east-west corridor has been documented in prior concept studies prepared by CFX including the SR 408 Eastern Extension Concept Development and Evaluation Study completed in 2008. This study evaluated potential corridors for a new limited-access facility between east Orange County and north Brevard County. The original study area generally parallels SR 50 from east of SR 434 to I-95. After a preliminary corridor evaluation, four viable corridors were determined to meet the criteria and were further evaluated. These corridors are shown on **Figure 2**. The results of the previous study indicated that "Corridor 3B (along SR 50) met the transportation need west of SR 520, providing relief of the existing and projected future traffic congestion along SR 50 from Alafaya Trail/SR 434 to SR 520. This alternative diverted the greatest number of trips, had the lowest estimated cost, and had the fewest potential impacts to environmental and community resources of any of the viable corridors considered at that time. This corridor also provided for a potential future extension of the proposed limited-access facility southeast along either the SR 520 or SR 50 corridors, affording system linkage between east Orange County and Brevard County."



2008 Study - Previously Identified Viable Corridors — Figure 2

As part of the SR 408 Eastern Extension PD&E Study, a preliminary corridor evaluation was initially performed in 2015, in which different viable alternatives were considered. Those alternatives that met the basic project objectives were further evaluated and presented in a final report which recommended that the proposed SR 408 extension be co-located within the existing SR 50 corridor. However, in May 2016, the Florida Department of Transportation (FDOT) notified CFX that there are issues with CFX utilizing FDOT right-of-way for the SR 408 extension. As a result, new transportation corridors were developed that avoid SR 50 and that will address the transportation needs while minimizing impacts to the natural, physical and cultural environments.

Deficiencies

The overall study was initiated with a detailed, comprehensive analysis of existing substandard conditions. In general terms, some of the most critical existing deficiencies include:

- **Capacity Deficiencies:** Results of the preliminary No Build projections reflect that even with the planned widening of SR 50 to six lanes by FDOT, there is insufficient capacity and major traffic congestion in future year projections. Additional capacity should be provided to satisfy the transportation needs of the study area.
- **Emergency Evacuation:** The East Central Florida Region has suffered from critical issues with fire and emergency services, and has been identified as a high hurricane vulnerable area by the National Oceanic Atmospheric Administration (NOAA), and thus needs sufficient and efficient evacuation routes. SR 50 has been designated as a primary evacuation route for the eastern Orange and northern Brevard Counties and any future capacity deficiency along this main evacuation route could seriously jeopardize the effectiveness of coastal evacuation.
- **Linkage Deficiencies:** SR 408 along with SR 50 are part of Florida's strategic transportation investments and provide an important connectivity function between different locations. Because of its important linkage function, the need to optimize vehicular mobility within the project limits is critical. A new expressway facility would not only improve mobility but significantly reduce the existing potential exposure to at-grade conflict points associated with traffic signals, and local access issues.

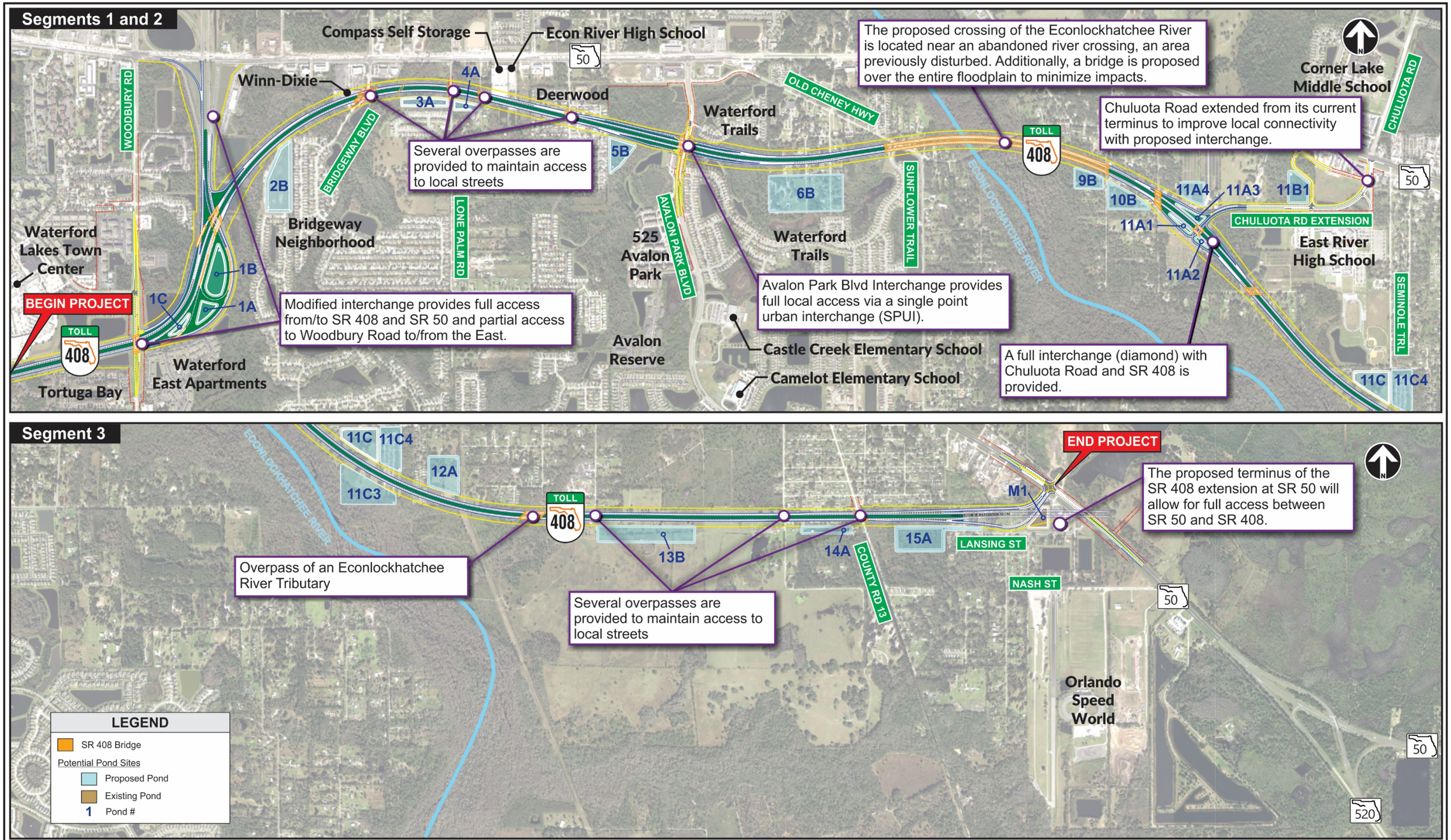
- **Planning Consistency:** CFX (formerly as OOCEA) adopted different studies like the *2030 Master Plan* which primarily focused in preserving and enhancing its system so it meets its transportation needs, and the 2008 SR 408 Eastern Extension Concept Development and Evaluation Study which recommended that the SR 408 extension should follow the SR 50 corridor out to SR 520. All proposed improvements are consistent with the Central Florida Expressway Authority (CFX) 2040 Master Plan, CFX Five-Year Work Plan, and MetroPlan Orlando 2040 Long Range Transportation plan.

Recommendations

Results of the public involvement effort as well as the engineering and environmental studies are summarized in Section 8 of this report. After a comprehensive evaluation process, one alternative was selected as being the most effective option. In general, this alternative was the result of the generation of various typical sections and horizontal and vertical alignment combinations along the three project segments as well as various interchange configurations at each access point.

A summary of the preferred alternative is illustrated on the following pages and details can be found in Section 7.

- Construction Segment 1 (from the Begin Project to Avalon Park Boulevard): Within Segment 1, the preferred alternative features a four-lane rural expressway typical section with 12-foot travel lanes, 12-foot outside shoulders, a 64-foot divided median, and a 94-foot border width. The section will feature several grade separations in order to provide access to local streets. There has also been a modification at the SR 408 and SR 50/Challenger Parkway interchange to provide full access between SR 50/Challenger Parkway and SR 408. There is an additional half interchange at Woodbury Road (Woodbury Road to Eastbound SR 408 and Westbound SR 408 to Woodbury Road). Based on the results of the traffic analysis, a single point urban interchange is proposed at Avalon Park Boulevard. **Figure 3** (top) shows some of the most distinctive features of this option within Segment 1, and **Figure 4** (top panel) shows the typical section. Eight (8) preferred ponds are located in Segment 1 (see **Table 1**).



Preferred Alternative **Figure 3**

- Construction Segment 2 (from Avalon Park Boulevard to Chuluota Road): Within Segment 2, the preferred alternative continues the same typical section previously described under Segment 1. Based on traffic projections and to minimize impacts to East River High School, County Road (CR) 419 (Chuluota Road) is extended westward to intersect with the SR 408 Extension with a full diamond interchange. The extension of Chuluota Road features an urban typical section with 11-foot travel lanes, curb and gutter, and 5-foot sidewalks on both sides of the roadway. **Figure 3** (top panel) shows some of the most distinctive features of the alternative within Segment 2 and **Figure 4** (top panel) shows the typical section for the SR 408 mainline and **Figure 4** (bottom panel) shows the typical section for the Chuluota Road extension. Seven (7) preferred ponds are located in Segment 2 (see **Table 1**).
- Construction Segment 3 (from Chuluota Road to the eastern project terminus): Within Segment 3, the preferred alternative continues the same typical section previously described under Segment 1. Some of the most important attributes within Segment 3 are shown on **Figure 3** (bottom panel) and **Figure 4** (top panel) shows the typical section. Seven (7) preferred ponds are located in Segment 3 (see **Table 1**).

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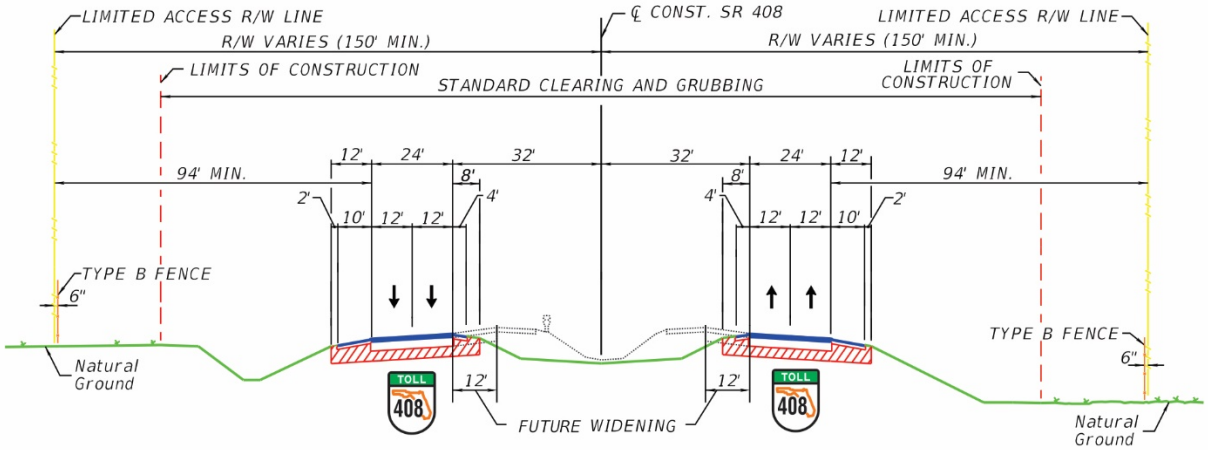
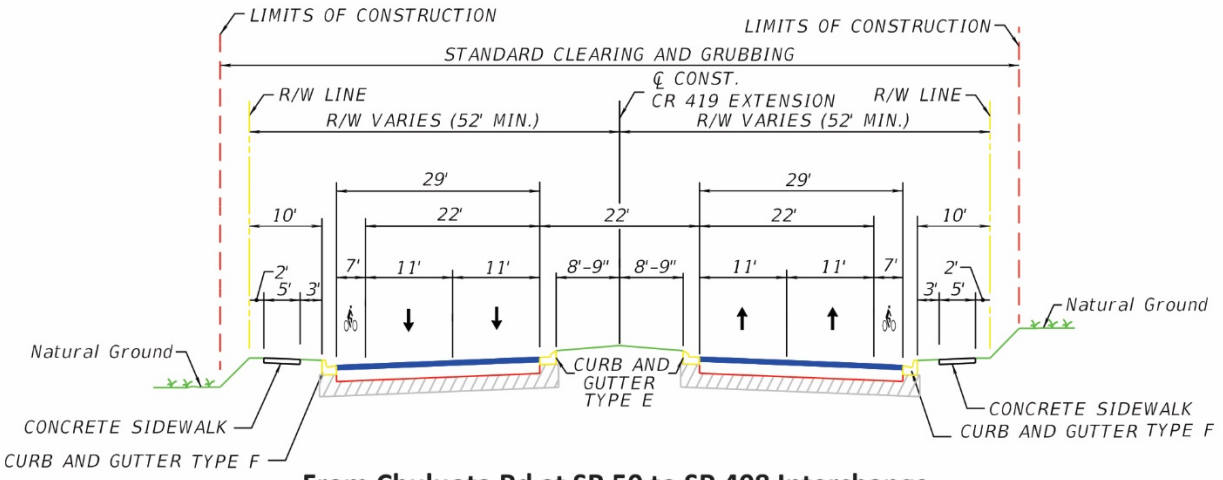
SR 408 Mainline Typical Section



From Begin Project to End of Project

Chuluota Road Extension Typical Section



From Chuluota Rd at SR 50 to SR 408 Interchange

Preferred Alternative Typical Sections **Figure 4**

Table- 1 Summary of Preferred Pond Sites

Segment	Basin	Pond Name	Preliminary Pond Site (ac)	Remarks
1	Basin 1	Pond 1A	1.98	Existing CFX Pond expanded
		Pond 1B	5.06	Existing CFX Pond expanded
		Pond 1C	1.10	CFX Property
	Basin 2	Pond 2B	10.23	Orange County School Board
	Basin 3-4	Pond 3A	3.06	Private Property
		Pond 4A	1.80	Private Property
	Basin 5	Pond 5B	4.10	Private Property
	Basin 6-8	Pond 6B	19.73	Private Property
2	Basin 9-10	Pond 9B	3.38	Private Property
		Pond 10B	5.00	Private Property
	Basin 11A	Pond 11A1	0.92	Private Property
		Pond 11A2	0.45	Private Property
		Pond 11A3	1.16	Private Property
		Pond 11A4	3.24	Private Property
	Basin 11B	Pond 11B1	3.98	FDOT Property
3	Basin 11C	Pond 11C	5.70	Private Property
		Pond 11C3	8.85	Private Property
		Pond 11C4	5.50	Private Property
	Basin 12	Pond 12A	6.88	Private Property
	Basin 13	Pond 13B	10.45	Private Property
	Basin 14	Pond 14A	2.57	Private Property
	Basin 15	Pond 15A	8.92	Private Property

Commitments

CFX commits to adhere to the following commitments.

- CFX will adhere to the USFWS Eastern Indigo Snake Programmatic Effect Determination Key (July 2017) or superseding guidance regarding the eastern indigo snake.

- Standard BMPs for construction of roads will be implemented during all construction and will follow FDOT's *Standard Specifications for Road and Bridge Construction.*

- CFX will mitigate for any unavoidable impacts to wood stork SFH at an approved mitigation bank and in accordance with the *USFWS Wood Stork Effect Determination Key* (U.S. Army Corps of Engineers and USFWS 2008).

- Prior to construction, a 100% gopher tortoise burrow survey will be conducted in accordance with FWC rules and guidelines.

- CFX will coordinate with Orange County School Board, East River High School and FDOT to implement the new access road from the Chuluota Road Extension to SR 50. Details of the proposed access road are included in the concept plans in **Appendix F**.

- The SR 408 bridges over the Econlockhatchee River are proposed to span over the river's floodplain in order to minimize impacts.

- As part of the construction of the bridges over the Econlockhatchee River, the existing remnants of Old Cheney Highway within the river's floodplain will be removed.

- The proposed SR 408/Woodbury Road interchange will provide the improvements necessary to accommodate a future four-lanes along Woodbury Road including reconstruction of Woodbury Road within the interchange and the bridge over SR 408 to a four-lane roadway with sidewalks.

- CFX will continue coordination with the Florida Department of Transportation, Florida's Turnpike Enterprise and Orange County regarding the proposed improvements and potential impacts to their facilities and/or projects.

1 INTRODUCTION

1.1 Purpose of the Report

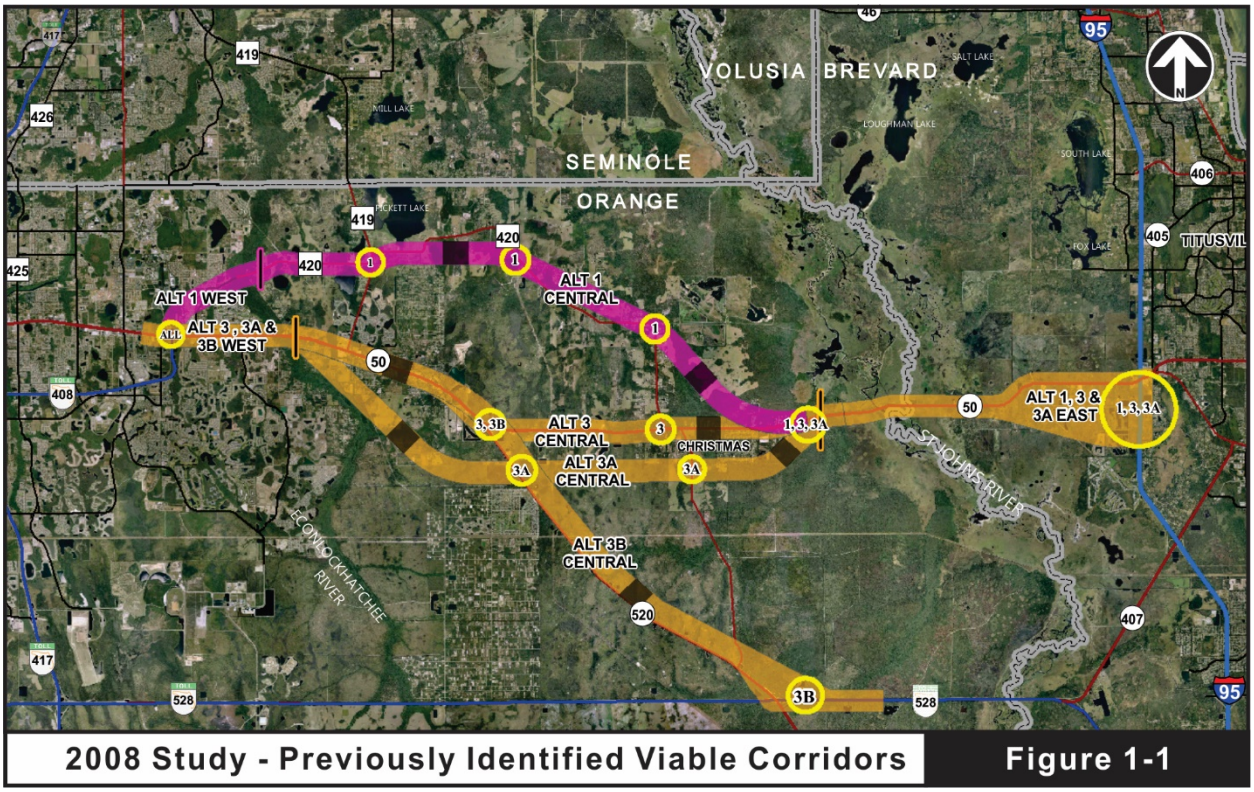
The purpose of the SR 408 Eastern Extension Project Development and Environment (PD&E) Study is to develop a proposed improvement strategy that is technically sound, environmentally sensitive and publicly acceptable. Emphasis has been placed on the development, evaluation and documentation of detailed engineering and environmental studies including data collection, conceptual design, environmental analyses, project documentation and the preparation of a Preliminary Engineering Report.

The Central Florida Expressway Authority (CFX) is presently evaluating the potential to extend State Road (SR) 408 from its current eastern terminus at SR 50, locally known as East Colonial Drive, to the vicinity of the SR 50 and SR 520 interchange in northeastern Orange County. This new, approximately seven-mile eastern extension of SR 408 would constitute the first stage towards providing a east-west high-speed corridor with future connectivity to I-95, enhance safety, and increase capacity and mobility for the region and CFX's customers.

1.2 Project Background/Description

The vision of this enhanced east-west corridor has been documented in prior concept studies prepared by CFX including the SR 408 Eastern Extension Concept Development and Evaluation Study completed in 2008. This study evaluated potential corridors for a new limited-access facility between east Orange County and north Brevard County. The original study area generally parallels SR 50 from east of SR 434 to I-95. After a preliminary corridor evaluation, four viable corridors were determined to meet the criteria and were further evaluated. These corridors are shown on **Figure 1-1**. The results of the previous study indicated that "Corridor 3B (along SR 50) met the transportation need west of SR 520, providing relief of the existing and projected future traffic congestion along SR 50 from Alafaya Trail/SR 434 to SR 520. This alternative diverted the greatest number of trips, had the lowest estimated cost, and had the fewest potential impacts to environmental and community resources of any of the viable corridors considered at that time. This corridor also provided for a potential future extension of the proposed limited-access facility southeast along either the SR 520 or

SR 50 corridors, affording system linkage between east Orange County and Brevard County."



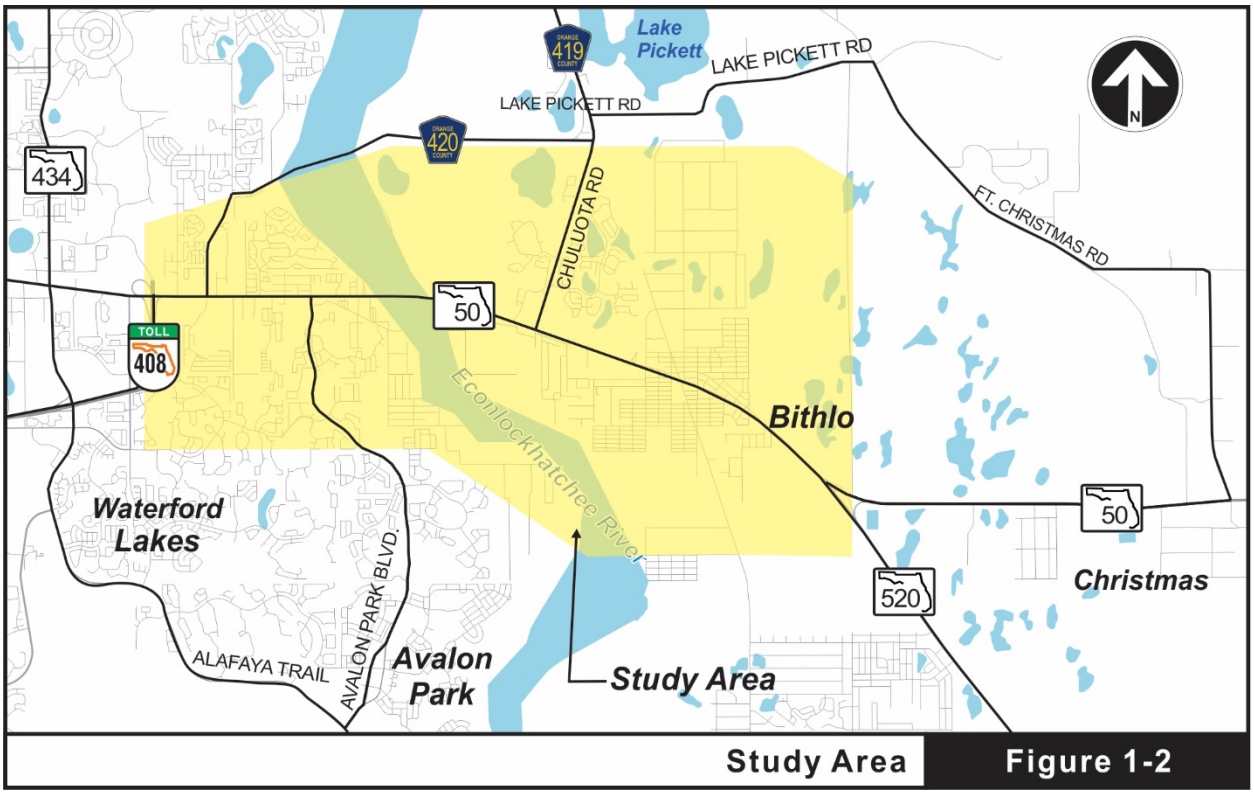
2008 Study - Previously Identified Viable Corridors — Figure 1-1

As part of the SR 408 Eastern Extension PD&E Study, a preliminary corridor evaluation was initially performed in 2015, in which different viable alternatives were considered. Those alternatives that met the basic project objectives were further evaluated and presented in a final report which recommended that the proposed SR 408 extension be co-located within the existing SR 50 corridor. However, in May 2016, the Florida Department of Transportation (FDOT) notified CFX that there are issues with CFX utilizing FDOT right-of-way for the SR 408 extension. As a result, new transportation corridors were developed that avoid SR 50 and that will address the transportation needs while minimizing impacts to the natural, physical and cultural environments.

1.3 Project Purpose

The purpose of the proposed SR 408 Eastern Extension is to provide an east-west high-speed corridor with future connectivity to I-95, enhance safety, and increase capacity and mobility for the region and CFX's customers (see **Figure 1-2**). There are five existing/projected corridor needs that serve as the main justification for the proposed

improvements. These needs are: 1) providing *additional capacity* in the east-west direction to mitigate or eliminate capacity deficiencies; 2) providing *additional emergency evacuation service* to supplement the limited number of evacuation routes in this area of Central Florida; 3) providing *improved transportation connectivity/linkage* necessitated by the continued population growth and land use development reflected in various local comprehensive plans; 4) providing *transit support*; and 5) providing *planning consistency*. A brief description of each of these needs follows.



1.3.1 Capacity Deficiency

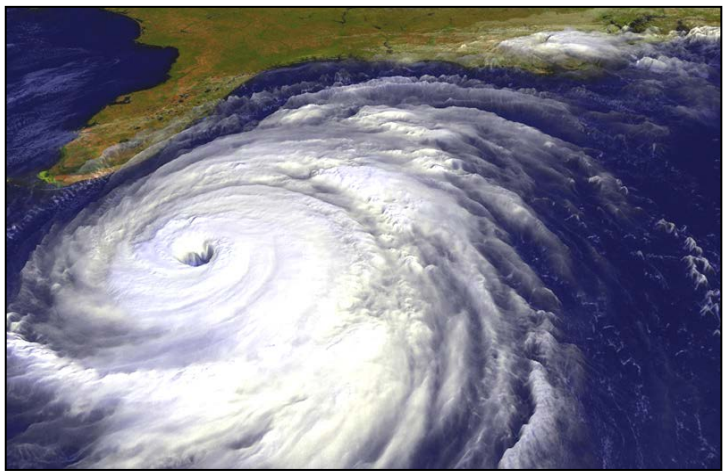
The planned project improvements are anticipated to accommodate the expected increase in traffic due to population and employment growth along the corridor. The preliminary No Build projections were run for years 2025, 2035 and 2045. The No Build SR 50 traffic projections along SR 50 will be increasing and a future SR 408 Eastern Extension to SR 520 would help alleviate this increase by diverting the traffic from SR 50 to SR 408. **Table 1-1** shows the Annual Average Daily Traffic (AADT) volumes for the year 2045.

Results of the preliminary No Build projections reflect that even with the planned widening of SR 50 to six lanes by FDOT, there is insufficient capacity in 2025 on the segment from SR 408 to CR 420 (Lake Pickett Road) and in 2035 from Lake Pickett Road to Avalon Park Boulevard. By the year 2045 the segment from Avalon Park Boulevard to Chuluota Road, although not over capacity, is projected to reach congested conditions. Unless additional capacity is provided along most project segments the vehicular mobility along this critical transportation link will be compromised.

Table 1-1 Future Traffic Volumes

Roadway	Limits		2045 AADT	
	From	To	SR 408	SR 50
No Build	East of SR 408		-	87,800
	Econlockhatchee River Bridge		-	50,400
	West of SR 520		-	34,500
Build	SR 408 existing eastern terminus	Bonneville Dr	33,700	66,500
	Bonneville Dr	Lake Pickett Rd	33,700	60,200
	Lake Pickett Rd	Pebble Beach Blvd	33,700	49,800
	Pebble Beach Blvd	Avalon Park Blvd	14,200	47,700-67,100
	Avalon Park Blvd	Tanner Rd	14,200-15,700	54,300-55,700
	Tanner Rd	Future Lake Pickett Development	15,700	47,800
	Future Lake Pickett Development	Chuluota Rd	15,700	41,400-51,800
	Chuluota Rd	N CR 13	3,000	45,300

1.3.2 Emergency Evacuation



The East Central Florida Region has been identified by the National Oceanic and Atmospheric Administration as a high hurricane vulnerable area within the United States and thus requires sufficient and efficient evacuation routes. SR 50 has been designated as a primary evacuation route for eastern Orange and northern Brevard Counties. Along with SR 528 and SR 46 they provide the only east-west evacuation routes for the area.

A recent hurricane evacuation study conducted by the East Central Florida Regional Planning Council estimated that over 220,000 persons would potentially evacuate Brevard County during a Category 3 storm. Any future capacity deficiency along SR 50 (the main evacuation route) could seriously jeopardize the effectiveness of coastal evacuation from north Brevard County. The provision of an additional east-west facility will afford redundancy of the highway network and would greatly improve response and recovery efforts.

Another critical issue deals with fire and emergency services. In the recent past, the (open) natural lands generally abutting SR 50 east of SR 520 have been known to be an area prone to wildfires. This sometimes necessitates the closure of some key east-west facilities in the area due to visibility or safety concerns. The provision of an additional east-west facility would afford the desirable redundancy to accommodate diverted regional traffic due to natural or man-made emergencies.

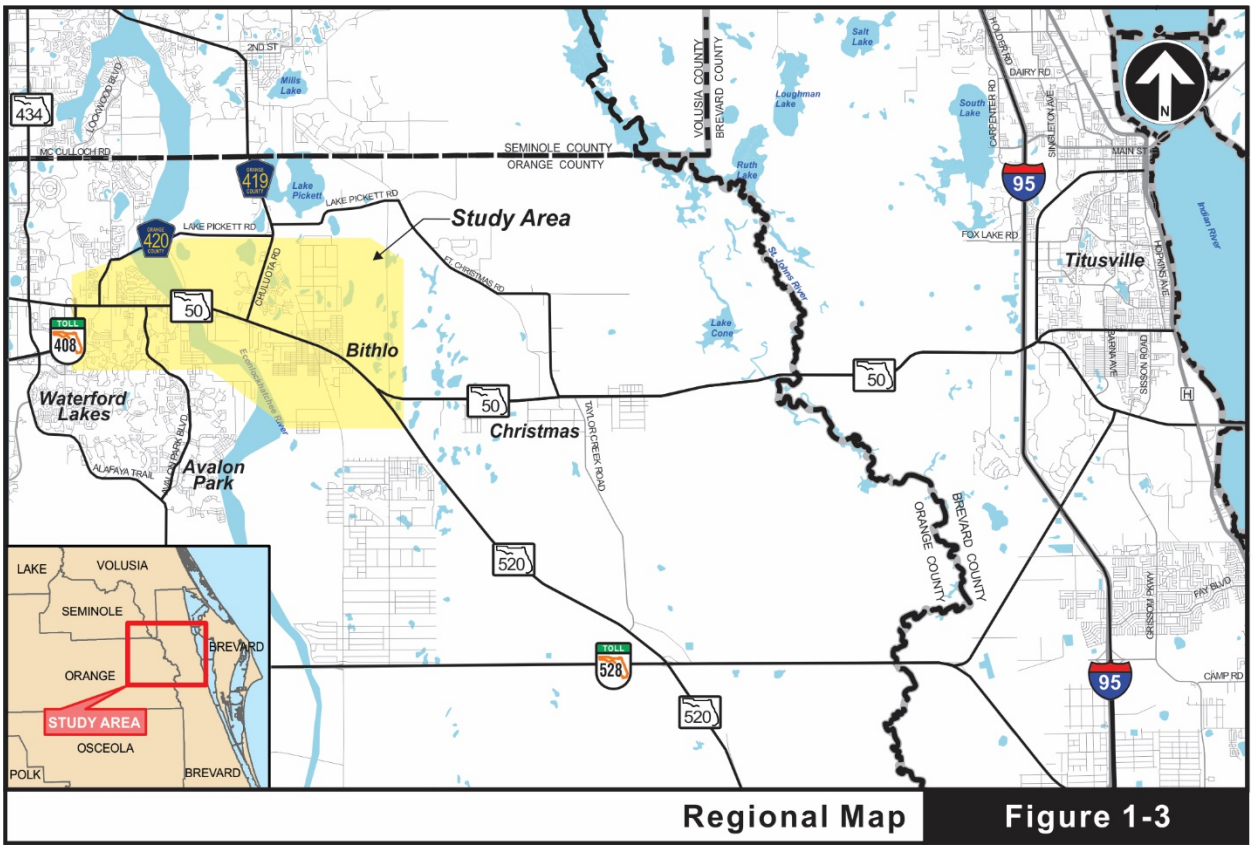
1.3.3 Connectivity/Linkage

On November 1, 2013, Executive Order 13-319 was signed by Governor Rick Scott, creating the East Central Florida Corridor Task Force with the purpose to evaluate and develop consensus recommendations on future transportation corridors serving established and emerging economic activity centers in portions of Brevard, Orange, and

Osceola counties. The results of the East Central Florida Corridor Task Force Final Report recommended preserving and enhancing the existing SR 50/SR 405 (Columbia Boulevard) corridor from downtown Orlando and the University of Central Florida area to Cape Canaveral, including an extension of the State Road 408/East-West Expressway from its current terminus. The SR 408 Eastern Extension is one piece of Florida's strategic transportation investments to support future growth and create connections between global trade activities, from Orlando International Airport and the University of Central Florida, to Cape Canaveral.

Additionally, in 2008, the Orlando-Orange County Expressway Authority (OOCEA) (now known as CFX), completed the 2008 SR 408 Eastern Extension Concept Development and Evaluation Study for an eastward extension of SR 408. The conclusion of the study resulted in a recommendation that the SR 408 extend eastward from SR 50 to SR 520 (see **Figure 1-3**).

Within the project vicinity, SR 50 is functionally classified as a major arterial facility and provides an important connectivity function between the east Orlando area on the west and I-95 just south of Titusville on the east. As traffic continues to grow within the study corridor due to the rapid development projected within the area it is essential to maintain adequate mobility on this critical roadway link. A new expressway facility would improve mobility and the at-grade conflict points associated with traffic signals, and local access issues will shift to interchanges and grade separations by controlling conflict points through the use of ramps and bridges. In summary, the proposed SR 408 Eastern Extension will greatly enhance Central Florida's regional transportation needs and provide the initial phase of an ultimate vision of an expressway connection from east Orlando to I-95 north of SR 528.



1.3.4 Transit Plan Support

The Central Florida Regional Transportation Authority (LYNX) is conducting a study to enhance transit service along SR 50. The current recommended alternative is Bus Rapid Transit (BRT) service along SR 50 from the community of Oakland to SR 434/Alafaya Trail and north to UCF. The BRT corridor is identified in the LYNX Vision 2030.

A new limited-access facility could support inter-agency transit service between Orange and Brevard counties. The benefits of enhanced transit service are frequently lost when the buses must travel on heavily congested roadways. The proposed roadway would support improved regional travel times and provide realistic options for commuters and visitors traveling between the two counties.

1.3.5 Planning Consistency

All proposed improvements are consistent with the CFX 2040 Master Plan, CFX Five-Year Work Plan, and MetroPlan Orlando 2040 Long Range Transportation Plan (**Table 1-2**).

Table 1-2 Local Transportation Plans

Plan	Improvement
CFX 2040 Master Plan	SR 408 Eastern Extension PD&E Study
CFX 2018-2022 Five-Year Work Plan	Project Development & Environment Study – Funded 2017-2018 15% Line & Grade – Design Funded 2019-2021
MetroPlan Orlando 2040 Long Range Transportation Plan	Central Florida Expressway Authority - Unfunded Needs SR 408 Eastern Extension Challenger Pkwy SR 520 New 4 Lane Expressway

2 ALTERNATIVE CORRIDOR ANALYSIS

2.1 Previous Corridor Evaluation

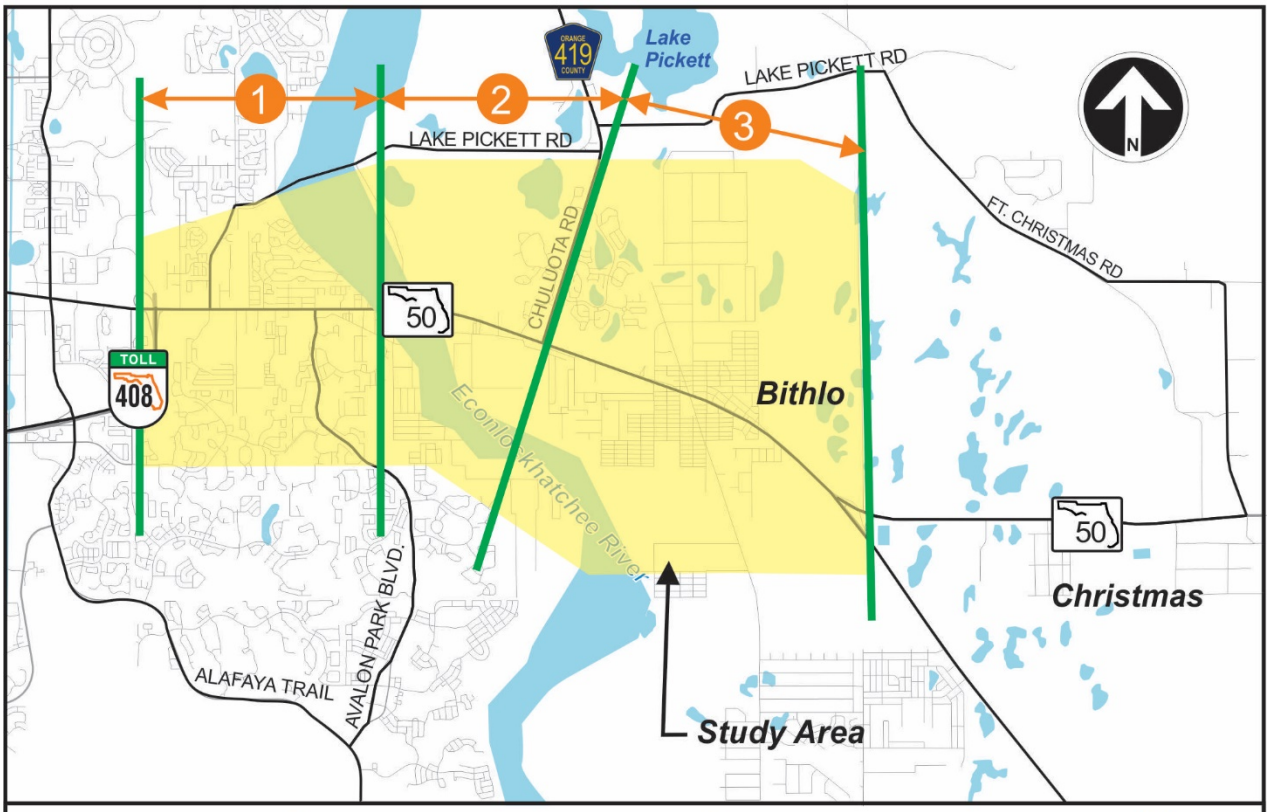
As previously stated, the SR 408 Eastern Extension Concept Development and Evaluation Study completed by CFX in 2008 evaluated various potential local corridors for a new limited access facility between east Orange County and north Brevard County. This original study recommended the use of the existing SR 50 corridor and the colocation of the proposed SR 408 Extension. However, since FDOT has expressed concerns about this potential colocation, a new corridor re-evaluation is necessary.

2.2 Corridor Re-Evaluation

In order to provide the greatest traffic relief and serve the greatest number of users, the study area (see **Figure 2-1**) was established as generally a half mile to the north and a half mile to the south of the existing SR 50 right-of-way as well as additional land within approximately 1.5 miles south of SR 50 and east of the Econlockhatchee River.

2.2.1 Identification of Project Segments

The first step in the evaluation of the corridor options was to divide the study area into distinct analysis segments. The segmental breakdown methodology ensures that the generated corridor alternatives are more responsive to the needs of each segment rather than only to the generalized project's needs. **Figure 2-1** illustrates the study area segmental breakdown and description. Each segment has rather unique characteristics as well as potential differences in environmental, engineering and socio-economic features. In general terms, for example, Segment 1 (the study area west of the Econlockhatchee River) is generally more urbanized and exhibits a higher traffic demand than Segments 2 and 3.



Segmental Breakdown **Figure 2-1**

Segment 2 (the area between the Econlockhatchee River and County Road 419 (Chuluota Road)) is more rural in nature and generally serves a lower density area with higher expected development growth while Segment 3 (from Chuluota Road to the eastern project terminus) has mostly industrial and low density residential development with a lower traffic demand.

2.2.2 Identification of Preliminary Corridors

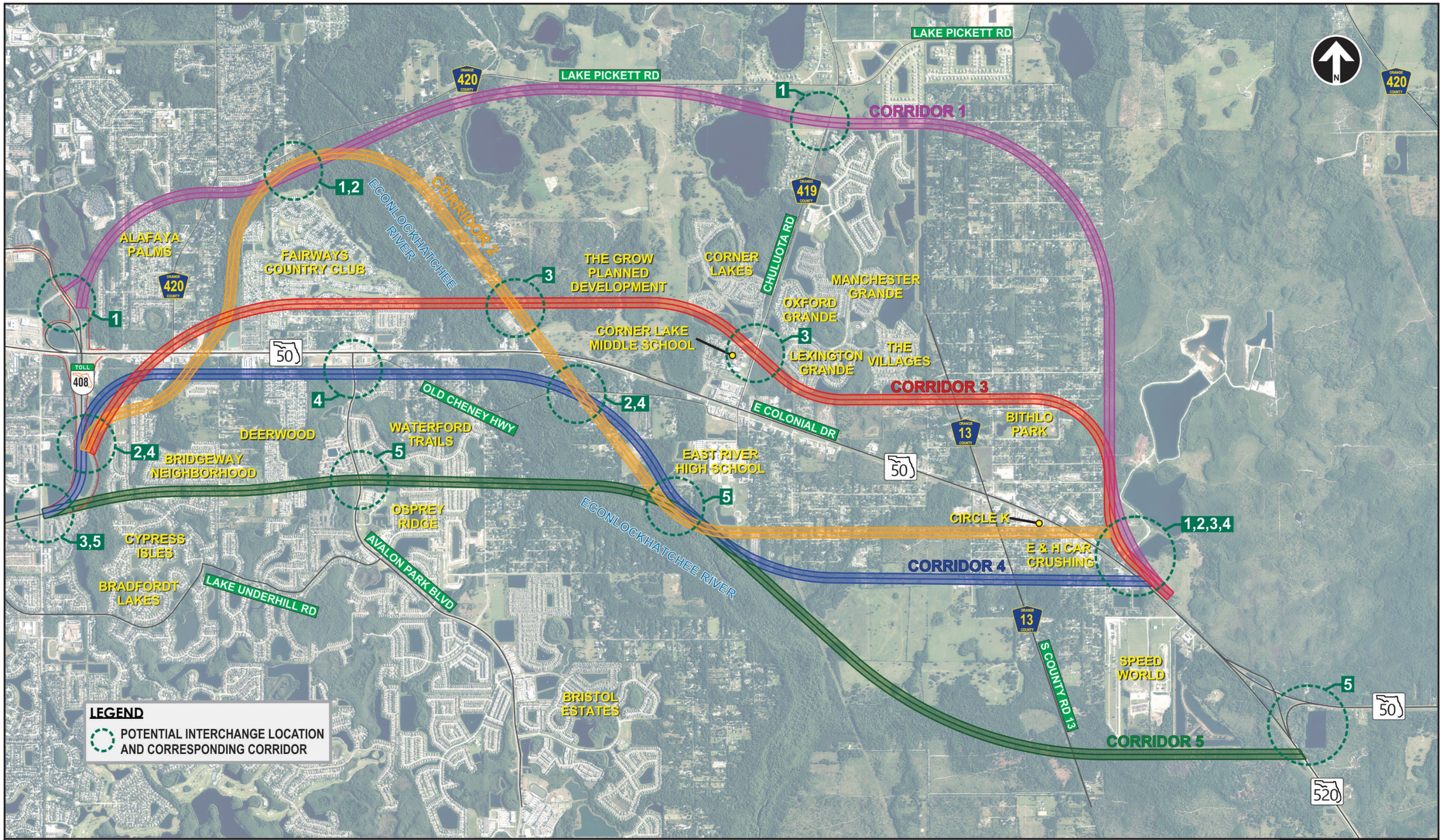
Initially, five preliminary corridors were developed for the potential SR 408 roadway extension (see **Figure 2-2**). These corridors were developed based on constraint mapping and input from the Project and Environmental Advisory Groups. The preliminary corridors were labelled 1 through 5 from north to south, for identification purposes. Each corridor represents a 400-foot wide area for the purpose of assessing community and environmental impacts. As shown on **Figure 2-2**, Corridors 1 and 3 mostly traverse an area north of the existing SR 50 facility while Corridors 4 and 5 extend through areas south of SR 50. Corridor 2 on the other hand initially stays mostly on the north side, then crosses to the south side of SR 50. It should be noted that the following general guidelines were followed in the development of the preliminary corridors.

- No corridor should infringe on the existing and proposed SR 50 right-of-way
- Potential location of future interchanges along the corridors should be at least 600 feet away from existing/future SR 50 in order to minimize potential detrimental traffic operational interfaces.

A brief description of the five preliminary corridors follows:

- Preliminary Corridor 1 (see **Figure 2-2**)

  Corridor 1 commences just north of the existing SR 408/SR 50 interchange and proceeds in a northeasterly direction through the Alafaya Palms community. Then the corridor crosses Lake Pickett Road and provides an interchange in the vicinity of Lake Pickett Road just west of the Econlockhatchee River crossing. The corridor continues in an eastbound direction just south of and parallel to Lake Pickett Road, at Chuluota Road. Another interchange is provided before continuing eastbound through the northeast section of the Bithlo community. The corridor then turns to the south along the eastern boundary of Bithlo and finally provides a terminal interchange at SR 50 about 0.75 mile northwest of the existing SR 50/SR 520 interchange.



Preliminary Corridor Alternatives | Figure 2-2

- Preliminary Corridor 2 (see **Figure 2-2**)

  Corridor 2 commences just south of the existing SR 408/SR 50 interchange and proceeds in a northeasterly direction crossing SR 50 just east of Knight Avenue. It then follows the tributary of the Econlockhatchee River generally parallel to Lake Pickett Road and provides an interchange in the vicinity of Lake Pickett Road just west of the Econlockhatchee River crossing. At this point it veers sharply to the southeast along the Florida Power and Light (FPL) Transmission Line corridor just east of the Econlockhatchee River along S. Tanner Road. This alternative then crosses SR 50 near S. Tanner Road and provides an interchange in the vicinity of Old Cheney Highway. It then continues in a southeasterly direction until just south of the East River High School property and turns easterly until it reaches SR 50 where a terminal interchange is provided just south of the Circle K property.

- Preliminary Corridor 3 (see **Figure 2-2**)

  This alternative generally begins at the same location as Corridor 2 and then proceeds northeasterly and crosses SR 50 just west of the Lake Pickett Road intersection. It then veers to the east through the Fairways Country Club residential community approximately 1,200 feet north of the existing SR 50 facility. It crosses the Econlockhatchee River and provides an interchange in the vicinity of S. Tanner Road, continues in an easterly direction, and bends southeasterly in the vicinity of Chuluota Road where an interchange is provided. It continues southeasterly and then easterly through a portion of the south-central Bithlo residential community. Finally, this corridor turns to the south north of the Bithlo Park along the eastern boundary of Bithlo and provides a terminal interchange at SR 50 about 0.75 mile northwest of the existing SR 50/SR 520 interchange.

- Preliminary Corridor 4 (see **Figure 2-2**)

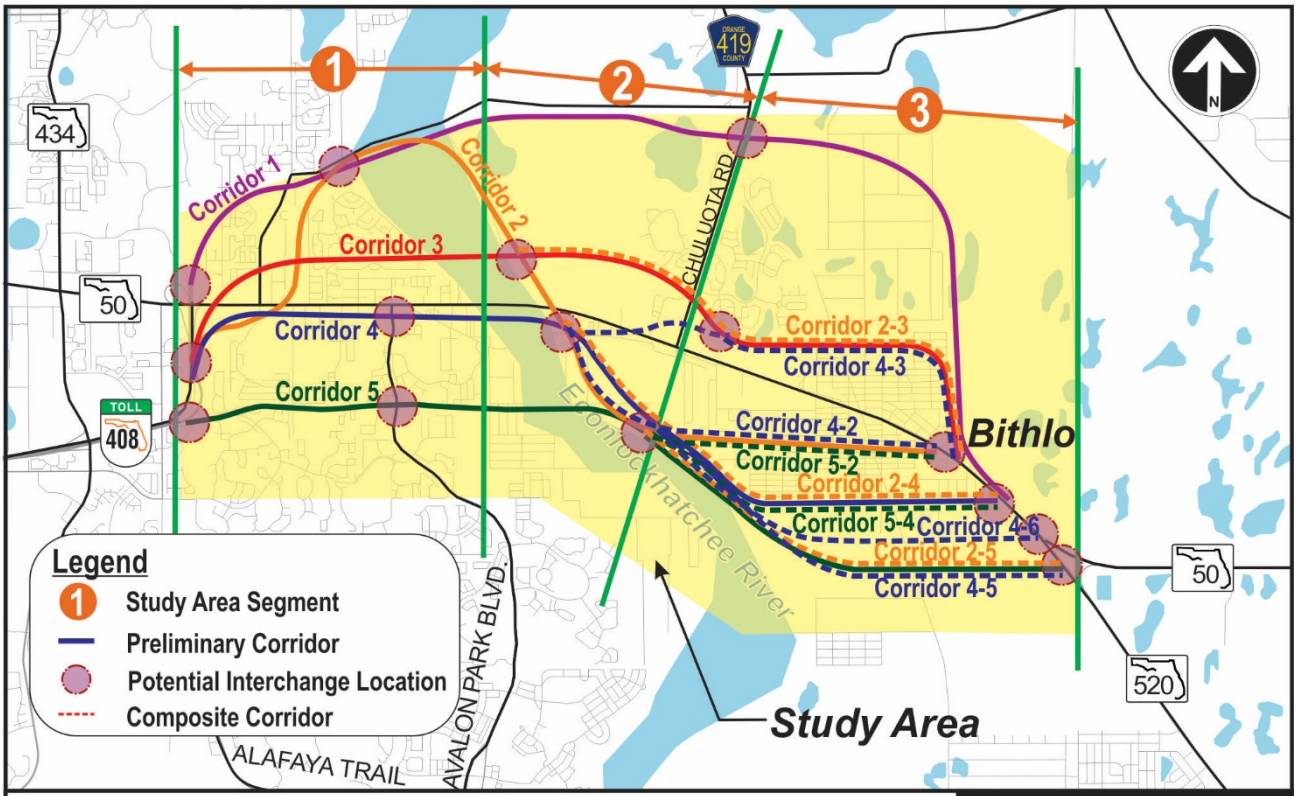
  Corridor 4 begins in the same general area as Corridors 2 and 3 but stays south of and parallels SR 50. After providing an interchange with Avalon Park Boulevard, the corridor crosses the Econlockhatchee River and provides another interchange in the vicinity of S. Tanner Road and Old Cheney Road. At this point it veers to the southeast generally paralleling the Econlockhatchee River and then turning eastward just south of various

existing residential developments until reaching SR 50 just south of the E & H Car Crushing property where a terminal interchange is provided.

- Preliminary Corridor 5 (see **Figure 2-2**)

  Corridor 5 begins in the immediate vicinity of the SR 408/Woodbury Road underpass and proceeds in an easterly direction through the Bridgeway and Waterford Trails neighborhoods. After providing an interchange with Avalon Park Boulevard, the corridor continues in an easterly direction, crosses the Econlockhatchee River and provides another interchange just southwest of the East River High School property. At this point the corridor veers to the southeast and then east, terminating at SR 520/SR 50 south of the Orlando Speed World Dragway property.

Next, based on geometric design and stakeholder input received, the five preliminary corridors were combined and resulted in the generation of eight (8) additional "composite" corridors illustrated on **Figure 2-3**. Three of these resulted from generally merging the first two segments of Corridor 2 with the last segments of Corridors 3, 4, and 5. Similarly, the first two segments of Corridor 4 were combined with the last segment of Corridors 2, 3 and



5. In addition, a new variation of the last segment of Corridor 4 was considered involving a direct connection to the existing SR 50/SR 520 interchange. Although this option would directly impact the existing Orlando Speed World Dragway property it is the only alternative that would avoid additional impacts along SR 50, through a direct connection to the SR 50/SR520 terminal interchange. Lastly, the first two segments of Corridor 5 were combined with the last segment of Corridors 2 and 4. In summary, this development procedure resulted in a total of 14 possible Alternative Corridors for future consideration.

2.2.3 Initial Corridor Screening

An initial screening to assess how well each competing corridor satisfies the previously established project's purpose and need was conducted. An alternative that does not satisfy the project's purpose and need may be eliminated from further consideration. In order to avoid elimination, each corridor would need to provide an enhanced connection as compared to the No Build (or No Action) Alternative. The need for enhancement is related to the predicted unsatisfactory future operating conditions as reflected in the traffic analysis if no action is taken. In addition, each corridor was evaluated for regional connectivity, emergency evacuation, transit, and support of economic development.

Table 2-1 provides the screening criteria and obtained results related to the purpose and need compliance. In order to better appreciate the obtained outcome, color values were assigned to the results as follows: Green cells (generally high compliance); Yellow cells (generally moderate compliance) and Red cells (generally low compliance). In addition, the evaluation was conducted by segments in order to more clearly judge the performance of each corridor within each individual segment it traverses rather than its "overall" performance. This approach provides a more in-depth evaluation by showing where the corridor ranks higher and lower segmentally. The results from **Table 2-1** show that generally the corridors south of SR 50 (4, 4-2, 4-3, 4-5, 4-6, 5, 5-2 and 5-4) have slightly more green cells than those north of SR 50. In other words, the southern corridors ranked slightly higher than the northern corridors mostly due to their superior regional connectivity.

In summary, although some corridors address the purpose and need more efficiently, it was determined that all of the established corridors do address the purpose and need.

TABLE 2-1 INITIAL SCREENING/PURPOSE AND NEED COMPLIANCE

COMPLIANCE CRITERIA		SEG	ALTERNATIVE CORRIDORS														
			1	2	2-3	2-4	2-5	3	4	4-2	4-3	4-5	4-6	5	5-2	5-4
Network/Systems Connectivity Improvement		1	High	High	High	High	High	Medium*	High	High	High	High	High	High	High	High
		2	High	Medium	High	Medium	Medium	High	Medium	Medium	High	Medium	Medium	Low	Low	Low
	A	3	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Enhanced Multi-Modal Potential		1	High	High	High	High	High	Medium*	High	High	High	High	High	High	High	High
		2	High	Medium	High	Medium	Medium	High	Medium	Medium	High	Medium	Medium	Low	Low	Low
	B	3	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Support of Economic Development		1	Low	Low	Low	Low	Low	Low	High	High	High	High	High	Low	Low	Low
		2	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
	C	3	Medium	Medium	Medium	Medium	Low	Medium	Medium	Medium	Medium	Low	Medium	Low	Medium	Medium
Enhancement of Emergency Services and Evacuation		1	High	High	High	High	High	High	High	High	High	High	High	High	High	High
		2	High	High	High	High	High	High	High	High	High	High	High	High	High	High
	D	3	High	High	High	High	High	High	High	High	High	High	High	High	High	High
Promotes Regional Connectivity		1	Medium	Medium	Medium	Medium	Medium	High	High	High	High	High	High	High	High	High
		2	Medium	Medium	Medium	Medium	Medium	High	High	High	High	High	High	High	High	High
	E	3	Medium	Medium	Medium	Medium	Medium	High	High	High	High	High	High	High	High	High

*Based on Future Residential Development

Notes: High = Highest Benefit; Medium = Neutral Benefit; Low = Low Benefit

A Based on the provision of effective connection to the existing/proposed major transportation network within the study area

B Based on typical section design speed, high speed facility, and strategic intermodal system criteria

C Based on the perceived likelihood of desirable economic development adjacent to the proposed interchange locations and their compatibility with existing/proposed abutting land uses

D Based on access, safety and design measures

E Based on perceived effective mobility (directness) between the two project termini

2.2.4 Preliminary Alternative Corridor Evaluation

The preliminary alternative corridor evaluation was based on a 400-foot wide representative alignment for each of the 14 competing corridors and their effect with respect to engineering, socio-economic, and environmental issues. It should be noted that the purpose of this preliminary evaluation is not to determine the "best" corridor but rather to eliminate inferior or suboptimal alternatives. In order to better appreciate the obtained results, numerical values were assigned to the results of each evaluation component (see **Tables 2-2** and **2-3**) as follows: Green cells (generally desirable or positive impacts = +2); Yellow cells (generally minor or moderate impacts = +1) and Red cells (generally undesirable or negative impacts = 0). In addition, each evaluation component was assigned a percentage value (weight) depending on its perceived degree of importance. For example, the importance of the total engineering component was judged to merit 39% (see **Table 2-2 top**) of the total decision while the environmental (see **Table 2-2 bottom**) and socio-economic components (see **Table 2-3**) were assigned relative weights of 27% and 34%, respectively. These parameter weightings were developed from the average of individual weighting sets prepared by members of the consultant's team, reflecting a broad range of professional backgrounds.

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PRELIMINARY ENGINEERING EVALUATION

EVALUATION COMPONENTS	Component Weight	UNITS	SEG.	ALTERNATIVE CORRIDORS													
				1	2	2-3	2-4	2-5	3	4	4-2	4-3	4-5	4-6	5	5-2	5-4
Major Utility Conflicts	5%	Number of potential impacts	1	9	8	8	8	8	11	9	9	9	9	9	9	17	17
			2	7	8	8	8	8	3	12	12	5	12	12	12	6	6
			3	21	24	19	10	13	19	22	23	19	13	14	13	23	13
Drainage Considerations	7%	Acres (Floodplain Impacts)	1	27	75	75	75	75	51	45	45	45	45	45	11	11	11
			2	53	34	54	34	34	68	27	27	48	27	27	47	53	47
			3	66	44	68	55	102	68	36	36	68	98	82	101	39	51
Reduction in Traffic Congestion/Improved Safety	12%	Percent of Diverted Traffic	1	20%	11%	13%	11%	11%	17%	28%	24%	29%	24%	24%	29%	24%	26%
			2	14%	6%	9%	6%	6%	10%	16%	9%	24%	3%	3%	30%	29%	30%
			3	17%	6%	3%	5%	3%	2%	20%	10%	3%	2%	2%	18%	6%	26%
Traffic Volume Accommodated	15%	2045 Traffic Volumes	1	19,300	10,500	11,700	10,200	10,200	15,800	28,200	24,300	29,500	23,400	23,400	29,500	24,200	26,500
			2	8,800	13,600	5,800	3,700	3,700	5,800	10,600	5,800	16,200	2,100	2,100	19,900	19,800	20,300
			3	6,700	2,200	1,000	2,100	1,000	1,000	8,300	4,200	1,400	1,000	1,000	7,500	2,200	11,400
Total Engineering Weight	39%																
Summary of Results (sum of corridor scores for each evaluation category)			1	0.44	0.10	0.10	0.10	0.10	0.29	0.44	0.44	0.44	0.44	0.44	0.51	0.46	0.46
			2	0.44	0.51	0.44	0.51	0.51	0.37	0.51	0.51	0.71	0.36	0.36	0.71	0.71	0.71
			3	0.39	0.39	0.32	0.44	0.37	0.39	0.61	0.46	0.39	0.37	0.37	0.52	0.46	0.59
Total Engineering Score for each Alternative Corridor (higher score = higher performing alternative corridors)			Totals	1.27	1.00	0.86	1.05	0.98	1.05	1.56	1.41	1.54	1.17	1.17	1.74	1.63	1.76

REMARKS

- Corridors 5-4, 5 and 5-2 generally performed the best since they provide higher congestion relief to SR 50, attracting higher traffic volumes and causing only minor utility conflicts.
- Corridors 4, 4-3, 4-2 and 4-6 also produced good results and caused only minimum utility conflicts and some floodplain encroachment impacts.
- Corridors 2 and 2-3 are the least effective options due to their low projected trip attraction and resulting low congestion relief to SR 50. This is likely due to their lack of directness between the project limits.

RATING

GOOD	= +2 POINTS
FAIR	= +1 POINT
POOR	= 0 POINTS

PRELIMINARY ENVIRONMENTAL EVALUATION

EVALUATION COMPONENTS	Component Weight	UNITS	SEG.	ALTERNATIVE CORRIDORS													
				1	2	2-3	2-4	2-5	3	4	4-2	4-3	4-5	4-6	5	5-2	5-4
Wetlands	4%	Acres	1	25	57	57	57	57	49	39	39	39	39	39	13	13	13
			2	52	34	64	34	34	42	24	24	55	24	24	37	50	37
			3	53	18	42	35	88	42	28	13	42	86	47	85	17	29
Wildlife and Habitat	3%	Average Wildlife Index Ranking	1	3.34	3.39	3.39	3.39	3.39	2.38	2.59	2.59	2.59	2.59	2.59	1.89	1.89	1.89
			2	3.51	3.89	3.88	3.89	3.89	2.81	4.64	4.64	4.3	4.64	4.64	5.63	6.15	5.63
			3	3.01	3.62	2.81	4.22	6.72	2.81	3.97	3.34	2.81	6.6	6	7.16	3.68	4.59
Ecological Connectivity	2%	New Crossings of Conservation Areas	1	5	4	4	4	4	5	6	6	6	6	6	5	5	5
			2	7	4	9	4	4	12	5	5	6	5	5	5	5	5
			3	8	9	15	7	16	15	8	6	15	15	10	11	7	6
Water Body	3%	No. of Crossings	1	5	4*	4*	4*	4*	5	4	4	4	4	4	6	6	1
			2	6	4	9	4	4	8	3	3	8	3	3	6	6	3
			3	7	3	8	2	8	8	5	3	8	8	8	7	2	2
Outstanding Florida Waterway	4%	Acres	1	6	5	5	5	5	20	0	0	0	0	0	0	0	0
			2	27	25	24	25	25	0	12	12	10	12	12	18	29	18
			3	0	11	0	36	36	0	9	5	0	33	37	34	13	10
SJRWMD Land Management Easements	4%	Acres	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	15	0	0	0	0	21	44	21	0	0
SJRWMD Regulatory Easements	4%	Acres	1	12	6	6	6	6	0	10	10	10	10	10	1	1	1
			2	9	8	17	8	8	10	7	7	16	7	7	4	5	4
			3	0	0	10	15	36	10	16	0	10	30	40	30	0	18
Water/Wastewater/Solid Waste Facilities	3%	No. of Facilities	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	1	0	0	0	0	0	0	0	0
			3	1	1	1	1	0	1	1	1	1	0	0	0	1	1
Total Environmental Weight	27%																
Summary of Results (sum of corridor scores for each evaluation category)			1	0.40	0.29	0.29	0.29	0.29	0.35	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.47
			2	0.23	0.32	0.19	0.32	0.32	0.29	0.40	0.40	0.24	0.40	0.40	0.30	0.22	0.36
			3	0.32	0.42	0.29	0.31	0.10	0.29	0.35	0.43	0.33	0.10	0.06	0.10	0.42	0.31
Total Environmental Score for each Alternative Corridor (higher score = higher performing alternative corridors)			Totals	0.95	1.03	0.77	0.92	0.71	0.93	1.16	1.24	0.98	0.91	0.87	0.84	1.08	1.14

REMARKS

- Corridor 4-2 generally performed the best due to its minimal impacts to wetlands, wildlife and habitat, ecological connectivity, outstanding Florida waterway, SJRWMD land management easements, SJRWMD regulatory easements, and water/wastewater/solid waste facilities.
- Corridor 4 also produced good results and caused only minimum impacts to ecological connectivity, outstanding Florida waterway, SJRWMD land management easements, and water/wastewater/solid waste facilities.
- Corridor 2-5 ranked the lowest, and is the least effective option due to the wetland, water body, outstanding Florida waterway, and water/wastewater/solid waste facility impacts.

* Follows Econlockhatchee River Tributary

Sample Calculation for Corridor 1 (Segment 1) under Residential & Commercial Units

Relative Segmental Score = Segmental Rating 2 (points) x Major Utility Conflicts Component Weight 5% = 0.10

Sample Calculation for Corridor 1 (Segment 1) under Wetlands

Relative Segmental Score = Segmental Rating 2 (points) x Wetlands Component Weight 4% = 0.08

Preliminary Corridor Evaluation **Table 2-2**

PRELIMINARY SOCIO-ECONOMIC EVALUATION

EVALUATION COMPONENTS	Component Weight	QUANTITATIVE MEASURE	SEG.	ALTERNATIVE CORRIDORS 1	2	2-3	2-4	2-5	3	4	4-2	4-3	4-5	4-6	5	5-2	5-4
Residential & Commercial Units	8%	Occupied Parcels / Vacant Parcels	1	38 / 18	52 / 16	52 / 16	52 / 16	52 / 16	112 / 10	21 / 5	21 / 5	5 / 5	21 / 5	21 / 5	147 / 9	147 / 9	147 / 9
			2	18 / 4	40 / 4	38 / 4	40 / 4	40 / 4	64 / 42	67 / 13	67 / 13	62 / 8	67 / 13	67 / 13	134 / 13	132 / 13	134 / 13
			3	84 / 38	149 / 59	64 / 42	64 / 33	36 / 4	64 / 42	66 / 32	149 / 58	64 / 42	37 / 3	10/2	11 / 2	125 / 57	40 / 31
Community Facilities (hospitals, schools, libraries, etc.)	4%	Number of Units	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			2	0	0	1	0	0	0	2	2	3	2	2	1	1	1
			3	0	2	0	1	1	0	1	2	0	1	1/2	1	2	1
Community Services (fire/police, post office, government, etc.)	4%	Number of Units	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parks/Recreational Facilities	4%	Acres	1	0	0	0	0	0	14	0	0	0	0	0	0	0	0
			2	14	19	19	19	19	0	0	0	0	0	0	4	5	4
			3	0	2	0	4	100	0	1	0	0	107	19	107	2	1
Historic/Archaeological	4%	Number of Sites	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	1	1	1	1	1	1	0	0	0
			3	1	1	1	0	0	0	0	1	0	0	0	0	1	0
Community Cohesion	7%	Number of Communities Split	1	3	1	1	1	1	2	1	1	1	1	1	3	3	3
			2	1	2	2	2	2	2	2	2	4	2	2	3	3	3
			3	2	3	2	4	1	2	3	4	2	1	0	1	2	3
Future Land Use Plan	3%	High/Medium/Low Density Residential (Acres)	1	0/16/18	0/44/29	0/44/29	0/44/29	0/44/29	0/8/11	0/51/0	0/51/0	0/51/0	0/51/0	0/51/0	0/42/18	0/42/19	0/42/18
			2	0/3/6	0/1/9	0/1/ 27	0/1/9	0/1/9	0/0/58	0/11/10	0/11/10	0/11/27	0/11/10	0/11/10	0/16/13	0/16/13	0/16/13
			3	0/0/4	0/0/26	0/0/58	0/0/6	0/0/0	0/0/58	0/0/6	0/0/26	0/0/58	0/0/0	0	0/0/6	0/0/26	6/ 0/ 0
Total Socio-Economic Weight	34%																
Summary of Results (sum of corridor scores for each evaluation category)			1	0.40	0.54	0.54	0.54	0.54	0.34	0.62	0.62	0.62	0.62	0.62	0.32	0.32	0.32
			2	0.60	0.45	0.38	0.45	0.45	0.31	0.34	0.34	0.24	0.34	0.34	0.27	0.27	0.27
			3	0.37	0.15	0.31	0.30	0.48	0.39	0.30	0.15	0.39	0.48	0.60	0.56	0.22	0.38
Total Environmental Score for each Alternative Corridor (higher score = higher performing alternative corridors)			Totals	**1.37**	**1.14**	**1.23**	**1.29**	**1.47**	**1.04**	**1.26**	**1.11**	**1.25**	**1.44**	**1.56**	**1.15**	**0.81**	**0.97**

REMARKS

- Corridor 4-6 generally performed the best since it generally provided low detrimental impacts as compared to the other options.
- Corridors 2-5 4, 4-5, and 1, also produced generally good results and caused only low detrimental impacts in relatively few categories.
- Corridor 5-2 is the least effective option due to its high detrimental impacts to residential and commercial units, community cohesion, and future land use plan.

RATING

GOOD	= +2 POINTS
FAIR	= +1 POINT
POOR	= 0 POINTS

Sample Calculation for Corridor 1 (Segment 1) under Residential & Commercial Units

Relative Segmental Score = Segmental Rating **1 (point)** x Residential & Commercial Units Component Weight **8%** = 0.08

Preliminary Corridor Evaluation (Cont.) **Table 2-3**

Table 2-4 summarizes the composite results obtained previously in **Tables 2-2** and **2-3** (engineering, environmental and socio-economic evaluations). The resulting total score of the individual components illustrated in **Tables 2-2** and **2-3** is shown on the last row of **Table 2-4**. The higher ranking "superior" alternative corridors are highlighted in yellow.

LEGEND
Component Weight
Total Weight
Superior Alternative

TABLE 2-4 PRELIMINARY COMPOSITE RESULTS

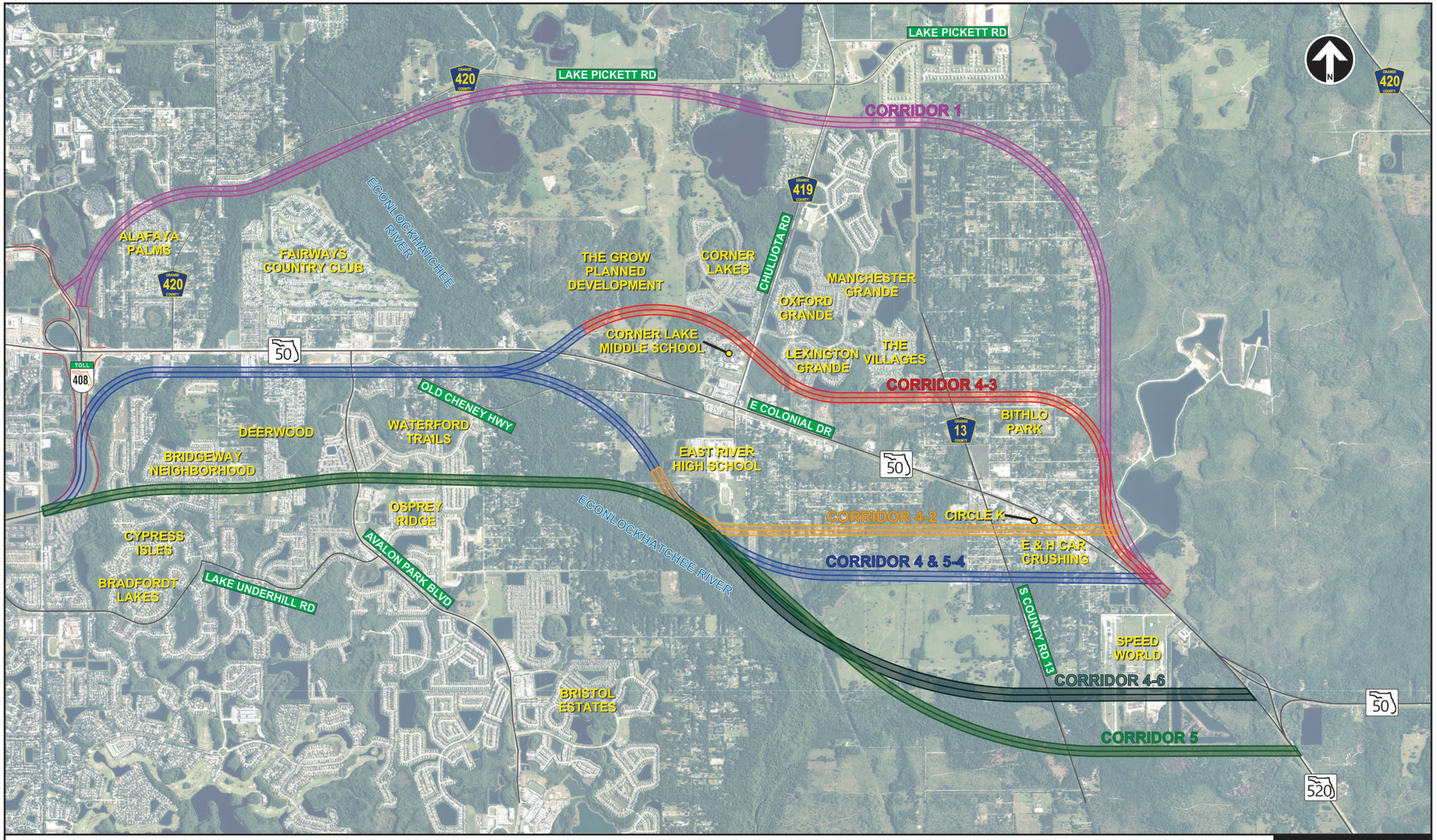
EVALUATION COMPONENTS	ALTERNATIVE CORRIDORS													
	1	2	2-3	2-4	2-5	3	4	4-2	4-3	4-5	4-6	5	5-2	5-4
Engineering 39%	1.27	1.00	0.86	1.05	0.98	1.05	1.56	1.41	1.54	1.17	1.17	1.74	1.63	1.76
Environmental 27%	0.95	1.03	0.77	0.92	0.71	0.93	1.16	1.24	0.98	0.91	0.87	0.84	1.08	1.14
Socio-Economic 34%	1.37	1.14	1.23	1.29	1.47	1.04	1.26	1.11	1.25	1.44	1.56	1.15	0.81	0.97
Totals 100%	3.59	3.17	2.86	3.26	3.16	3.02	3.98	3.76	3.77	3.52	3.60	3.73	3.52	3.87

According to **Table 2-5**, Alternative Corridors 1, 4, 4-2, 4-3, 4-6, 5 and 5-4 were selected for further evaluation based on the criteria that they are the only ones that exceed the group median value of 3.56 and are within the standard deviation of 0.33. It should be noted that the objective of this phase is not necessarily to determine which options are the best but rather to identify which alternative(s) are inferior so that they can be eliminated before even more stringent evaluation criteria and procedures are used during the next evaluation phase. The results obtained show that options 2, 2-3, 2-4, 2-5, 3, 4-5, and 5-2, are inferior and were thus eliminated from further consideration. **Figure 2-4** illustrates the six remaining superior corridors.

TABLE 2-5 PRELIMINARY ALTERNATIVE CORRIDOR ELIMINATION

CORRIDOR	SCORE	MEDIAN	STANDARD DEVIATION	RESONS FOR ELIMINATION
1	3.59	3.56	0.33	Remains Viable
2	3.17			Failed Criteria #1
2-3	2.86			Failed Criteria #1
2-4	3.26			Failed Criteria #1
2-5	3.16			Failed Criteria #1
3	3.02			Failed Criteria #1
4	3.98			Remains Viable
4-2	3.76			Remains Viable
4-3	3.77			Remains Viable
4-5	3.52			Failed Criteria #1
4-6	3.60			Remains Viable
5	3.73			Remains Viable
5-2	3.52			Failed Criteria #1
5-4	3.87			Remains Viable

Selection Criteria
#1 - Only those alternatives which score higher than the median value for the group will be selected
#2 - The maximum gap between the last selected alternative and the next must not be greater than one standard deviation



Remaining Superior Alternative Corridors — Figure 2-4

2.2.5 Pre-Final Alternative Corridor Evaluation

In order to check the validity of the previous analysis, a multi-objective approach using a weighted numerical/descriptive technique was used for the remaining alternative corridors. **Table 2-6** is a numerical/descriptive matrix, which describes and evaluates the features of the seven (7) remaining competing corridor alternatives (see **Figure 2-4**). The evaluation used involved the generation of a weighting scheme for each of the evaluation parameters. The evaluation parameters generally fall within four general criteria categories, engineering, socio-economic, environmental, and cost. Eleven (11) different evaluation sub-criteria were used. Each sub-criteria was assigned a value depending on its perceived degree of importance. These criteria and sub-criteria weightings were developed from the average of individual weighting sets prepared by members of the consultant's team reflecting a broad range of professional backgrounds. In addition, the alternative performance with respect to each parameter was compared using two benchmarks; 1) the overall effect on the specified parameter and/or 2) the relative effect between the competing alternatives. The overall effect received one of the five judgmental values (++ = 1.00, + = 0.80, o = 0.60, - = 0.40, - - = 0.20). If, however, any of the alternatives had an overall negative effect, then the worst alternative received a (- -) and the relatively better alternative received a higher score (-). If any two values were approximately equal then they both received the relatively lowest score. If the alternatives had an overall positive effect then the best alternative received a (++) and the relatively worse alternative received a lower score (+). A common value, therefore, signifies an equal overall and relative effect. This evaluation involves a combination of both qualitative and quantitative values resulting in an overall score. Each score indicated on the matrix is the result of multiplying the judgmental analysis rating times the relative weight for that parameter. For example, in **Table 2-6**, Corridor 5-4 under the "Traffic Congestion/Safety" parameter was given a (++) designation (judgmental value = 1.0) since this option provides the greatest congestion relief to SR 50. This judgmental value of 1.0 was then multiplied by the relative weight of the "Traffic Congestion/Safety" parameter (12.0) resulting in an overall score of 12.0. Those alternative options found most feasible, which merited further development and evaluation, are shown in yellow.

LEGEND		
++	SUBSTANTIALLY POSITIVE EFFECT OR BEST ALTERNATIVE	1.0
+	GENERALLY POSITIVE EFFECT OR GOOD ALTERNATIVE	0.8
O	GENERALLY NO EFFECT OR MODERATE ALTERNATIVE	0.6
-	GENERALLY NEGATIVE EFFECT OR INFERIOR ALTERNATIVE	0.4
--	GENERALLY NEGATIVE EFFECT OR WORST ALTERNATIVE	0.2

TABLE 2-6

PRE-FINAL ALTERNATIVE CORRIDOR EVALUATION

IMPACTS / CORRIDORS	ENGINEERING 33			ENVIRONMENTAL 26				SOCIO-ECONOMIC 23		COST 18		TOTAL SCORE
	TRAFFIC CONGESTION/SAFETY 12	TRAFFIC ACCOMMODATED 11	CONNECTIVITY 10	SJRWMD REGULATORY EASEMENTS 8	WETLAND IMPACTS 6	WILDLIFE AND HABITAT 6	OUTSTANDING FLORIDA WATERWAY IMPACTS 6	COMMUNITY COHESION 13	CONTROVERSY POTENTIAL 10	CONSTRUCTION 8	R/W AND MITIGATION 10	
1	Not an effective corridor in terms of reducing congestion along SR 50 and diminishing congestion safety concerns O 7.2	Low traffic volumes accommodated along the corridor O 6.6	Not as effective in terms of network and systems connectivity as the other corridors due to its lack of directness -- 2.0	Generally moderate impacts to SJRWMD Regulatory Easements when compared to the other corridors with 21 acres of impacts O 4.8	Generally high wetland impacts with 130 acres -- 1.2	Generally moderate impacts to wildlife and habitat with an average wildlife index ranking of 9.86 O 3.6	Generally high impacts to Outstanding Florida Waterways with 35 acres of impacts - 2.4	Lowest impacts to community cohesion when compared to the other corridors with 6 communites split O 7.8	Significant local opposition to this corridor alternative has been previously expressed - 4.0	Highest potential cost of all corridor options (approximately $325M to $335M) -- 1.6	Generally moderate potential right-of-way impact costs when compared to the other alternative corridors with 200 parcel impacts and generally moderate mitigation impact costs O 6.0	**47.2**
4	Generally effective corridor in terms of reducing congestion and diminishing safety concerns along SR 50 + 9.6	Generally attracted higher volumes than Corridor 1 + 8.8	Supports connections to the local and regional roadway network and its proximity to SR 50 is an advantage ++ 10.0	Generally higher impacts when compared to Corridor 1 with 34 acres of impacts to the SJRWMD Regulatory Easements - 3.2	Generally moderate wetland impacts when compared to the other corridors with 90 acres O 3.6	High impacts to wildlife and habitats with an Average Wildlife Index Ranking of 11.2 -- 1.2	Moderate impacts to Outstanding Florida Waterways with 25 acres of impacts O 3.6	Similar to Corridor 1 but slightly higher number of communites split (6 communities) O 7.8	Moderate controversy potential due to some impacts within the first two project segments O 6.0	Generally lower potential cost (approximately $191M to $201M) O 4.8	Generally similar costs to previous corridor with 204 parcel impacts but with higher mitigation impact costs - 4.0	**62.6**
4-2	Generally similar to Corridor 4 within segment 1 but less effective within segments 2 and 3 and diminishing congestion safety concerns along SR 50 O 7.2	Overall generally similar to Corridor 1 but with higher traffic volumes attracted within Segment 1 and lower within segments 2 and 3 O 6.6	Generally similar to Corridor 4 but slightly less direct + 8.0	Lowest impacts to SJRWMD Regulatory easements with impacts of 17 acres O 4.8	Lowest impacts to wetlands with 75 acres + 4.8	Generally high impacts with an Average Wildlife Index Ranking of 10.57 - 2.4	Moderate impacts to Outstanding Florida Waterways with 15 acres O 3.6	Slightly higher number of communities impacted (7) than previous two alternatives - 5.2	Generally similar to previous corridor alternative O 6.0	Least potential cost of all corridor options (approximately $160M to $170M) + 6.4	Generally higher right-of-way impact costs with 313 parcel impacts but lower migitation impact costs than previous alternatives - 4.0	**59.0**
4-3	Generally similar to Corridor 4 + 9.6	Similar to Corridor 4 + 8.8	Generally similar to the previous two corridors but less direct O 6.0	Generally similar impacts to Corridor 4 with 36 acres of impacts to the SJRWMD Regulatory Easements - 3.2	Generally similar wetland impacts to Corridor 1 with 135 acres -- 1.2	Generally similar impacts to Corridor 1 with an Average Wildlife Index Ranking of 9.7 O 3.6	Low impacts to Outstanding Florida Waterways with 10 acres of impacts + 4.8	Similar to Corridor 4-2 with 7 community split - 5.2	Generally similar to previous corridor alternative O 6.0	Generally high potential cost (approximately $288M to $298M) - 3.2	Generally similar to corridor 1 with lower right-of-way costs (186 parcels) but higher mitigation impact costs - 4.0	**55.6**
4-6	Generally similar to corridor 4 + 9.6	Generally similar to corridor 4-2 O 6.6	Generally similar to corridor 4 with direct connection to SR 50/SR 520 intersection ++ 10.0	Highest impacts to SJRWMD Regulatory easements with impacts of 57 acres -- 1.6	High wetland impacts (111 acres) - 2.4	High impacts to wildlife and habitat with an Average Wildlife Index Ranking of 13.35 -- 1.2	Second highest impacts to Outstanding Florida Waterways with 49 acres of impacts -- 1.2	Relatively good in terms of cohesion impacts with 3 communities impacted + 10.4	Major controversy potential due to its severe impacts to Speed World and Dietrich Ranch -- 2.0	Generally similar to corridor 4 O 4.8	Significant impacts associated with Speed World and mitigation requirement for the Dietrich Mitigation Site - 4.0	**53.8**
5	Generally similar to previous corridor + 9.6	Higher traffic attraction than all previous alternatives ++ 11.0	Generally similar to the previous corridor but only slightly less direct O 6.0	Second highest impacts to SJRWMD Regulatory easements with impacts of 48 acres -- 1.6	Similar to Corridor 4-3 with impacts of 135 acres -- 1.2	High impacts to wildlife and habitat with an Average Wildlife Index Ranking of 14.68 -- 1.2	Highest impacts to Outstanding Florida Waterways with 55 acres of impacts -- 1.2	Similar to previous two alternatives with 7 community splits - 5.2	Significant controversy potential due to major impacts within the first two project segments - 4.0	Generally similar to previous corridor with approximate costs of $264M to $274M - 3.2	Generally similar to Corridor 4-2 with higher right-of-way impact costs of 316 parcel impacts and even higher mitigation impact costs -- 2.0	**46.2**
5-4	Generally the most effective of all corridors in terms of reducing congestion along SR 50 and diminishing congestion safety concerns along SR 50 ++ 12.0	Generally similar to previous corridor ++ 11.0	Generally similar to previous corrdor with minor difference in terms of directness O 6.0	Generally similar to corridor 1 with impacts of 24 acres O 4.8	Generally similar to Corridor 4-2 with wetland impacts of 80 acres + 4.8	Generally similar to the highest impacts corridor with an Average Wildlife Index Ranking of 12.11 -- 1.2	Generally high impacts to Outstanding Florida Waterways with 30 acres of impacts - 2.4	Generally the most impacts to community cohesion with 9 communities split -- 2.6	Generally similar to previous corridor alternative - 4.0	Generally similar to Corridor 4-2 with slighly higher corridor costs (approximately $168M to $178M) + 6.4	Generally highest right-of-way impact costs with 343 parcel impacts with only moderate mitigation impact costs -- 2.0	**57.2**

According to **Table 2-7**, both the group median scores and standard deviation were used as the basis for elimination of inferior options. The results obtained show that Alternative Corridors 1, 4-3, 4-6, and 5 are clearly inferior and were thus eliminated from further consideration.

Table 2-7 Pre-Final Alternative Corridor Elimination

Corridor	Score	Median	Standard Deviation	Reasons for Elimination
1	47.2	*55.6*	*5.57*	Failed Criterion #1
4	62.6			Remains Viable
4-2	59.0			Remains Viable
4-3	55.6			Failed Criterion #1
4-6	53.8			Failed Criterion #1
5	46.2			Failed Criterion #1
5-4	57.2			Remain Viable

Selection Criteria

#1 – Only those alternatives which score higher than the median value for the group will be selected

#2 – The maximum gap between the last selected alternative and the next must not be greater than one standard deviation

Table 2-8 illustrates the general performance of the three remaining competing corridors. According to the table, Alternative 5-4 is the best option in terms of engineering features, but the worst in terms of socio-economic and right-of-way impacts. In addition, it will most likely generate significant controversy due to its high right-of-way and community cohesion impacts. Alternatives 4 and 4-2 are mostly similar within the first two segments, with Alternative 4 performing slightly better within segment 3 in terms of avoiding right-of-way impacts. In summary, Alternative 4 seems to be the best corridor choice in terms of providing a superior solution with an adequate balance between the four decisional components (engineering, environmental, socioeconomic and cost).

Table 2-8 Pre-Final Alternative Corridor Results

DECISONAL COMPONENTS / ALTERNATIVES	ENGINEERING	ENVIRONMENTAL	SOCIO-ECONOMIC	COST
4	• Provides high traffic attraction and congestion relief to SR 50. • Relatively minor potential utility conflicts	• Good alternative with only minor impacts to ecological connectivity, Outstanding Florida Waterway, SJRWMD land management easements and water/wastewater/ solidwaste facilities.	• Generally the best option in terms of minimizing or avoiding right-of-way impacts to private and public properties, historic/ archaeological sites, etc.	• Modestly higher construction cost than the other two options but with much lower right-of-way impacts (204 parcels)
4-2	• Generally similar to Alternative 4 for first two segments. Slightly less effective within segment 3. In terms of traffic attraction and congestion relief to SR 50. • Similar to Alternative 4 in terms of utility conflicts.	• Generally the best option due to its minimum impacts to wetlands wildlife and habitat, ecological connectivity, Outstanding Florida Waterway, SJRWMD land management and regulatory easements and water/wastewater/ solidwaste facilities.	• Generally similar to alternative 4 for first two segments but slightly less effective within segment 3. • Similar to alternative 4 in terms of controversy potential for the first two segments with some potential for first two segments with some potential increase within segment 3.	• Lowest construction cost of remaining options, but significant right-of-way impacts to approximately 313 parcels
5-4	• Generally the best option in terms of higher traffic attraction and provision of congestion relief to SR 50. • Relatively minor potential utility conflicts	• Generally comparable with Alternative 4	• Generally the worst option due to its high detrimental impacts to residential and commercial units, community cohesion and future land use plans. • Major Controversy potential expected due to its high right-of-way and cohesion impacts.	• Generally similar construction cost than Alternative 4-2 but with the highest right-of-way impacts of all options

2.2.6 Final Alternative Corridor Evaluation

In order to further test the validity of the results of the previous pre-final corridor evaluation, the use of a more detailed evaluation procedure is necessary. The core decision-making tool used for the evaluation was the "Expert Choice" computer software, which utilizes the Analytical Hierarchy Process (AHP) procedure. The AHP method is based on the breakdown of each problem into a system of stratified levels of hierarchies where each level consists of criteria or objectives to be compared. The relative importance or priority for all the criteria in a given level is then established through a sequence of pair-wise comparisons, which will ultimately lead to the derivation of priorities (i.e., weights or importance) for each criterion. Each alternative is then compared in a series of pair-wise comparisons in relation to each of the evaluation criteria that leads to the determination of the recommended corridor alternative. A complete description of the project evaluation criteria and AHP methodology as well as the AHP computer run results are included in **Appendix A**. The results from the final alternative evaluation confirm that Corridor 4 is the top-ranked alternative (see **Figure 2-5**).

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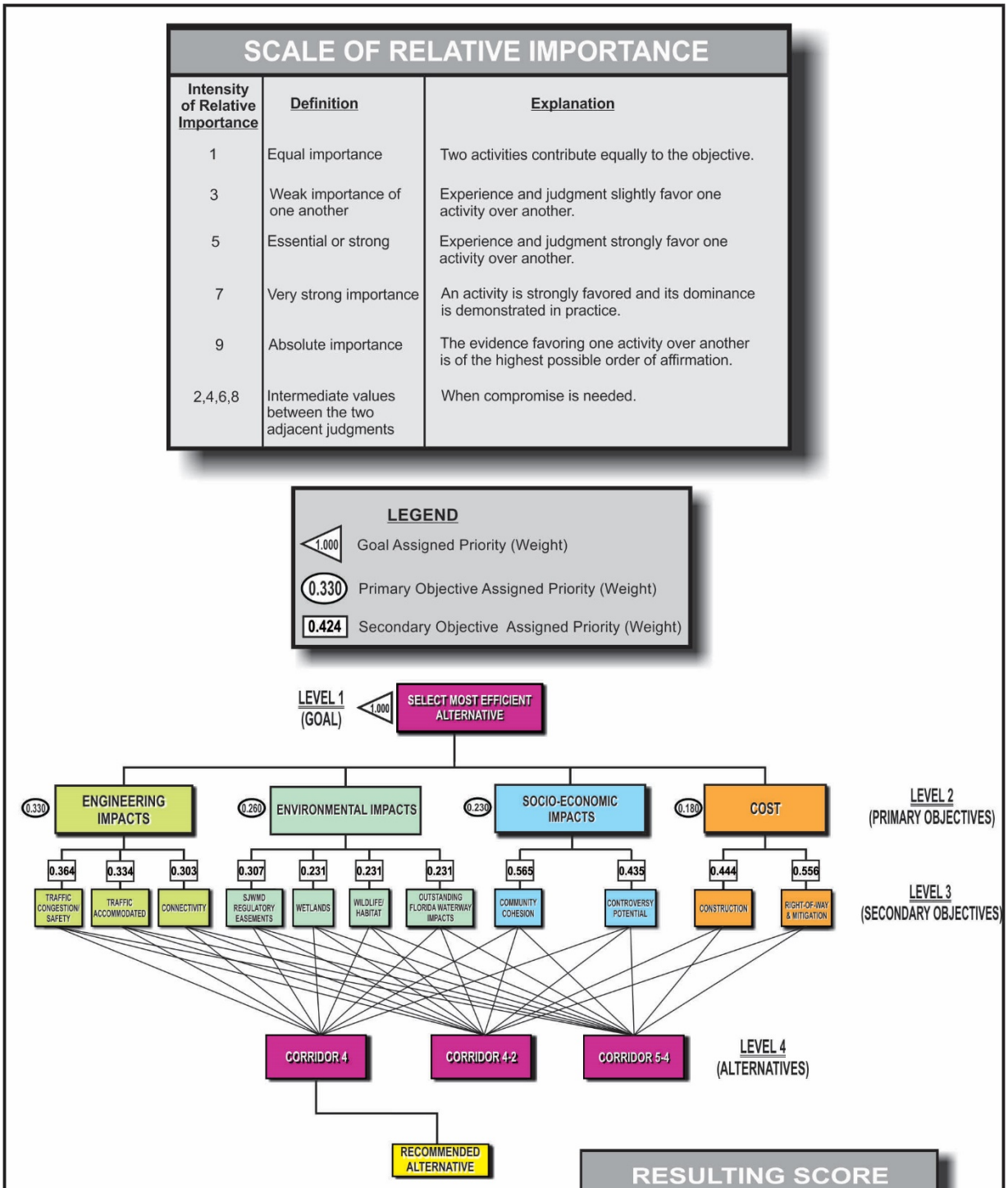
SCALE OF RELATIVE IMPORTANCE

Intensity of Relative Importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective.
3	Weak importance of one another	Experience and judgment slightly favor one activity over another.
5	Essential or strong	Experience and judgment strongly favor one activity over another.
7	Very strong importance	An activity is strongly favored and its dominance is demonstrated in practice.
9	Absolute importance	The evidence favoring one activity over another is of the highest possible order of affirmation.
2,4,6,8	Intermediate values between the two adjacent judgments	When compromise is needed.



RESULTING SCORE

ALTERNATIVES	FINAL SCORE	RANK
CORRIDOR 4	0.378	1
CORRIDOR 4-2	0.322	2
CORRIDOR 5-4	0.300	3

AHP Results — Figure 2-5

2.3 Corridor Conclusions

The obtained results indicate that Corridor 4 is the best choice to fulfill the project objectives. This option is generally in close proximity to the SR 50 corridor and could provide an effective limited access eastern extension of SR 408 from its present western terminus just east of SR 434 to the SR 50 and SR 520 junction. Most of the local trips within this corridor would be serviced by SR 50 while the proposed SR 408 extension would greatly enhance the mobility and linkage needs of the project area. It should be noted that this corridor does offer the possibility to provide future extension options further east, further increasing the system linkage between east Orange County and Brevard County.

The next steps involved the generation of various alternatives within the selected corridor which strive to mitigate or remove the existing and projected impacts and deficiencies and optimize the provision of an effective SR 408 eastern extension.

3 EXISTING CORRIDOR CONDITIONS

According to the results of the Corridor Analysis (summarized in Section 3 of this document), corridors generally paralleling SR 50 to the south would provide an efficient location for the eastern extension of SR 408. This section of the report will briefly describe some existing physical, operational and environmental issues prevalent within this corridor.

This section involved an on-site inventory and verification of current existing conditions as well as the collection of pertinent data that would serve as the basis for a detailed evaluation. Other important features along the study corridor such as utilities, as well as the social/environmental characteristics were reviewed and summarized. **Appendix B** of this report contains a list of references of previous study reports and other pertinent documents that were consulted during this task.

3.1 SR 408 Existing Features

SR 408, also known as the Spessard L. Holland East-West Expressway, is a limited access tolled east-west expressway owned and operated by CFX. This existing three (3) lane each direction expressway currently ends at the SR 50 and Challenger Parkway interchange and has a posted speed of 65 mph.

3.2 Utilities

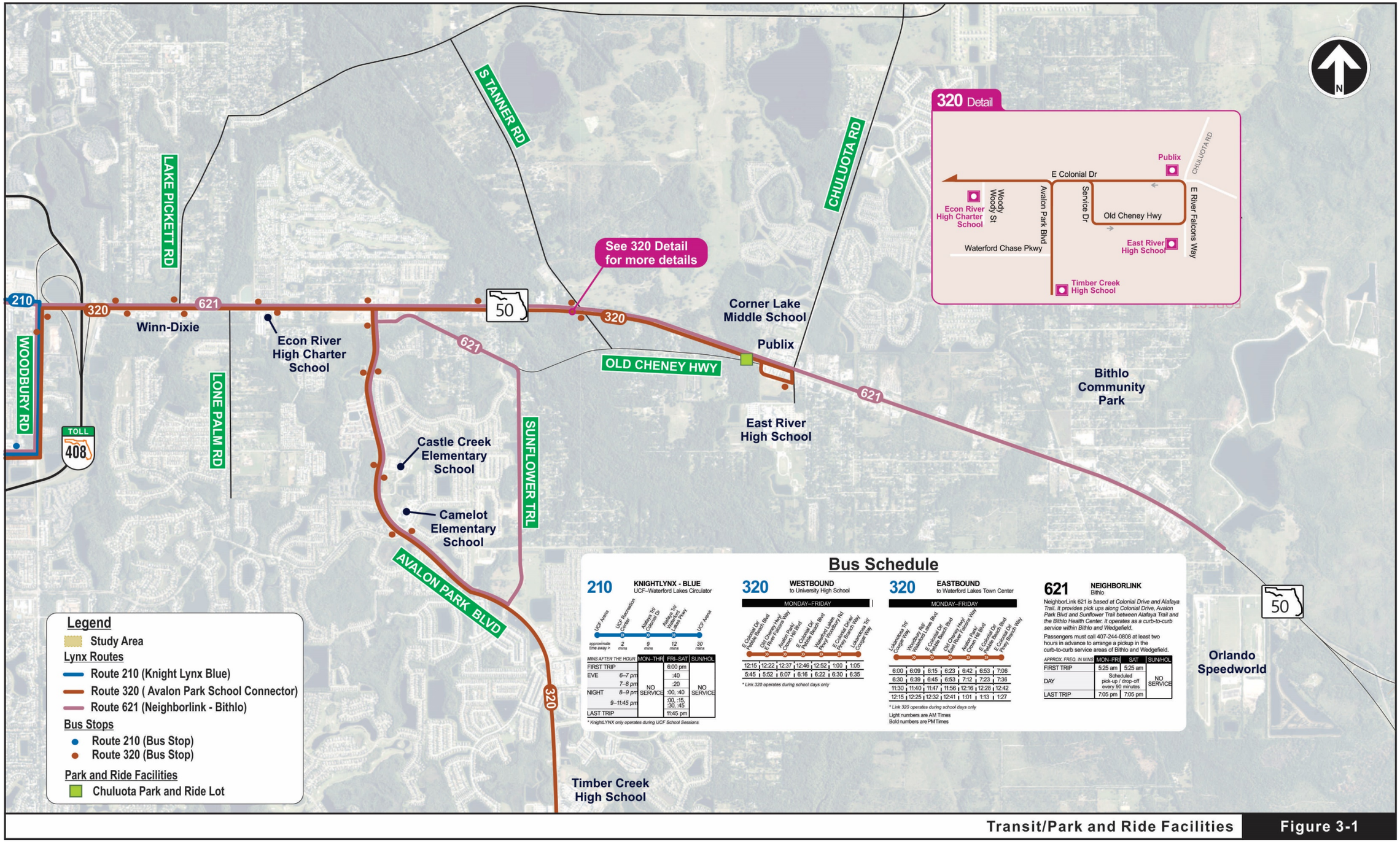
Utility companies with known facilities within the proposed project limits were contacted and requested to submit as-built plans and information on any proposed utilities within the project limits. **Table 3-1** presents a list of utilities owners and types of utilities. A summary of the Utility location based on the responses received is included in **Appendix C**.

Table 3-1 Existing Utilities

Utility	Contact Information	Utility Type
American Traffic Solutions	Santiago Martinez - (480) 596-4595	Communications/Electric
Charter Communications	Marvin Usry Jr - (407) 532-8509	Internet, Cable T.V., Phone, Fiber
City of Orlando-Wastewater	David Breitrick - (407)246-3525	Wastewater/Reclaim Water
Advanced Cabling Solutions Inc	Robert Ford - (407) 883-8881	Electric and Fiber
Duke Energy	Megan Vonstetina - (727) 893-9394	Electric
Fibernet Direct	Danny Haskett - (305) 552-2931	Fiber
Lovelace Gas Service	Garry Lovelace - (407) 277-2966	Gas
MCI	Dean Boyers - (469) 886-4238	Communications/Fiber Optic
Orange County Utilities - Waste Water	David Shorette - (407) 254-9764	Wastewater
Orange County Public Works	Roger Smith - (407) 836-7900	Traffic Signals & Fiber
Central Florida Expressway Authority	Vu Vu - (407) 843-5120	Fiber Optic
Orange County Utilities	Marc Brown - (407) 836-6869	Water
Orlando Telephone Company Inc	Jack Leopard - (407) 996-6297	Fiber and Telephone
OUC - Transmission	Adonis Willis – (407) 434-4134	Transmission
Duke Energy	Megan Vonstetina - (727) 893-9394	Fiber
Teco Peoples Gas - Orlando	Deborah Frazier - (407)420-6609	Gas
Centurylink	George Mcelvain - (303) 992-9931	Telephone
AT&T/Distribution	Dino Farruggio - (561) 997-0240	Telephone
Comcast Cable Communications	Wade Mathews - (352) 516-3824	CATV

3.3 Transit/Park and Ride Facilities

The LYNX bus system serves the Orlando metropolitan area and adjacent communities with over 80 bus routes. The system is run by the Central Florida Regional Transportation Authority and provides three routes serving the project vicinity. **Figure 3-1** illustrates the three routes that serve the project vicinity.



Transit/Park and Ride Facilities | Figure 3-1

NeighborLink 621 is based at Colonial Drive (SR 50) and Alafaya Trail (SR 434) just west of the begin project. It provides several stops along SR 50, Avalon Park Boulevard and Sunflower Trail between Alafaya Trail and the Bithlo and Wedgefield with a scheduled headway of 90 minutes, Monday thru Saturdays from 5:30 am to 7:05 pm.

KnightLYNX Blue 210 Provides a circulator service between the University of Central Florida (UCF) just north and west of the begin project and the Waterford Lakes Town Center. This circulator service only operates on Fridays and Saturdays between 6:00 pm and 12:15 am.

Avalon Park School Connector 320 Provides service along Colonial Drive (SR 50), Avalon Park Boulevard and Old Cheney Highway. Operates weekdays from 6:00 am to 7:30 am and 11:30 am to 1:30 pm in the eastbound direction and weekdays between 12:00 pm to 1:00 pm and 5:45 pm to 6:35 pm in the westbound direction.

The Chuluota Park and Ride Lot (16622 East Colonial Dr., Orlando) (see photo on the right) is a facility located approximately 0.3 of a mile west of Chuluota Road (CR 419) on the south side of SR 50. It features 87 spaces, five (5) handicapped spaces and two (2) bike lockers. It is highly visible from SR 50 and is served by LYNX (NeighborLink 621 route).

3.4 Environmental Characteristics

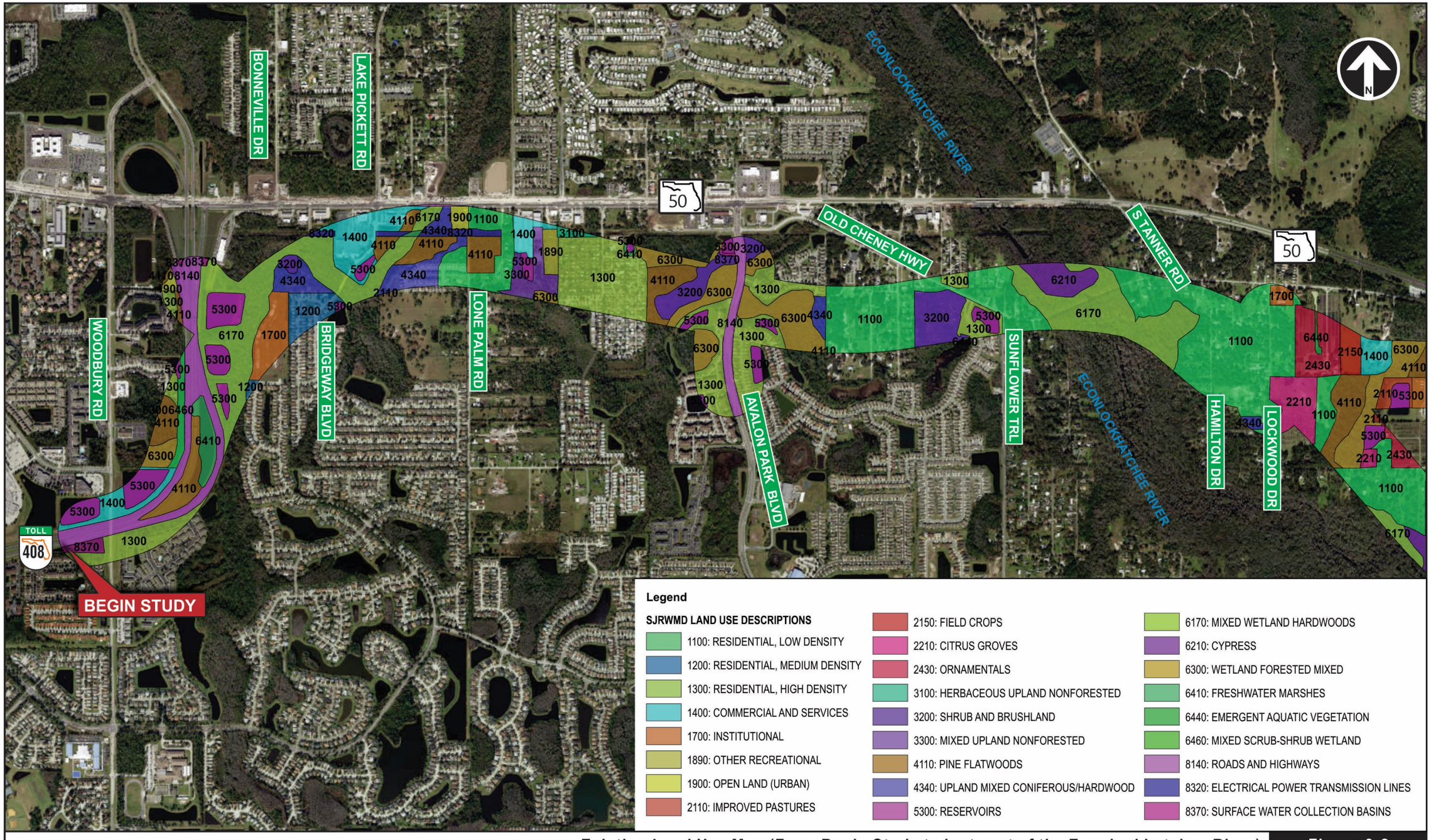
The following sections briefly summarize some of the key environmental considerations prevalent within the project study area. For more existing environmental conditions please refer to the Project Environmental Impact Report (PEIR) prepared for this study.

3.4.1 Land Use

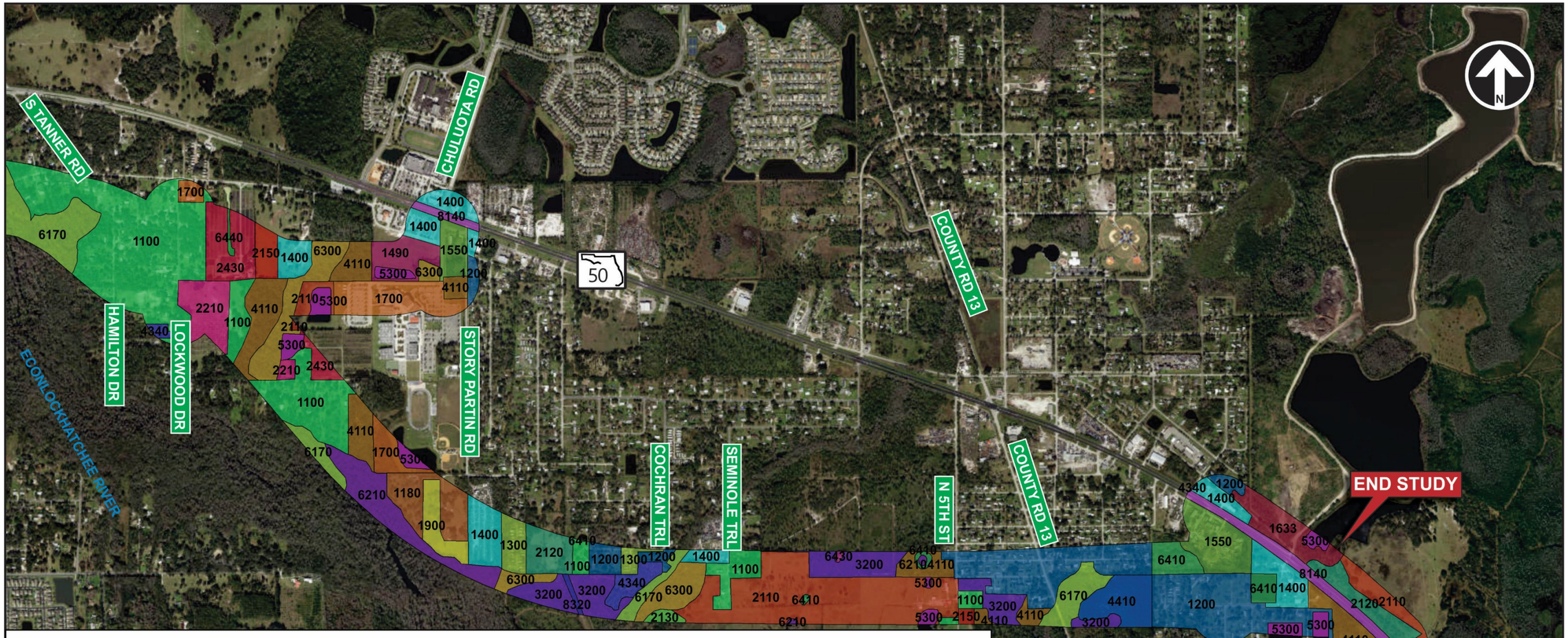
Land use descriptions provided for both uplands and wetlands are classified utilizing the Florida Land Use Cover and Forms Classifications System (FLUCCS) designation. Existing land use in the project area was initially determined utilizing U.S. Geological Survey (USGS) maps, historical images, aerial photographs, and land use mapping from the St. Johns River Water Management District (SJRWMD) (2012). Land use categories reported by SJRWMD were verified in the field. Field reviews generally confirmed the SJRWMD land use mapping, with minor updates to account for recent development or where natural land cover type differs from that reported by SJRWMD.

Land use categories mapped by SJRWMD are shown on **Figures 3-2** and **3-3** and land use categories in the project area are described below. Descriptions of FLUCCS codes are taken primarily from FDOT (1999) and SFWMD (2009). Land uses in the project area vary from undeveloped natural areas to highly developed residential and commercial areas. Immediately west of the project limits are Commercial and Services (FLUCCS 1400), Residential Medium density (FLUCCS 1200), and Pine Flatwoods (FLUCCS 4110) land use types. Immediately east of the project limits are Shrub and Brushland (FLUCCS 3200), Pine Flatwoods (FLUCCS 4110), and Freshwater Marshes (FLUCCS 6410) land use types.

Land use map data was inconsistent with broader conditions encountered during field inspections in three locations. The area mapped as a phosphate mine (FLUCCS 1633) just west of the project end point actually mines fill dirt, not phosphates. A broad expanse mapped as Pine Flatwoods (FLUCCS 4110) south of SR 50 at its interchange with SR 520 contains habitat that more closely matches descriptions of mixed forested wetland plant communities. An area mapped as Freshwater Marsh (FLUCCS 6410), immediately east of the southern part of 9th Street in Bithlo, is actually a highly disturbed site that has been used as an unofficial dump and is a designated brownfield. Its current grade is substantially higher than the surrounding areas and it is bordered by canals.



Existing Land Use Map (From Begin Study to just east of the Econlockhatchee River) **Figure 3-2**



Legend

SJRWMD LAND USE DESCRIPTIONS

- 1100: RESIDENTIAL, LOW DENSITY
- 1180: RESIDENTIAL, RURAL
- 1200: RESIDENTIAL, MEDIUM DENSITY
- 1300: RESIDENTIAL, HIGH DENSITY
- 1400: COMMERCIAL AND SERVICES
- 1490: COMMERCIAL & SERVICES UNDER CONSTRUCTION
- 1550: OTHER LIGHT INDUSTRIAL
- 1633: PHOSPHATES
- 1700: INSTITUTIONAL
- 1830: RACE TRACKS
- 1900: OPEN LAND (URBAN)
- 2110: IMPROVED PASTURES
- 2120: UNIMPROVED PASTURES
- 2130: WOODLAND PASTURES
- 2150: FIELD CROPS
- 2210: CITRUS GROVES
- 2430: ORNAMENTALS
- 3200: SHRUB AND BRUSHLAND
- 4110: PINE FLATWOODS
- 4340: UPLAND MIXED CONIFEROUS/HARDWOOD
- 4410: PINE PLANTATION
- 5300: RESERVOIRS
- 6170: MIXED WETLAND HARDWOODS
- 6210: CYPRESS
- 6300: WETLAND FORESTED MIXED
- 6410: FRESHWATER MARSHES
- 6430: WET PRAIRIES
- 6440: EMERGENT AQUATIC VEGETATION
- 8140: ROADS AND HIGHWAYS
- 8320: ELECTRICAL POWER TRANSMISSION LINES

Existing Land Use Map (From just east of Econlockhatchee River to End Study) **Figure 3-3**

3.4.2 Soils

The Natural Resources Conservation Service (NRCS) (2015) indicates that twelve soil types occur in the study area (see **Figures 3-4** and **Figure 3-5**). Three hydric soil types, Sanibel muck, Samsula muck, and Wauberg fine sand, are mapped in the project area.

Table 3-2 describes the soils listed by the Soil Survey as occurring on-site.

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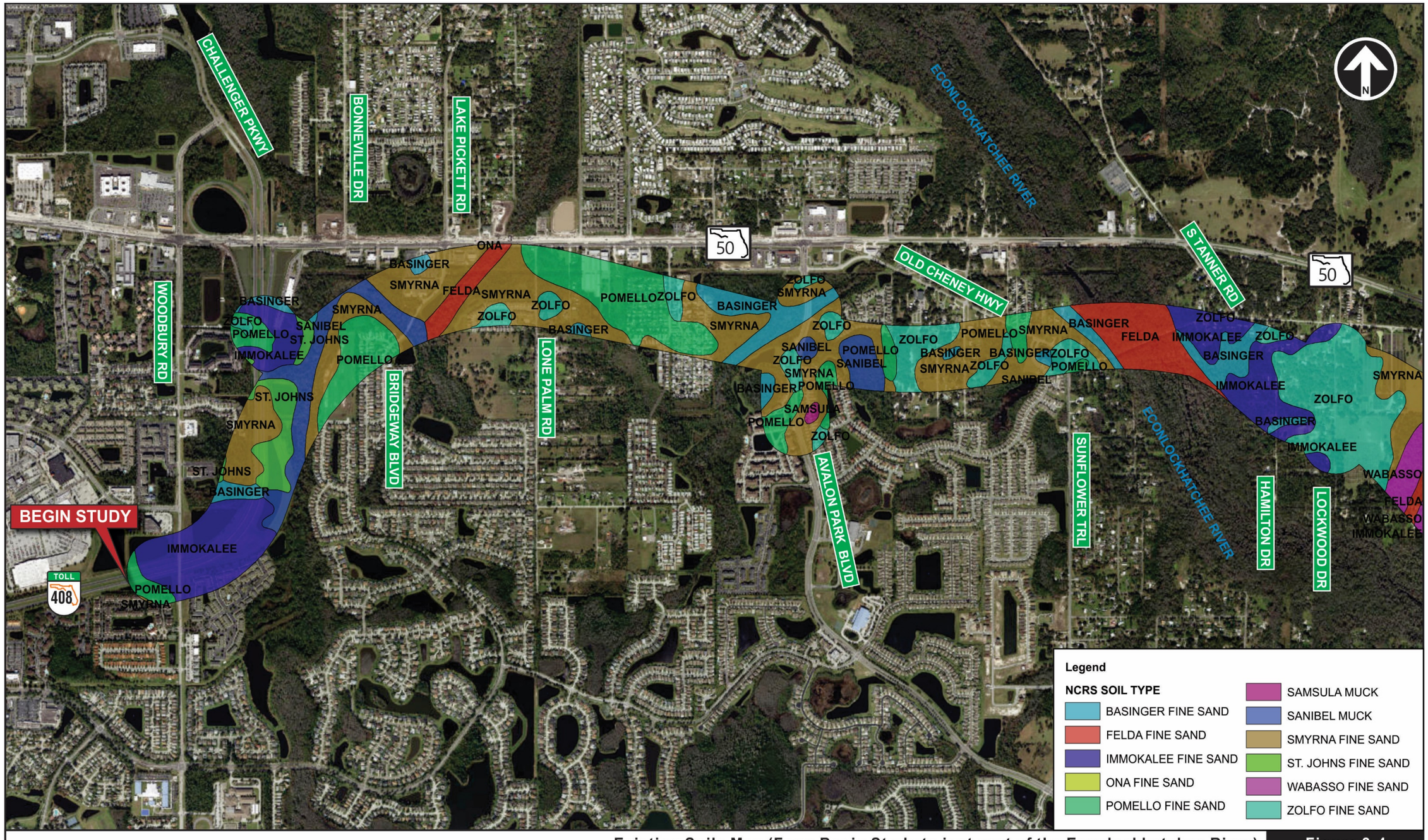
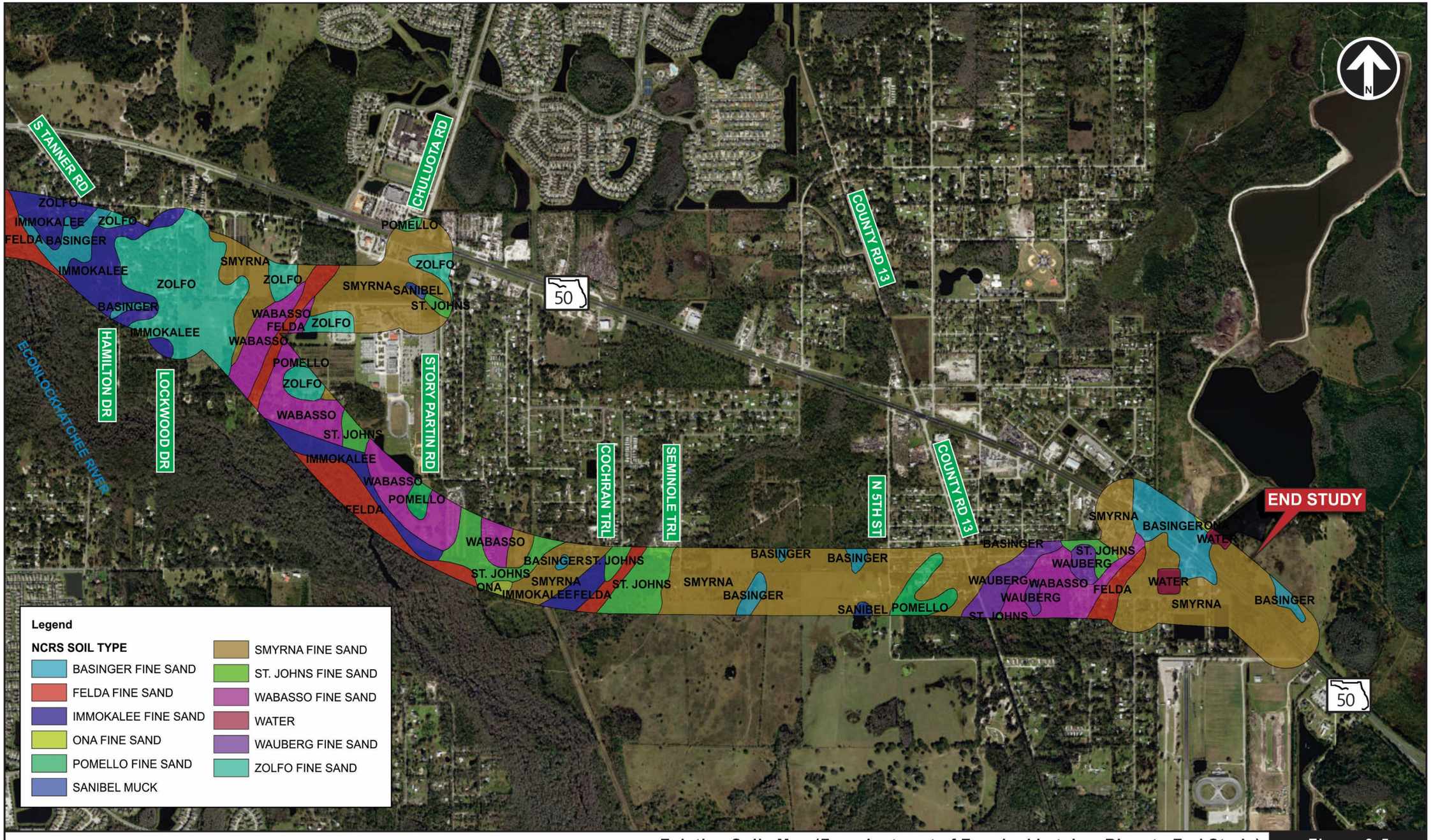


Existing Soils Map (From Begin Study to just east of the Econlockhatchee River) **Figure 3-4**



Existing Soils Map (From just east of Econlockhatchee River to End Study) **Figure 3-5**

Table 3-2 On-site Soils

Soil Type	Slope	Characteristics
Basigner fine sand	0 to 2 Percent	This type consists of very deep, very poorly and poorly drained, rapidly permeable soil in low flats, sloughs, depressions and poorly defined drainage ways. They formed in sandy marine sediments. Permeability is rapid. This is not a hydric soil.
Felda fine sand	0 to 2 Percent	This soil consists of very deep, poorly drained and very poorly drained, moderately permeable soils in drainage ways, sloughs, depressions, flood plains and low flats of the southern flatwoods and the southern central Florida ridge. They formed in sandy and loamy marine deposits. Permeability is rapid to very slow depending on soil horizon. This is not a hydric soil.
Immokalee fine sand	0 to 5 Percent	This soil type consists of very deep, very poorly and poorly drained soils on flatwoods and in depressions primarily in the southern Florida flatwoods, but also occurs in the south central Florida ridge, Florida Everglades and associated areas and the southern Florida lowlands of peninsular Florida. They formed in sandy marine sediments. Permeability is very rapid to moderate. This is not a hydric soil.
Ona fine sand	0 to 2 Percent	This type consists of poorly drained, moderately permeable soils that formed in thick sandy marine sediments. They are in the flatwood areas of central and southern Florida. Permeability is moderate. This is not a hydric soil.
Pomello-Urban land complex	0 to 2 Percent	This soil type consists of nearly level, moderately well drained sandy soil that has been altered for use as building sites and is urban land or covered by houses, streets, driveways, buildings, and parking lots. Permeability is moderate where infrastructure is absent. This is a not hydric soil.
Samsula muck	>2 Percent	This soil type consists of very deep, very poorly drained, rapidly permeable soils that formed in moderately thick beds of hydrophytic plant remains and are underlain by sandy marine sediments in narrow to broad swamps and depressional areas in the flatwoods. Permeability is rapid. **This is a hydric soil.**
Sanibel muck	>2 Percent	This soil type consists of nearly level, deep, very poorly drained soil that has a muck surface layer over sandy mineral material located in ponds, drainage ways and low broad flats. Permeability is rapid. **This is a hydric soil**.
Smyrna-Smyrna wet fine sand	0 to 2 Percent	This soil type consists of very deep, poorly to very poorly drained soils formed in thick deposits of sandy marine material. Permeability is rapid to moderate. This is not hydric soil.
St. Johns fine sand	0 to 2 Percent	This soil type consists of very deep, very poorly or poorly drained, moderately permeable soils on broad flats and depressional areas of the lower Coastal Plain. They formed in sandy marine sediments. Permeability is moderate. This is not a hydric soil.
Wabasso fine sand	0 to 2 Percent	This soil type consists of very deep, very poorly and poorly drained, slowly permeable soils on flatwoods, flood plains and depressions in in the southern Florida flatwoods and to a less extent in south central Florida ridge, southern Florida lowlands and Florida Everglades and associated areas. They formed in sandy and loamy marine sediments. Permeability ranges from rapid to slow depending on soil horizon. This is not hydric soil.
Wauberg Fine Sand	0 to 2 Percent	This soil type is nearly level, poorly drained, and found in low areas on the flatwoods. Permeability is very slow, forming thick beds of loamy marine sediments within large prairie areas. Water capacity is low to medium in the surface layer, subsoil, and substratum. It is very low to low in the subsurface. This soil is well suited to improved pasture grasses, but has severe limitations for building site development, sanitary facilities, and recreational uses. **This is a hydric soil.**
Zolfo fine sand	0 to 5 Percent	This soil type consists of very deep, somewhat poorly drained soils that formed in thick beds of sandy marine deposits. These soils are on low broad landscapes that are slightly higher than adjacent flatwoods on the lower coastal plain of central Florida. Permeability is rapid to moderate. This is not hydric soil.

*Source NRCS 2015

3.4.3 Contamination

A Contamination Screening Evaluation Report (CSER) was prepared for this study. The analysis included information from Florida Department of Environmental Protection (FDEP) and US Environmental Protection Agency (USEPA) databases as well as field investigations and reviews of historic and aerial photographs. No National Priorities List (NPL) superfund sites or landfills were identified within one mile of the project corridor. Out of 22 sites, 3 were assigned a risk rating of None, 4 were assigned a risk rating of Low, 14 were assigned a risk rating of Medium, and 1 was assigned a risk rating of High. Medium and High risk sites are recommended for additional assessment during final design, including soil and groundwater testing, if right-of-way acquisition or subsurface work (including construction of any structures or stormwater ponds) is proposed on or adjacent to them. A SJRWMD Environmental Resource Permit will be necessary and a Dewatering Permit is anticipated for any dewatering operations during construction. **Minimal** contamination impacts are anticipated. The contamination sites are summarized in **Table 3-3**. **Figures 3-6** through **3-8** show the locations of each site.

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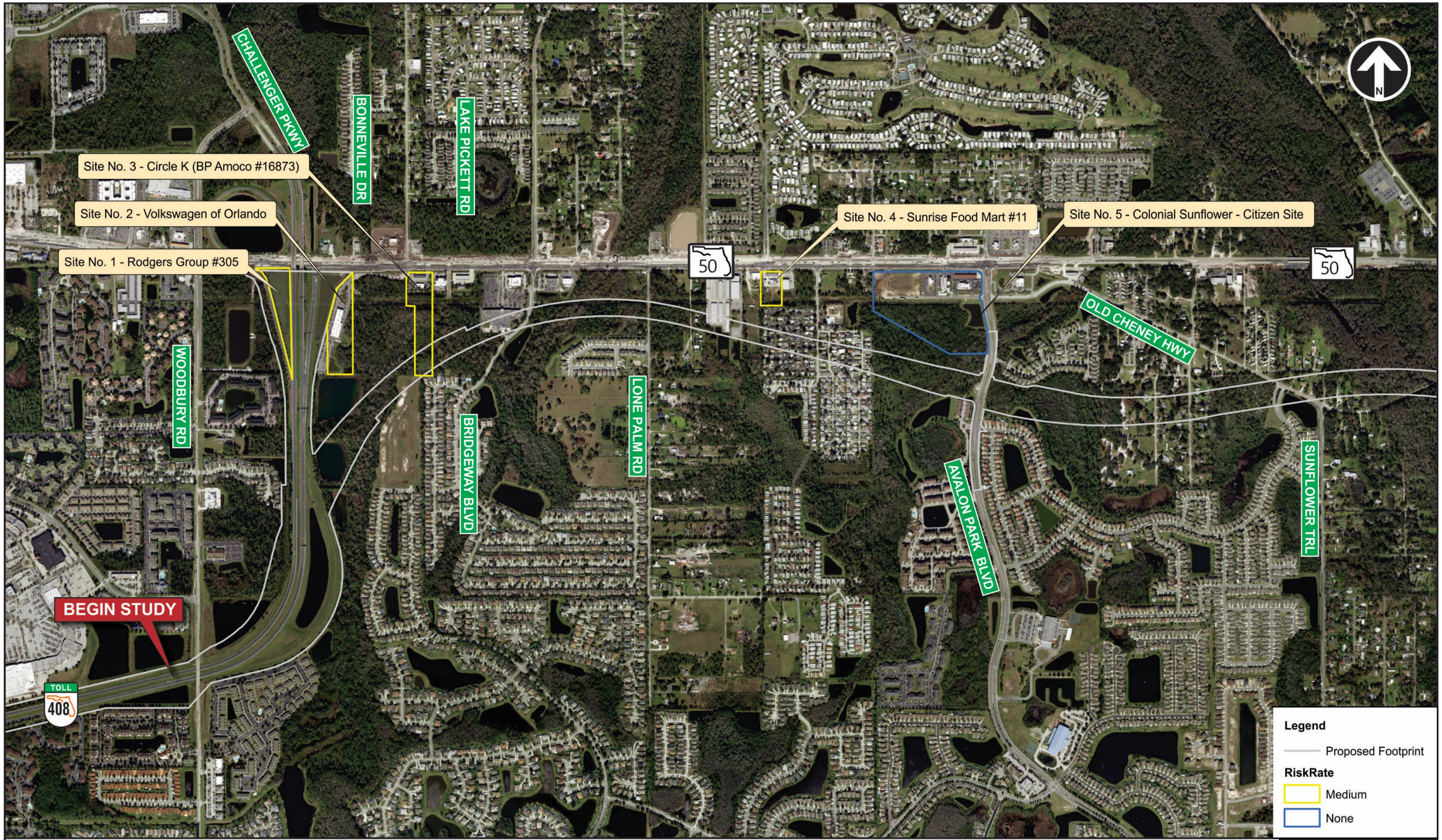
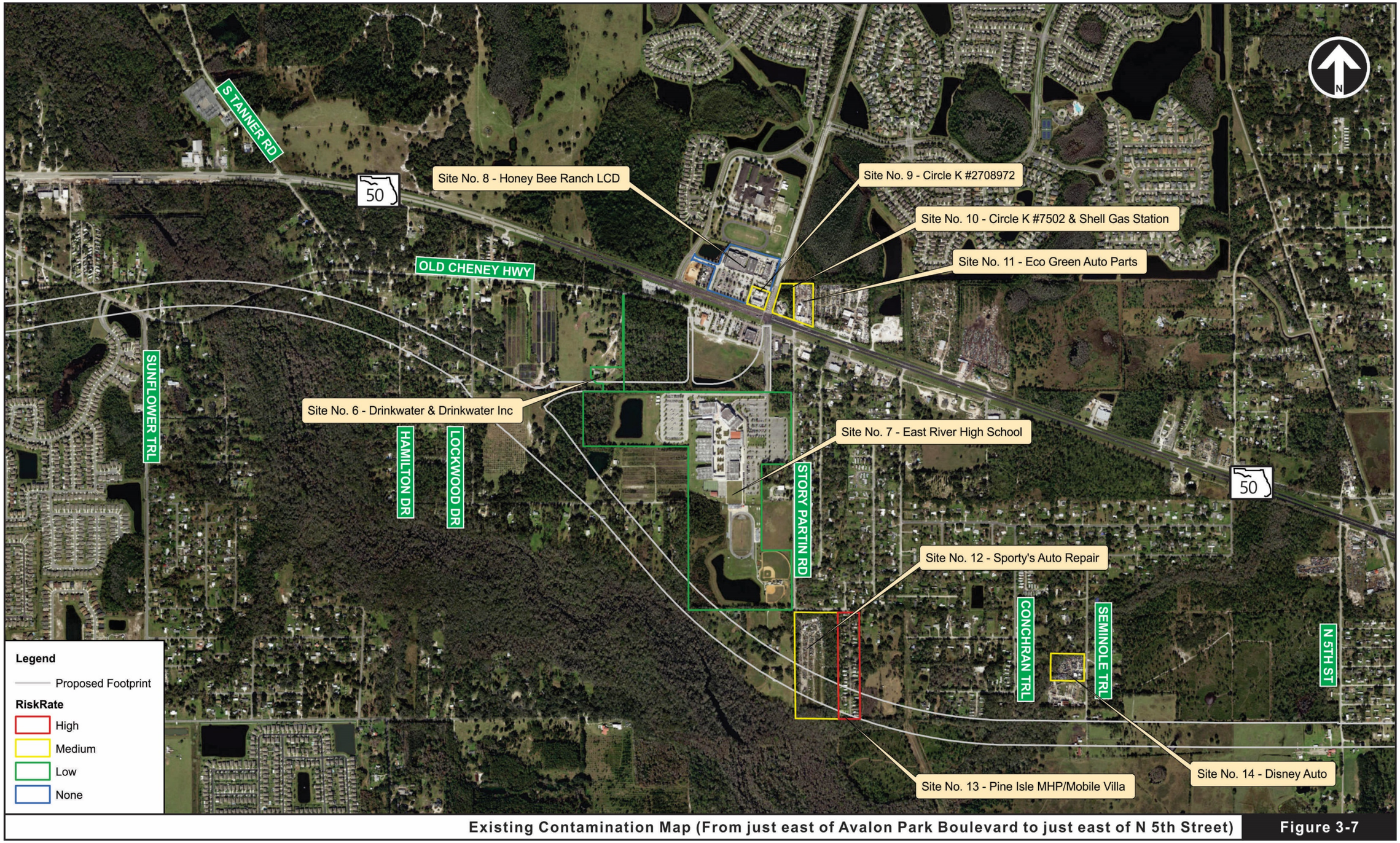
Table 3-3 Contamination Site Summary

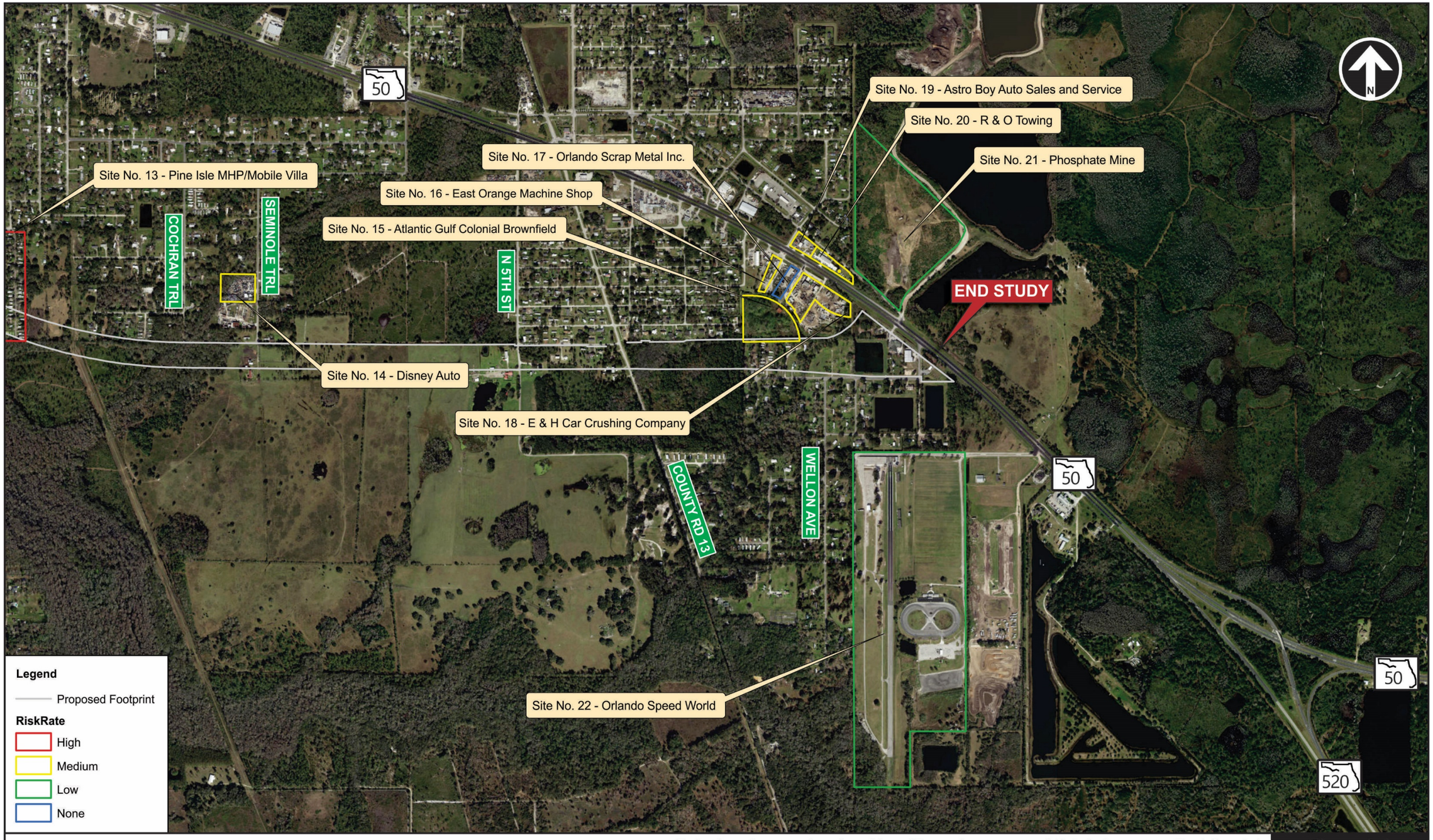
Site #	Facility Name	Address	Facility ID (FDEP/ RCRA)	Databases	Concern		Distance of Contamination from Project Corridor	Risk Rating
1	Rodgers Group #306	E. Colonial Dr. and SR 408 Intersection	9102292	FDEP OCULUS	Petroleum Cleanup	FDOT	Co-located	Medium
2	Volkswagen of Orlando	12700 E. Colonial Dr.	SQG_204620, FLR10KE95, FLR10KO15	FDEP OCULUS	Gas, Oil, Solvents	Napleton Orlando Imports	Adjacent	Medium
3	Circle K (BP Amoco #16873)	12914 E. Colonial Dr.	9804439	FDEP OCULUS	Petroleum Cleanup	Circle K Stores Inc	Co-located	Medium
4	Sunrise Food Mart #11	14266 E. Colonial Dr.	8943447	FDEP OCULUS	Petroleum Cleanup	Orlando Petrol LLC	Adjacent	Medium
5	Colonial Sunflower - Citizen Site	No absolute address available; Planned Site	99954, 6059	None	Solid Waste	Orange County (once finalized)	Adjacent	None
6	Drinkwater & Drinkwater Inc	16578 Old Cheney Hwy.	9045622	FDEP	Fuel/Petroleum Cleanup	Margaret P. & Norman W. Drinkwater	Co-located	Low
7	East River High School	654 Columbia School Rd.	9812033	None	Petroleum Contamination	School Board of Orange County Florida	Adjacent	Low
8	Honey Bee Ranch LCD	16877 E Colonial Dr. #322	86888 (Solid Waste Facility ID), 4571	FDEP OCULUS	Construction Debris	PSM Corner Lakes Plaza LLC	Adjacent	None
9	Circle K #2708972	16891 E. Colonial Dr.	9101787	FDEP OCULUS	Gas, Oil, Solvents, UST	Circle K Stores Inc.	Adjacent	Medium
10	Circle K #7502 & Shell Gas Station	16959 E Colonial Dr.	8521400	FDEP OCULUS	Gasoline, oil, solvents	Erland L Stenberg & Mary Ann Stenberg	Adjacent	Medium
11	Eco Green Auto Parts	16969 E. Colonial Dr.	FLR000053637, SQG_74119, FLR05G750	FDEP OCULUS	Gas, Oil, Solvents	Green East Colonial Drive LLC	Adjacent	Medium
12	Sporty's Auto Repair	250 Story Partin Rd.	FLR000095232, FLR05F715	FDEP OCULUS	Petroleum products	250 Story Partin Rd. LLC	Co-located	Medium
13	Pine Isle MHP/Mobile Villa	190 Story Partin Rd.	FLA010877	FDEP	Water/sewage contaminants	Pine Isle MHP LLC	Co-located	High
14	Disney Auto	104 Seminole Trl.	FLR000049874, FLR05E268	FDEP OCULUS	Petroleum products	Aminolsharieh Bahman Tr	Adjacent	Medium
15	Atlantic Gulf Colonial Brownfield: Rocco	18800 E Colonial Dr.	BF481302000, FLR10FD46, 25403	FDEP OCULUS	Petroleum Cleanup, Oil, Solvents, Solid Waste, Groundwater Contamination	Shaka Mik LLC	Adjacent	Medium
16	East Orange Machine Shop	18776 E. Colonial Dr.	FLD984188078	FDEP OCULUS	Gas, Oil, Contaminants Related to Welding	Schuetrum Michael L	Adjacent	Medium
17	Orlando Scrap Metal Inc.	18778 E. Colonial Dr.	FLD981473499, FLD984188078, FLD984209692	FDEP OCULUS	None	Singer Metal Recycling Inc.	Adjacent	None
18	E & H Car Crushing Company, Inc	106 Gloucester St.	9202945, 93235, 9202945a, 9202945c	FDEP OCULUS	Gasoline, Oil	ERB Harold and ERB Joyce	Co-located	Medium
19	Astro Boy Auto Sales and Service	18765 E. Colonial Dr.	None	None	Paint, Solvents, Gasoline, Oil	Eccli Family Trust	Adjacent	Medium
20	R & O Towing	18801 E. Colonial Dr.	SQG_76423	FDEP OCULUS	Paint, Solvents, Gasoline, Oil	Robert Oliva	Adjacent	Medium
21	Phosphate Mine	251 Baxter Rd.	Parcel ID: 26-22-32-1312-01-000	FDEP OCULUS	Heavy Metals	40 Acres & a Mule LLC	Adjacent	Low
22	Orlando Speed World	19164 E. Colonial Dr.	9700560, 9700558, FLR000014597	FDEP OCULUS	Petroleum products	RBS JR Inc.	Adjacent	Low



Potential Contamination Sites (From Begin Study to just east of Avalon Park Boulevard) **Figure 3-6**



Existing Contamination Map (From just east of Avalon Park Boulevard to just east of N 5th Street) **Figure 3-7**



Existing Contamination Map (From just east of N 5th Street to End Study) **Figure 3-8**

3.4.4 Flood Zones

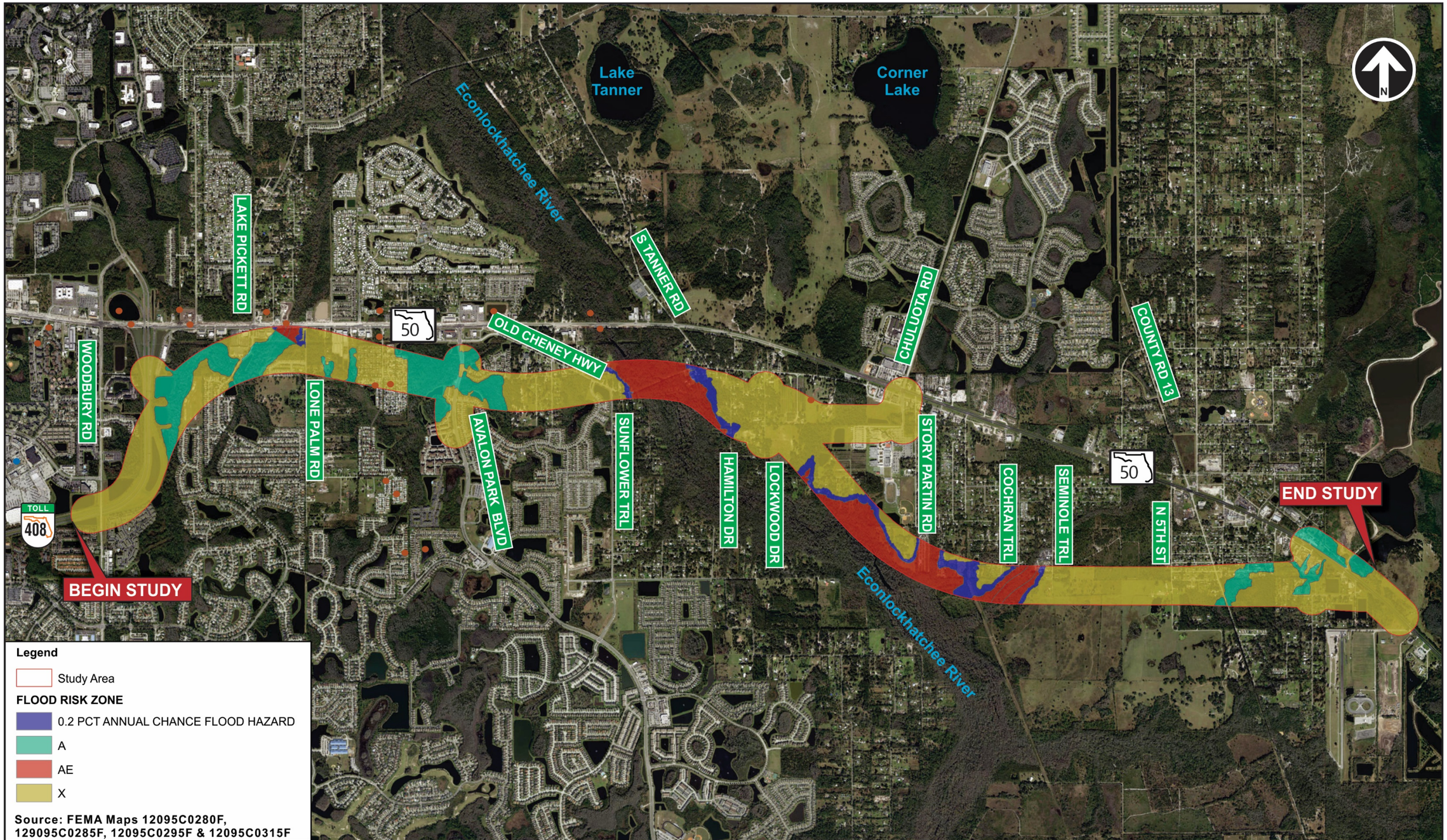
According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (updated December 4, 2012), a large portion of the project corridor is located within Flood Zone X, which is a flood zone that has a 0.2% annual flood chance. Small portions of the project area are located within flood zones A and AE, which are flood zones that are inundated by the 100-year flood (see **Figure 3-9**). FEMA Map Nos. 12095C0280F, 129095C0285F, 12095C0295F and 12095C0315F, provide flood information for the project (see **Appendix D**). There are many naturally occurring streams and drainageways located throughout the project area.

3.4.5 Elevation and Hydrologic Features

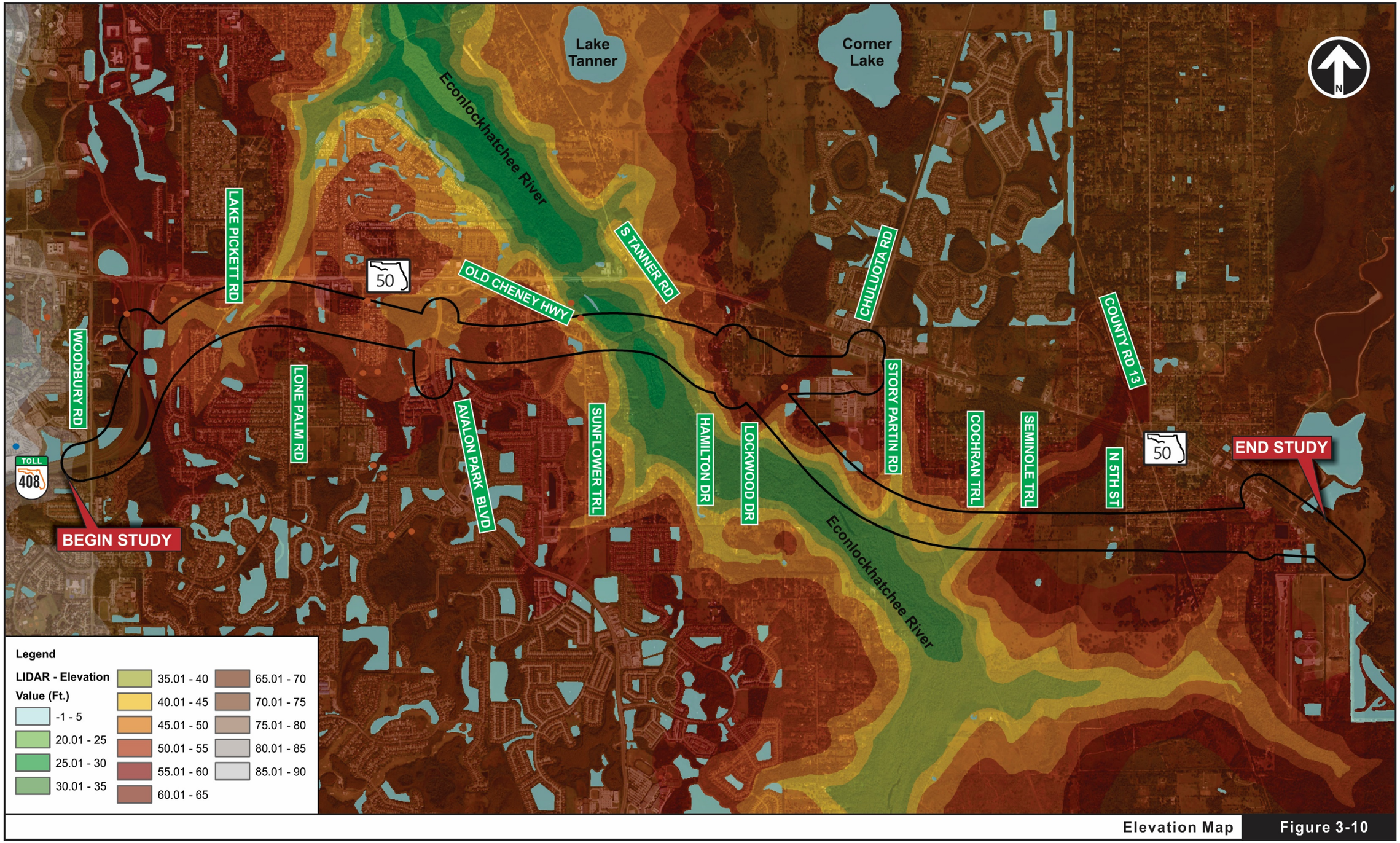
Figure 3-10 shows elevation maps created with data collected using available LiDAR in North American Datum 1983 (NAD 83). The project area has a ground elevation ranging between approximately 25 and 80 feet. The eastern and western ends of the project area have existing elevations ranging from approximately 60 to 80 feet and the elevation dips along the Econlockhatchee River basin.

Hydrologic features and wetland areas are mapped by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) and are shown on **Figure 3-11**. The Econlockhatchee River is considered an Outstanding Florida Water (OFW), is in a Riparian Habitat Protection Zone, and also has associated Special Basin Criteria that must be met for permit issuance. As shown on **Figure 3-11**, in addition to the Econlockhatchee River, several river tributaries also cross the project study area. The nearest major water features besides the Econlockhatchee River and its tributaries are Lake Tanner and Corner Lake, both located approximately one mile north of the project corridor.

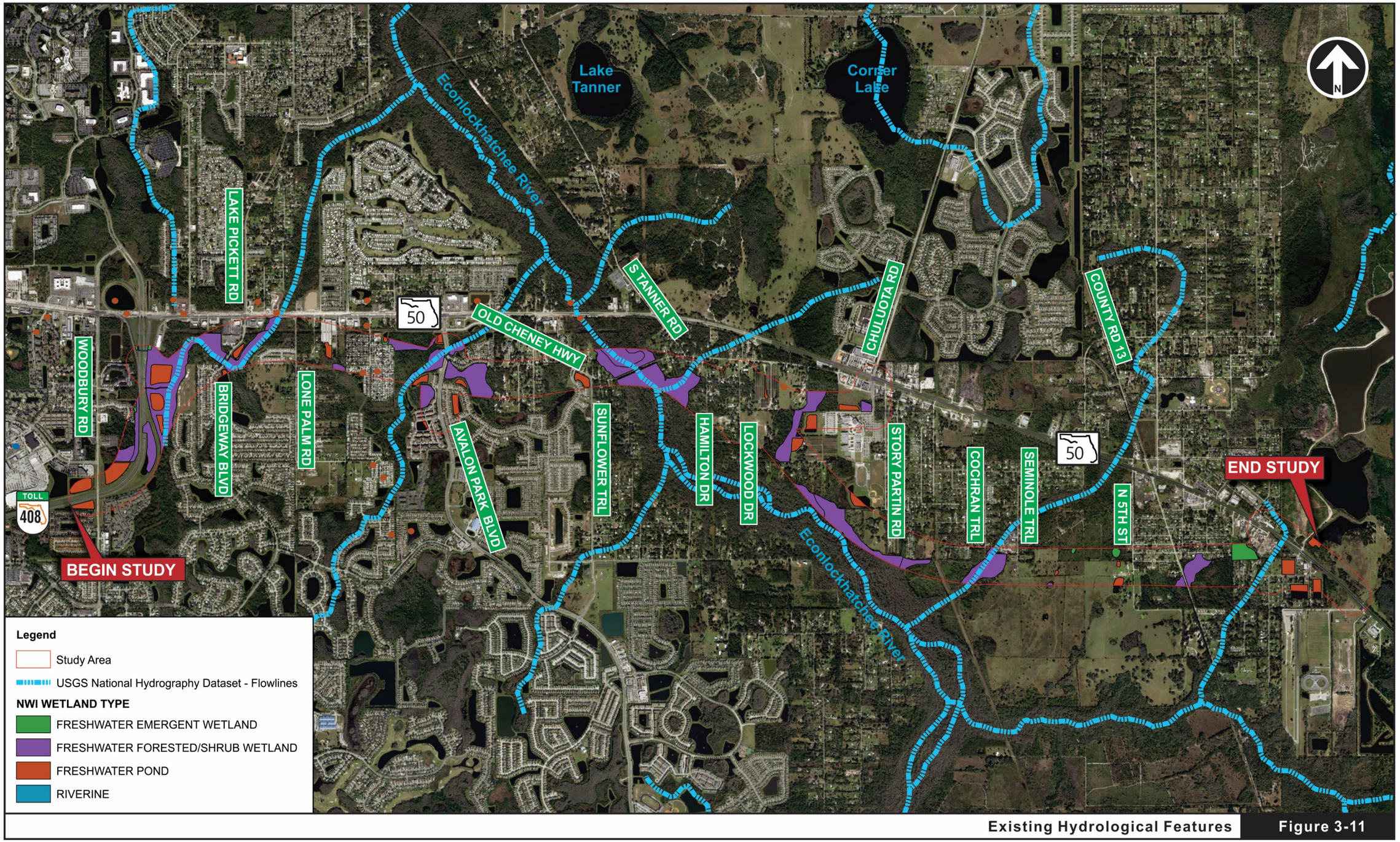
Based on a review of data from the Florida Department of Health (2015), 71 potable wells are present within or adjacent to the study area. Most of these wells are concentrated in the eastern half on the study area and are associated with residential communities and commercial establishments. The project is not underlain by a Sole Source Aquifer as identified by the USEPA.



Flood Risk Zones | Figure 3-9



Elevation Map | Figure 3-10



Existing Hydrological Features **Figure 3-11**

3.4.6 Groundwater

According to the groundwater flow-pattern map from SJRWMD, groundwater flow in the project area is generally to the south-southeast.

3.5 Drainage

The proposed SR 408 Eastern Extension corridor is located within the jurisdiction of the SJRWMD and hydrologically within the Big Econ Drainage Basin. The project discharges into the Econlockhatchee River, which is a tributary of the St. Johns River. The Econlockhatchee River drainage basin drains from the south to the north. Since this is a new alignment, the proposed on-site drainage basins are located within various land uses of which are urban, built-up, and wooded/wetland. The drainage conditions for the urban and built-up land uses consists of curb and gutter and open swales that collect the runoff and discharge it to existing retention facilities. Stormwater runoff from the wooded areas drain into existing wetlands or low-lying areas that are connected to the Econlockhatchee River tributaries.

The proposed SR 408 Eastern Extension corridor is a new alignment; therefore, there are no existing cross drains or bridge crossings located along the project corridor. The corridor crosses over the Econlockhatchee River, Econlockhatchee River Tributaries, and wetlands. In general terms, the tributaries east of the river flow in a north to south direction, the tributaries west of the river flow in a south to north. Runoff from the proposed corridor drains to low-lying areas, such as wetlands and creeks that are connected to the Econlockhatchee River. The Econlockhatchee River is listed as an OFW per the FDEP. Projects that discharge into OFW require an additional 50% of treatment volume for proposed stormwater management facilities. The river is not listed for nutrient impairment; therefore, pollutant loading analysis is not required. The on-site drainage divides and basin limits are the same for existing and proposed conditions. A drainage map for existing condition was not prepared for this report since the on-site area foot print is the same as the proposed condition.

The SR 408 Eastern Extension corridor is divided into 15 basins, with basin 11 divided into 3 sub-Basins, 11A, 11B and 11C, for stormwater management. The basin limits are shown on **Figure 3-12**. The basin divides were based on a conceptual SR 408 Eastern Extension profile with high points and low points. The same basin divide limits were

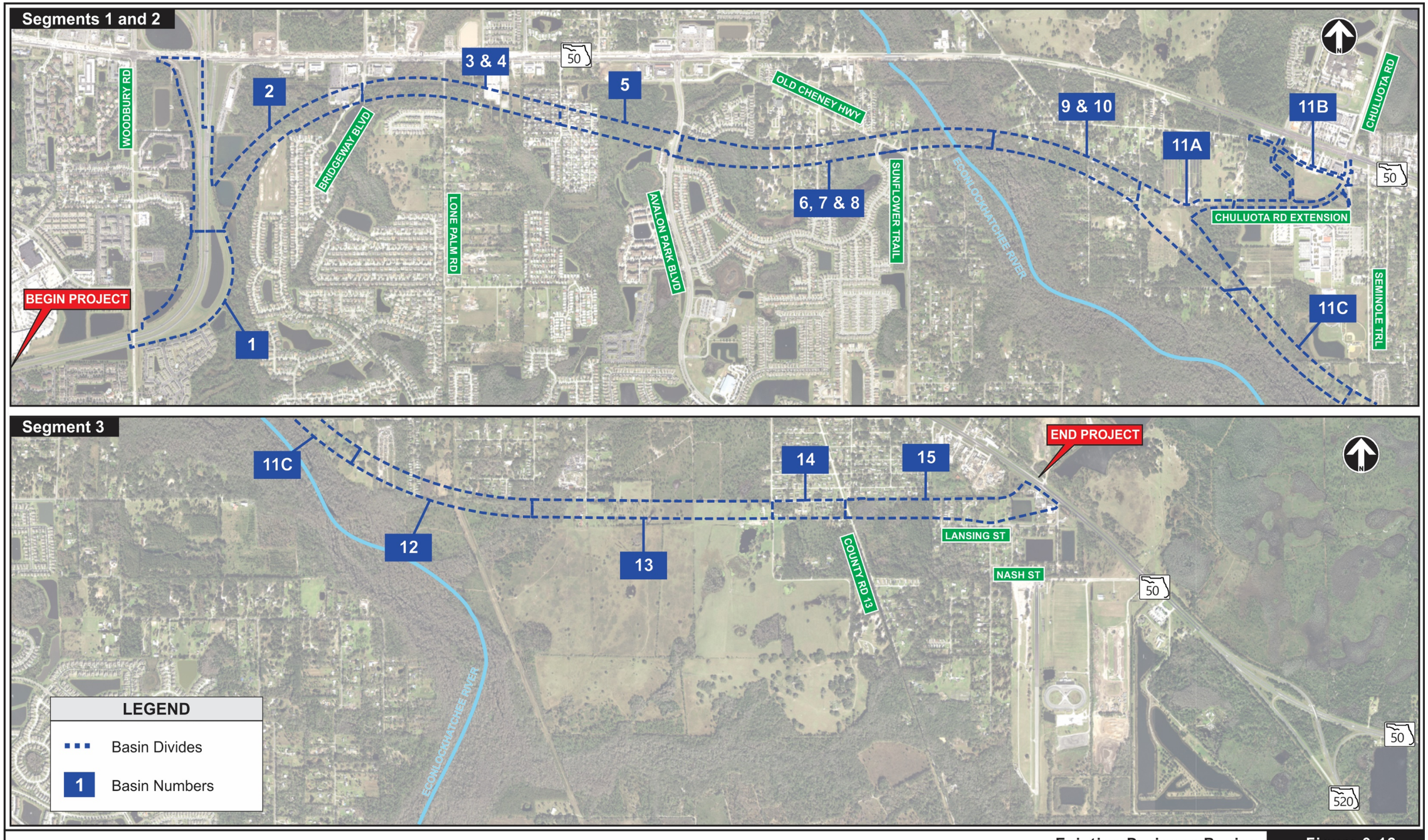
used for the proposed condition as well. An existing condition drainage map was not prepared for this report, since the on-site basin limits and right-of-way width are the same for the existing and proposed condition. Offsite drainage patterns remain the same.

3.5.1 Existing Cross Drains

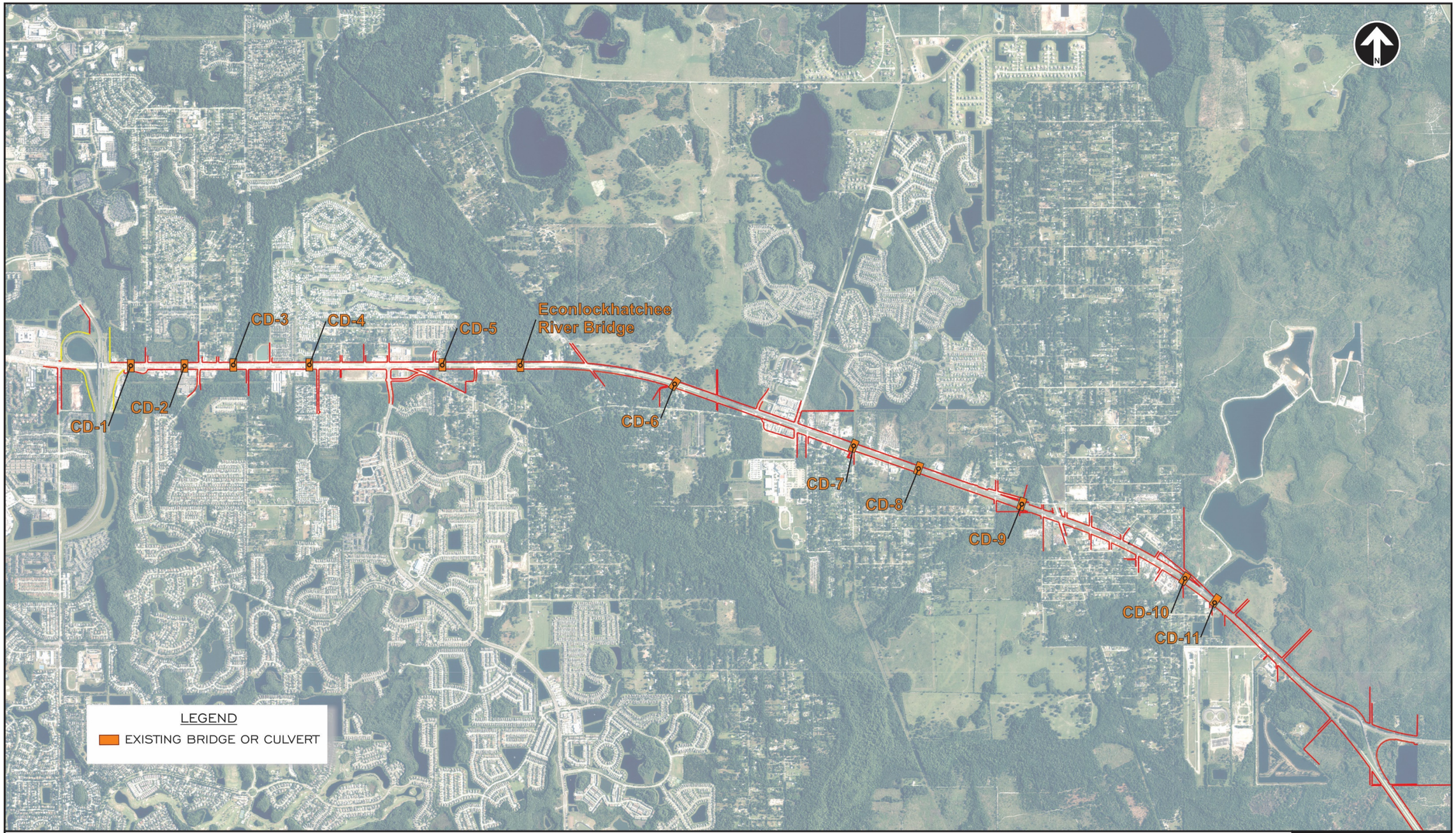
Considering this is a new alignment, there are no existing cross drains or bridge structures for review. However, existing cross drains upstream and downstream of the proposed alignment were taken into consideration to maintain functionality and to verify the recommended improvements do not adversely impact the overall drainage function. Refer to **Table 3-4** for existing SR 50 cross drain information. The cross drains are shown on **Figure 3-13**.

Table 3-4 Existing SR 50 Cross Drain General Information

Cross Drain ID	Pipe Description	50-Year DHW EL (ft)	Date of Construction
SR 50 CD-1	2-8'x6' CBC	58.57	2012
SR 50 CD-2	2-24" RCP	53.53	2012
SR 50 CD-3	2-12.95'x8.5' CBC	50.04	2012
SR 50 CD-4	1-30" RCP	54.68	2012
SR 50 CD-5	3-10'x6' CBC	43.70	1960
SR 50 CD-6	3-36" RCP	59.10	1960
SR 50 CD-7	1-4'x4' CBC & 1-54" RCP Jointed	59.10	1960
SR 50 CD-8	1-30" RCP	66.50	1960
SR 50 CD-9	1-8'x7' CBC	54.80	1960
SR 50 CD-10	1-10'x4' CBC	60.80	1960
SR 50 CD-11	1-24" RCP	61.60	1960



Existing Drainage Basins | Figure 3-12



Existing Cross Drain Locations | Figure 3-13

3.6 Existing Traffic Conditions

The purpose of this section is to describe data collection efforts, document field observations and summarize the existing (2015) operational characteristics of SR 50 in the Study Area. To summarize this work, the existing traffic conditions were established using the turning movement counts collected at all signalized intersections, supplemented with traffic counts collected by the FDOT and Orange County. The intersection geometry was established from field visits and aerial maps. Given that the widening of SR 50 to six lanes (three lanes in each direction) between SR 408 and a point east of Avalon Park Boulevard is underway, the lane geometry was obtained from the design plans. The 2015 traffic conditions were analyzed under the SR 50 widened configuration. The peak hour turning movement volumes were developed from counts and the intersection level of service was completed using SYNCHRO software. The roadway segment operational analysis utilized 2012 FDOT Quality and Level of Service Handbook tables.

3.6.1 Data Collection

Data collection efforts in support of the project included a traffic count survey, Bluetooth Origin-Destination (O-D) survey and a travel time and delay survey. The data collection tasks were performed during the second week of April 2015. The section of SR 50 between SR 408 and Avalon Park Boulevard was under construction during the data collection period. Also, the section of SR 50 between Chuluota Road and SR 520 was being resurfaced. Due to these construction activities, representative SR 50 mainline counts were feasible at limited locations. The counts on SR 50 were supplemented with historic traffic counts obtained by the FDOT and Orange County.

3.6.1.1 Traffic Counts

Traffic counts were collected along SR 50 and major cross streets intersecting SR 50. The traffic count locations are shown on **Figure 3-14**. **Table 3-5** contains the locations at which three-day classification counts were collected, including SR 50 both east and west of the SR 408 ramps and SR 50 near the Econlockhatchee River.

Table 3-5 Locations with 3-Day Classification Counts

SR 50 West of SR 408 Ramps
SR 50 East of SR 408 Ramps
SR 50 at Econlockhatchee River

Because of construction activities on SR 50, the classification counts on either side of SR 408 were collected through video recordings.

Table 3-6 lists the locations at which eight-hour intersection turning movement counts were collected at all signalized intersections within the Study Area.

Table 3-6 Locations on SR 50 with Turning Movement Counts (TMC's)

SR 408 Northbound Off-Ramp
Bonneville Drive
Lake Pickett Road
Pebble Beach Boulevard
Avalon Park Boulevard
Chuluota Road (CR 419)
CR 13

Table 3-7 lists the locations at which 24-hour counts were collected on SR 50 and the major cross streets. In addition, a series of 7-day counts were collected to supplement the Bluetooth survey as described below.

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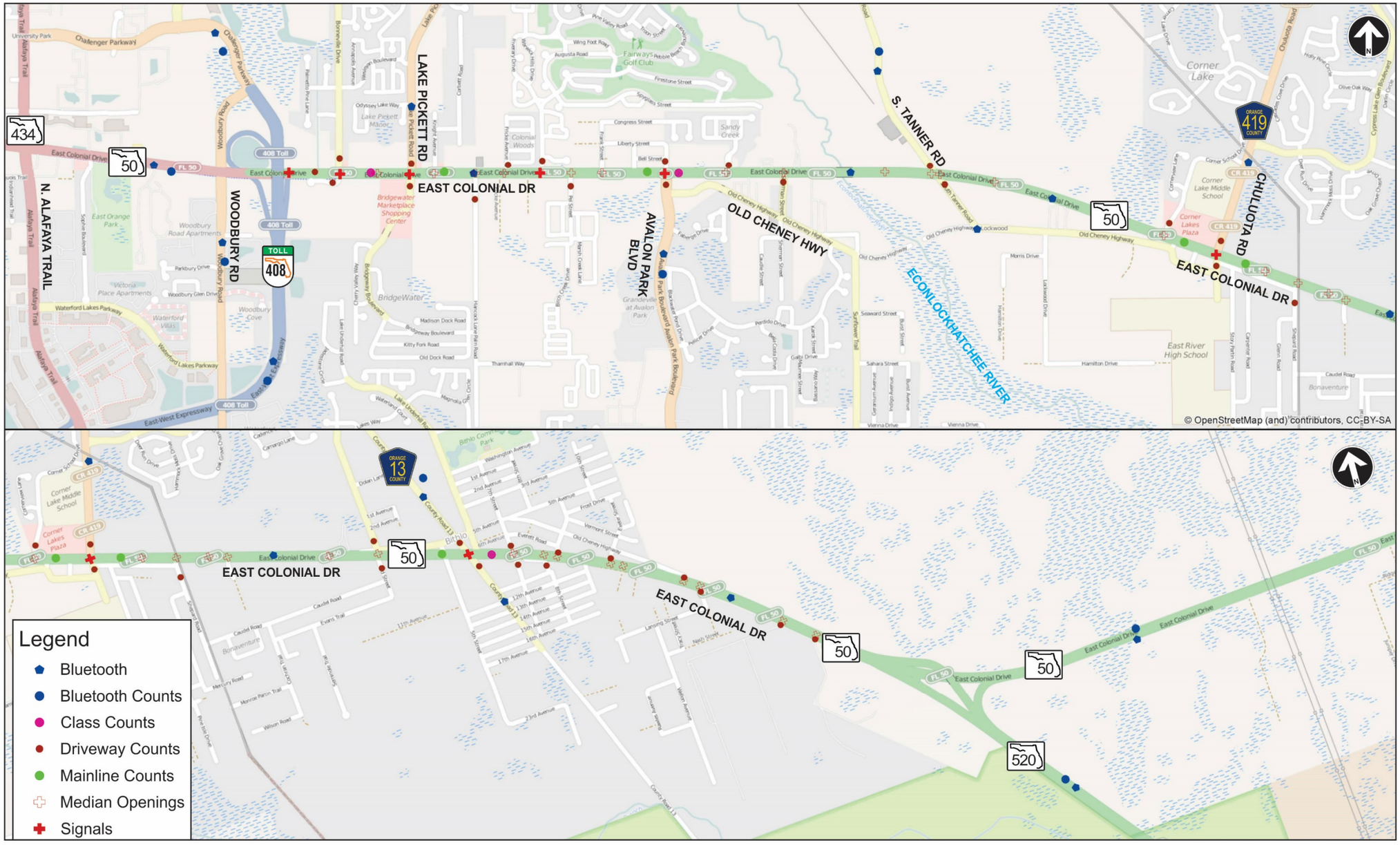


Traffic Count Locations **Figure 3-14**

Table 3-7 Locations with 24-Hour Volume Counts

Woodbury Road, south of SR 50	Hancock Lone Palm Road, south of SR 50
Woodbury Road, north of SR 50	Fricke Avenue, north of SR 50
Bonneville Road, north of SR 50	Pel Street, south of SR 50
Bonneville Road, south of SR 50	Frank Street, north of SR 50
Lake Pickett Drive, south of SR 50	Sandy Creek Lane, north of SR 50
Pebble Beach Boulevard, north of SR 50	Sherman Street, south of SR 50
Avalon Park Boulevard, north of SR 50	Corner School Drive, north of SR 50
Tanner Road, north of SR 50	Shepard Road, south of SR 50
Tanner Road, south of SR 50	3rd Street, north of SR 50
Chuluota Road/CR 419, south of SR 50	Belvedere Road, north of SR 50
CR 13, north of SR 50	7th Street, north of SR 50
CR 13, south of SR 50	7th Street, south of SR 50
SR 50, west of Chuluota Road	Clarendon Street, north of SR 50
SR 50, east of Chuluota Road	Exeter Street, north of SR 50
SR 50, east of CR 13	Old Cheney Highway, north of SR 50
SR 50, west of CR 13	Lansing Street, south of SR 50

All traffic counts consisting of approach volume and vehicle classification counts were adjusted using the latest FDOT axle and seasonal correction factors for Orange County to estimate 2015 annual average daily traffic (AADT).

In addition to the original counts collected as part of this study, traffic data from the SR 50 Widening Project - SR 50 from Avalon Park Boulevard to Chuluota Road: Project Traffic and PD&E and Design Report were used as references.

3.6.1.2 Bluetooth O-D Survey

A Bluetooth survey was conducted along SR 50, including the roadway between the intersections with SR 408 in the west through the intersection with SR 520 in the east. The purpose of this survey was to establish origin-destination (O-D) patterns within and along SR 50. The survey utilized BluFAX sensors developed and marketed by Traffax, Inc., the subconsultant performing the survey. These sensors are designed to be deployed along roadway corridors where the sensors detect and record the Bluetooth signals emanating from electronic devices in passing vehicles.

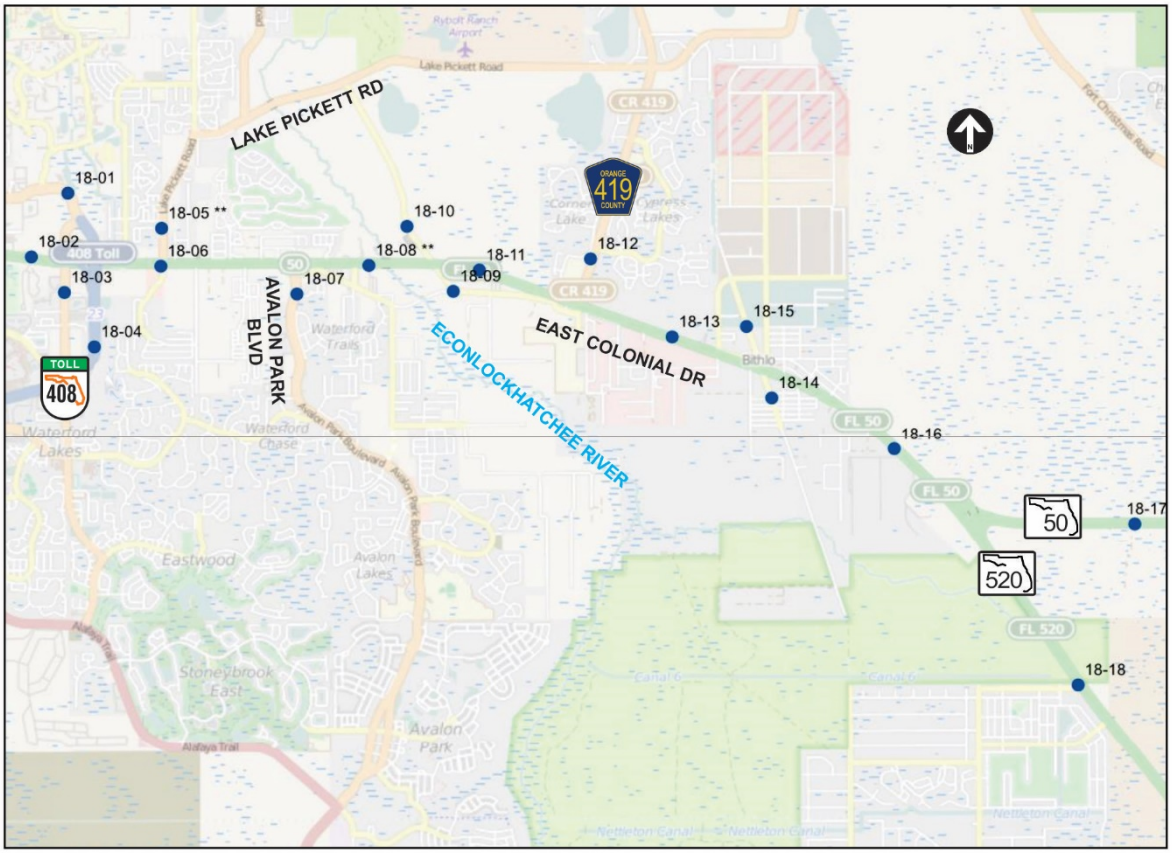
The recordings are time dated. When the same Bluetooth enabled device is identified at multiple sensors along the corridor, the analysis software is then able to reconstruct the vehicle's trip and provide information about O-D patterns as well as travel times along the corridor.

The goal of this survey was to identify traffic movement patterns of motorists along SR 50 traveling on the east-west corridor, largely between SR 408 and SR 50 in the west connected with SR 50 and SR 520 in the east. Detectors were deployed in such a way as to determine the specific access point at which motorists entered the study area; these locations are not only along SR 50 but along the major side streets forming a tight cordon of the study area. **Figure 3-15** contains a map with the detector locations and the average weekday trips factored from the Bluetooth data. Traffic counts (7-day) were obtained at each of these locations during the time of the Bluetooth survey.

The results from this survey take the form of a trip table, i.e., a table with the number of trips between each entry and exit to this portion of SR 50. The raw survey results were first simplified down to thirteen main ways into and out of this portion of SR 50.

The results were then factored to match the traffic counts entering and exiting the corridor. After the simplification and factoring, the data was summarized in a table of average weekday movements between thirteen entry/exit roadways. The rows identify entry points and the columns exit points. While there is a general pattern of symmetry in the table of trips, the volumes in this table are not precisely symmetrical. For this reason, the volumes in the westbound direction do not equal the volumes in the eastbound direction. The survey resulted in a fact-based understanding of current movements through this portion of SR 50. The two main entries and exits are SR 50 West and SR 408, followed by Woodbury Road and Avalon Park Boulevard. These are followed by Chuluota Road, SR 520, Lake Pickett Road and SR 50 East. Looking first at eastbound trips, roughly 35.2% of the trips traveling from SR 50 East and SR 520 end up traveling the whole corridor to SR 50 West. Then, looking at westbound trips, approximately 22.4% of the trips entering from SR 50 West are traveling through the corridor to SR 50 East and SR 520. A slightly smaller proportion of the trips (17.9%)

Bluetooth Detector Locations



Average Weekday Trips Factored from Bluetooth Detectors

INBOUND \ OUTBOUND		Challenger Parkway 18-01	SR 50 West 18-02	Woodbury Road 18-03	SR 408 18-04	Lake Pickett 18-05	Avalon Park 18-07	South Tanner 18-09	North Tanner 18-10	CR 419 18-12	South CR 13 18-14	North CR 13 18-15	SR 50 East 18-17	SR 520 East 18-18	Inbound Total
Challenger Parkway	**18-01**	-	302	1,000	2,038	42	194	2	6	61	2	3	59	82	**3,792**
SR 50 West	**18-02**	270	-	4,784	2,743	1,643	3,344	43	139	1,490	148	147	1,527	2,721	**19,000**
Woodbury Road	**18-03**	1,576	4,642	-	2,097	1,657	856	44	96	888	40	124	481	866	**13,367**
SR 408	**18-04**	2,983	2,723	841	-	2,360	2,574	98	159	2,067	92	240	1,984	1,098	**17,218**
Lake Pickett	**18-05**	109	2,395	1,266	3,442	-	370	5	69	197	-	22	22	103	**8,000**
Avalon Park	**18-07**	199	3,361	481	2,506	359	-	25	686	1,006	37	64	440	749	**9,914**
South Tanner	**18-09**	-	62	8	80	14	17	-	11	-	18	10	5	3	**228**
North Tanner	**18-10**	12	137	49	178	152	555	18	-	103	6	-	41	160	**1,411**
CR 419	**18-12**	63	1,397	591	2,066	297	880	21	244	-	82	125	729	2,295	**8,789**
South CR 13	**18-14**	3	236	30	181	3	32	6	56	108	-	85	46	74	**859**
North CR 13	**18-15**	5	331	76	359	12	45	11	49	7366	-		69	99	**1,196**
SR 50 East	**18-17**	67	1,824	270	1,764	70	387	5	201	646	22	48	-	421	**5,725**
SR 520 East	**18-18**	129	3,074	415	911	101	652	14	504	1,741	56	149	442	-	**8,187**
Outbound Total		**5,415**	**20,483**	**9,812**	**18,365**	**6,711**	**9,908**	**291**	**2,218**	**8,389**	**558**	**1,018**	**5,845**	**8,672**	**97,686**

Bluetooth Detectors **Figure 3-15**

entering from SR 408 are traveling the entire length of the corridor to SR 50 East and SR 520. Only 19.2% of the trips traveling from SR 50 East and SR 520 used the entire corridor to reach SR 408.

The results from the Bluetooth survey were used to improve the project-specific model that was used to forecast traffic for the proposed SR 408 Eastern Extension.

3.6.1.3 Speed and Delay Runs

Travel time and delay data was collected using the floating-car method and utilizing QSTARZ Travel Recorder XT GPS unit, which is capable of recording its latitude and longitude in one second intervals. Multiple runs were performed on April 15, 2015 along SR 50 during the A.M. and P.M. peak periods. The travel time summary is shown in **Table 3-8**. As expected, during the A.M. peak hours, the westbound direction had lower speeds throughout the SR 50 corridor. The speeds were especially low west of Avalon Park Boulevard between Pebble Beach Boulevard and Woodbury Road. During the P.M. peak hours, both eastbound and westbound directions had lower speeds between Woodbury Road and Avalon Park Boulevard. The lower speeds could be attributed to the higher signal density along with higher turning volumes to/from SR 408 Ramps, Lake Pickett Road, and Avalon Park Boulevard.

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Table 3-8 SR 50 Average Field Collected Speed by Period

Start	End	Distance (Miles)	AM Average		Midday Average		PM Average	
			EB	WB	EB	WB	EB	WB
Woodbury Rd	East of SR 408	0.34	33.3	18.7	30.5	19.3	14.1	16.1
East of SR 408	Lake Pickette Rd	0.42	29.0	17.7	25.0	29.0	18.5	28.6
Lake Pickett Rd	Pebble Beach Blvd	0.52	35.4	7.8	41.0	27.0	40.9	28.8
Pebble Beach Blvd	Avalon Park Blvd	0.50	24.1	25.8	24.1	36.4	33.0	44.8
Avalon Park Blvd	Tanner Rd	1.07	50.9	34.6	52.6	32.3	46.4	37.3
Tanner Road	Chuluota Rd	1.17	46.3	51.3	50.1	53.0	28.6	54.1
Chuluota Rd	N CR 13	1.50	41.1	38.9	38.0	40.6	35.9	40.2
N CR 13	SR 50 / 520 Interchange	2.06	No Data	No Data	No Data	47.5	No Data	No Data
SR 50 / 520 Interchange	Fort Christmas Rd	3.25	No Data	No Data	61.3	62.6	No Data	No Data
SR 50 / 520 Interchange	Wedgefield / Macon Pkwy	1.49	No Data	No Data	No Data	58.2	No Data	No Data

Note: Periods correspond to the following times: AM: 6:45 to 9:45am, MD: 12:00 to 3:00pm, PM: 4:00 to 6:00pm

In addition to the SR 50 corridor, speed and delay runs were conducted during the off peak hours along Lake Pickett Road. This route is the only viable alternative that runs parallel to SR 50 and crosses the Econlockhatchee River. This route might make sense as an alternative to SR 50 for some commuters traveling from Seminole County via Chuluota Road or Tanner Road North. **Table 3-9** contains the distance and speeds along Lake Pickett Road. Even though the speed limit on Lake Pickett Road is lower than SR 50, off-peak hour speeds are comparable to the SR 50 corridor.

Table 3-9 Lake Pickett Rd / Chuluota Rd Field Collected Speeds (off-peak)

Start	End	Distance (Miles)	Speed (MPH)
SR 50 (via Chuluota Rd)	Lake Pickett Rd	1.9	36.4
Chuluota Rd (via Lake Pickett Rd)	Tanner Rd South	2.4	41.1
Tanner Rd South	Tanner Rd North	0.8	36.7
Tanner Rd North	SR 50	1.3	21.0

Note: This route only performed in the Counter Clockwise direction

3.6.2 Existing Traffic Volumes

Based on results from the traffic count program and other available traffic data, summaries of traffic volumes in the SR 50 corridor were prepared, including estimates of annual average daily traffic (AADT) and A.M. and P.M. peak hour traffic volumes. A number of other traffic characteristics that might influence design such as the hourly distribution of traffic, weekly distribution of traffic, directional distribution of traffic and vehicle classification patterns were also analyzed and summaries prepared. Traffic factors used in the design process were also presented.

3.6.2.1 Corridor Volumes

The FDOT Axle Correction and Seasonal Factors were applied to the approach volume and classification counts to estimate 2015 AADT. As the purpose of the study was to develop design hour traffic forecasts for the SR 408 Eastern Extension, the level of service analysis for the SR 50 corridor was limited to existing and future signalized intersections and major cross streets only. The 2015 AADT is shown on **Figure 3-16** and the 2015 A.M. and P.M. turning movement volumes are shown on **Figure 3-17**.

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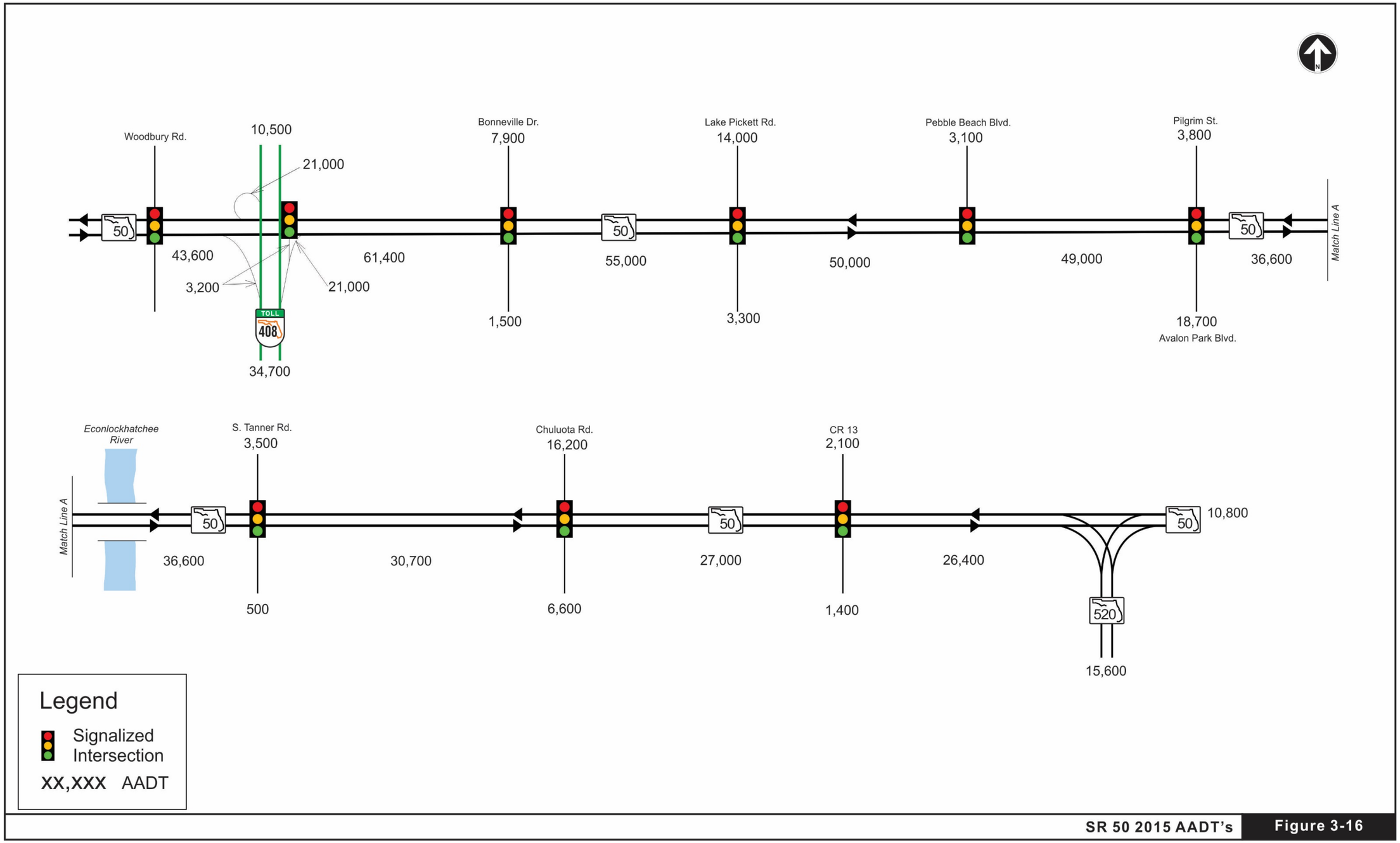
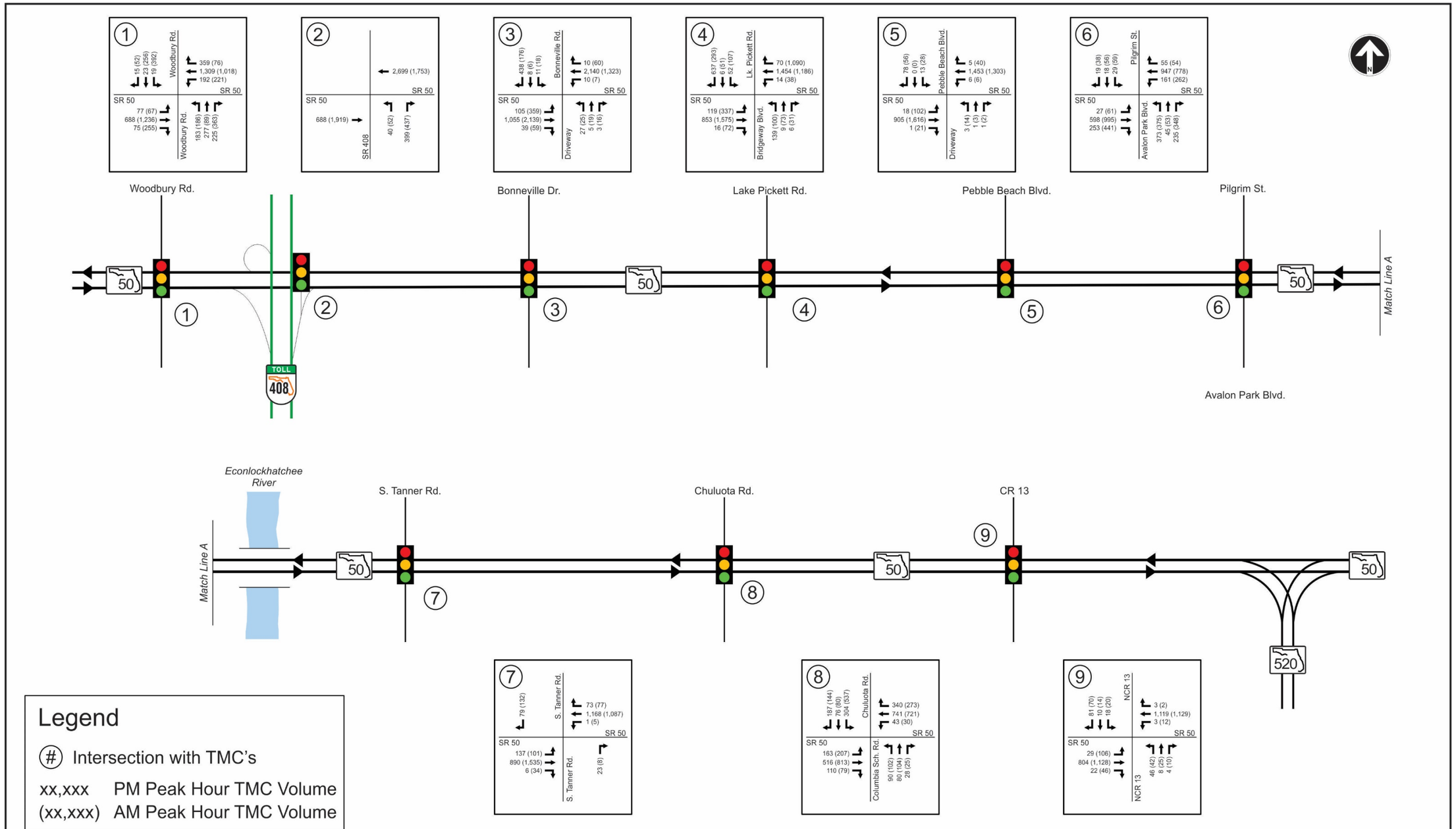


SR 50 2015 AADT's | Figure 3-16



SR 50 Turning Movement Volumes | Figure 3-17

3.6.2.2 Daily Distribution of Traffic

As shown on **Figure 3-16**, weekday traffic volumes on SR 50 near the Bithlo area remain relatively constant over the course of the five-day work week. Traffic is highest on Fridays, with an index value of 110 (10% higher than the average day), and volumes on Monday through Thursday were very similar. Saturday traffic volume exceeds the average slightly with an index value of 102. Sundays are the lightest traveled days with a volume that is 92% of the average. **Figure 3-18** also shows the same data for SR 408 at the Dean Mainline Plaza, which shows a similar pattern. Weekday indexed traffic volumes from Monday through Thursday range from 104 to 110, or 4% to 10% higher than the average, with Friday being the peak day with an index of 114. Traffic volumes decline on Saturdays and Sundays when volumes are 86% and 71% of AADT, respectively.

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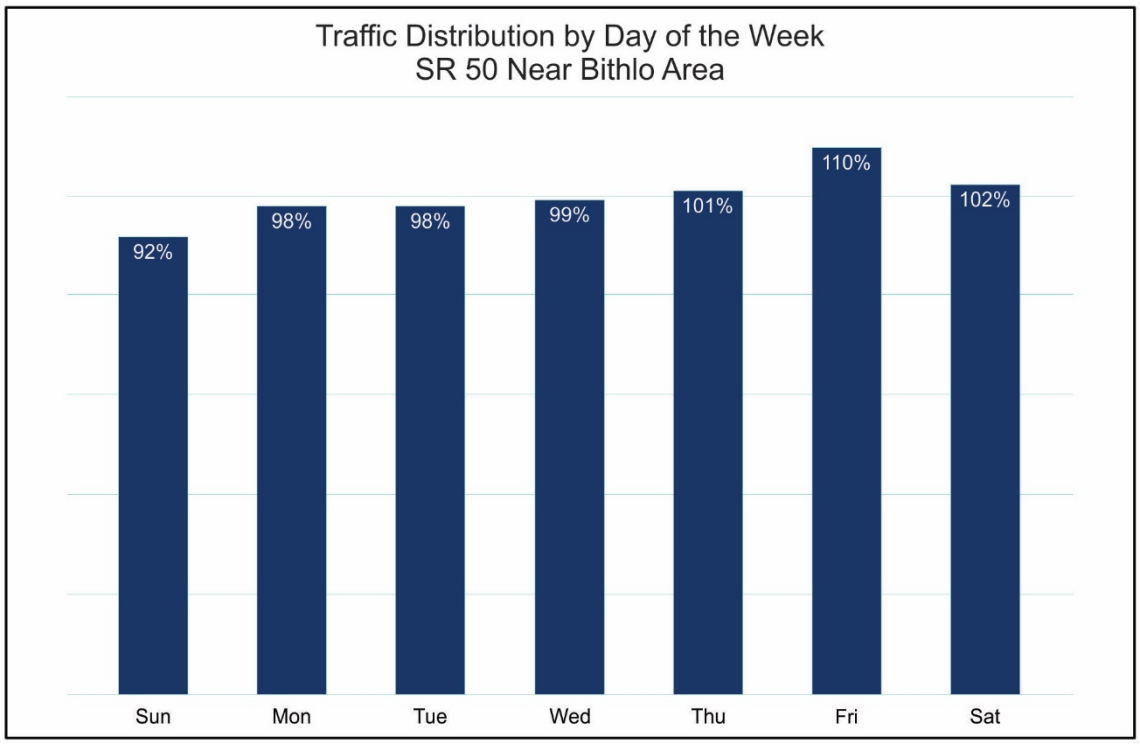

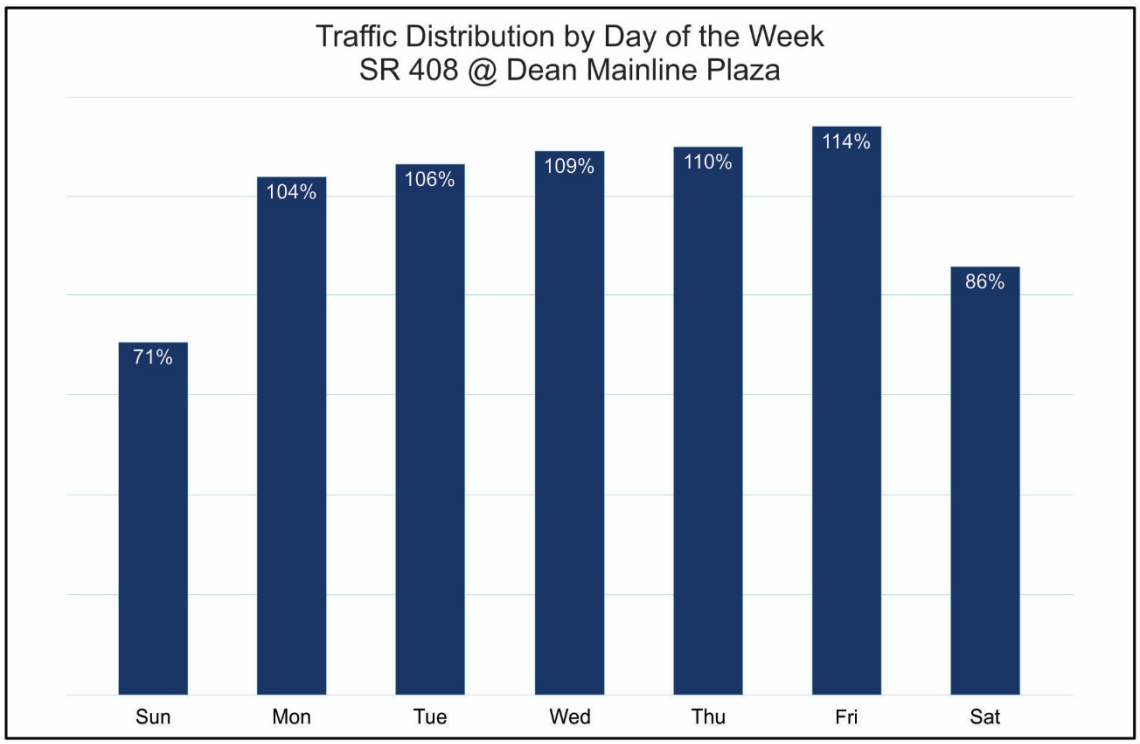

Daily Distribution of Traffic **Figure 3-18**

3.6.2.3 Hourly and Directional Distribution of Traffic (K and D Factors)

The hourly distribution of traffic includes information on the usage characteristics of the facility. The hourly distributions represent counts collected during a typical week from the Florida Transportation Information (FTI) webpage, field and CFX plaza data. **Figure 3-19** represents the hourly traffic distribution on SR 50 within the project limits and on SR 408. The traffic distribution on SR 50 east of Avalon Park Boulevard shows peaking in both directions in A.M. and P.M. peak periods, while the traffic distribution on SR 50 just east of SR 408 shows peaking in the westbound direction during the A.M. peak and in the eastbound direction during the P.M. peak. The hourly traffic distribution on SR 408 at the Dean Mainline Plaza shows traffic peaking in both directions during the A.M. and P.M. peaks. Also, the distribution shows higher peaking characteristics on SR 408 during the peak hours.

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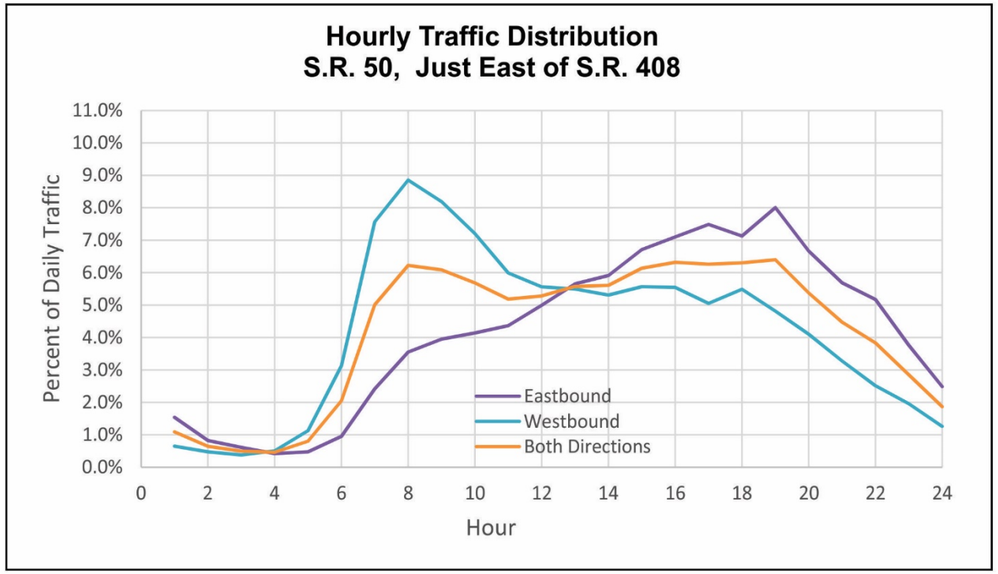

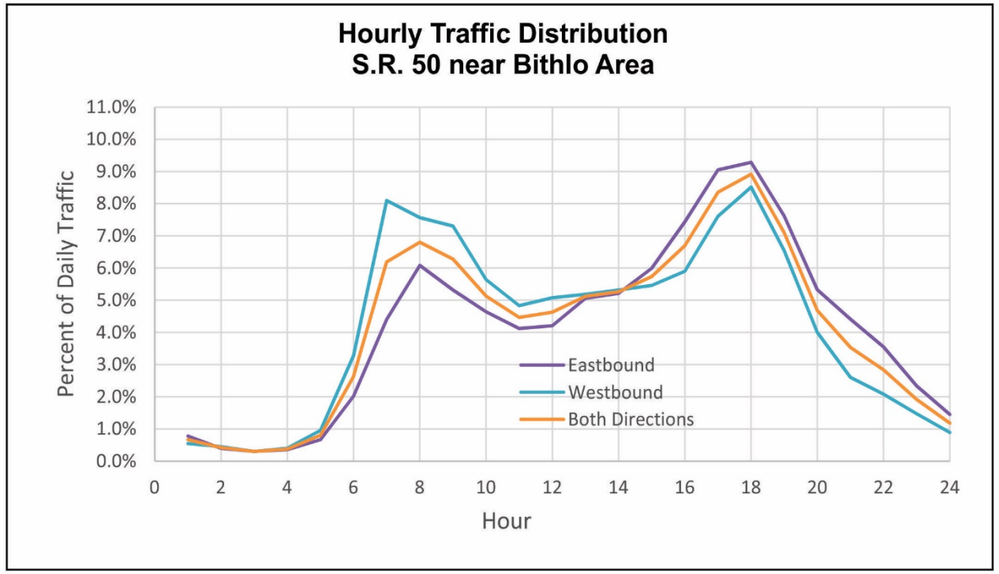

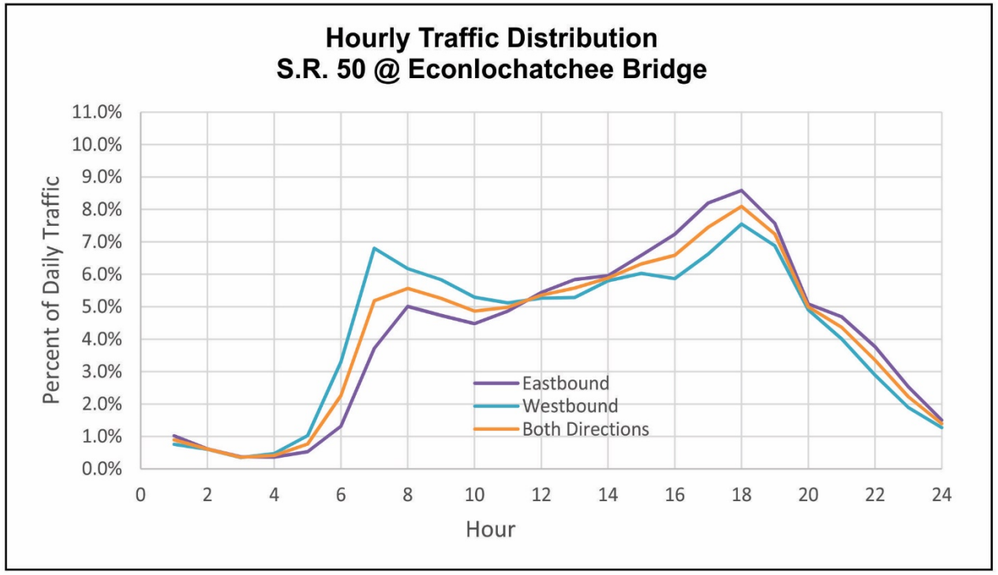

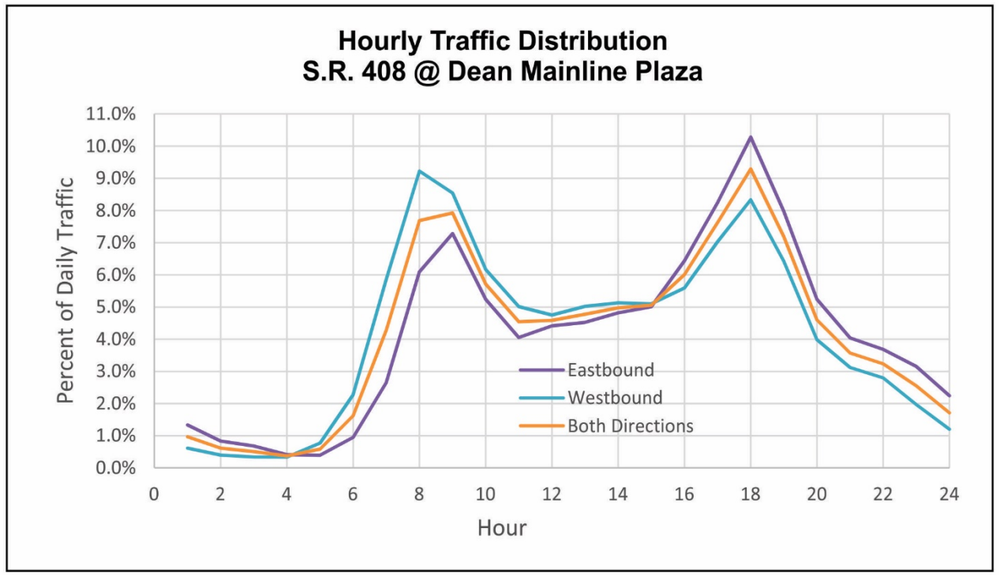

Hourly Distribution of Traffic **Figure 3-19**

Table 3-10 shows historical K and D Factors from count stations along SR 50 within the project limits. The hourly bi-directional counts at SR 50 just east of SR 408 (**Figure 3-17**) show higher directionality both in the A.M. and P.M. peak periods. This could be due to heavy commuter traffic from Avalon Park Boulevard and Lake Pickett Road using this section of SR 50. A K-factor of 9.0% and a D-factor of 55.0% were recommended for SR 50 considering the fact that as the traffic increases the K-factor tends to lower, and also the traffic directionality observed at SR 50 near the SR 408 interchange is higher than other locations along SR 50.

Table 3-10 SR 50 Peak Hour Traffic Characteristics

Location	Year	K Factor	D Factor
Cosite #750561 ON SR-50, 2.314 MI. E OF SR 408 (RVL)	2015	9.0%	53.2%
	2014	9.0%	53.2%
	2013	9.0%	53.3%
	Average	*9.0%*	*53.2%*
Cosite #750104 SR-50, 0.19 MI W OF SR-520 NEAR BITHLO, ORANGE CO	2015	9.5%	52.6%
	2014	9.5%	52.6%
	2013	9.5%	52.6%
	Average	*9.5%*	*52.6%*

Table 3-11 lists the A.M. and P.M. peak hour K and D Factors at all CFX facility mainline plazas. The data was obtained from the "CFX 2014 System's Traffic Data and Statistics Manual." The P.M. peak K and D factors were used to come up with K and D factors for the SR 408 Eastern Extension. Data from SR 408 at Dean Mainline Plaza would not be representative of the SR 408 Eastern Extension characteristics as traffic peaking characteristics are influenced by traffic heading to UCF and Research Parkway. Based on knowledge of CFX facilities, it is expected that the SR 408 Eastern Extension would have similar characteristics as SR 414 as most traffic is heading to work places during the A.M. peak and to home during the P.M. peak. Similar characteristics are observed on SR 417 at the University-Mainline Plaza and SR 429 at the New Independence Parkway/Mainline Plaza. For a conservative analysis, a K-factor of 11.0% and a D-factor of 60.0% are assumed for the SR 408 Eastern Extension which is proposed to run parallel to SR 50.

Table 3-11 CFX Facilities Peak Hour Traffic Characteristics

Facility	Plaza Name	K-am	K-pm	D-am	D-pm
SR 408	Hiawassee Mainline Plaza	8.77%	9.54%	72.19%	64.96%
	Pine Hills Mainline Plaza	8.72%	9.21%	70.85%	61.10%
	Conway Mainline Plaza	7.89%	8.96%	68.88%	59.22%
	Dean Mainline Plaza	7.91%	9.53%	51.25%	54.94%
SR 528	Airport Mainline Plaza	7.24%	8.08%	62.28%	60.78%
	Beachline Mainline Plaza	7.37%	8.62%	67.94%	56.23%
	Dallas Mainline Plaza	6.68%	8.03%	59.60%	52.34%
SR 417	John Young Mainline Plaza	6.99%	9.32%	67.70%	62.28%
	Boggy Creek Mainline Plaza	7.59%	9.47%	57.13%	54.08%
	Curry Ford Mainline Plaza	8.76%	10.08%	52.80%	56.91%
	University Mainline Plaza	8.79%	10.23%	57.30%	58.80%
SR 429	Independence Mainline Plaza	8.07%	10.17%	64.15%	59.56%
	Forest Lake Mainline Plaza	8.86%	9.89%	62.15%	59.36%
SR 414	Hills Mainline Plaza	9.62%	10.42%	66.76%	60.99%

Source: CFX 2014 System's Traffic Data and Statistics Manual
K-am = Total AM Peak Hour Traffic / Average Weekday Total Traffic
K-pm = Total PM Peak Hour Traffic / Average Weekday Total Traffic
D-am = Peak AM Hour Directional Traffic / Total Peak AM Hour Traffic
D-pm = Peak PM Hour Directional Traffic / Total Peak PM Hour Traffic

3.6.2.4 Vehicle Classification

Table 3-12 lists vehicle classification data on SR 50 in the Study Area and on SR 408 at the Dean Mainline Plaza. The table also contains the field-collected vehicle classification data at the Econlockhatchee River Bridge. The data at the Econlockhatchee River Bridge was collected during the construction of SR 50, and shows relatively high single-unit truck percentages. This data was not used for this reason. The FDOT Cosite #750104 located near Bithlo shows an average of 4.8% of trucks. The truck percentages along SR 50 could be lower than that as most of the commuter traffic joins SR 50 from Chuluota Road, Avalon Park Boulevard, and Lake Pickett Drive. The truck percentages on SR 408 are less than 1.0%. For this analysis, a Daily Truck (T24) factor of 4.5% is assumed for SR 50 and 2.0% for the SR 408 Extension. A summary of all recommended traffic design characteristics for this study appear in **Table 3-13**.

Table 3-12 Vehicle Classification

Count Location	Year	Passenger Vehicles	Total Trucks	Single Units Trucks	Combination Trailer Trucks	Multi Trailer Trucks
Cosite #750104 SR 50, 0.19 mile west of SR 520 Near Bithlo	2015	95.37%	4.63%	2.81%	1.79%	0.03%
	2014	95.24%	4.76%	2.83%	1.90%	0.03%
	2013	95.09%	4.91%	2.92%	1.95%	0.04%
	Average	*95.23%*	*4.77%*	*2.85%*	*1.88%*	*0.03%*
Cosite #751008 SR 50, 0.612 mile east of SR 520 Overpass	2015	94.80%	5.20%	3.82%	1.38%	0.00%
	2014	94.89%	5.11%	3.60%	1.51%	0.00%
	2013	94.41%	5.59%	3.73%	1.86%	0.00%
	Average	*94.70%*	*5.30%*	*3.71%*	*1.58%*	*0.00%*
Field Count SR 50 @ Econlockhatchee Bridge*	2015	*88.86%*	*11.14%*	*9.51%*	*1.61%*	*0.02%*
Count Location	**Year**	**2- Axle**	**3+ Axle Vehicles**	**3 Axle**	**4 Axle**	**5+ Axle**
SR 408 @ Dean Mainline Plaza**	2015	99.38%	0.62%	0.42%	0.10%	0.09%

*Count was collected during the SR 50 construction. As a result, the total truck percentages, especially the single unit truck percentage is very high. Under normal conditions, the truck percentage is expected to be similar or lower than the truck percentages observed at FDOT sites east of the Bridge due to additional higher passenger vehicles from Chuluota Road, expected to cross the Econlockhatchee Bridge.
** Class data on SR 408 is available by Axle Count only.

Table 3-13 Recommended K, D and T Factors

Location	K Factor	D Factor	T Factor
SR 50 and Cross Streets	9.0%	55.0%	4.5%
SR 408 Extension	11.0%	60.0%	2.0%

3.6.3 Level of Service

Along the project corridor, Level of Service (LOS) is determined by use of the FDOT 2012 Generalized Service Volume Tables for interrupted flow facilities on State Signalized Arterials. Within this context, the majority of the project (from the SR 408 interchange to the SR 520 interchange) is treated as an Urban Class I Arterial whereas

the section of SR 50 to the east and SR 520 to the south of the interchange are treated as Rural Highway. The determined LOS for 2015 AADT values are shown in the following section.

3.6.3.1 Existing Roadway Segment Level of Service Analysis

The minimum acceptable LOS for SR 50 is LOS E according to Orange County's Comprehensive Plan. SR 50 is classified as an urban arterial road within the study section. Using this classification, a roadway segment LOS analysis was performed for the peak direction peak hour conditions using the Year 2012 FDOT Quality and Level of Service Handbook tables. **Table 3-14** provides a summary of the roadway LOS conditions for daily, A.M. and P.M. traffic conditions.

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Table 3-14 2015 Roadway Segment Level of Service

Roadway	From	To	Lanes	2015 AADT	2015 Am Peak	2015 PM Peak	2015 Level of Service		
							Daily	AM Peak	PM Peak
SR 50	Woodbury Rd.	SR 408 Ramps	6L*	45,900	1,683	1,903	C	C	C
SR 50	SR 408 Ramps	Bonneville Dr.	6L*	61,400	2,795	2,490	F	C	C
SR 50	Bonneville Dr.	Lake Pickett Rd.	6L*	55,000	1,871	2,364	C	C	C
SR 50	Lake Pickett Rd.	Avalon Park Blvd.	6L*	*49,000*	2,021	1,466	C	C	C
SR 50	Avalon Park Blvd.	Tanner Rd.	4L	36,600	1,305	1,568	C	C	C
SR 50	Tanner Rd.	Chuluota Rd.	4L	30,700	1,061	1,175	C	C	C
SR 50	Chuluota Rd.	CR 13	4L	27,000	1,166	1,272	C	C	C
SR 50	CR 13	SR 520	4L	26,400	1,018	1,180	B	B	B
SR 50	East of SR 520		4L	10,800	393	519	B	B	B
Woodbury Rd.	North of SR 50		4L	14,300	976	1,057	D	D	D
Woodbury Rd.	South of SR 50		4L	22,400	954	1,239	D	D	D
Bonneville Dr.	North of SR 50		2L	7,900	548	334	D	D	D
Lake Pickett Rd.	North of SR 50		2L	14,000	703	458	F	F	D
Avalon Park Blvd.	South of SR 50		4L	18,700	849	769	D	D	D
Tanner Rd.	North of SR 50		2L	2,100	245	190	C	C	C
Chuluota Rd. (CR 419)	North of SR 50		2L	16,200	678	705	F	D	F
Chuluota Rd. (CR 419)	South of SR 50		2L	6,600	190	317	D	C	D
CR 13	North of SR 50		2L	2,100	105	97	C	C	C
CR 13	South of SR 50		2L	1,400	58	58	C	C	C
SR 520	East of SR 50		4L	15,600	665	713	B	B	B

* Since Six-Laning of SR 50 is underway, SR 50 from Woodbury Road to Avalon Park Boulevard is assumed as a six-lane facility for LOS analysis

All roadway segments were found to operate at LOS E or better, except:

- SR 50 between SR 408 ramps and Bonneville Drive
- Lake Pickett Road, north of SR 50
- Chuluota Road, north of SR 50.

SR 50 between Bonneville Drive and Lake Pickett Road has four lanes in the eastbound direction, with the outer most lane designated to serve the traffic from SR 408

northbound off-ramp. Including the fourth lane in the daily LOS analysis, this segment would operate better. Improvements will be planned to Chuluota Road and Lake Pickett Road as a part of developer commitments from Lake Pickett North and South Developments.

3.6.3.2 Existing Intersection Level of Service Analysis

The existing A.M. and P.M. peak hour turning movement counts shown on **Figure 3-15** was utilized in performing the intersection level of service operations analysis using the SYNCHRO software. **Table 3-15** provides a summary of the intersection LOS for the peak hour conditions. Under the existing conditions, all signalized intersections were found to operate at LOS E or better during both A.M. and P.M. peak hour conditions.

Table 3-15 2015 A.M. and P.M. Intersection Level of Service

Intersection	Intersection Delay (sec/veh)		Intersection Level of Service	
	A.M.	P.M.	A.M.	P.M.
SR 50 @ Woodbury Rd.	37.1	59.1	D	D
SR 50 @ SR 408 Northbound Off-Ramp	33.0	14.4	C	B
SR 50 @ Bonneville Dr.	30.1	19.8	C	B
SR 50 @ Lake Pickett Rd.	52.8	41.5	D	D
SR 50 @ Pebble Beach Blvd.	11.4	15.8	B	B
SR 50 @ Avalon Park Blvd.	48.0	51.2	D	D
SR 50 @ Chuluota Rd.	29.2	51.9	C	D
SR 50 @ CR 13	10.2	14.8	B	B

3.7 Intelligent Transportation System

As part of the Intelligent Transportation System (ITS) review, the cost associated with installing a new ITS within the project limits of the SR 408 Eastern Extension were evaluated. The Maintenance of Communication (MOC) is a major component in any construction project impacting ITS infrastructure, especially along a Tolling Facility like the SR 408 East-West Expressway. However, this project is a new roadway corridor extension; therefore, the only existing equipment affected by construction is at the south

end of the project. The future design plans will be required to show how the preservation of the ITS and Tolling communications will be maintained throughout the construction phases. The ITS review will help develop a high-level cost estimate for the ITS in order to extend the current ITS facilities throughout the corridor.

The ITS program generally consists of Fiber Optic Network (FON), Closed Circuit Television (CCTV), Dynamic Message Signs (DMS), Arterial Dynamic Message Signs (ADMS), Traffic Monitoring Station (TMS), Data Collection Sensors (DCS), Wrong Way signs and other devices installed along roadways. This system is typically maintained, monitored, and operated 24 hours a day. The CFX has a history of success with operating and maintaining ITS. Typical successes have included reduced travel times, improved travel time reliability, decreased secondary crashes, decreased time for emergency response, and reduction in the number of stops and delays on the tolling facilities. Applying the successful operational strategies of ITS technologies, in conjunction with the roadway improvements proposed in this study, has the potential to increase mobility and reduce unnecessary delays caused by the increasing volume of traffic along the roadway facility.

3.7.1 Existing ITS

This section is intended to provide a general overview of the existing conditions of the ITS system and its components along the SR 408. The ITS system and its components consist of a FON, on both sides of the road which is typically installed on the shoulders, communications infrastructure, and ITS field devices. The FON consists of a 2-72 SM fiber optic cable (FOC) backbone and 12 SM FOC lateral drop cables to field devices. The lateral drops to the tolling locations are 24 SM FOC drops to ramp sites and 48 SM FOC drops to mainline sites.

4 DESIGN CONTROLS & STANDARDS

Design controls and standards must be established prior to the formulation of design alternatives to ensure an adequate, safe, functional and operational roadway. These criteria are needed to develop typical sections, horizontal and vertical alignments, and other design features such as drainage, aesthetics, landscaping, and multimodal facilities. The controls and standards are those specified by the CFX.

4.1 Roadway Characteristics

As previously stated, SR 408, also known as Spessard L. Holland East-West Expressway, is a limited access tolled east-west expressway owned and operated by CFX. The standards that apply to this project are enumerated in **Table 4-1**.

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Table 4-1 Roadway Design Criteria

Design Element	Design Standard	Source
Design Year	2045	- Scope of Services
Design Vehicle	WB-62FL/WB-67	- AASHTO 2004, Pg. 18 - FDOT PPM Vol. I, Pgs. 1-19
Design Speed Rural Freeway Urban Arterial Rural Arterial Other Frontage Road Service Road Access Road Ramp Directional Loop	 70 mph *(begin project to Avalon Park Blvd)* 65 mph *(Avalon Park Blvd to end project)* 45 mph[1] 55 mph 45 mph 50 mph As appropriate 50 mph 30 mph	- FDOT PPM Vol. I, Tbl. 1.9.1, 1.9.2
Lane Widths Freeway Ramp 1-lane 2-lane Turning Roadway Arterial Collector/Service Road Bicycle Rural/Urban	 12-ft 15-ft 24-ft Case dependent 12-ft (Rural: 11') 12-ft (Rural: 11') 7-ft Buffered bike lane	- FDOT PPM Vol. I, Tbl. 2.1.1, 2.1.2, 2.1.3 & 2.14.1

Table 4-1 Roadway Design Criteria (Continued)

Design Element	Design Standard	Source
Cross Slope (lanes 1-way) Roadway 2-lane (2) 3-lane (3) 4-lane (4) 2 Bridge Section Max. Lane "Roll-over" DS < 35 mph DS => 35 mph	 -0.02 ft/ft (2) -0.02 ft/ft (2), -0.03 ft/ft (1) +0.02 ft/ft (1), -0.02 ft/ft (2),-0.03 (1) –0.02 (typical, uniform, no slope break) 4.0% 5.0% (between through lane & aux. lane) 6.0% (between through lane & aux. lane)	- FDOT PPM Vol. I, Fig. 2.1.1 - PPM Vol. I, Sect. 2.1.5 - FDOT PPM Vol. I, Fig. 2.1.1 - PPM Vol. I, Table 2.1.4
Median Width Freeway DS 60 mph ≥ DS 60 mph < All Arterial & Collector DS 45 mph ≤ DS 45 mph >	 64-ft 40-ft 26-ft (with barrier) 22-ft 40-ft	- FDOT PPM Vol. I, Tbl. 2.2.1
Offset Left Turn Lanes Median width 30-ft < Median width 30-ft >	 Parallel offset lane Taper offset lane	- FDOT PPM Vol. I, Sect. 2.13.3 & Fig. 2.13.2 - AASHTO Exh. 9-98

Shoulder Width (lanes 1-way)	Total (ft)		Paved (ft)		Source
	Outside	Left	Outside	Left	
Freeway					-FDOT PPM Vol. I, Tbl. 2.3.1 to 2.3.4, Fig. 2.3.1 -Design Standards Index No. 510
3-lane or more	12	12	10	10	
2-lane	12	8	10	4	
Ramp					
1-lane	6	6	4	2	
2-lane	10	8	8	4	
Aux. Lane	12	N/A	10	N/A	
Arterial & Collector (Norm. vol.)					
2-lane divided	10	8	5	0	
1-lane undivided	10	N/A	5	N/A	
Service Road, 2-Lane, 2-Way, Undivided	10	N/A	5	N/A	
Shoulder Cross Slope	0.06	0.05	-	-	
Max. Shoulder "Roll-over"	7.0%	7.0%	-	-	

Table 4-1 Roadway Design Criteria (Continued)

Design Element	Design Element				Design Element
Bridge section (lanes 1-way)					
2-lane	10	6	-	-	-FDOT PPM Vol. I, Fig. 2.0.1, 2.0.2, 2.0.4
3-lane or more	10	10	-	-	
1-lane ramp	6	6	-	-	
2-lane ramp	10	6	-	-	
Service Road, 2-Lane, 2-Way Undivided	10*	10*	-	-	
*For Normal and High Traffic Volumes					
Border Width					- FDOT PPM Vol. I, Tbl. 2.5.1, 2.5.2
Freeway	94-ft, *(desirable)*				- *(CFX Policy)*[3]
Ramp	94-ft, *(L.O.C. plus 10-ft as min.)*				
Arterial/Collector					
DS > 45 mph	40-ft				
DS ≤ 45 mph	33-ft				
Arterial/Collector (Curb & Gutter)					
DS = 45 mph	14-ft (12-ft with bike lane)				
DS ≤ 40 mph	12-ft (10-ft with bike lane)				
Roadside Slopes	Fill Height (ft)		Rate		- FDOT PPM Vol. I, Tbl. 2.4.1
Front slope (for a Freeway facility with DS ≥ 45 mph)	0.0-5		1:6		
	5-10		1:6 to CZ & 1:4		
	10-20		1:6 to CZ & 1:3		
	> 20		1:2 with guardrail *(Use 10-ft bench at half the height of fill)*		- *(CFX Policy)*[3] *Use 1:3 slopes, avoid 1:2 slopes except where as necessary*
Front slope (curb & gutter)**	All		1:2 not flatter than 1:6		
Back slope**	All		1:4 or 1:3 w/ standard width trap. ditch & 1:6 front slope		
Back slope (curb & gutter)**	All		1:2 not flatter than 1:6		

**Standards for Urban Arterials and Collectors with Curb and Gutter facility with DS ≥ 45 mph

Table 4-1 Roadway Design Criteria (Continued)

Design Element	Design Standard		Source
Max. Grade / Max. Change in Grade	Max. Grade	%	- FDOT PPM Vol. I, Tbl. 2.6.1, 2.6.2
Freeway (Rural / Urban); DS 65 mph - 70 mph	3.0%	0.20% / 0.30%	
Ramp; DS 45 mph – 50 mph			
Directional	5.0%	0.60%	
Loop	7.0%	1.00%	
Arterial			
Rural	3.5%	0.50%	
Urban	6.0%	0.70%	
Collector	6.5% to 9.0%	-	- FDOT PPM Vol. I, Tbl. 2.6.4
Frontage Road/Service Road	8.0%	0.70%	
Min. Grade Curb & Gutter	0.3%	-	
Minimum Stopping Sight Distance (Grades 2.0%) (Non-Interstate/All Other Facilities)	Dsgn. Speed (mph)	Distance (ft)	- FDOT PPM Vol. I, Tbl. 2.7.1
	70	730	
	65	645	
	55	495	
	50	425	
	45	360	
	30	200	
Decision Sight Distance (Per avoidance maneuver)	Dsgn. Speed (mph)	Distance (ft)	- AASHTO Exh. 3-3
	70	780-1445	
	65	695-1365	
	55	535-1135	
	50	465-1030	
	45	395-930	
	30	220-620	
Horizontal Curve Length	V = Design Speed		- FDOT PPM Vol. I, Tbl. 2.8.2a
Freeway	30V (15V min.)		
Others	15V (400-ft min.)		
Max. Curvature (Degree of Curve)			- FDOT PPM Vol. I, Tbl. 2.8.3
Freeway			
DS = 70 mph Rural	3 30’ 00”		
DS = 65 mph Rural	4 15’ 00”		
Arterial			
DS = 55 mph Rural	6 30’ 00”		
DS = 45 mph Urban	8 15’ 00”		
Collector (Urban)			
DS = 45 mph Frontage Road	8 15’ 00”		
DS = 50 mph Service Road	8 15’ 00”		
Ramp (Rural)			
DS = 50 mph Directional	8 15’ 00”		
DS = 30 mph Loop	24 45’ 00”		

Table 4-1 Roadway Design Criteria (Continued)

Design Element	Design Standard			Source
<u>Superelevation Transition</u> Tangent Curve *Spirals*	80% (50% min.) 20% (50% min.) *(Curves 1˚30' 00" do not use spirals)*			-FDOT PPM Vol. I, Sect. 2.9 *- (CFX Policy)*$_3$
<u>Superelevation Rates</u>	emax	SE Trans.		- FDOT PPM Vol. I, Tbl. 2.9.1, 2.9.2, 2.9.3, 2.9.4
Freeway DS = 70 mph Rural DS = 65 mph Rural Arterial DS = 55 mph Rural DS = 45 mph Urban Collector DS = 45 mph Frontage Road (Urban) DS = 50 mph Service Road (Rural) Ramp (Rural) DS = 50 mph Directional DS = 30 mph Loop	 0.10 0.10 0.10 0.05 0.05 0.10 0.10 0.10	 1:200 (6 lane) 1:250 (2 & 4 lane) 1:225 (2 & 4 lane) 1:150 1:150 1:200 1:200 1:150		- Design Standards Ind. No. 510, 511 - AASHTO Exh. 3-28
<u>Vertical Curves</u> Length, L = KA	Design Speed (mph)	K-value		- FDOT PPM Vol. I, Tbl. 2.8.5, 2.8.6 - AASHTO Exh. 3-72 (crest) 3-75 (sag)
		Crest	Sag	
	70	401	181	
	65	313	157	
	55	185	115	
	50	136	96	
	45	98	79	- *CFX Policy*$_3$ *Note: FDOT K-values for "ALL OTHER FACILITIES" are desirable*
	30	31	37	
<u>Minimum Lengths</u>	Crest		Sag	
Freeway DS = 70 mph Rural DS = 65 mph Rural Arterial DS = 55 mph Rural DS = 45 mph Urban Collector DS = 45 mph Frontage Road DS = 50 mph Service Road Ramp DS = 50 mph Directional DS = 30 mph Loop	 500-ft 450-ft 350-ft 135-ft 135-ft 300-ft 300-ft 90-ft		 400-ft 350-ft 250-ft 135-ft 135-ft 200-ft 200-ft 90-ft	

Table 4-1 Roadway Design Criteria (Continued)

Design Element	Design Standard		Source
Ramps Ramp Terminals Length Taper	Entrance "Parallel-Type" 900 to 1200-ft 300-ft (25:1)	Exit "Taper-Type" 550-ft (2°to 5°, 4° desirable)	- Design Standards Ind. No. 525 - AASHTO Pg. 850-856
Minimum Spacing Entrance to Exit[6] Exit to Entrance Entrance to Entrance Exit to Exit Turning Roadways	1,600 to 2,000-ft 500-ft 1,000-ft 1,000-ft 600 to 800-ft		- AASHTO Exh. 10-68, Pg. 844
Lane Drop Taper	L = WS (DS > 45 mph) $L = WS^2/60$ (DS <=45 mph) 50:1 min, 70:1 desirable (freeways)		- Design Standards Ind. No. 525, 526 - AASHTO Pg. 818
Clear Zone Freeway DS = 70 mph Rural DS = 65 mph Rural Arterial DS = 55 mph Rural DS = 45 mph Urban Collector DS = 45 mph Frontage Road DS = 50 mph Service Road Ramp DS = 50 mph Directional 1 to 2-lane DS = 30 mph Loop 1 to 2-lane	 36-ft 36-ft 30-ft 4-ft (Curb & Gutter) As appropriate 4-ft (Curb & Gutter) 24-ft 14-ft to 24-ft 10-ft to 18-ft		- FDOT PPM Vol. I, Tbl. 2.11.11
Vertical Clearance Over Roadway Over Railroad Sign over Roadway Over Water	 16'-6" 23'-6" 17'-6" 12'-0" min.		- FDOT PPM Vol. I, Tbl. 2.10.1 to 2.10.4, Sect. 2.10.1
Limited Access Limits Rural Urban Crossroad overpass/ no interchange	 300-ft min. 100-ft min. 200-ft		- FDOT PPM Vol. I, Sect. 2.14.1

4.2 Drainage Criteria

The design of stormwater management facilities for this project is governed by the rules and criteria set forth by the St. Johns River Water Management District (SJRWMD) and the FDOT. These criteria were drawn from the 2013 SJRWMD Applicant's Handbook and 2016 FDOT Drainage Manual.

Water Quality and Pond Recovery

- Wet Detention (SJRWMD)
    1. Water quality treatment – Greater of 1" over the total basin or 2.5" over the impervious area
    2. Recovery – one-half the treatment volume within the first 24 to 30 hours

- Dry Retention (on-line)
    1. Treatment - Greater of 1" over the basin or 1.25" over the impervious area
    2. Recovery- Treatment volume within 72 hours

- Outstanding Florida Water (OFW) : Treat an additional fifty percent of the runoff volume

- Econlockhatchee River Hydrology Basin Criteria
    1. Mean annual storm (2.3 year return period) with a total 24 hour rainfall depth of 4.5 inches.
    2. 25-year return period

Water Quantity

- Open Basin-Post-development peak discharges shall be at or below pre-development peak discharge for the 25-year/24-hour storm event.

Pond Design (FDOT Criteria)

- Ponds shall be designed to provide a minimum 20-foot of horizontal clearance between the top edge of the normal pool elevation and the right-of-way line. Maintenance berm shall be at least 15-feet with a slope of 1:8 or flatter.
- Corners of ponds shall be rounded to provide an acceptable turning radius for maintenance equipment (30-foot minimum inside radius).
- At least 1-foot of freeboard is required above the maximum design stage of the pond below the front of the maintenance berm.

5 ALTERNATIVES CONSIDERED

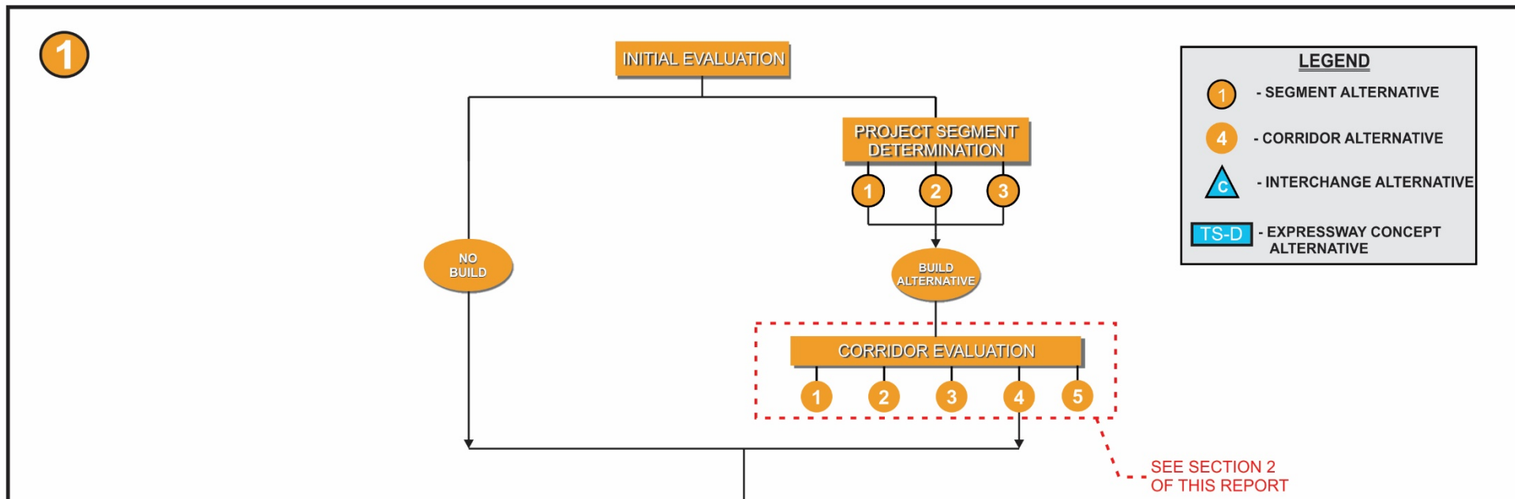
It was previously established and summarized in Section 1 of this report, that a new transportation corridor is needed in order to meet the needs of this project. As indicated by the results shown in Section 2, Corridor 4 was selected as the best option for implementation. This section provides a comparison of various typical sections and alignments within the selected corridor to determine the most efficient preferred SR 408 Eastern Extension alternative. Based on the existing deficiencies, needs and existing conditions of the selected corridor and also public/agency input, a comprehensive alternative development and evaluation process was initiated and conducted for the proposed project improvements as documented herein.

As illustrated on **Figure 5-1**, a multi-phase alternative development, evaluation and selection process was employed to properly assess all alternatives considered for the proposed improvements within the previously selected corridor. Essentially, three (3) different phases comprised the alternative selection process for the proposed project. A description of each of the three (3) different phases follows.

5.1 Phase 1 - Initial Evaluation

5.1.1 No Build Alternative

The “No Build” alternative is an alternative solution frequently used in PD&E studies that assumes the retainment of existing conditions. It is mostly used as a benchmark condition in order to compare the costs and benefits of implementing the proposed improvements to those incurred by continuing to use the existing facilities. In this case, the only existing major east-west arterial facility (SR 50) within the project confines is inadequate not only in terms of future projected capacity needs but, more importantly, it would not provide the desirable redundancy in evacuation and emergency response potential nor the required additional regional connectivity to I-95 on the east. It is evident that, because of the reasons previously discussed in this document, adoption of this alternative would not solve many of the existing needs associated with the goals of this project. However, the "No Build" alternative will be maintained as a viable option providing an effective



DESCRIPTION		
PHASE DESIGNATION	PURPOSE	EVALUATION TECHNIQUE
INITIAL EVALUATION	•INITIAL EVALUATION OF NO PROJECT •RE-EVALUATION OF PREVIOUS CORRIDOR STUDY TO DETERMINE THE VALIDITY OF THE PREVIOUS CONCLUSIONS	•FATAL FLAW ASSESSMENTS AND SCREENING •EVALUATION MATRIX WITH DESCRIPTIVE MEASURES
PRELIMINARY CONCEPTUAL GENERATION & EVALUATION	•DETERMINATION OF PROJECT SEGMENTS AND PRELIMINARY EVALUATION OF CONCEPTUAL SOLUTIONS TO GAUGE THE RELATIVE EFFECTIVENESS OF EACH ALTERNATIVE WITH RESPECT TO THE PROJECT OBJECTIVES	•FATAL FLAW ASSESSMENTS •EVALUATION MATRIX WITH DESCRIPTIVE MEASURES
FINAL EVALUATION OF EXPRESSWAY EXTENSION ALTERNATIVES	REMAINING CONCEPTUAL ALTERNATIVES ARE FURTHER SCREENED TO SELECT A FINAL ALTERNATIVE	

Alternative Selection Process **Figure 5-1**

baseline condition by which other project alternatives will be compared throughout the project alternative selection process.

5.1.2 Build Alternatives

Expressway extension options need to consider various major components of providing a new, multilane facility which includes the selection of a preferred corridor in conjunction with the most efficient typical section and alignment options as well as access point locations and configurations. The generation and selection of a preferred corridor was previously discussed in Section 2. The following sections provide a detailed discussion concerning other critical system components of the preferred extension option.

5.2 Phase 2 - Preliminary Conceptual Expressway Evaluation

This phase entailed the generation and evaluation of alternatives for the extension of SR 408 within the previously selected corridor. Alternatives were generated for two (2) distinct system components: typical section options for the SR 408 Eastern Extension mainline and interchange configuration options.

5.2.1 Segmental Determination and Generation

The first step in the evaluation of the mainline options was to breakdown the project into distinct segments. The segmental breakdown methodology was previously described and utilized in the development of the various corridor options (see **Section 2.2.1**, **page 2-1**). According to the previously obtained results, the project was divided into three distinct segments (see **Figure 3-1**).

5.2.2 Expressway Extension Typical Sections

This task entailed the generation and preliminary evaluation of various mainline typical section options. In view of the fact that traffic projections indicate a significant drop in the traffic demand within Segment 3 (see **Table 2-2**, **Page 2-10**), the potential use of two-lane options were also initially considered within that segment. **Table 5-1** summarizes the overall characteristics of a “representative” divided two-lane facility versus a four-lane facility in the context of meeting the project needs. As shown in the table, the two-lane

Table 5-1 Two Lane VS Four Lane Comparisons

Parameters \ Alternatives	2-LANE DIVIDED		4-LANE DIVIDED	
Safety	Even though the provision of a non-traversable median would virtually eliminate the fatal head-on crashes, it is a fixed object that is proximate to both directional lanes. This fixed object could be struck by errant vehicles traveling at high speeds and cause accidents. Previous statistical evidence clearly shows that from both an accident frequency and severity perspective, two lane divided highways are not as safe as four lane divided facilities.	-	Ample divided median and additional capacity contributes to a safer facility.	+
Traffic Service	In case of increasing traffic demand, provision of a divided non-traversable median on a two-lane roadway will worsen the level-of-traffic service. In addition, the provision of lower posted and enforced speeds could produce even greater driver frustration and an overall reduction in mobility. Provision of a divided median on a two-lane facility will increase the percentage of time that a vehicle will be delayed in a platoon trying to pass. In addition, forcing vehicles to go unusually slow on this type of low access/high mobility facility will result in lower average speeds, more delay and thus overall lower service quality.	-	The provision of a divided four-lane facility would provide acceptable levels of service, throughout the project segment and accommodate potential future growth.	+
Evacuation / Emergency Service	A divided non-traversable median will also worsen conditions in terms of hurricane evacuation or emergency services. With the non-traversable median concept, less continuous pavement is provided on each side. An accident or incident on the outbound side could easily disrupt the flow of traffic since vehicles are basically restricted by the median. Maneuvering large vehicles (Rv's, trailers, trucks, etc.) within this narrower width will be more difficult. In addition, a lower design and posted speed facility with a narrow median will not be able to evacuate as many people as a higher speed, unconstrained facility.	-	A four-lane facility provides an adequate evacuation route and improves traffic safety during a mass evacuation or emergency situation.	+
Planning Consistency	The limited additional mobility provided by a two-lane facility extension is not consistent with the freeway/expressway functional classification envisioned in all previous/existing master plans.	-	Fully compatible with all previous/existing master plans.	+
Provide Effective Transit Support	Potentially provides only limited (due to capacity limitations) additional interagency transit service that could extend between Orange and Brevard Counties.	-	Provides a realistic effective option for commuters and visitors traveling between the two counties.	+
Transportation Connectivity / Linkage	Provision of only marginal additional capacity limits desired additional connectivity between Orlando and Cape Canaveral.	-	Enhances potential future connectivity between Orlando and Cape Canaveral and is consistent with the ultimate vision to provide an effective expressway connection from east Orlando to I-95 north of SR 528.	+
Cost	Least expensive option in terms of initial capital expenditure, but will generate higher road user cost, as well as potential future expansion costs.	+	Most expensive option in terms of initial capital cost but offers reduced road user costs.	-

LEGEND
+ GENERALLY POSITIVE EFFECT
− GENERALLY NEGATIVE EFFECT

option would not fulfill the intended project needs, thus it was eliminated from further consideration.

Next, four (4) distinct 4-lane typical sections were developed covering both urban and rural options. **Table 5-2** illustrates and describes the features of the various typical section alternatives and their segmental applicability. According to the results of the table only Alternative TS-A and TS-D are viable throughout most or all of the project segments.

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Table 5-2 Initial Typical Section Evaluation

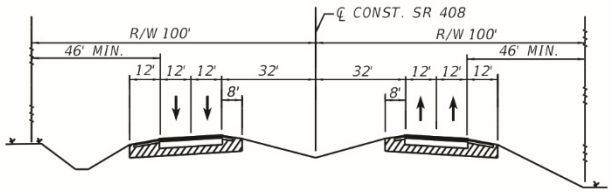
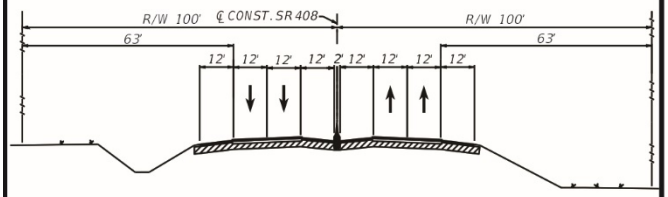
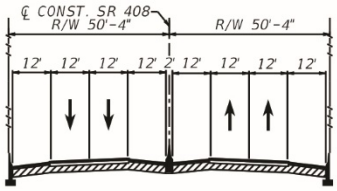
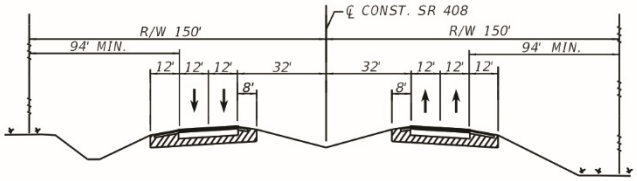
TYPICAL SECTION ALTERNATIVES	Design Speed	Median Width	Border Width	R/W Req'd	Applicable Segments 1	2	3
 Alternative TS-A	65	64'	46'	200'	✓	✓	✓
 Alternative TS-B	65	26'	63'	200'	X	X	X
 Alternative TS-C	65	26'	13'-4"	100'-8"	X	X	X
 Alternative TS-D	70	64'	94'	300'	✓	✓	✓

Table 5-3 is a numerical descriptive matrix which evaluates the advantages and disadvantages of the two remaining typical sections. According to the results obtained, TS-D is generally superior due to the fact that it meets all required standards and has a higher compatibility for any required future expansion.

LEGEND		
++	SUBSTANTIALLY POSITIVE EFFECT OR BEST ALTERNATIVE	1.0
+	GENERALLY POSITIVE EFFECT OR GOOD ALTERNATIVE	0.8
O	GENERALLY NO EFFECT OR MODERATE ALTERNATIVE	0.6
-	GENERALLY NEGATIVE EFFECT OR INFERIOR ALTERNATIVE	0.4
- -	GENERALLY NEGATIVE EFFECT OR WORST ALTERNATIVE	0.2

TABLE 5-3
PRELIMINARY TYPICAL SECTION EVALUATION

IMPACTS / OPTIONS	ENGINEERING 34			ENVIRONMENTAL 30				SOCIO-ECONOMIC 20		COST 16		RANK (TOTAL SCORE)
	TRAFFIC SERVICE 11	OPERATIONAL ISSUES 12	COMPATIBILITY FOR FUTURE EXPANSION 11	WATER QUALITY AND DRAINAGE 7	POTENTIAL WETLANDS & WILDLIFE HABITAT IMPACTS 8	CONTAMINATION IMPACTS 9	NOISE 6	HURRICANE EVACUATION EMERGENCY RESPONSE 10	RELOCATION POTENTIAL 10	CONSTRUCTION 8	R/W 8	
TS-A	Adequate rural section that would allow high operating speeds + 8.8	Ample section with wide median however the standard border width (94') is not met O 7.2	Limited for future expansion due to substandard border width O 6.6	Moderate amount of impervious area O 4.2	Smaller area of potential wetland and habitat impacts than TS-D O 4.8	Minor potential contamination impacts O 5.4	Minor noise impacts O 3.6	Additional capacity and high design speed facilitates emergency response & hurricane evacuation + 8.0	Some relocations required generally due to new expressway - 4.0	Moderate construction cost O 4.8	Requires less amount of right-of-way than TS-D O 4.8	62.2
TS-D	Adequate rural section that would allow high operating speeds + 8.8	Ample section which meets all standards + 9.6	Generally superior to option TS-A in terms of future expansion potential + 8.8	Generally similar to alternative TS-A but affords larger area available for stormwater treatment + 5.6	Higher area of potential wetland and habitat impacts - 3.2	Minor potential contamination impacts O 5.4	Minor noise impacts O 3.6	Generally similar to alternative TS-A + 8.0	Generally similar to alternative TS-A - 4.0	Moderate construction cost O 4.8	Requires a large amount of r/w impacts - 3.2	65.0

5.2.3 Conceptual Interchange Configuration Evaluation

The main objective of this task was to screen out all non-viable (inferior) interchange configurations and thus identify at an early stage what configuration(s) would work best at each interchange location. Summaries of these evaluations are illustrated on **Figures 5-2** through **5-5**. These descriptive matrices show various potential interchange configurations at each of the four interchange locations. It should be noted that several additional interchange options were conceptually developed and preliminarily evaluated for fatal flaws from a traffic and geometric standpoint. Several options were eliminated due to serious operational and/or constructability concerns.

It should be noted that when evaluating the potential interchanges along the SR 408 Eastern Extension Corridor one parameter that was considered was that the future interchanges should be at least 600 feet away from the existing/future SR 50 in order to minimize potential detrimental traffic operational interfaces. These interchange locations have been analyzed based on the traffic models with areas of higher congestion and demand to alleviate the traffic from the neighboring local streets. The proposed interchange locations are as follows:

- Segment 1: The existing SR 50/Challenger Parkway and Avalon Park Boulevard
- Segment 2: Chuluota Road Extension
- Segment 3: End terminus at SR 50

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LEGEND		
++	SUBSTANTIALLY POSITIVE EFFECT OR BEST ALTERNATIVE	1.0
+	GENERALLY POSITIVE EFFECT OR GOOD ALTERNATIVE	0.8
O	GENERALLY NO EFFECT OR MODERATE ALTERNATIVE	0.6
-	GENERALLY NEGATIVE EFFECT OR INFERIOR ALTERNATIVE	0.4
--	GENERALLY NEGATIVE EFFECT OR WORST ALTERNATIVE	0.2

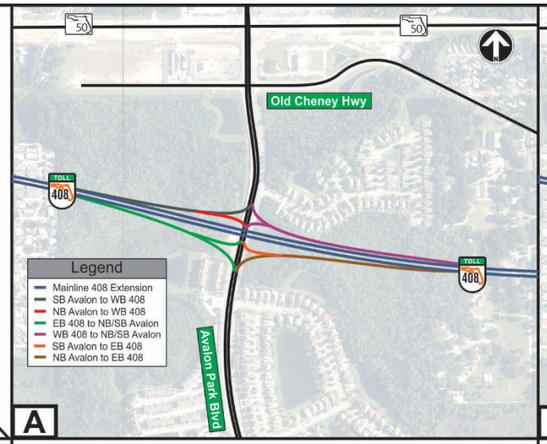
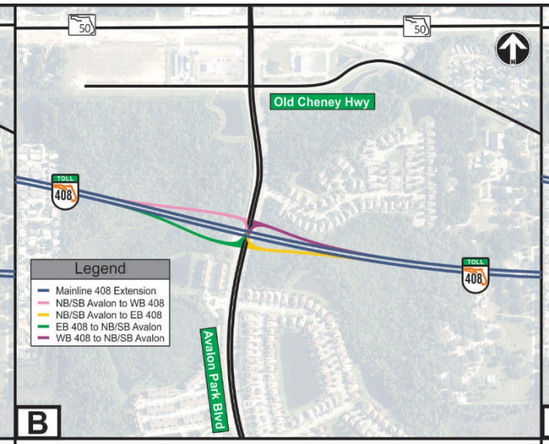
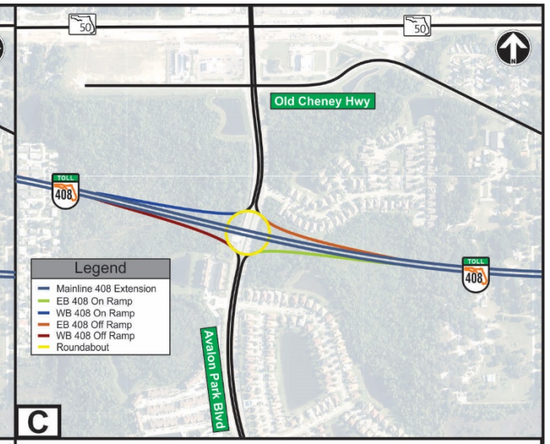
15 CRITERIA WEIGHT
12.0 RESULTING SCORE
71.8 TOTAL SCORE

	PARAMETERS	ALTERNATIVES A	ALTERNATIVES B	ALTERNATIVES C
ENGINEERING	GEOMETRIC / OPERATIONAL FEATURES (15)	Minor concern with required EB SR 50 advanced signage for traffic destined to either SB or WB SR 408 and its potential operational effect on the traffic around the Woodbury Road intersection due to its close proximity. Relocation of existing EB SR 50 to SB SR 408 ramp affords better (longer) spacing for the consecutive entrances along SB SR 408. (+) 12.0	Location of new interchange further south affords longer weaving distance for the SB SR 50 and Challenger Parkway traffic destined EB on the SR 408 Extension, but new exit is on the left an undesirable feature. Geometric curvature and operating speed associated with the WB SR 408 Extension to NB movements is rather restrictive and would negatively affect the merging/weaving maneuvers with the NB SR 408 to SR 50 and to Challenger Parkway movements. (-) 6.0	Effective interchange configuration, generally providing good operational features and additional access via Woodbury Road. (+) 12.0
ENGINEERING	TRAFFIC SERVICE (15)	Generally good traffic service. Provision of direct connection from EB SR 50 to EB SR 408 extension is a major advantage. However, access to SR 50 from WB SR 408 is via Challenger Parkway could negatively impact local streets. (O) 9.0	Design favors EB SR 408 Extension traffic and generally increases delay for the heavy NB traffic exiting at the SR 50/SR 408 interchange or continuing north to the Challenger Parkway. (-) 6.0	Provides the best traffic service of all the alternatives. (+) 12.0
ENGINEERING	SAFETY (15)	Generally safe option. (+) 12.0	Some weaving distance concerns between the proposed interchange and exit to SR 50. (O) 9.0	Generally safe. (+) 12.0
SOCIOECONOMIC	CONSTRUCTIBILITY / M.O.T. IMPLICATIONS (11)	No significant constructibility nor detrimental MOT implications expected. (O) 6.6	No significant constructibility nor detrimental MOT implications expected. (O) 6.6	No significant constructibility nor detrimental MOT implications expected. (O) 6.6
SOCIOECONOMIC	IMPACTS TO SENSITIVE SITES (7)	No impact to sensitive sites. (O) 4.2	No impacts to sensitive sites. (O) 4.2	No impacts to sensitive sites. (O) 4.2
SOCIOECONOMIC	R/W & RELOCATION IMPACTS (11)	Relatively minor right-of-way impacts at SE quadrant. (O) 6.6	Relatively minor right-of-way impacts. (O) 6.6	Relatively minor right-of-way impacts. (O) 6.6
ENV.	ENVIRONMENTAL IMPACTS (11)	Minor environmental impacts. (O) 6.6	Minor environmental impacts. (O) 6.6	Minor environmental impacts. (O) 6.6
COST	COST (15)	Generally high cost due to second and third level directional ramps. (-) 6.0	Generally moderate cost. (O) 9.0	Generally moderate cost. (O) 9.0
	SUMMARY REMARKS	Provides good merging/diverging movements at existing SR 408/SR 50 interchange. Relatively minor r/w impacts. 63.0	Additional delay for the high NB traffic movements exiting at SR 50 and the Challenger Parkway and additional operational concerns. 54.0	Safe configuration, providing the best service at a moderate cost. 69.0
	REMAINS VIABLE?	No	No	Yes

SR 408 Extension/SR 408/SR 50 Interchange Configurations — Figure 5-2

LEGEND		
++	SUBSTANTIALLY POSITIVE EFFECT OR BEST ALTERNATIVE	1.0
+	GENERALLY POSITIVE EFFECT OR GOOD ALTERNATIVE	0.8
O	GENERALLY NO EFFECT OR MODERATE ALTERNATIVE	0.6
-	GENERALLY NEGATIVE EFFECT OR INFERIOR ALTERNATIVE	0.4
--	GENERALLY NEGATIVE EFFECT OR WORST ALTERNATIVE	0.2

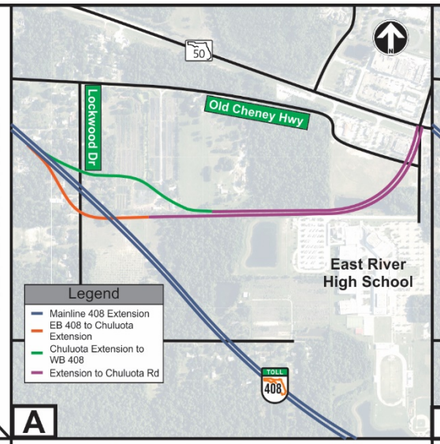
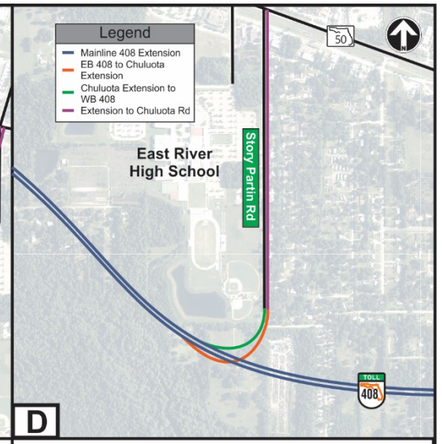
15 CRITERIA WEIGHT
9.0 RESULTING SCORE
71.8 TOTAL SCORE

	PARAMETERS	A	B	C
	ALTERNATIVES			
ENGINEERING	GEOMETRIC / OPERATIONAL FEATURES (15)	Generally simple and common geometric configuration that avoids the interweaving traffic flows that occur on other interchange configurations. Would likely require the provision of two closely spaced signals. O 9.0	Significant improvement in vehicular operational efficiency over the standard diamond option since it only requires one signal installation. + 12.0	Avoids the need for a traffic signal. Queue length at the off ramp is less than at a signalized intersection. Vehicular headway leaving the roundabout along the on ramp is more random than at a signal and allows a smoother behavior on the freeway. O 9.0
ENGINEERING	TRAFFIC SERVICE (15)	No significant detrimental mobility effects for pedestrians and bicyclists. O 9.0	Generally good vehicular traffic service. Configuration and signal timing requirements generally make it difficult for pedestrians and bicyclists to cross the intersection in relatively short time. + 12.0	No significant detrimental effects for pedestrians and bicyclists. Generally adequate traffic service. O 9.0
ENGINEERING	SAFETY (15)	Generally safe configuration although it requires the use of two traffic signals. O 9.0	Generally safer than the standard diamond configuration in terms of vehicular traffic. + 12.0	Generally shown to be superior in terms of vehicular safety to most other interchange configurations. Makes wrong way turn into an off ramp more difficult. Effective configuration in terms of managing speeds along the minor road. + 12.0
SOCIOECONOMIC	CONSTRUCTIBILITY / M.O.T. IMPLICATIONS (11)	No significant constructibility nor detrimental MOT implications expected. However the interchange location will likely require the relocation of the existing LYNX Route 320 bus stops. + 8.8	No significant constructibility nor detrimental MOT implications expected. However the interchange location will likely require the relocation of the existing Lynx Route 320 bus stops. + 8.8	No significant constructibility nor detrimental MOT implications expected. However the interchange location will likely require the relocation of the existing Lynx Route 320 bus stops. + 8.8
SOCIOECONOMIC	IMPACTS TO SENSITIVE SITES (7)	Impacts to the conservation lands due to the interchange location. There are higher impacts because of the wider footprint of this interchange configuration. - 2.8	Impacts to the conservation lands due to the interchange location. There are slightly lower impacts because of the smaller footprint of this interchange configuration. O 4.2	General impacts to the conservation lands due to the interchange location. There are higher impacts because of the wider footprint of this interchange configuration. - 2.8
SOCIOECONOMIC	R/W & RELOCATION IMPACTS (11)	Relatively minor right-of-way impacts. O 6.6	Relatively minor right-of-way impacts. O 6.6	Relatively minor right-of-way impacts. O 6.6
ENV.	ENVIRONMENTAL IMPACTS (11)	Generally significant environmental impacts. - 4.4	Generally similar to the Diamond Interchange A but with less impacts due to the smaller footprint of the interchange configuration. O 6.6	Generally significant environmental impacts. - 4.4
COST	COST (15)	Generally moderate cost, but required dual signal installations will increase maintenance cost. O 9.0	High cost due to significantly higher structural cost, however required provision of only one signal installation will reduce maintenance cost. - 6.0	Generally high cost due to the significant structure cost to cross over the roundabout however it avoids maintenance cost associated with traffic signals. - 6.0
	SUMMARY REMARKS	Feasible option which generally maintains good operational conditions along Avalon Park Boulevard. 58.6	Generally improves operational conditions over standard diamond configuration but interaction of pedestrian and bicycle traffic is a concern. 68.2	Generally a feasible alternative, but does not improve operational conditions due to the roundabout. 58.6
	REMAINS VIABLE?	No	Yes	No

SR 408 Extension/Avalon Park Boulevard Interchange Configurations **Figure 5-3**

LEGEND		
++	SUBSTANTIALLY POSITIVE EFFECT OR BEST ALTERNATIVE	1.0
+	GENERALLY POSITIVE EFFECT OR GOOD ALTERNATIVE	0.8
O	GENERALLY NO EFFECT OR MODERATE ALTERNATIVE	0.6
-	GENERALLY NEGATIVE EFFECT OR INFERIOR ALTERNATIVE	0.4
--	GENERALLY NEGATIVE EFFECT OR WORST ALTERNATIVE	0.2

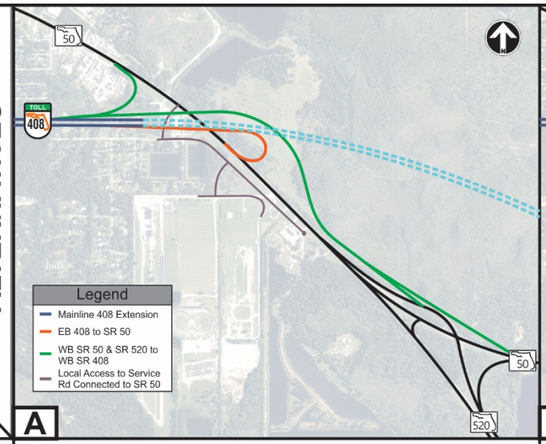
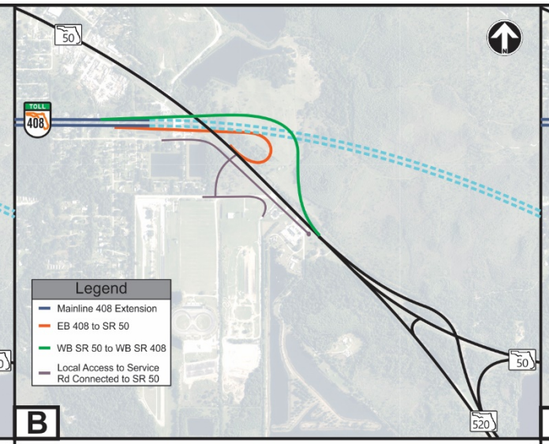
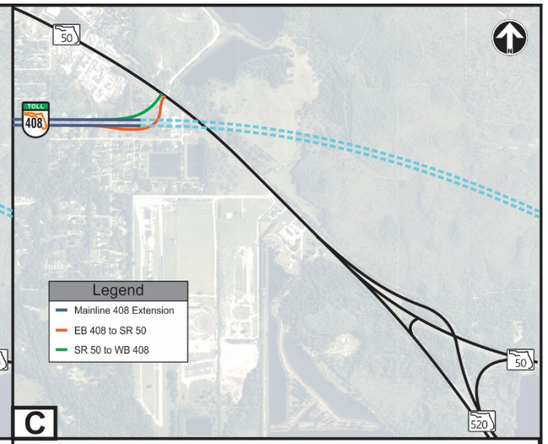
15 CRITERIA WEIGHT
9.0 RESULTING SCORE
71.8 TOTAL SCORE

	PARAMETERS	A	B	C	D
	ALTERNATIVES				
ENGINEERING	GEOMETRIC / OPERATIONAL FEATURES (15)	No significant geometric nor operational concerns and provides uninterrupted local traffic through the interchange. + (12.0)	No significant geometric nor operational concerns but local traffic must also traverse the roundabout. O (9.0)	No significant geometric nor operational concerns and provides uninterrupted local traffic through the interchange via a simple intersection. + (12.0)	No significant geometric nor operational concerns. + (12.0)
ENGINEERING	TRAFFIC SERVICE (15)	Generally provides adequate traffic service although the movements to and from the east are not provided. O (9.0)	Generally provides good traffic service. + (12.0)	Provides excellent traffic service. ++ (15.0)	Generally provides good traffic service although the movements to and from the east are not provided. + (12.0)
ENGINEERING	SAFETY (15)	Generally safe option. + (12.0)	Generally safe option. + (12.0)	Generally safe option. + (12.0)	Generally safe option. + (12.0)
SOCIOECONOMIC	CONSTRUCTIBILITY / M.O.T. IMPLICATIONS (11)	No significant constructibility nor detrimental MOT implications expected. + (8.8)	No significant constructibility nor detrimental MOT implications expected. + (8.8)	No significant constructibility nor detrimental MOT implications expected. + (8.8)	No significant constructibility nor detrimental MOT implications expected. + (8.8)
SOCIOECONOMIC	IMPACTS TO SENSITIVE SITES (7)	Although this alternative does not directly impact any sensitive sites, it could attract a significant volume of traffic via the road serving as the main entrance to East River High School. O (4.2)	Although this alternative does not directly impact any sensitive sites, it could attract a significant volume of traffic via the road serving as the main entrance to East River High School. O (4.2)	Although this alternative does not directly impact any sensitive sites, it could attract a significant volume of traffic via the road serving as the main entrance to East River High School. O (4.2)	No impact to sensitive sites although additional traffic attraction via Story Parting Road might be objectionable to the Orange County Fire Station #82 and adjacent residential community. O (4.2)
SOCIOECONOMIC	R/W & RELOCATION IMPACTS (11)	Moderate r/w impacts around Lockwood Drive and just north of the East River High School entrance. - (4.4)	Moderate right-of-way impacts due to the wider footprint of the interchange configuration. - (4.4)	Least impacts of all alternatives. O (6.6)	Several relocations would be required r/w impacts around Story Parting Road. -- (2.2)
ENV.	ENVIRONMENTAL IMPACTS (11)	Minor environmental impacts. O (6.6)	Minor environmental impacts. O (6.6)	Minor environmental impacts. O (6.6)	Minor environmental impacts. O (6.6)
COST	COST (15)	Moderate cost. O (9.0)	Moderate cost. O (9.0)	Moderate cost. O (9.0)	Slightly higher cost than the previous two options partly due to the relocation of the Chuluota Road/SR 50 intersection. - (6.0)
	SUMMARY REMARKS	Viable option but additional right-of-way associated with ample directional ramp in the Northeast quadrant might be controversial. (66.0)	(66.0)	(74.2)	Viable option but very high traffic attraction might be objectionable to residents along Story Partin Road. (63.8)
	REMAINS VIABLE?	No	No	Yes	No

SR 408 Extension/CR 419 Extension Interchange Configurations **Figure 5-4**

LEGEND		
++	SUBSTANTIALLY POSITIVE EFFECT OR BEST ALTERNATIVE	1.0
+	GENERALLY POSITIVE EFFECT OR GOOD ALTERNATIVE	0.8
O	GENERALLY NO EFFECT OR MODERATE ALTERNATIVE	0.6
-	GENERALLY NEGATIVE EFFECT OR INFERIOR ALTERNATIVE	0.4
--	GENERALLY NEGATIVE EFFECT OR WORST ALTERNATIVE	0.2

15 CRITERIA WEIGHT
12.0 RESULTING SCORE
71.8 TOTAL SCORE

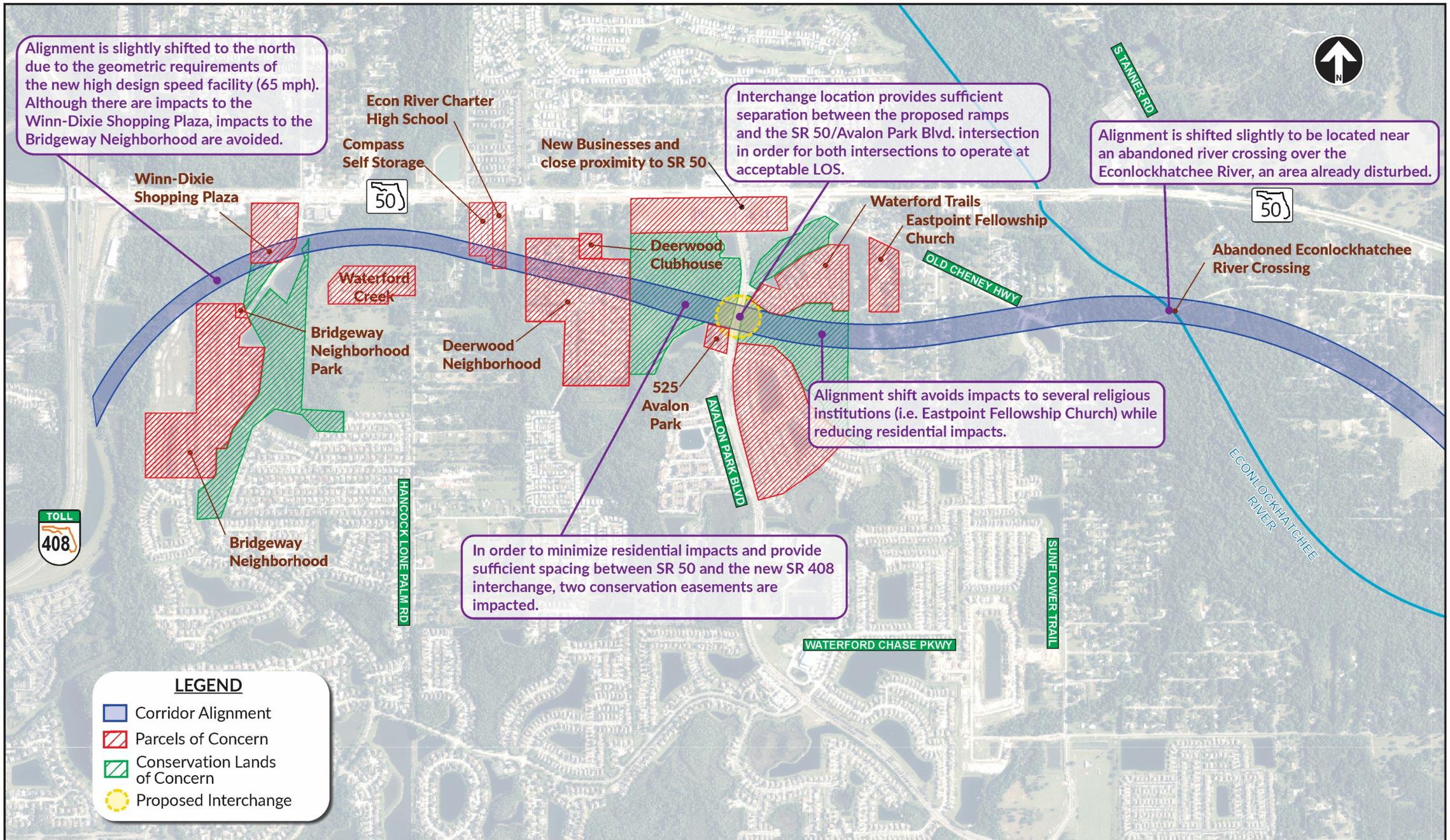
PARAMETERS		ALTERNATIVES
		A 
		B 
		C 
ENGINEERING	GEOMETRIC / OPERATIONAL FEATURES (15)	Generally similar geometry but requires the provision of a two-way service road along the south side of SR 50 to maintain local access. + (12.0)
		Generally similar to previous option but will require a signal. o (9.0)
		Simple geometry but might require the provision of 1 traffic signal (for entering and exiting SR 408 Extension traffic). o (9.0)
	TRAFFIC SERVICE (15)	Generally good traffic service but some weaving concerns along SB SR 50 between the EB SR 408 off-ramp merge area and the SR 50/SR 520 interchange. + (12.0)
		Although this option avoids weaving concerns along SB SR 50, the new required signal will affect the operational efficiency along SR 50. o (9.0)
		Generally similar to Alternative B. - (9.0)
	SAFETY (15)	Generally safe option. + (12.0)
		Generally safe option. + (12.0)
		Generally safe option. + (12.0)
SOCIOECONOMIC	CONSTRUCTIBILITY / M.O.T. IMPLICATIONS (11)	No significant constructibility but additional MOT coordination required due to the required construction of the service road. + (8.8)
		Generally similar to previous option. + (8.8)
		No significant constructibility nor MOT problems are anticipated. + (8.8)
	IMPACTS TO SENSITIVE SITES (7)	No impacts to sensitive sites. o (4.2)
		No impacts to sensitive sites. o (4.2)
		No impacts to sensitive sites. o (4.2)
	R/W & RELOCATION IMPACTS (11)	Moderate r/w impacts required. o (6.6)
		Moderate r/w impacts required. o (6.6)
		Generally less impacts than either options. ++ (11.0)
ENV.	ENVIRONMENTAL IMPACTS (11)	Minor environmental impacts. o (6.6)
		Minor environmental impacts. o (6.6)
		Minor environmental impacts. o (6.6)
COST	COST (15)	Generally high cost. - (6.0)
		Generally high cost. - (6.0)
		Least expensive of all options. ++ (15.0)
	SUMMARY REMARKS	Simple and effective configuration if weaving is not a problem. (68.2)
		Simple and effective configuration provided that new signal does not appreciable detract the LOS. (62.2)
		Simple and flexible solution but will require substantial modifications. (75.6)
	REMAINS VIABLE?	No
		No
		Yes

SR 408 Extension/SR 50 Interchange Configurations **Figure 5-5**

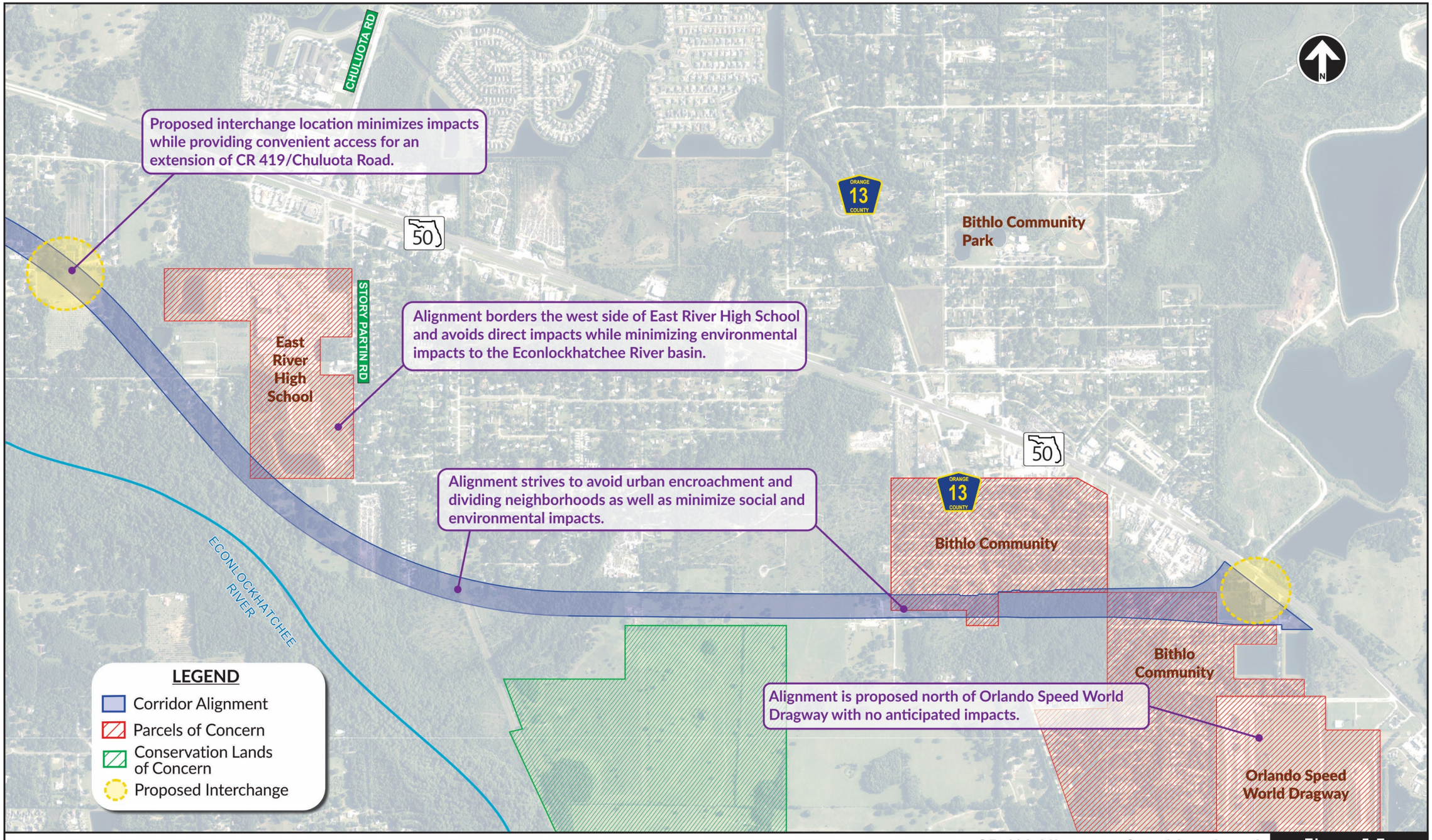
5.3 Phase 3 - Horizontal Alignment Considerations

In order to evaluate different alternative roadway concepts, it is also necessary to take into account their horizontal alignment or relative position within the chosen corridor. Although the alignment is generally dictated by the design speed (65 mph in Segment 1 and 70 mph in Segments 2 and 3), **Figures 5-6** and **5-7** illustrate some of the critical issues involved in the selection of the recommended alignment. As previously stated, Segment 1 of the project exhibits generally urbanized conditions with various residential neighborhoods and commercial land uses. The alignment through this area strives to avoid, or at least minimize, most detrimental impacts resulting from the proposed facility. It is important to note that the ample geometric requirements associated with high design speed facilities (e.g. – smooth long curves, etc.) limits the ability to entirely avoid some impacts. In addition, the location of the proposed interchanges require that certain minimum distances to major arterial facilities (e.g. – SR 50) be maintained to ensure appropriate vehicular flow associated with proper merging, weaving and queueing distances. As shown on **Figures 5-6** and **5-7**, Segments 2 and 3 are less dense in terms of urban development. The alignment through these areas strives to maintain a delicate balance to possibly avoid urban encroachment while minimizing impacts to the existing environmental conservation easements.

Closer inspection of the selected corridor revealed that a slight deviation to the south from just west of Avalon Park Boulevard to just east of the Econlockhatchee River would be beneficial. This deviation is necessary in order to reduce residential impacts and provide sufficient spacing between SR 50 and the SR 408 Eastern Extension interchange at Avalon Park Boulevard. The results of a preliminary traffic analysis determined that a new interchange at Avalon Park Boulevard needs to be located more than 600 feet south of SR 50 in order to provide adequate operations at both the new 408 interchange and the SR 50/Avalon Park Boulevard intersection.



SR 408 Alignment Considerations 1 | Figure 5-6



SR 408 Alignment Considerations 2 | Figure 5-7

5.3.1 Preferred Alternative

Based on the previous evaluation of alternatives, from an engineering, environmental socio-economic, and cost perspective, as well as assessing public comments received, the resulting preferred alternative is illustrated on **Figure 7-1** (see Page 7-2). In general terms, the preferred alternative is the best option to satisfy the project Purpose and Need. It features a four-lane divided facility with a 60-foot median width, 12-foot lanes, and a design speed of 65 – 70 mph within a 300-foot right-of-way. A partial interchange will be provided at Woodbury Road and full interchanges at SR 50/408, Avalon Park Boulevard, CR 419/Chuluota Road Extension and at the eastern project terminus with SR 50/SR 520. Additional details concerning the preferred alternative is included in Section 7.

6 FUTURE TRAFFIC ANALYSIS

The forecasts of average daily traffic (ADT) for the No Build and Build alternatives were prepared using the project-specific travel demand model described in the Draft Traffic Technical Memorandum (DTTM). For the preliminary alternatives considered, the forecasted traffic is provided in annual average daily traffic (AADT) for design year 2045. For the final alternative, summaries of the forecasts under No Build and Build conditions of average daily traffic (ADT) and the Directional Design Hour Volumes (DDHV) are provided. This section also contains summaries of the roadway segment and intersection operation level of service for 2025 (opening year) and 2045 (design year) conditions.

The DDHVs were developed using these ADT forecasts and the recommended K and D factors. The daily and peak hour traffic operational conditions for roadway segments were conducted using the 2012 FDOT Quality and Level of Service Handbook tables. The intersection operation LOS analysis was conducted using SYNCHRO software. Mitigation measures needed at intersections and roadway segments impacted by the proposed project were considered.

6.1 Description of Alternatives

The 2045 forecast year, or design year, was used to evaluate the alternative corridors. Future traffic projections were developed for the No Build alternative and multiple build alternatives. All alternatives, including the No Build alternative, assume that SR 50 will be widened to 6 lanes, prior to this project's opening year, beyond the terminus of the present-day widening project, i.e., between Avalon Park Boulevard and SR 520. The Build alternatives were tolled at $0.18 per mile and escalated in accordance with the Customer First toll rate policy.

The description of all the alternatives considered in the study was previously provided in Section 5 of this report.

6.2 Daily Traffic Forecasts

A project-specific travel demand model was developed to forecast traffic. The calibration of the travel demand model is described in detail in the DTTM. Using the calibrated model, traffic forecasts were developed for three future years 2025, 2035 and 2045 (reporting only 2025 and 2045) to coincide with the opening year and design year of the project. The 2025 and 2045 models included the socio-economic data from the MetroPlan Orlando (the MPO) along with the roadway network improvements identified in the MPO's Long Range Transportation Plan (LRTP) and CFX's Master Plan. In the LRTP, SR 50 from the existing 6-lane terminus at Avalon Park Boulevard to SR 520 will be widened to six lanes by year 2025. In addition, land uses for the proposed Lake Pickett Development, extending from SR 50 to the Seminole County Boundary and from Tanner Road to Chuluota Road (CR 419), are included in the model.

The travel demand model was run for the years 2025 and 2045 for both No Build and Build conditions. The No Build and Build scenarios included the same land use assumption. The No Build scenario assumed the widening of SR 50 to six lanes throughout the project limits. The Build scenario included SR 408 Eastern Extension, in addition to the 6-lane cross section for SR 50. The project is envisioned as a tolled extension of SR 408. The project has been coded in the network with a toll rate of $0.18 per mile in 2015 dollars, consistent with average tolls on all new CFX facilities. The toll rates have been inflated to 2025 and 2045 using the new toll policy of a compounded annual growth rate of one and one-half percent (1.5%), in accordance with the CFX Customer First toll rate policy, adopted by the CFX Board in January 2017. Since all the alternative concepts run parallel to SR 50, the model results are comparable between these alternatives with the minor reassignment of traffic at the access points to the project. The 2025 and 2045 model volume was converted to AADT using a Model Output Conversion Factor (MOCF) of 0.98. The MOCF for Orange County was obtained from the FTI webpage. The AADT from the 2025 and 2045 model runs are shown in **Table 6-1** and shows that the growth rates within the study area are generally lower in the No Build scenario compared to the Build scenario. This also indicates that there is a latent demand which is not served by the six-lanes of SR 50 alone. With the addition of four lanes of SR 408 Eastern Extension, the demand on the SR 50/SR 408 corridor increases.

Table 6-1: No Build and Build 2025 and 2045 Model Output (AADT)

Location	2015 Base	No Build 2025	No Build 2045	Build 2025*	Build 2045*	No Build Growth Rate	Build Growth Rate
SR 50 East of SR 408	68,300	78,700	87,500	82,800	100,800	0.9%	1.7%
SR 50 @ Econ. River Bridge	38,500	49,800	57,900	50,400	66,100	1.7%	2.6%
SR 50 West of SR 520	29,200	34,000	36,000	34,500	40,800	0.8%	1.4%
Avalon Park South of SR 50	13,900	22,200	20,400	23,100	30,400	1.6%	2.1%
Chuluota North of SR 50	17,800	20,100	24,300	20,100	26,800	1.2%	1.2%

* 2025 and 2045 Build scenarios include four lanes of SR 408 Eastern Extension along with 6-lanes of SR 50 within the limits of the Project.

Using the model output and recognizing the expected travel pattern changes due to the better access provided by the SR 408 Eastern Extension, and impacts from proposed Lake Pickett South Development, the 2025 and 2045 AADT were developed. **Figure 6-1** contains the No Build 2025 and 2045 AADTs and **Figure 6-2** shows Build 2025 and 2045 AADTs.

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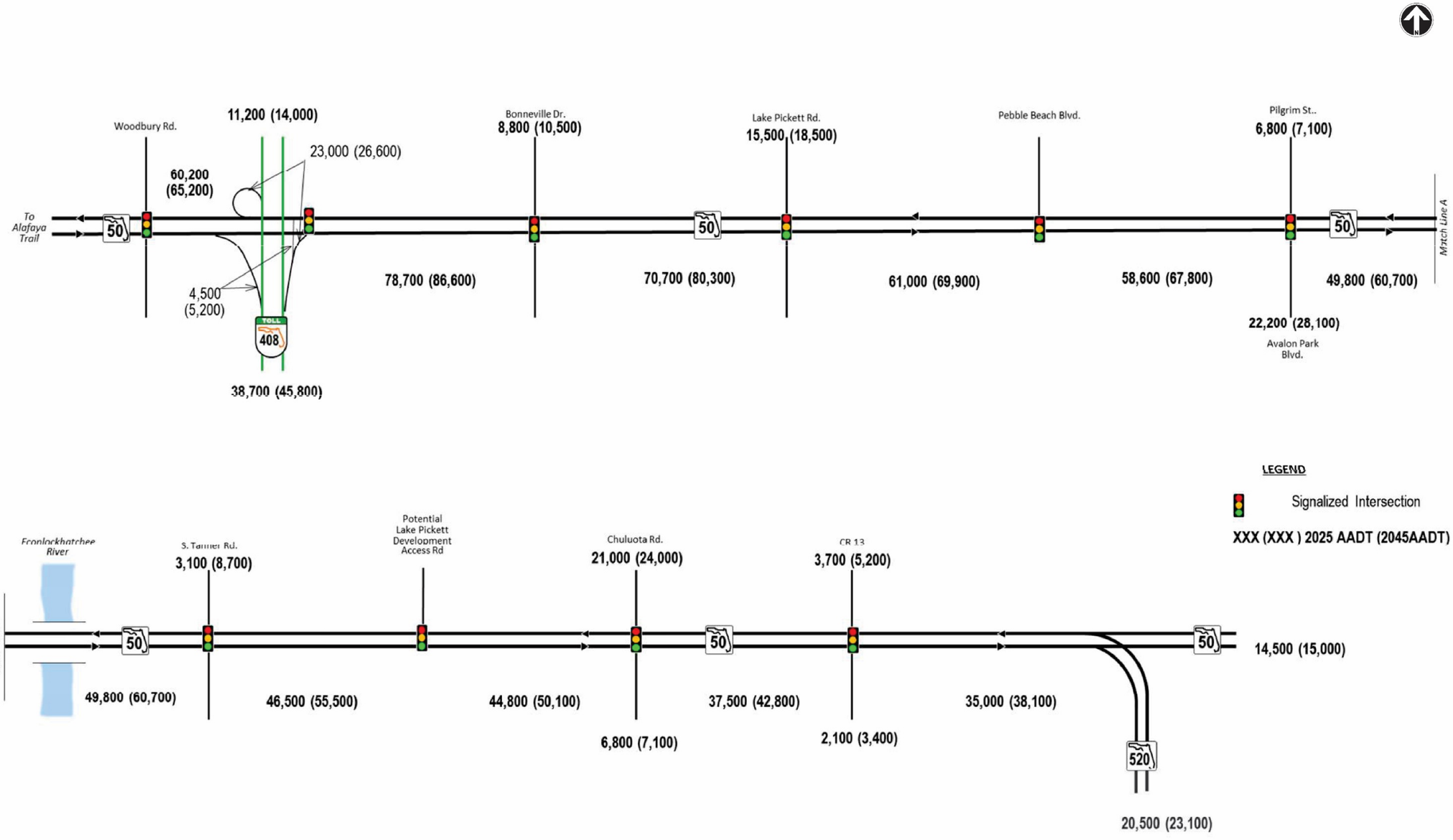
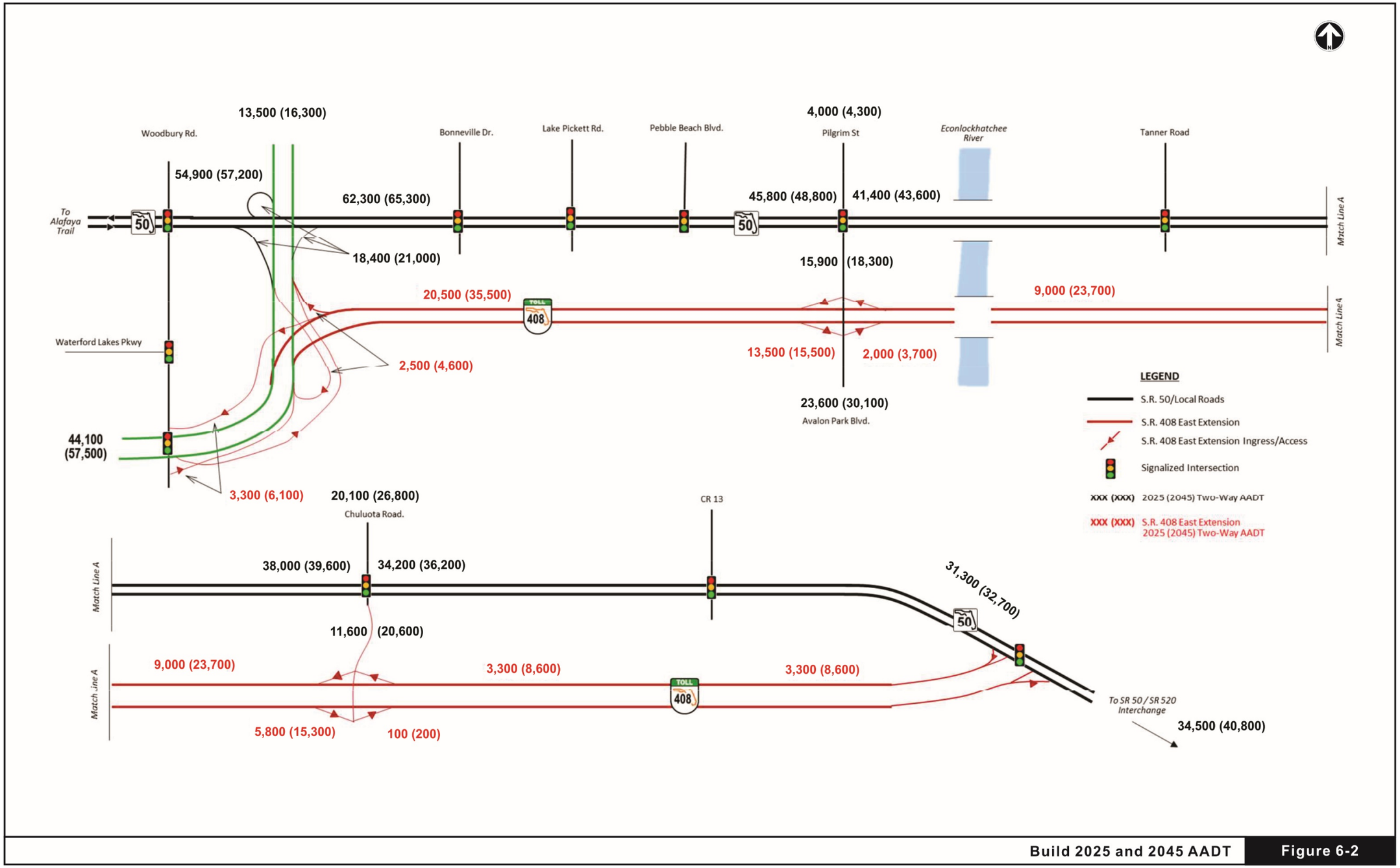


No Build 2025 and 2045 AADT **Figure 6-1**



Build 2025 and 2045 AADT | Figure 6-2

The daily roadway segment LOS analysis was conducted for the No Build and Build conditions using the 2012 FDOT Quality and Level of Service Handbook tables. A summary of No Build daily LOS is provided in **Table 6-2**. Under No Build conditions, by 2025, SR 50 from Woodbury Road to Avalon Park Boulevard is expected to operate at LOS F, and by 2045 an additional segment of SR 50 from Avalon Park Boulevard to Tanner Road is expected to operate at LOS F. In addition to SR 50, Chuluota Road North of SR 50 is projected to operate at LOS F. Improvements would be planned as a part of a Lake Pickett development agreement, to mitigate failing conditions on both Chuluota Road and Lake Pickett Road. However, SR 50 at a daily level is projected to operate at LOS F under the SR 50 6-lane configuration.

Table 6-2: No Build 2025 and 2045 Daily Roadway Segment LOS

Roadway	From	To	Lanes	No Build AADT		No Build LOS	
				2025	2045	2025	2045
SR 50	Woodbury Rd	SR 408 Ramps	6L	60,200	65,200	F	F
	SR 408 Ramps	Bonneville Dr	6L	78,700	86,600	F	F
	Bonneville Dr	Lake Pickett Rd	6L	70,700	80,300	F	F
	Lake Pickett Rd	Pebble Beach Blvd	6L	61,000	69,900	F	F
	Pebble Beach Blvd	Avalon Park Blvd	6L	58,600	67,800	D	F
	Avalon Park Blvd	Tanner Rd	6L	49,800	60,700	C	F
	Just West of Chuluota Rd (CR 419)		6L	46,500	55,500	C	C
	Just East of Chuluota Rd (CR 419)		6L	44,800	50,100	C	C
	Just West of CR 13		6L	37,500	42,800	C	C
	CR 13	SR 520	6L	35,000	38,100	C	C
	East of SR 520		4L	14,500	15,000	B	B
Bonneville Dr	North of SR 50		2L	8,800	10,500	D	D
Lake Pickett Rd	North of SR 50		2L	15,500	18,500	F	F
Avalon Park Blvd	South of SR 50		4L	22,200	28,100	D	D
Tanner Rd	North of SR 50		2L	3,100	8,700	C	D
Chuluota Rd (CR 419)	North of SR 50		2L	20,100	24,000	F	F
	South of SR 50		2L	6,800	7,100	D	D
CR 13	North of SR 50		2L	3,700	5,200	C	C
	South of SR 50		2L	2,100	3,400	C	C
SR 520	East of SR 50		4L	20,500	23,100	B	B

A summary of Daily Build LOS is provided in **Table 6-3** and only shows the analysis of those segments of SR 50 and cross streets that directly impact the project. Under Build conditions, SR 50 from Woodbury Road to SR 408 ramps is projected to operate at LOS F in 2025, and by 2045 an additional segment of SR 50 from the SR 408 Ramps to Lake Pickett Road is projected to operate at LOS F. The traffic volumes on SR 50 are lower under the Build condition than under the No Build condition. In addition to SR 50, Lake Pickett Road (north of SR 50) is projected to operate at LOS F. Improvements to Lake Pickett Drive would be planned as a part of the Lake Pickett development agreement to mitigate failing conditions.

The SR 408 Eastern Extension would impact the intersections of SR 50 at Avalon Park Boulevard and Chuluota Road as the off ramps that connect to SR 408 Eastern Extension are provided near these intersections. Therefore, intersection improvements are recommended for the Avalon Park Boulevard northbound approach and Chuluota Road southbound approach as mitigation measures, and also to provide better access to the SR 408 ramps located just west of Avalon Park Boulevard and those located west of Chuluota Road. Recommendations are described under the intersection operating conditions section.

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Table 6-3: Build 2025 and 2045 Daily Roadway Segment LOS

Roadway	From	To	Lanes	Build AADT		Build LOS	
				2025	2045	2025	2045
SR 50	Woodbury Rd	SR 408 Ramps	6L	54,900	57,200	C	C
	SR 408 Ramps	Bonneville Dr	6L	62,300	65,300	F	F
	Just West of Avalon Park Blvd		6L	45,800	48,800	C	C
	Just East of Avalon Park Blvd		6L	41,400	43,600	C	C
	Just West of Chuluota Rd		6L	38,000	39,600	C	C
	Just East of Chuluota Rd		6L	34,200	36,200	C	C
	CR 13	SR 408 Extension	6L	31,300	32,700	C	C
	SR 408 Extension	SR 520	6L	34,500	40,800	B	C
Avalon Park Blvd	South of SR 50		4L	15,900	18,300	D	D
Avalon Park Blvd	South of SR 408 Extension		4L	23,600	30,100	D	E
Chuluota Rd (CR 419)	North of SR 50		2L	20,100	26,800	D	D
	South of SR 50		4L	11,600	20,600	C	D
SR 408 Extension	SR 408	SR 408 Extension	4L	20,500	35,500	B	B
SR 408 Extension	Avalon Park Blvd	Chuluota Rd (CR 419)	4L	9,000	23,700	B	B
SR 408 Extension	Chuluota Rd (CR 419)	SR 50	4L	3,300	8,600	B	B

Under Build conditions, SR 408 Eastern Extension would provide a premium toll choice and would alleviate traffic conditions on SR 50 by diverting traffic off of the congested SR 50. The SR 408 Eastern Extension would also provide a better alternative to the traffic that is currently using SR 408 but are projected to face significant delays on SR 50 to access SR 408 under 2025 and 2045 conditions.

6.3 Design-Hour Traffic Forecasts and LOS

The Directional Design Hour Volume (DDHV) for traffic forecast years 2025 and 2045 were developed for the No Build and Build alternatives. DDHV were developed using the K and D factors along with forecasted AADTs described in the DTTM and present-day intersection turning movement volumes.

The DDHVs for 2025 opening year conditions are presented on **Figures 6-3** through **6-6**. **Figures 6-3** and **6-4** contains a summary of No Build condition DDHVs. **Figure 6-5**

and **6-6** present the 2025 Build condition DDHVs. The DDHVs for 2045 design year conditions are presented on **Figures 6-7** through **6-10**. **Figures 6-7** and **6-8** provide a summary of the 2045 No Build conditions DDHVs. **Figure 6-9** and **6-10** present the 2045 DDHVs under Build condition.

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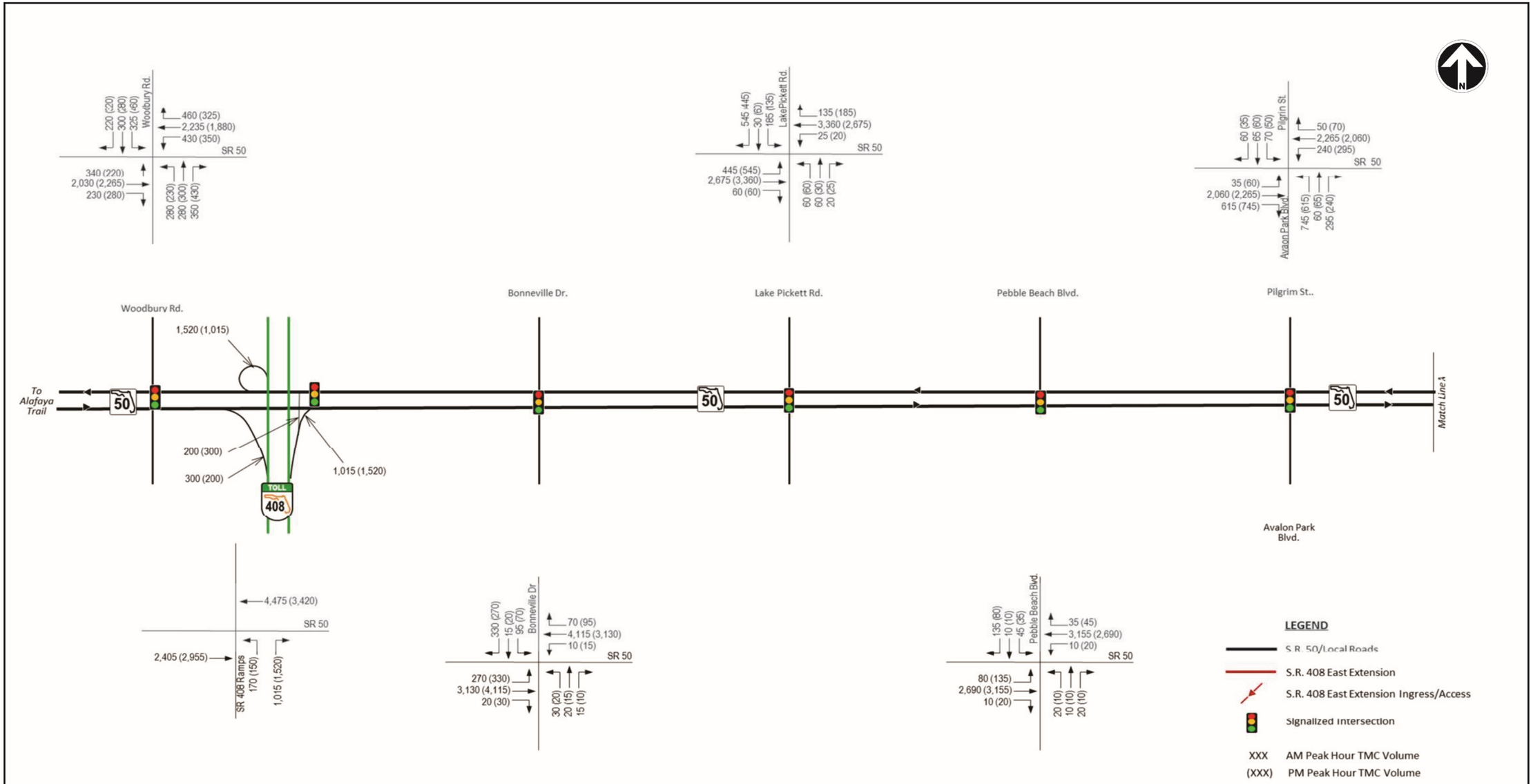
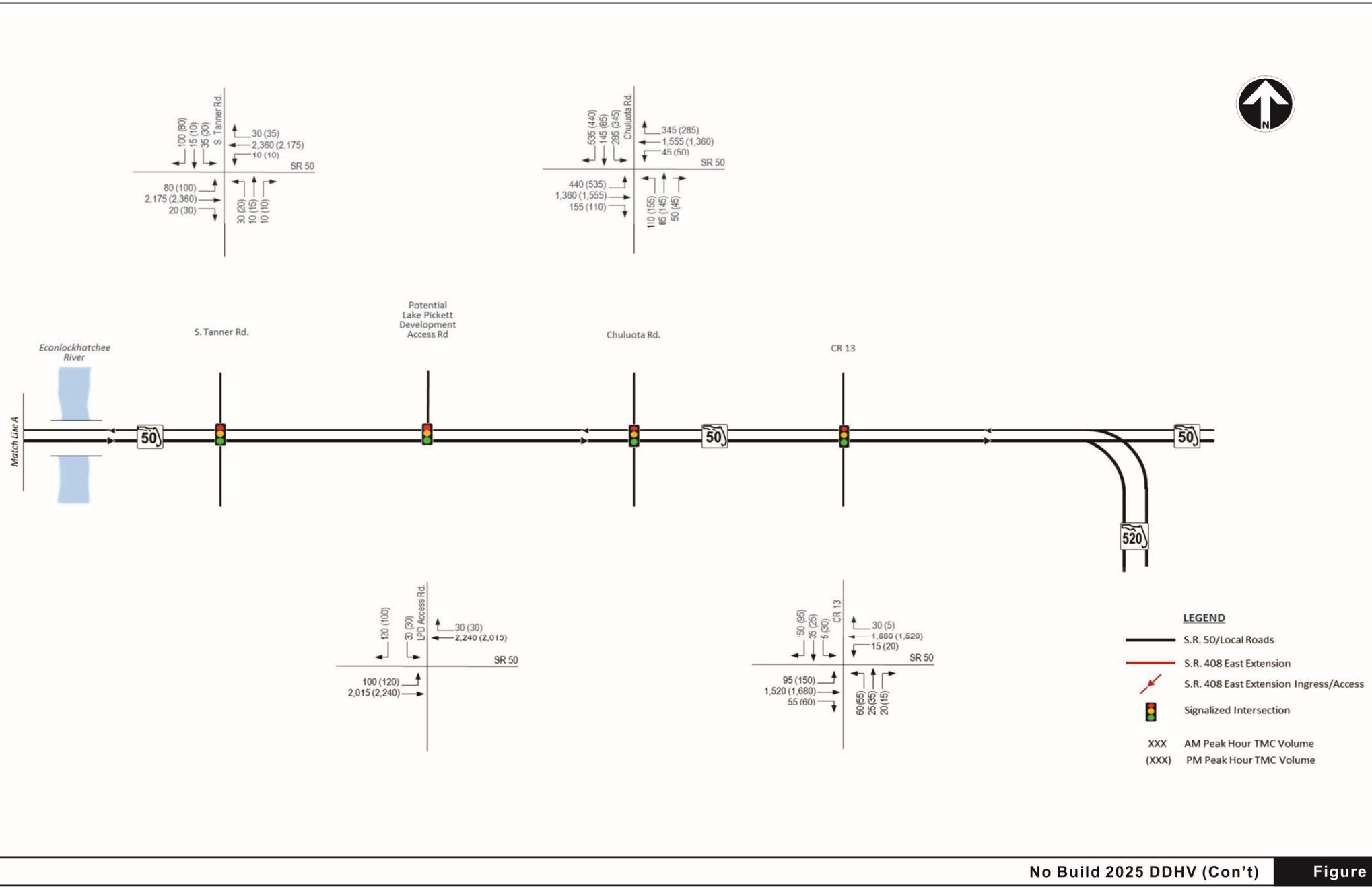
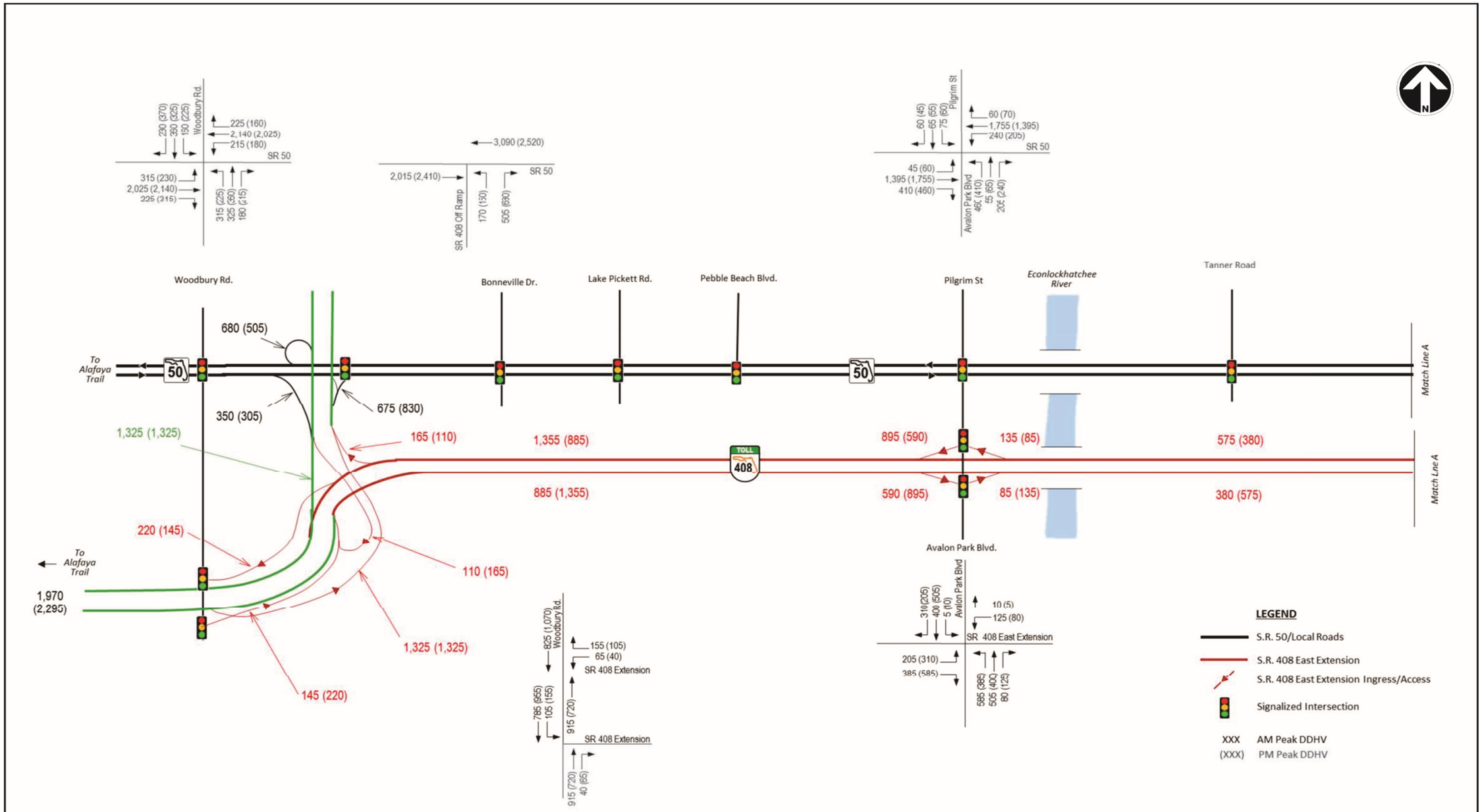


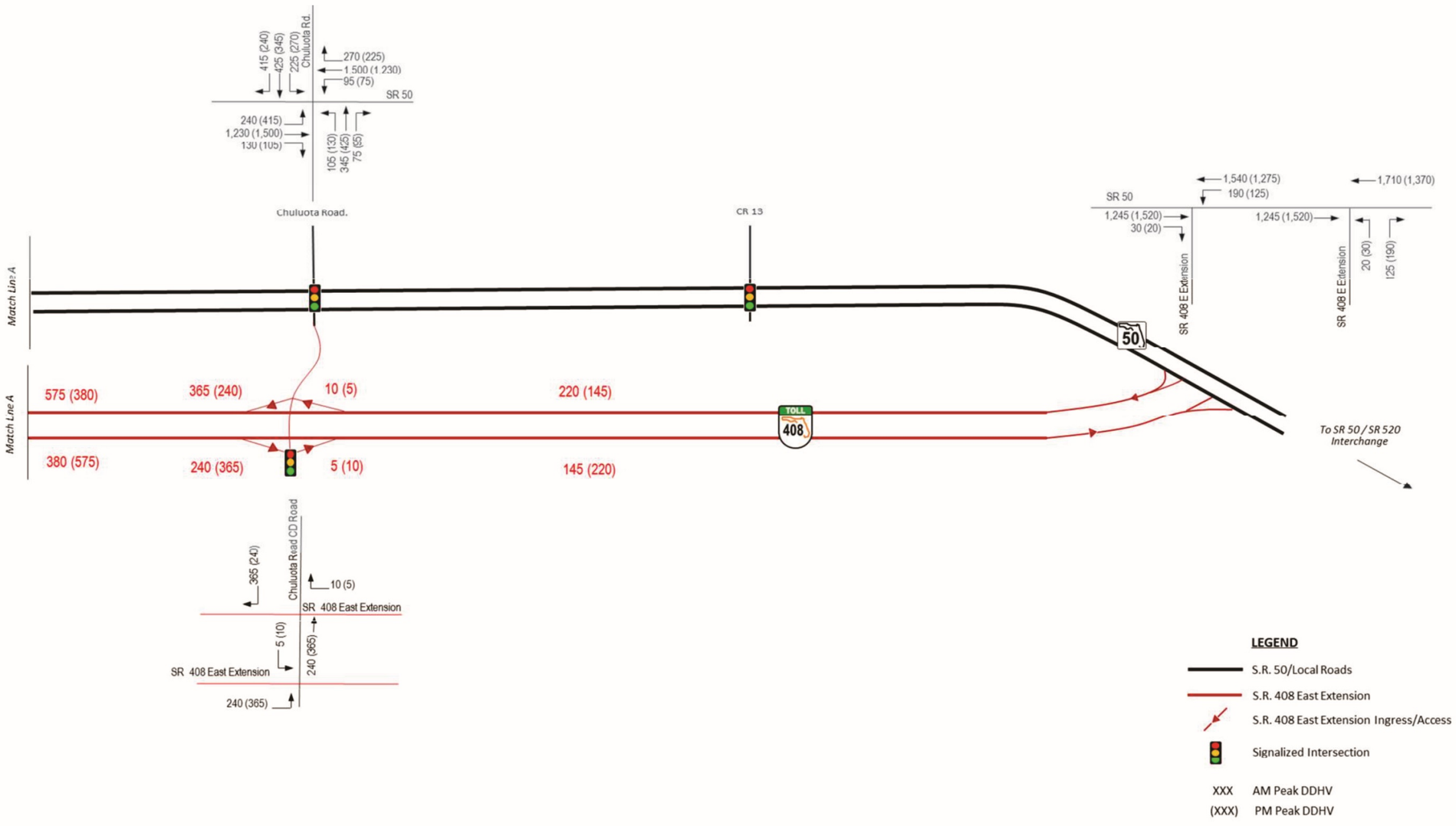
No Build 2025 DDHV **Figure 6-3**



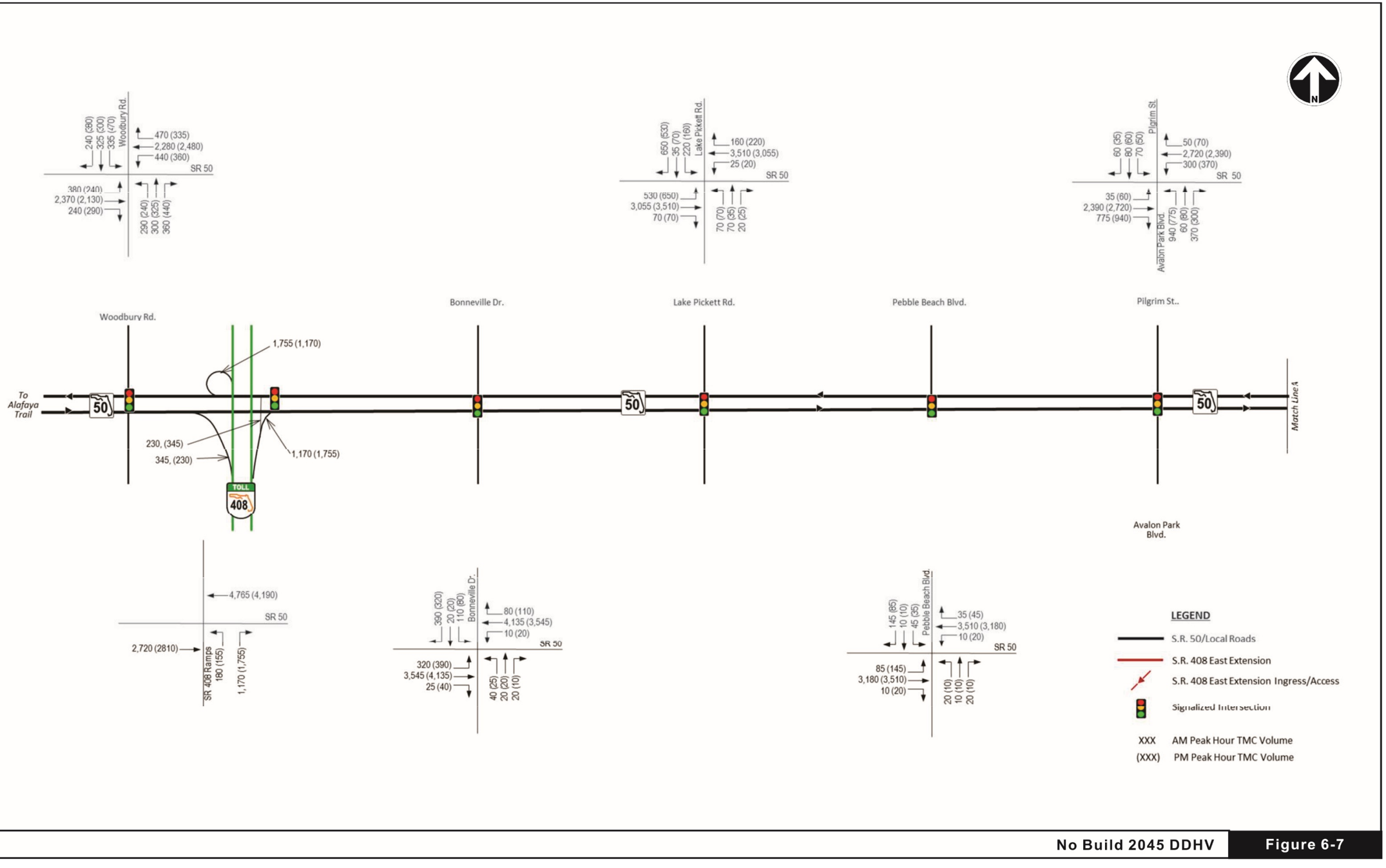
No Build 2025 DDHV (Con't) **Figure 6-4**



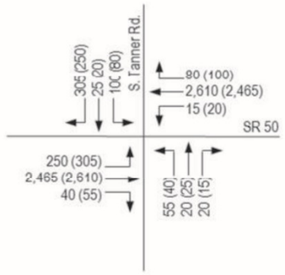
Build Final Alternative 2025 DDHV **Figure 6-5**

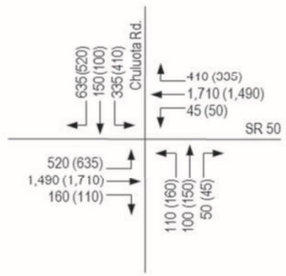


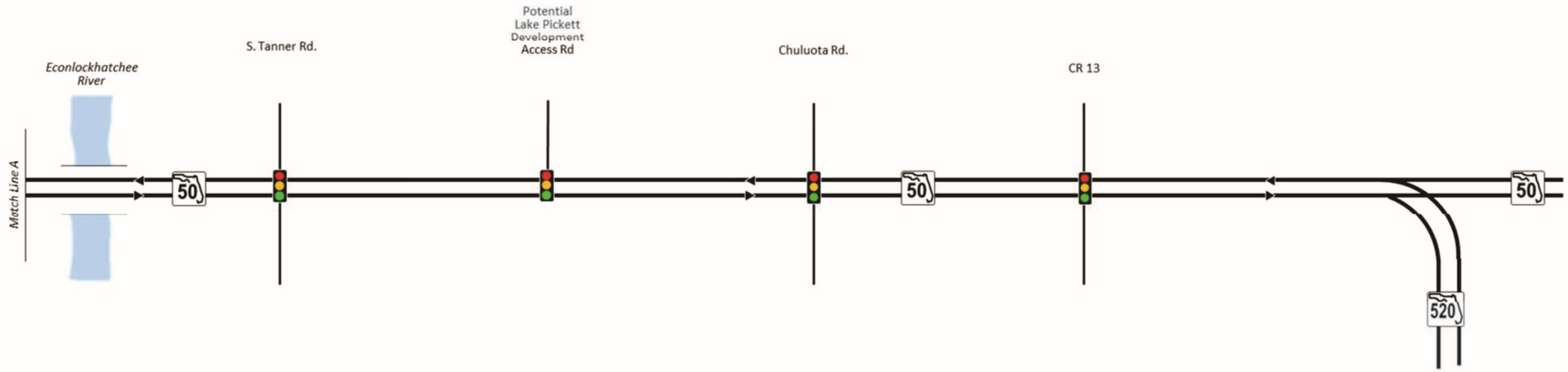
Build Final Alternative 2025 DDHV (Con't) **Figure 6-6**

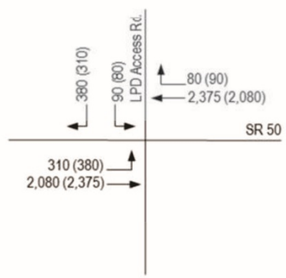


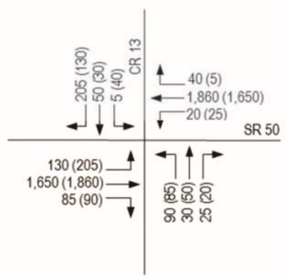
No Build 2045 DDHV **Figure 6-7**









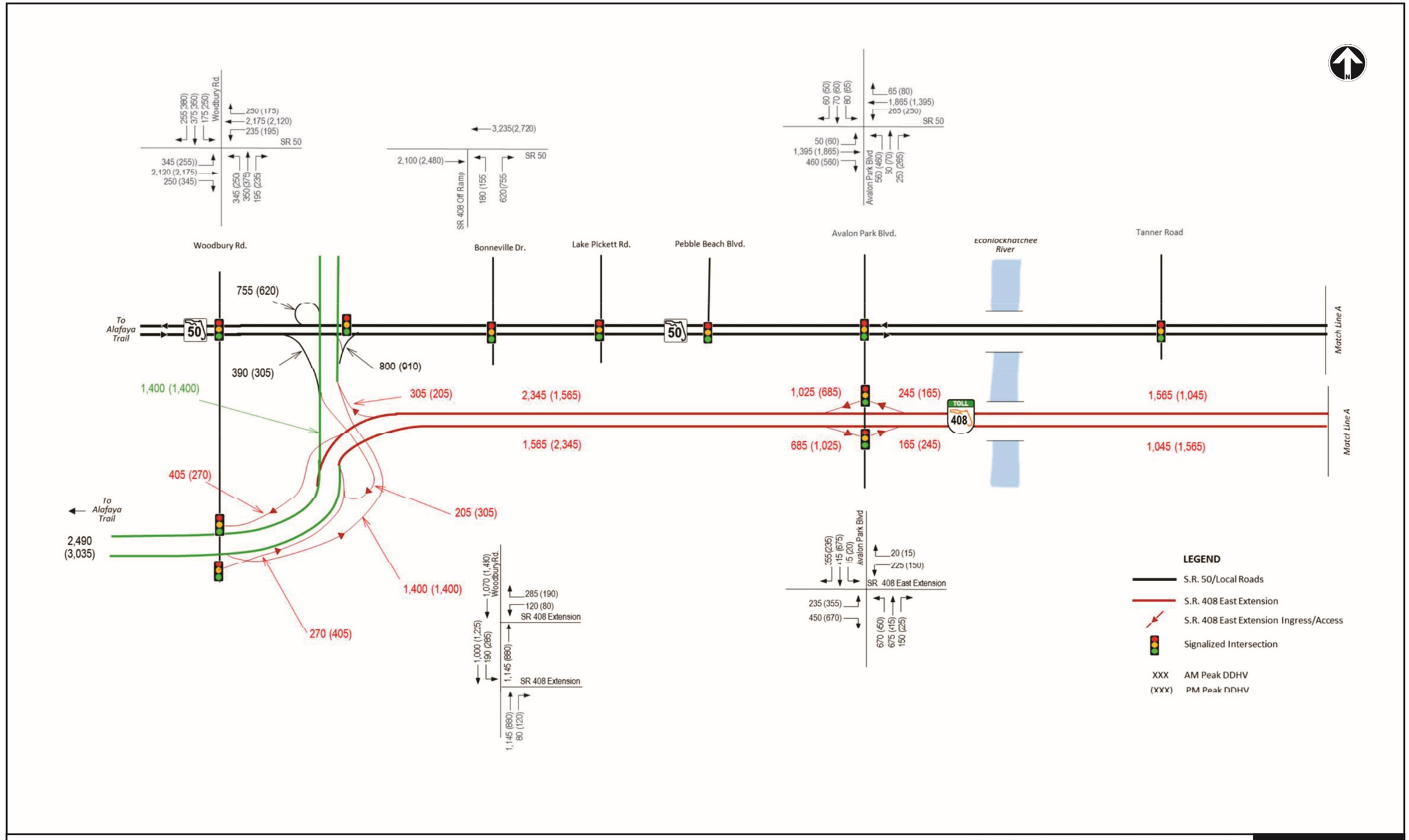


LEGEND

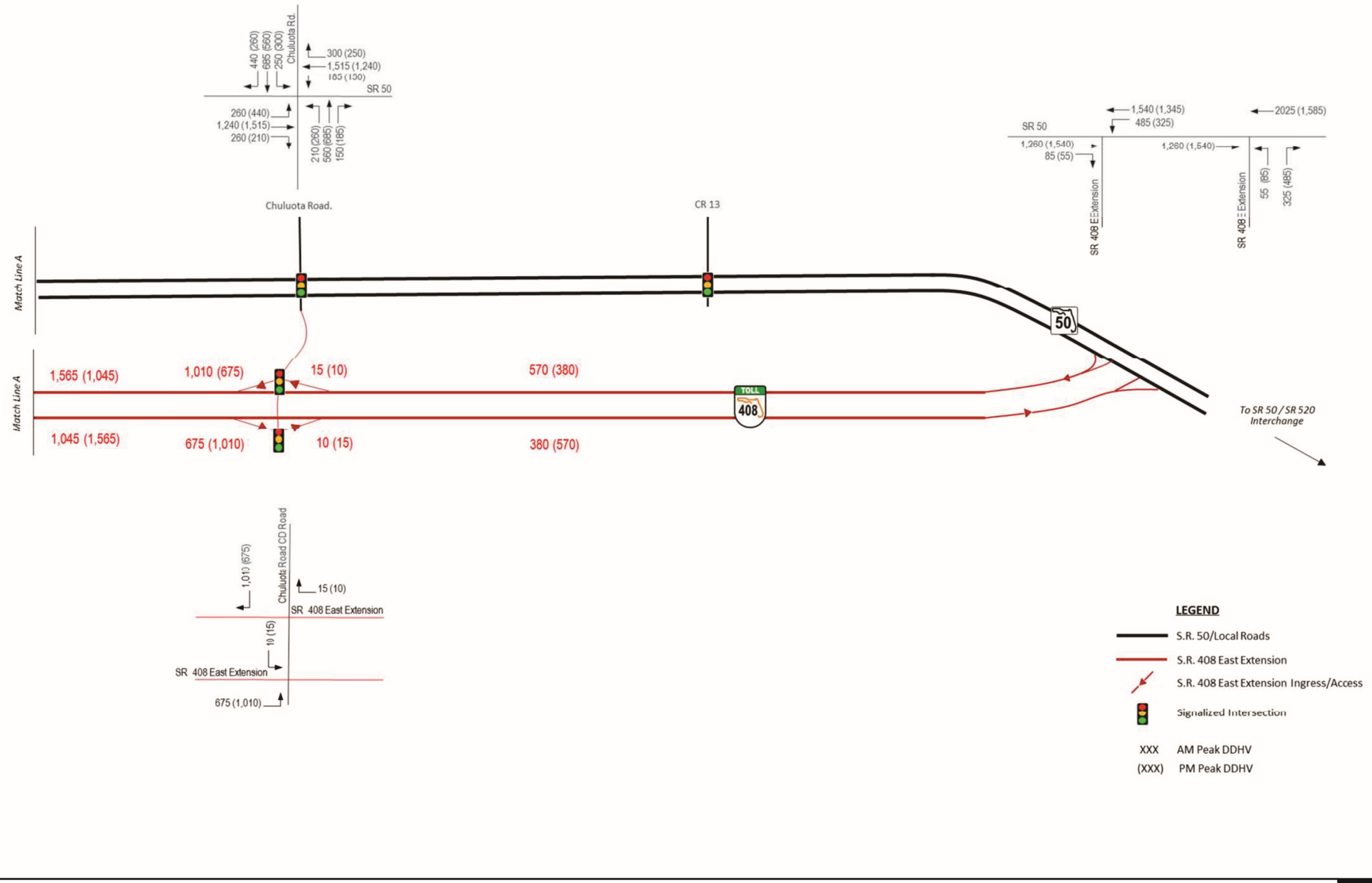
- S.R. 50/Local Roads
- S.R. 408 East Extension
- S.R. 408 East Extension Ingress/Access
- Signalized Intersection

XXX AM Peak Hour TMC Volume
(XXX) PM Peak Hour TMC Volume

No Build 2045 DDHV (Con't) **Figure 6-8**



Build Final Alternative 2045 DDHV **Figure 6-9**



Build Final Alternative 2045 DDHV (Con't) **Figure 6-10**

The roadway segment LOS analysis was conducted in the PM peak hour for the No Build and Build conditions using these DDHVs. A summary of No Build Peak Hour LOS is provided in **Table 6-4** and Build Peak Hour LOS is provided in **Table 6-5**.

By the opening year 2025, under No Build conditions, SR 50 from Woodbury Road to Avalon Park Boulevard is projected to operate at LOS F in the peak direction. By 2045, the design year, an additional segment of SR 50 from Avalon Park Boulevard to Tanner Road is projected to operate at LOS F in the peak direction. In addition to SR 50, Chuluota Road (north of SR 50) is projected to operate at LOS F. Improvements to mitigate failing conditions on Chuluota Road is expected as part of the Lake Pickett development agreement. However, SR 50 at a Peak Hour level is projected to operate at LOS F under the SR 50 6-lane configuration.

Under Build conditions, in 2025, SR 50 from Woodbury Road to Lake Pickett Road is projected to operate at LOS F, but only the section from Woodbury Road to the SR 408 ramps will continue to operate at LOS F in 2045. In 2045, SR 50 operates at LOS C for a majority of the corridor in the Build condition.

Under Build conditions, SR 408 Eastern Extension would provide a premium toll choice and would alleviate traffic conditions on SR 50 by diverting traffic off the congested SR 50 corridor. The SR 408 Eastern Extension would provide a better alternative to the traffic that is currently using SR 408 but faces significant delays on SR 50 to access SR 408.

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Table 6-4: No Build 2025 and 2045 Peak Hour Roadway Segment LOS

Roadway	From	To	Lanes	No Build PM Peak DDHVs				No Build PM Peak LOS			
				2025		2045		2025		2045	
				EB	WB	EB	WB	EB	WB	EB	WB
SR 50	Woodbury Rd	SR 408 Ramps	6L	3,155	2,555	3,040	3,175	F	C	F	F
	SR 408 Ramps	Bonneville Dr	6L	4,475	3,420	4,565	4,190	F	F	F	F
	Bonneville Dr	Lake Pickett Rd	6L	4,195	3,240	4,225	3,675	F	F	F	F
	Lake Pickett Rd	Pebble Beach Blvd	6L	3,520	2,880	3,695	3,295	F	C	F	F
	Pebble Beach Blvd	Avalon Park Blvd	6L	3,200	2,755	3,555	3,225	F	C	F	F
	Avalon Park Blvd	Tanner Rd	6L	2,555	2,425	3,070	2,830	C	C	F	C
	Just West of Chuluota Rd (CR 419)		6L	2,200	1,955	2,455	2,170	C	C	C	C
	Just East of Chuluota Rd (CR 419)		6L	1,945	1,695	2,165	1,875	C	C	C	C
	Just West of CR 13		6L	1,890	1,670	2,155	1,865	C	C	C	C
	CR 13	SR 520	6L	1,725	1,545	1,920	1,680	C	C	C	C
	East of SR 520		4L	715	645	760	665	B	B	B	B
Bonneville Dr	North of SR 50		2L	440	360	520	420	D	D	D	D
Lake Pickett Rd	North of SR 50		2L	760	640	905	760	F	D	F	F
Avalon Park Blvd	South of SR 50		4L	920	1,100	1,155	1,370	D	D	D	D
Tanner Rd	North of SR 50		2L	150	120	430	350	C	C	D	D
Chuluota Rd (CR 419)	North of SR 50		2L	870	965	1,120	1,030	F	F	F	F
	South of SR 50		2L	345	245	355	260	D	C	D	C
CR 13	North of SR 50		2L	190	150	260	200	C	C	C	C
	South of SR 50		2L	105	105	155	145	C	C	C	C
SR 520	East of SR 50		4L	1,010	900	1,160	1,015	B	B	B	B

Table 6-5: Build 2025 and 2045 Peak Hour Roadway Segment LOS

Roadway	From	To	Lanes	Build PM Peak DDHV				Build PM Peak LOS			
				2025		2045		2025		2045	
				EB	WB	EB	WB	EB	WB	EB	WB
SR 50	Woodbury Rd	SR 408 Ramps	6L	2,715	2,365	2,785	2,490	C	C	C	C
	SR 408 Ramps	Bonneville Dr	6L	3,090	2,520	3,235	2,720	F	C	F	C
	Just West of Avalon Park Blvd		6L	2,275	1,850	2,485	1,905	C	C	C	C
	Just East of Avalon Park Blvd		6L	2,055	1,675	2,195	1,725	C	C	C	C
	Just West of Chuluota Rd		6L	2,020	1,600	2,165	1,760	C	C	C	C
	Just East of Chuluota Rd		6L	1,865	1,530	2,000	1,640	C	C	C	C
	CR 13	SR 408 Extension	6L	1,540	1,275	1,595	1,345	C	C	C	C
	SR 408 Extension	SR 520	6L	1,710	1,370	2,025	1,585	B	B	C	B
Avalon Park Blvd	South of SR 50		4L	715	720	795	870	D	D	D	D
Avalon Park Blvd	South of SR 408 Extension		4L	910	1,170	1,090	1,495	D	D	D	D
Chuluota Rd (CR 419)	North of SR 50		2L	1,065	855	1,375	1,120	D	D	D	D
	South of SR 50		4L	650	525	1,130	920	C	C	D	D
SR 408 Extension	SR 408	SR 408 Extension	4L	1,355	885	2,345	1,565	B	B	C	B
	Avalon Park Blvd	Chuluota Rd (CR 419)	4L	575	380	1,565	1,045	B	B	B	B
	Chuluota Rd (CR 419)	SR 50	4L	220	145	570	380	B	B	B	B

The No Build and Build 2025 and 2045 A.M. and P.M. peak hour turning movement counts shown on **Figures 6-3 through 6-10** were utilized in performing the intersection level of service operations analysis using the SYNCHRO software. **Table 6-6** provides a summary of the intersection LOS for the peak hour conditions under 2025 conditions and **Table 6-7** provides a summary of 2045 peak hour intersection LOS. The Synchro output is provided in **Appendix E**. Only those intersections directly impacted by project traffic were analyzed for peak hour intersection LOS.

Under the 2025 opening year conditions, as shown in **Table 6-6**, the SR 50/Woodbury Road and SR 50/SR 408 northbound off-ramp intersection operate at LOS F in the No Build condition. All the major signalized intersections within the project area are projected to operate at LOS E or better with the SR 408 Eastern Extension project.

In the 2045 Design Year, under the No Build conditions as shown in **Table 6-7**, significant impacts are projected at SR 50/Woodbury Road intersection, SR 50/SR 408 northbound off-ramp, and SR 50/Avalon Park Boulevard, with these intersections operating at LOS F. Under the 2045 Build conditions, as shown in **Table 6-7**, all major signalized intersection roads operate at LOS E or better with the SR 408 Eastern Extension project, with the exception of the SR 50/Woodbury Road intersection in the AM Peak that operates at LOS F, although it is operating better than in the No Build AM peak condition.

Table 6-6: No Build and Build 2025 Peak Hour Intersection LOS

Intersection	Intersection Delay (sec/veh)				Intersection LOS			
	No Build		Build		No Build		Build	
	AM	PM	AM	PM	AM	PM	AM	PM
SR 50 @ Woodbury Rd	114.3	99.8	74.6	65.4	F	F	F	E
SR 50 @ SR 408 Northbound Off-Ramp	94.6	61.6	26.8	35.1	F	E	C	D
SR 50 @ Avalon Park Blvd	65.1	56.6	41.7	41.6	E	E	D	D
SR 50 @ Chuluota Rd (CR 419)	46.1	48.8	51.3	60.4	D	D	D	E
Woodbury Rd @ SR 408 Extension Off Ramp	N/A	N/A	5.1	5.0	N/A	N/A	A	A
Woodbury Rd @ SR 408 Extension On Ramp	N/A	N/A	19.0	20.7	N/A	N/A	B	C
Avalon Park Blvd @ SR 408 Extension Ramps	N/A	N/A	35.1	35.1	N/A	N/A	D	D
Chuluota Rd @ SR 408 Extension Ramps	N/A	N/A	7.8	6.1	N/A	N/A	A	A
SR 50 @ SR 408 Extension On Ramp	N/A	N/A	15.6	17.7	N/A	N/A	B	B
SR 50 @ SR 408 Extension Off Ramp	N/A	N/A	6.8	21.7	N/A	N/A	A	C

Table 6-7: No Build and Build 2045 Peak Hour Intersection LOS

Intersection	Intersection Delay (sec/veh)				Intersection LOS			
	No Build		Build		No Build		Build	
	AM	PM	AM	PM	AM	PM	AM	PM
SR 50 @ Woodbury Rd	139.1	131.0	80.3	72.8	F	F	F	E
SR 50 @ SR 408 Northbound Off-Ramp	143.3	116.3	33.8	38.4	F	F	C	D
SR 50 @ Avalon Park Blvd	100.9	93.4	44.6	40.4	F	F	D	D
SR 50 @ Chuluota Rd (CR 419)	53.3	55.3	60.5	65.3	D	E	E	E
Woodbury Rd @ SR 408 Extension Off Ramp	N/A	N/A	10.7	6.4	N/A	N/A	B	A
Woodbury Rd @ SR 408 Extension On Ramp	N/A	N/A	19.8	26.7	N/A	N/A	B	C
Avalon Park Blvd @ SR 408 Extension Ramps	N/A	N/A	37.6	39.2	N/A	N/A	D	D
Chuluota Rd @ SR 408 Extension Ramps	N/A	N/A	6.7	7.9	N/A	N/A	A	A
SR 50 @ SR 408 Extension On Ramp	N/A	N/A	23.6	20.8	N/A	N/A	C	C
SR 50 @ SR 408 Extension Off Ramp	N/A	N/A	12.0	25.4	N/A	N/A	B	C

In summary, the following intersection improvements are recommended:

- Future geometry proposed as a part of SR 50 improvements are maintained with additional improvements as follows:
    - At SR 50/Chuluota Road, an additional southbound through lane is recommended with the following geometry: two southbound exclusive left turn lanes, two southbound through lanes and one southbound right turn lane. The additional southbound through turn lane improves the intersection operation and provides a better access to SR 408 Eastern Extension, which is located just south of the intersection at SR 50. Intersection geometry in the northbound direction is recommended to be changed from a northbound exclusive left turn lane, northbound shared left turn/through lane and a northbound exclusive right turn lane, to a northbound exclusive left turn lane, northbound exclusive through lane and a northbound shared through/right turn lane with the other approaches retained from the SR 50 widening plans.
- Future geometry on intersecting cross streets proposed as part of the SR 408 Eastern Extension is recommended as follows:
    - At Woodbury Road, the planned improvements on Woodbury Road at the location of the SR 408 Eastern Extension is a 4-lane section. It is recommended that a southbound exclusive left turn lane and a northbound exclusive right turn lane be provided for the east bound on-ramp.
    - At Avalon Park Boulevard, the existing 4-lane section at the location of the SR 408 Eastern Extension interchange it is recommended that northbound exclusive dual left turn lanes for the westbound on-ramp and southbound exclusive right turn lane be provided for the westbound on-ramp, and southbound exclusive left turn lane and northbound exclusive right turn lane be provided for the eastbound on-ramp.

7 PREFERRED ALTERNATIVE

After a comprehensive evaluation process, one alternative was selected as being the most effective option. This alternative is illustrated on **Figure 7-1**. In general, this alternative was the result of the generation of various typical sections and horizontal and vertical alignment combinations as well as various interchange configurations at each access point. For more details see **Appendix F** for the Concept Plans.

The typical sections for the preferred alternative are depicted on **Figure 7-2**.

Based on constructability and financial considerations, the preferred alternative has been divided in three distinct construction segments as follows:

Construction Segment 1: From the begin project to Avalon Park Boulevard. This segment includes the construction of the SR 408 Eastern Extension from the begin project (just west of Woodbury Road) to Avalon Park Boulevard. It would thus provide an initial effective connection through the study area with the highest traffic demand.

Construction Segment 2: From Avalon Park Boulevard to Chuluota Road. This segment would extend SR 408 from Avalon Park Boulevard to Chuluota Road. It would provide a new Econlockhatchee River crossing, an interchange at Chuluota Road and the proposed Chuluota Road extension connection to SR 50.

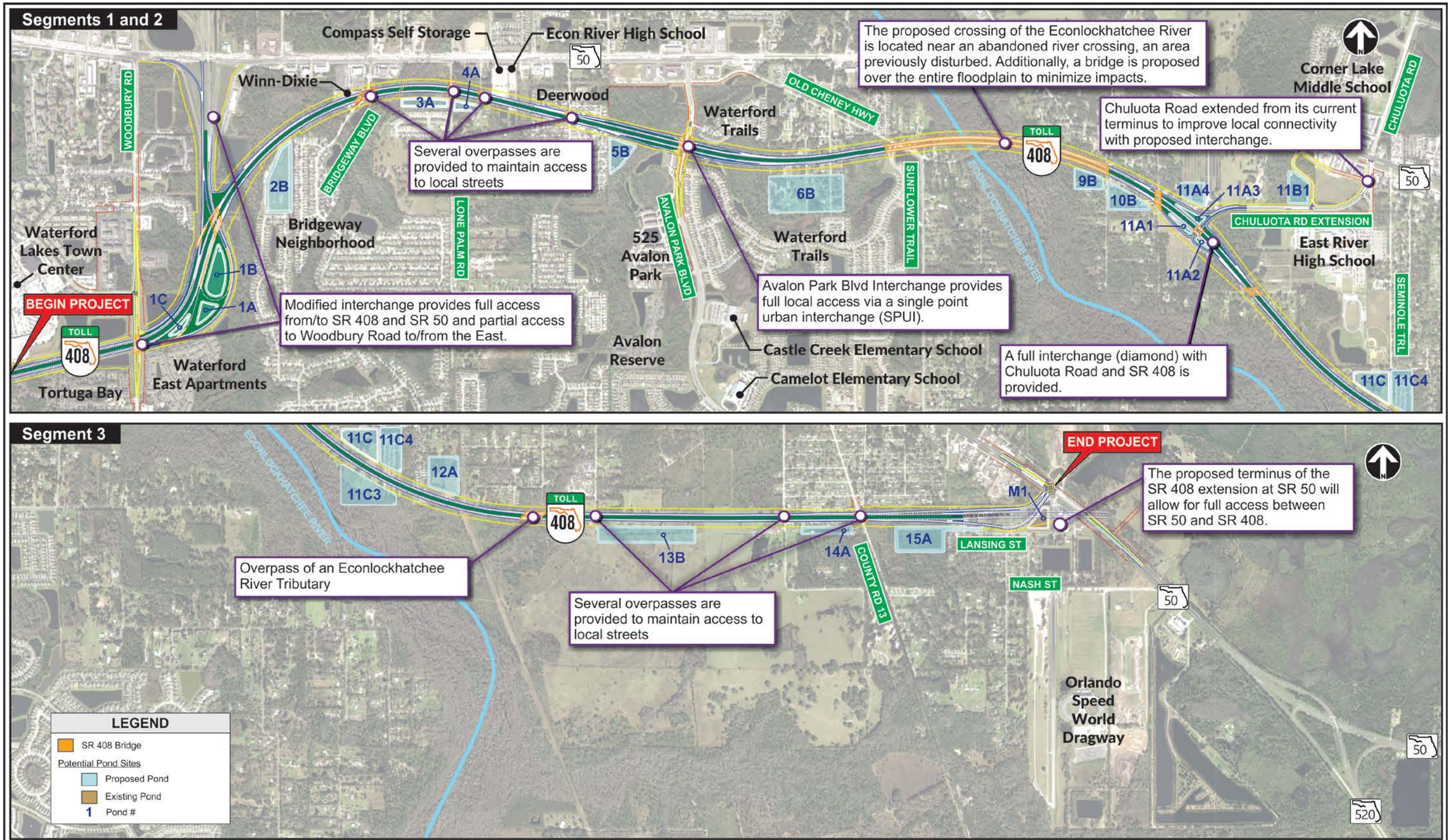
Construction Segment 3: From Chuluota Road to the eastern project terminus including the terminal interchange at SR 50.

7.1 Preliminary Roadway Design

7.1.1 Proposed Typical Sections

SR 408 Mainline:

Results of the public involvement effort as well as the engineering and environmental studies indicate that the typical sections for the SR 408 mainline for the eastern extension are as follows:



Preferred Alternative | Figure 7-1

- Construction Segment 1: Within Construction Segment 1, the preferred alternative features a 4-lane rural expressway typical section with 12-foot travel lanes, 12-foot outside shoulders, a 64-foot divided median, and a 94-foot border width. The section will feature several grade separations in order to provide access to local streets.

- Construction Segment 2: Within Construction Segment 2, the preferred alternative continues the same typical section previously described under CS-1.

- Construction Segment 3: Within Construction Segment 3, the preferred alternative continues the same typical section previously described under Construction Segments 1 and 2.

It should be noted that the SR 408 Eastern Extension typical section has been designed to accommodate a possible 6-lane expansion if needed in the future. The typical section package prepared for this project is included in **Appendix F** and shows the proposed SR 408 and Chuluota Road extension typical sections.

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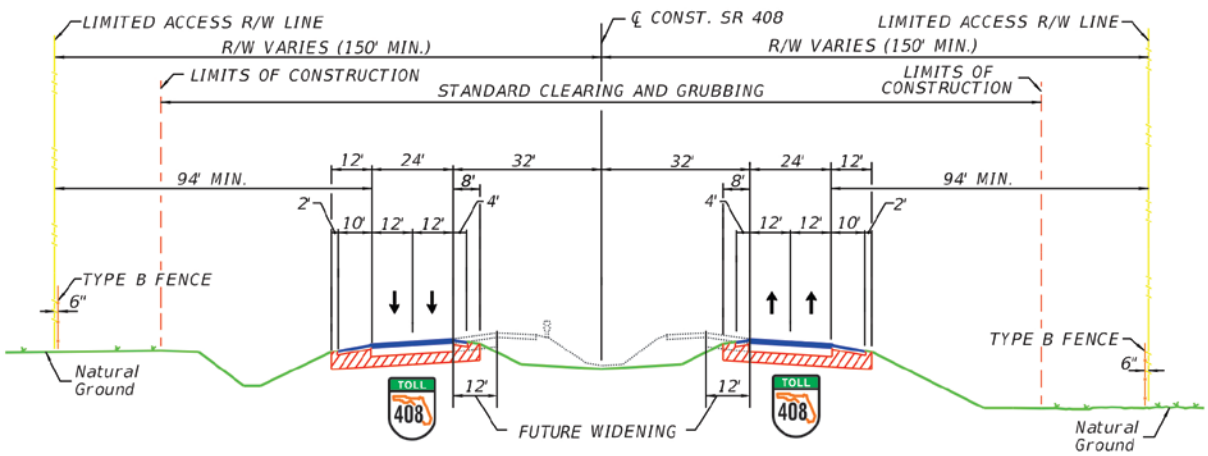
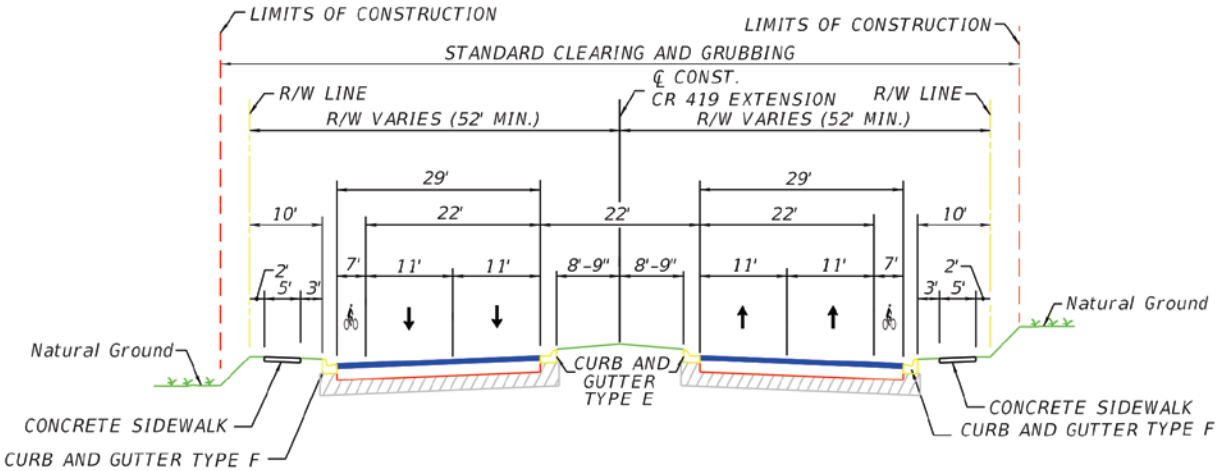
SR 408 Mainline Typical Section



From Begin Project to End of Project

Chuluota Road Extension Typical Section



From Chuluota Rd at SR 50 to SR 408 Interchange

Preferred Alternative Typical Sections **Figure 7-2**

SR 50:

At the SR 408 and SR 50 interchange north of SR 520 the preferred alternative proposes to modify SR 50 by adding left turn lanes at the proposed intersection with SR 408.

In coordination with the Florida Department of Transportation (FDOT) the access and typical section modifications of SR 50 is in line with the previously proposed access management from the SR 50 widening (currently on hold) (see **Appendix G** for meeting minutes). The proposed access management class for SR 50 is access class 3 and under access management class 3, directional median openings are allowed at 1,320-feet spacing and full median openings at 2,640-feet. As was previously mentioned,

there is an ongoing PD&E study along SR 50 being conducted by the Florida Turnpike Enterprise.

Woodbury Road:

The preferred alternative features a four-lane urban typical section with 12-foot travel lanes, 6-foot sidewalks, and a 22-foot divided raised median. The section will feature a new grade separation over the SR 408 mainline. There has been coordination with Orange County for the Woodbury Road typical section (see **Appendix G**).

7.1.2 Horizontal Alignment

For the preferred alternative, the horizontal curves are described in **Table 7-1**.

Table 7-1 Proposed Horizontal Curves

Location	Curve	PC STA	PI STA	D	Delta	L (ft)	R (ft)
SR 408 Mainline	A-1	380+73.18	389+18.05	4'00'00"	61'04'01" (LT)	1,526.67	1,432.39
	A-2	1031+19.20	1035+83.14	2'28'27"	22'39'24" (RT)	915.76	2,315.83
	A-3	499+79.42	511+30.21	1'00'00"	22'42'43" (LT)	2,271.37	5,730.00
	A-4	536+39.60	568+27.21	1'00'00"	58'10'41" (RT)	5,817.82	5,729.58
	A-5	612+66.74	638+62.31	48'44'47"	48'44'32" (LT)	4,874.23	5,729.58
	A-6	684+47.18	690+58.59	0'05'00"	1'01'08" (LT)	1,222.79	68,754.00
	A-7	738+23.22	752+52.34	0'23'47"	11'17'22" (RT)	2,848.99	14,459.16
SR 408 to Challenger Parkway/SR 50	B-1	1008+33.35	1021+35.11	5'11'35"	99'25'56" (LT)	1,914.76	1,103.34
	B-2	1031+19.20	1035+83.14	2'28'27"	22'39'24" (RT)	915.76	2,315.83
Avalon Park Blvd Interchange	C-1	3000+00.00	3005+68.94	2'11'45"	24'36'01" (RT)	1,111.77	2,609.38
	C-2	3011+20.35	3012+31.94	0'32'28"	1'12'27" (RT)	223.17	10,590.53
	C-3	3013+43.52	3016+50.45	4'02'55"	24'28'24" (LT)	604.49	1,415.21
Chuluota Road Extension	D-1	4000+00.00	4000+91.72	8'27'51"	15'25'58" (RT)	182.33	676.92
	D-2	4004+32.34	4007+50.97	7'49'58"	47'04'30" (RT)	601.00	731.49
	D-3	4025+93.24	4032+75.02	8'26'18"	90'14'01" (LT)	1,069.34	679.00
SR 408/SR 50 Interchange	E-1	5000+00.00	5004+88.72	0'21'16"	3'27'44" (RT)	977.14	16,170.96
	E-2	5009+77.14	5014+94.98	0'24'59"	4'18'40" (RT)	1,035.19	13,758.24
	E-3	5020+12.33	5025+56.74	0'24'59"	4'31'55" (RT)	1,088.24	13,758.24

7.1.3 Vertical Alignment

For the preferred alternative, the vertical curves are described in **Table 7-2**.

Table 7-2 Proposed Vertical Curves

Location	Curve Type	VPI Station (ft)	VPI Elevation	Grade (Back) %	Grade (Ahead) %	Length of Curve (ft)	K
SR 408 Mainline	Sag	390+25.00	67.61	-0.358	+1.800	800	371
	Crest	404+70.00	93.62	+1.800	-0.300	1800	857
	Sag	467+50.00	74.78	-0.300	+0.300	800	1333
	Crest	505+00.00	86.03	+0.300	-0.300	1800	3000
	Sag	519+00.00	81.83	-0.300	+0.300	800	1333
	Crest	560+00.00	94.13	+0.300	-0.300	1000	1667
	Crest	603+00.00	81.23	-0.300	-2.713	1000	414
	Sag	614+98.42	48.72	-2.713	+0.822	800	226
	Crest	629+08.48	60.31	+0.822	-0.479	1000	1329
	Sag	643+93.08	53.19	-0.479	+1.175	800	484
	Crest	666+00.00	79.13	+1.175	-0.300	1000	1143
	Crest	676+00.00	82.13	+0.300	-0.766	1000	938
	Sag	686+98.47	73.71	-0.766	+1.200	800	407
	Crest	700+00.00	89.33	+1.200	-0.300	1000	667
	Sag	727+00.00	81.23	-0.300	+0.637	800	854
	Crest	756+79.89	100.22	+0.637	-0.300	1800	1920

7.1.4 Bicycle and Pedestrian Accommodations

SR 408 is proposed as a limited access facility; therefore, no bicycle nor pedestrian facility will be provided along the SR 408 Eastern Extension. Along the extension of Chuluota Road there are proposed 7-foot bicycle lanes and continuous 5-foot concrete sidewalks along the north and south side of the Chuluota Road Extension. Also there are various grade separations that will be provided along the mainline of SR 408 which will allow pedestrian connectivity throughout various local streets.

7.1.5 Potential Design Exceptions and Variations

No design exceptions or variations are anticipated at this time.

7.1.6 Lighting

Along SR 408 lighting will be provided. A lighting analysis will be done in final design to determine lighting requirements. It should also be noted that pedestrian lighting under the proposed structures has been requested by Orange County.

7.1.7 Proposed ITS Devices

DMS and ADMS: DMS will provide motorists with travel information, such as travel time, amber alerts, traffic incident, and others. The signs will be strategically placed in advance of off-ramps to allow the motorist to decide to remain on the highway or find an alternative route. The ADMS will be placed at each interchange to alert motorists of travel time and incidents prior to entering the tolling facilities.

CCTV Cameras: The purpose of the CCTV cameras is to provide 100% comprehensive video coverage along SR 408. The cameras will also cover mainline and ramp toll plazas, side streets, and views of the DMS to verify that the correct information is being displayed. The cameras will be placed using approximately one-mile spacing.

TMS: The Traffic Monitoring Stations will provide volume, lane occupancy, and speed information in multiple detection zones. Each vehicle detection device will collect and process the data on a lane-by-lane basis. The vehicle detectors will automatically identify and detect speed fluctuations along the road and send an alert to the operator(s) at the Regional Traffic Management Center (RTMC). TMS sensors will be installed at every on/off ramp and in between the interchanges.

DCS: The DCS is used in travel time analysis by detecting transponders. The DCS sites will be installed at every on/off ramp and will collect accurate travel time information to be disseminated to the traveling public via DMS signs.

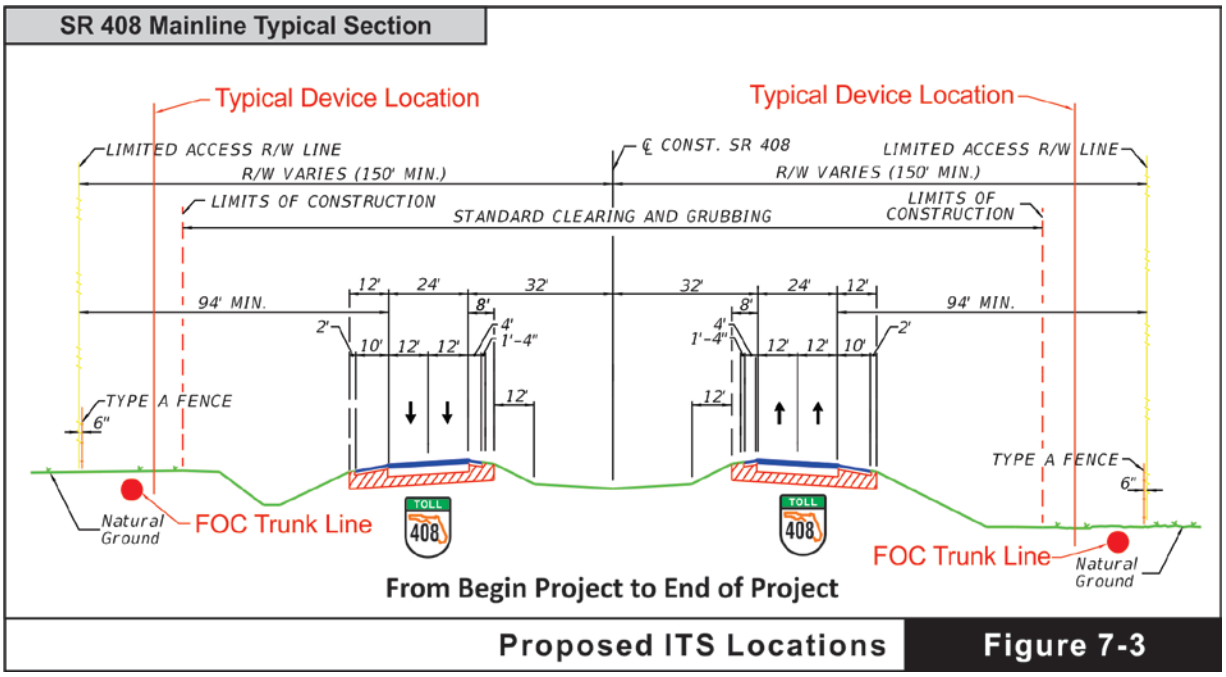
Underground Power Distribution System: An underground power distribution system with Uninterrupted Power Supply (UPS) backup will be included as part of the analysis for the new SR 408 Eastern Extension. For the purpose of this study, one power service per HUB location will be considered. The future design firm shall be responsible for verifying the proposed locations, determining available power sources and voltages, and coordinating with Utility Companies. The electrical design will consist of commercially available power sources. Disconnects and service meters are to be installed at all locations.

Wrong Way signs: The “Wrong Way” signs are equipped with flashing beacons to prevent wrong way drivers from entering CFX’s expressway system. The devices also send out alerts to the RTMC where operators can post wrong way driving alerts on

overhead Dynamic Message Signs when these events are detected. The Wrong Way signs are included in the cost estimate for every on-ramp within the extension.

7.1.7.1 Roadway Design Configuration

The design and cost estimate for the ITS system is based on the typical section described in previous sections. The ITS equipment and conduit are recommended to be installed in the locations identified on **Figure 7-3**.



7.1.7.2 ITS Cost Estimate

As part of this study, a high-level cost analysis was performed to determine the preliminary funding requirements for the replacement of existing ITS infrastructure as well as for the deployment of the new ITS devices.

There are several items that will be included to ensure a fully functional system and efficient ITS devices. The capital cost pricing used in this calculation was a combination of the FDOT Long Range Estimate and past projects' Engineer's Estimates. In addition to the capital cost, a 10% cost of mobilization, a 10% cost of design, a 15% cost of Construction Engineering Inspector (CEI), a 3% cost of MOC, and a 10% cost of contingency were included in the estimate. Below is the list of the primary items:

- Fiber Optic Cable and Hardware
- Pull Boxes
- Conduit
- Power Services, Service Wire and Conduit for new power connections
- CCTV Cameras
- Data Collection Sensors (DCS)
- Traffic Monitoring Stations (TMS)
- Dynamic Message Signs (DMS) and Arterial Dynamic Message Signs (ADMS)
- Wrong Way Signs
- Field Ethernet Switches
- Cabinets

Note: This estimate does not include any tolling items – as tolling items are estimated separately.

The overall engineer's estimate capital cost is $11,579,308. For a detailed cost breakdown and item descriptions, please see **Appendix I**.

7.2 Structural Analysis

A Bridge Analysis Report (BAR) was prepared for this study. The structural plans for the proposed structures are included in **Appendix F**. A summary of the proposed structures is presented in **Tables 7-3** through **7-5**. **Figure 7-4** depict the location of each structure.

7.2.1 Bridge Summary

Construction Segment 1

A total of 14 new bridges are proposed within this segment. Six of the 14 have long spans and are recommended to be composed of steel plate or steel tub girder type superstructures. The remaining 8 have medium length spans and are recommended to be composed of prestressed concrete Florida I beam or slab type superstructures. Unless otherwise noted, bridge superstructures are recommended to be supported by pile bent piers.

Table 7-3: Construction Segment 1 Bridge Summary

Bridge No.	Bridge Location/Description	Possible Superstructure				Possible Substructure		Total Superstructure Depth (ft)	No. of Spans	Bridge Length (ft)	Average Bridge Width (ft)	Deck Area (sf)	$/SF	Estimated Cost
		Anticipated Type	Min. CL Radius (ft)	Max Span Length (ft)	Approximate Depth (ft)	Anticipated Type	Approximate Depth below Superstructure (ft)							
1A	Woodbury Rd over SR 408	Prestressed Concrete Florida I Beams	N/A	113	4.92	Multicolumn, Pile Bents	0	4.92	2	209	102.50	21,423	120	$2,570,700
1	SR 408 EB On Ramp Over SR 408 EB Off Ramp	Curved Steel Plate Girders	1,390	250	9.25	Multicolumn, Pile Bents	0	9.25	3	470	35.67	16,763	182	$3,050,927
2	SR 408 EB Over SR 408 EB On/Off Ramps	Steel Plate Girders	N/A	207	8.88	Pile Bents	0	8.88	1	207	76.00	15,732	172	$2,705,904
3	SR 408 WB Over SR 408 EB On/Off Ramps	Steel Plate Girders	N/A	211	8.88	Pile Bents	0	8.88	1	211	50.67	10,691	172	$1,838,916
4	SR 408 WB Off Ramp Over SR 408 EB On/Off Ramps	Steel Plate Girders	N/A	197	8.88	Pile Bents	0	8.88	1	197	29.67	5,845	172	$1,005,338
5	SR 408 WB Off Ramp Over SR 408 WB On Ramp	Prestressed Concrete Florida I Beams	3,820	174	8.21	Straddle, Pile Bents	1.5	9.71	2	347	38.67	13,417	125	$1,677,167
6	SR 408 WB Over Bridgeway Blvd	Steel Plate Girders	7,699	229	9.88	Pile Bents	0	9.88	1	229	64.17	14,694	172	$2,527,397
7	SR 408 EB Over Bridgeway Blvd	Steel Plate Girders	7,579	237	9.88	Pile Bents	0	9.88	1	237	48.17	11,416	172	$1,963,466
8	SR 408 WB Over Hancock Lone Palm Rd	Prestressed Concrete Florida I Beams	N/A	71	4.17	Pile Bents	0	4.17	1	71	54.17	3,846	120	$461,500
9	SR 408 EB Over Hancock Lone Palm Rd	Prestressed Concrete Florida I Beams	N/A	72	4.17	Pile Bents	0	4.17	1	72	48.17	3,468	120	$416,160
10	SR 408 WB Over Fricke Ave	Transversely PT - P/S Concrete Slab Units	N/A	42	1.67	Pile Bents	0	1.67	1	42	51.08	2,146	135	$289,643
11	SR 408 EB Over Fricke Ave	Transversely PT - P/S Concrete Slab Units	N/A	42	1.67	Pile Bents	0	1.67	1	42	44.67	1,876	135	$253,260
12	SR 408 WB Over Pel St	Prestressed Concrete Florida I Beams	N/A	73	4.17	Pile Bents	0	4.17	1	73	69.92	5,104	120	$612,470
13	SR 408 EB Over Pel St	Prestressed Concrete Florida I Beams	N/A	73	4.17	Pile Bents	0	4.17	1	73	44.67	3,261	120	$391,280

Total Estimated Bridge Cost - Segment 1 = $19,764,128
Total Bridge Area (SF) - Segment 1 = 129,682
Average Cost/SF - Segment 1 = $152.41

Table 7-4: Construction Segment 2 Bridge Summary

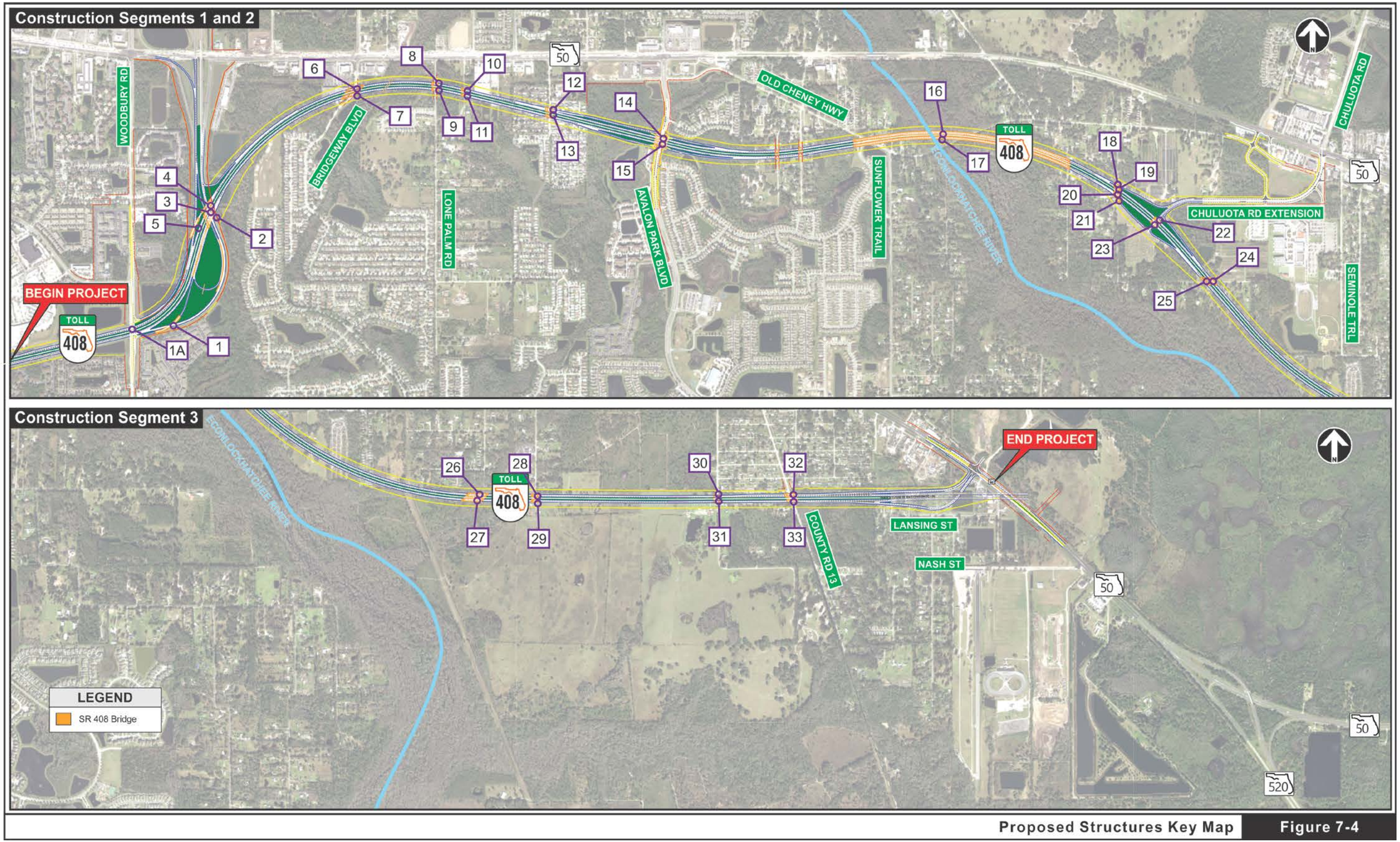
Bridge No.	Bridge Location/Description	Possible Superstructure				Possible Substructure		Total Superstructure Depth (ft)	No. of Spans	Bridge Length (ft)	Average Bridge Width (ft)	Deck Area (sf)	$/SF	Estimated Cost
		Anticipated Type	Min. CL Radius (ft)	Max Span Length (ft)	Approx. Depth (ft)	Anticipated Type	Approx. Depth below Superstructure (ft)							
14	SR 408 WB Over Avalon Park Blvd	Steel Plate Girders	N/A	230	9.63	Pile Bents	0	9.63	1	230	50.67	11,653	172	$2,004,373
15	SR 408 EB Over Avalon Park Blvd	Steel Plate Girders	N/A	230	9.63	Pile Bents	0	9.63	1	230	50.67	11,653	172	$2,004,373
16	SR 408 WB Over Econlockhatchee River	Steel Plate Girders & Prestressed Concrete Florida I Beams	N/A	250	10.38	Hammerhead, Pile Bents	4	14.38	30	3,808	51.55	196,301	180	$35,334,130
17	SR 408 EB Over Econlockhatchee River	Steel Plate Girders & Prestressed Concrete Florida I Beams	N/A	250	10.38	Hammerhead, Pile Bents	4	14.38	30	3,835	45.74	175,409	180	$31,573,610
18	SR 408 WB On Ramp Over Lockwood Dr	Prestressed Concrete Florida I Beams	N/A	91	4.17	Pile Bents	0	4.17	1	91	29.67	2,700	120	$323,960
19	SR 408 WB Over Lockwood Dr	Prestressed Concrete Florida I Beams	N/A	96	4.17	Pile Bents	0	4.17	1	96	44.67	4,288	120	$514,560
20	SR 408 EB Over Lockwood Dr	Prestressed Concrete Florida I Beams	N/A	98	4.17	Pile Bents	0	4.17	1	98	44.67	4,377	120	$525,280
21	SR 408 EB Off Ramp Over Lockwood Dr	Prestressed Concrete Florida I Beams	N/A	169	7.21	Pile Bents	0	7.21	1	169	29.67	5,014	120	$601,640

Total Estimated Bridge Cost - Segment 2 = $72,881,926
Total Bridge Area (SF) - Segment 2 = 411,395
Average Cost/SF - Segment 2 = $177.16

Table 7-5: Construction Segment 3 Bridge Summary

Bridge No.	Bridge Location/Description	Possible Superstructure				Possible Substructure		Total Superstructure Depth (ft)	No. of Spans	Bridge Length (ft)	Average Bridge Width (ft)	Deck Area (sf)	$/SF	Estimated Cost
		Anticipated Type	Min. CL Radius (ft)	Max Span Length (ft)	Approximate Depth (ft)	Anticipated Type	Approximate Depth below Superstructure (ft)							
22	SR 408 WB Over SR 408 On/Off Ramps Chuluota Rd (CR 419)	Prestressed Concrete Florida I Beams	N/A	121	4.92	Pile Bents	0	4.92	1	121	44.67	5,405	120	$648,560
23	SR 408 EB Over SR 408 On/Off Ramps Chuluota Rd (CR 419)	Prestressed Concrete Florida I Beams	N/A	122	4.92	Pile Bents	0	4.92	1	122	44.67	5,449	120	$653,920
24	SR 408 WB Over Hamilton Dr	Prestressed Concrete Florida I Beams	N/A	106	4.17	Pile Bents	0	4.17	1	106	44.67	4,735	120	$568,160
25	SR 408 EB Over Hamilton Dr	Prestressed Concrete Florida I Beams	N/A	106	4.17	Pile Bents	0	4.17	1	106	56.33	5,971	120	$716,560
26	SR 408 WB Over Econlockhatchee River Tributary	Prestressed Concrete Florida I Beams	N/A	152	7.21	Pile Bents	0	7.21	2	305	45.67	13,928	120	$1,671,400
27	SR 408 EB Over Econlockhatchee River Tributary	Prestressed Concrete Florida I Beams	N/A	150	7.21	Pile Bents	0	7.21	2	300	51.67	15,500	120	$1,860,000
28	SR 408 WB Over Seminole Trail	Prestressed Concrete Florida I Beams	N/A	81	4.17	Pile Bents	0	4.17	1	81	44.67	3,618	120	$434,160
29	SR 408 EB Over Seminole Trail	Prestressed Concrete Florida I Beams	N/A	81	4.17	Pile Bents	0	4.17	1	81	44.67	3,618	120	$434,160
30	SR 408 WB Over N. 5th St	Prestressed Concrete Florida I Beams	N/A	70	4.17	Pile Bents	0	4.17	1	70	44.67	3,127	120	$375,200
31	SR 408 EB Over N. 5th St	Prestressed Concrete Florida I Beams	N/A	70	4.17	Pile Bents	0	4.17	1	70	44.67	3,127	120	$375,200
32	SR 408 WB Over North County Rd 13	Prestressed Concrete Florida I Beams	N/A	128	5.67	Pile Bents	0	5.67	1	128	59.50	7,616	120	$913,920
33	SR 408 EB Over North County Rd 13	Prestressed Concrete Florida I Beams	N/A	128	5.67	Pile Bents	0	5.67	1	128	45.50	5,824	120	$698,880

Total Estimated Bridge Cost - Segment 3 = $9,350,120
Total Bridge Area (SF) - Segment 3 = 77,918
Average Cost/SF - Segment 3 = $120.00



Proposed Structures Key Map | Figure 7-4

Construction Segment 2

A total of eight (8) new bridges are proposed within this segment. Four (4) of the proposed bridges are single span bridges composed of prestressed concrete Florida I beam type superstructures founded on pile end bents.

SR 408 Over Econlockhatchee River

These bridges are a two-lane structure carrying eastbound and westbound mainline SR 408 traffic over the Econlockhatchee River. The eastbound and westbound bridges have an approximate required overall length of 3,835 and 3,808 feet, respectively, and each have 30 spans. The first two spans are designed to span over the intersection of Perdido Drive and Old Cheney Highway and the remaining spans are designed to go over the wetlands of the Econlockhatchee River. To minimize wetland impacts, the spanning over the Econlockhatchee River facilitates the span by span methodology wherein a following span in a sequence of spans is constructed from a previously constructed span. This will eliminate temporary impacts associated with the installation of temporary supports required to construct the piers within the wetland and multiple access points required for the construction of longer span bridges.

Construction Segment 3

A total of 12 new bridges are proposed within this segment. With the exception of bridge Nos. 26 and 27, all of the bridges are single span bridges composed of prestressed concrete Florida I beam type superstructures founded on pile end bents. Bridge Nos. 26 and 27 are two span bridges over a tributary of the Econolockhatchee River and are recommended to be constructed of prestressed concrete Florida I beams as well.

For all segments, possible foundation types for the bridges include 18-inch and 24-inch square prestressed concrete piles, steel H-piles, steel pipe piles, and drilled shafts. Selection of the foundation system should give significant consideration for systems that reduce the potential for vibration and noise impacts at locations within a 1,000-foot radius of residential and/or commercial structures. Therefore, prestressed concrete piles would be less desirable than the low displacement piling such as steel H-piles and steel pipe piles for bridges within close proximity of existing structures. Low

displacement piles require lower impact hammer energy levels and thus create lower noise and vibration levels during installation. Large non-redundant drilled shaft foundations, if feasible, would also have lower noise and vibration levels, and will also have the potential to reduce the area of impact at ground level.

7.3 Utility Impact Potential

To determine the extent of utility adjustments from project improvements, local utility companies with known facilities within the project limits were contacted and requested to submit the location of their existing and planned facilities. Refer to **Table 3-1** (see Page 3-2) for a list of utilities present within the project limits.

The majority of overhead and buried utilities run along some of the major side streets such as Woodbury Road, existing SR 408/Challenger Parkway, Avalon Park Boulevard, and SR 50. As a result of the construction of the preferred alternative, most utilities located within the major intersections/interchanges where reconstruction may occur (such as Avalon Park Boulevard and SR 50 at the end terminus) will be impacted and will need to be relocated. Additionally, the preferred alternative encroaches on the Duke Energy utility easement that is located south of SR 50 approaching Avalon Park Boulevard for approximately 1700-feet. Due to this encroachment, there are approximately five transmission poles that are being impacted. There are also impacts to the Orlando Utilities Commission (OUC) transmission lines with the preferred alternative crossing this easement at approximately STA 648+50 and directly impacting 300 feet of the utility easement and three (3) transmission poles. There is an Orange County Utilities Pump Station that is located west of Avalon Park Boulevard that is being directly impacted by the preferred alternative and will need to be relocated. More utility impact details can be found in the Utility Assessment Package, a supplemental document to this report. Coordination will continue through final design.

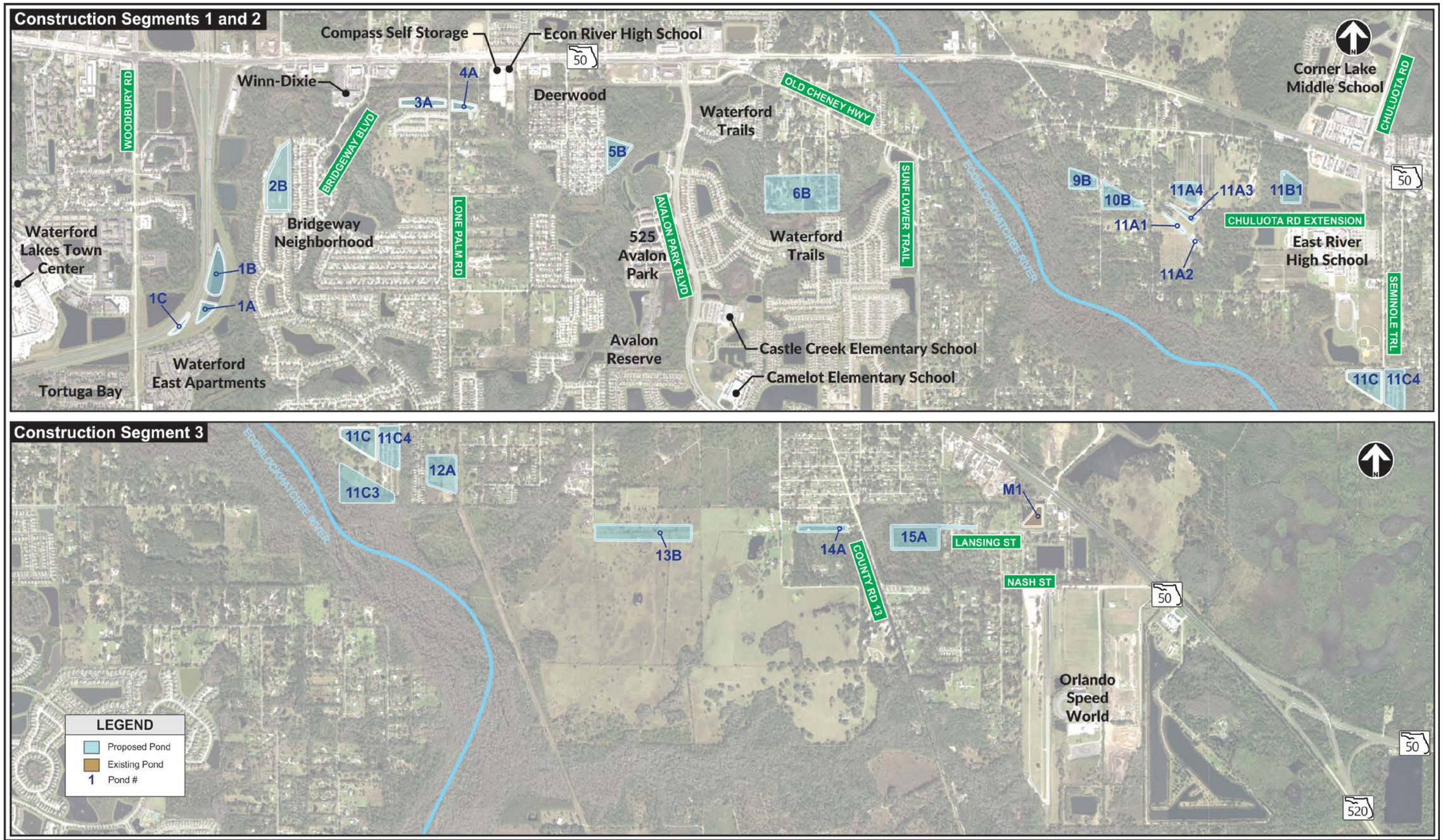
7.4 Drainage

The Pond Siting Report (PSR) prepared for this project divided the corridor into fifteen (15) drainage basins and identified preferred pond sites for each. The intent of the PSR was to evaluate and recommend potential pond locations for each basin. The project was divided into 15 on-site drainage basins. The drainage basins were divided based on high points of the proposed bridge overpass, which maintain flow connectivity to side streets. Scuppers may be used to collect runoff on the proposed bridges when the spread cannot be contained within the shoulder. Shoulder gutter inlets will be used to collect runoff from segments of the bridge with MSE walls and at high fill areas. Bridge drainage shall be evaluated during the design phase. Most of the offsite runoff flows into low lying areas such as wetlands and Econlockhatchee River tributaries. The offsite runoff will be conveyed through the proposed cross drains. Some of the offsite runoff that drains into the project basin can be collected in by-pass swales at the toe of the embankment and directed to proposed cross drains per historical flow paths. There is enough right-of-way (300 feet) for the entire SR 408 corridor to provide by-pass swales. The other option is to collect offsite runoff in swales or ditch bottom inlets and route it through the stormwater ponds without providing treatment or attenuation. This evaluation shall be performed during the final design. **Table 7-6** lists the preferred pond locations for each basin.

Pond location recommendations (**Figure 7-5**) are based on preliminary data calculations, reasonable engineering judgement, and assumptions. Pond sizes and locations may change during final design as more detailed information becomes available.

Table 7-6: Preferred Pond Sites

Construction Segment	Basin	Pond Name	Preliminary Pond Site (ac)	Remarks
1	Basin 1	Pond 1A	1.98	Existing CFX Pond expanded
		Pond 1B	5.06	Existing CFX Pond expanded
		Pond 1C	1.10	CFX Property
	Basin 2	Pond 2B	10.23	Orange County School Board
	Basin 3-4	Pond 3A	3.06	Private Property
		Pond 4A	1.80	Private Property
	Basin 5	Pond 5B	4.10	Private Property
	Basin 6-8	Pond 6B	19.73	Private Property
2	Basin 9-10	Pond 9B	3.38	Private Property
		Pond 10B	5.00	Private Property
	Basin 11A	Pond 11A1	0.92	Private Property
		Pond 11A2	0.45	Private Property
		Pond 11A3	1.16	Private Property
		Pond 11A4	3.24	Private Property
	Basin 11B	Pond 11B1	3.98	FDOT Property
3	Basin 11C	Pond 11C	5.70	Private Property
		Pond 11C3	8.85	Private Property
		Pond 11C4	5.50	Private Property
	Basin 12	Pond 12A	6.88	Private Property
	Basin 13	Pond 13B	10.45	Private Property
	Basin 14	Pond 14A	2.57	Private Property
	Basin 15	Pond 15A	8.92	Private Property



Preferred Pond Sites **Figure 7-5**

7.4.1 Proposed Cross Drains

The roadway geometry is limited in order to minimize impacts and meet the requirements for the proposed design speed. Different interchange layouts and considerations were made to provide alternative conceptual designs. Fourteen cross drain locations were selected once the alignment and the most effective interchange layouts were identified. The proposed cross drain locations were also chosen based on the natural flow of the land from the surrounding floodplains and wetlands. The proposed SR 408 Eastern Extension corridor will have floodplain impacts along most of the corridor. These floodplain impacts will be mitigated by routing this volume to the project's proposed storm water management facilities, and roadside swales. Offsite runoff will be conveyed through proposed cross drains and bypass swales. A bypass swale will be required to provide flow connectivity from CD-5 to CD-6. The existing drainage system at Deerwood Manufactured Home Park will be severed by the proposed project. Avalon and University Meadows neighborhoods will not be impacted by the proposed project. Refer to **Table 7-7** for calculated culvert size, flow direction, and floodplain status.

Table 7-7 Proposed SR 408 Cross Drain General Information

Cross Drain ID	Pipe Description	Flow Direction	Receiving Water Body	Within Floodplain (Yes/No)
CD-1	3-11'x5' CBC	North	Unnamed Tributary(1)	Yes (Zone A)
CD-2	4-10'x5' CBC	South	Unnamed Tributary(1)	Yes (Zone A)
CD-3	3-11'x7' CBC	North	Unnamed Tributary(1)	Yes (Zone A)
CD-3A	1-30" RCP	South	Unnamed Tributary(2)	Yes (Zone A)
CD-4	2-8'x4' CBC	North	Unnamed Tributary(2)	Yes (Zone A)
CD-5	2-72" RCP	North	Floodplain	Yes (Zone A)
CD-6	2-72" RCP	North	Floodplain	Yes (Zone A)
CD-7	2-48" RCP	South	Wetland	Yes (Zone X)
CD-8	1-10'x5' CBC	South	Wetland	Yes (Zone X)
CD-9	1-72" RCP	South	Floodplain	Yes (Zone AE)
CD-10	2-6'x4' CBC	South	Channel E	Yes (Zone AE)
CD-11	2-24" RCP	South	Channel K	Yes (Zone A)
CD-12	2-8'x4' CBC	South	Channel KE	Yes (Zone A)
CD-13	1-48" RCP	South	Channel M	Yes (Zone X)

7.4.2 Permit Agency Coordination

St. Johns River Water Management District

This project is within the jurisdiction of the SJRWMD. The SJRWMD will require an ERP and potentially a dewatering permit for this project prior to initiating construction. In addition to the standard requirements of an Environmental Resource Permit (ERP), Special Basin Criteria apply and impacts within the Econlockhatchee River Riparian Habitat Protection Zone require additional mitigation. The office responsible for the technical review of the permit application package will be the SJRWMD.

Florida Fish and Wildlife Conservation Commission

FWC will provide commentary during the ERP review process. FWC may conduct field reviews and comment to the SJRWMD on any adverse effects the proposed activity may have on state protected wildlife species and their habitats.

US Army Corps of Engineers

Because impacts to wetlands under the jurisdiction of USACE would total more than one-half acre, a USACE standard permit (Dredge/Fill) is anticipated. Unavoidable impacts to jurisdictional wetlands will require mitigation. The USACE provides a separate and independent review of the ERP from the SJRWMD.

Environmental Protection Agency

The EPA requires permits for stormwater discharge to Waters of the United States in association with the National Pollutant Discharge Elimination System (NPDES) and the Clean Water Act. The permit application requirements include a stormwater pollution prevention plan indicating both structural and non-structural controls to be implemented. A NPDES permit is anticipated.

U.S. Fish and Wildlife Service

No adverse impacts to federally listed species are anticipated. The project occurs in the USFWS consultation areas for Audubon's crested caracara (Polyborus plancus audubonii), Everglade snail kite (Rostrhamus sociabilis plumbeus), and red-cockaded woodpecker (Picoides borealis).

7.5 Right-of-way Impacts

The preliminary cost estimates include the expenditures associated with right-of-way acquisition such as land costs. The right-of-way cost estimates and acres of impacts are currently shown in **Table 7-8**.

Table 7-8 Right-of-way Cost Estimates per Segment

Segment	Roadway Impacts (Acres)	Pond Impacts (Acres)	Cost Estimates
1	65.82	20.21	$91,300,000
2	86.20	31.81	$64,300,000
3	105.79	49.23	$44,400,000
Totals	**257.81**	**101.25**	**$200,000,000**

7.6 Construction Cost Estimate

The construction cost estimate for this project is summarized in **Table 7-9**. For more details see **Appendix H**.

Table 7-9 Construction Cost Estimate per Segment

Cost	Construction Segment 1	Construction Segment 2	Construction Segment 3
Construction Cost	$130,179,177	$149,412,134	$90,708,231
Engineering/Administration/Legal (24%)	$31,243,003	$35,858,912	$21,380,925
Mitigation	$6,196,058	$3,872,931	$5,227,912
Toll Collection Equipment	$1,260,000	$1,260,000	$1,260,000
Construction Segment Total	$168,878,238	$190,403,977	$118,577,068
TOTAL COST	**$477,859,283**		

7.7 Environmental Impacts

The following sections briefly summarize some of the key environmental considerations prevalent within the project study area. For more detailed information on the proposed environmental conditions, please refer to the Project Environmental Impact Report (PEIR) prepared for this study.

7.7.1 Contamination

Information was obtained for the CSER from FDEP and USEPA databases as well as field investigations and reviews of historic and aerial photographs. A total of 22 sites were identified with potential contamination concerns. After evaluation, 2 of those sites were assigned a risk rating of None, 4 sites were assigned a risk rating of Low, 13 sites were assigned a risk rating of Medium, and 3 sites were assigned a risk rating of High. One brownfield is adjacent to the preferred alternative. Multiple auto salvage yards that are not represented in regulatory contamination databases are present in the project area.

There are one High-risk, two Medium-risk, and two Low-risk sites proposed for right-of-way acquisition under the preferred alternative. Additionally, two High-risk sites are adjacent to the preferred alternative. The two preferred floodplain compensation ponds, 11C3 and 11C4, are located on or adjacent to the property of Sporty's Auto Repair, a Medium-risk contamination site previously identified in the CSER. Sporty's Auto Repair would also be impacted by the preferred alternative.

Medium- and High-risk sites are recommended for additional assessment, including soil and groundwater testing, if right-of-way acquisition or subsurface work (including construction of any structures or stormwater ponds) is proposed on or adjacent to them. Because of the database and field reviews and planned additional assessment, no substantial contamination impacts are anticipated.

7.7.2 Floodplains

The project will impact the 100-year floodplain in three different ways:

- Longitudinal roadway widening impacts resulting from filling the floodplain areas associated with the Econlockhatchee River and its tributaries.

- Impact due to preferred pond locations in floodplain.
- Impact due to proposed cross drains in floodplain.

The longitudinal impact due to the SR 408 Eastern Extension preferred alternative cannot be avoided. During the final design phase of the project, every effort should be taken to minimize floodplain impacts. During the design phase, floodplain impacts should be mitigated by routing to proposed stormwater management facilities and roadside swales. Also, a Bridge Hydraulics Report (BHR) will be prepared during the design phase to document the hydraulic impacts of the SR 408 Eastern Extension preferred alternative.

The FEMA's Flood Insurance Rate Map (FIRM) for Orange County shows that a portion of the project lies within the 100-year floodplain areas Zone AE (100-year Base flood elevations are provided) and Zone A (100-year base flood elevations are not provided, areas with 1% change of flooding). Most of the project lies within flood Zone X (Areas of minimal flood hazard and above the 500-year flood zone). FEMA Map Nos. 12095C0280F, 129095C0285F, 12095C0295F and 12095C0315F, provide flood information for the project. Floodplain impact will occur throughout the project corridor and includes the Econlockhatchee River and its tributaries.

Total floodplain impact due to roadway fill for the entire proposed project corridor is 100.28 ac-ft. Available compensation in the proposed stormwater ponds and floodplain compensation ponds are 107.47 ac-ft. The dredge and fill volume are based on limited information available during the PD&E study. A detailed evaluation should be done during the final design. Based on the preliminary evaluation, the project will provide more floodplain compensation than the impacts. Therefore, a cup for cup compensation is provided by the project. Two floodplain compensation pond sites were identified for this project in Basin 11C. The pond sites are Pond 11C3 and Pond 11C4. Both Pond 11C3 and Pond 11C4 are selected as the recommended floodplain compensation ponds. Beside these two floodplain compensation ponds, several stormwater ponds located adjacent to floodplains will also provide floodplain compensation. Floodplain impacts due to the proposed corridor were calculated and documented in the Pond Siting Report, a supplemental document to this report.

7.7.3 Noise

A traffic noise analysis was performed following Code of Federal Regulations Title 23 Part 772 (23 CFR 772), *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, using methodology established by the Florida Department of Transportation (FDOT) in the *Project Development and Environment Manual*, Part 2, Chapter 18 (dated June 14, 2017). The purpose of the noise study is to identify noise-sensitive sites that would be impacted with the proposed project and evaluate abatement measures at impacted noise-sensitive sites.

Noise barriers were considered for all noise-sensitive receptor sites where Design Year traffic noise levels were predicted to equal or exceed the Noise Abatement Criteria (NAC). As such, noise barriers were considered at 13 locations to mitigate noise impacts. Since traffic management and alignment modifications were determined to not be viable abatement measures, noise barriers were determined to be the only potentially viable abatement measure that could be implemented for this project.

Nine noise barriers are predicted to benefit 526 residences, including 417 that are predicted to be impacted by improvements planned with this project, at a cost below the cost reasonable criteria ($42,000 per benefited sites) (see **Table 7-10**). The recommended noise barriers will be further considered as the design plans and more detailed elevation data for the planned improvements to extend SR 408 are developed. The noise barriers recommended are summarized in the table on the following page and graphically shown in the appendices of this report.

Noise abatement is not feasible and/or reasonable for the remaining 89 impacted residences because of isolated impacted homes and/or unreasonable cost.

7.8 Summary of Impacts

Table 7-11 provides a summary of impacts for the No Build and preferred alternatives of the SR 408 Eastern Extension.

Table 7-10 Recommended Noise Barriers

Barrier Alternative	Barrier Height (feet)	Est, Barrier Length[1] (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Number of Benefited Residences				Total Estimated Cost[4]	Cost Per Benefited Residence
					5-5.9 dB(A)	6-5.9 dB(A)	≥ 7 dB(A)	Impacted[2]	Other[3]	Total	Average Reduction dB(A)		
Noise Barrier for Crest at Waterford Lakes													
NC-CWL-03	14	2,500	Right of Way	39	2	0	78	80	23	103	9.1	$1,050,000	$10,194
Noise Barrier for Waterford Lakes, Bridgewater, and Waterford Creek													
NC-WL-04	Varies 8-14	8,400	Mainline Shoulder	111	1	2	108	111	48	159	9.3	$3,523,800	$22,162
Noise Barrier for Deerwood Manufactured Park Homes (South of SR 408 Extension)													
NC-DWS-02	14	2,000	Mainline Shoulder	56	5	11	36	52	6	58	7.1	$840,000	$14,483
Noise Barrier for Deerwood Manufactured Park Homes (North of SR 408 Extension)													
NC-DWN-03	Varies 8-16	2,000	Mainline Shoulder	45	4	16	25	45	0	45	7.0	$810,000	$18,000
Noise Barrier for Waterford Trails and Single-Family Homes (South of SR 408 Extension)													
NC-WTS-03	Varies 8-14	5,600	Mainline Shoulder	47	9	9	19	37	27	64	7.0	$2,118,000	$33,094
Noise Barrier for Waterford Trails and Single-Family Homes (North of SR 408 Extension)													
NC-WTN-04	Varies 8-14	5,000	Mainline Shoulder	51	5	25	15	45	24	69	5.9	$1,794,000	$26,000
Noise Barrier for Seaward Plantation Estates (North of SR 408 Extension)													
NC-SP-03	Varies 8-14	1,850	Mainline Shoulder	10	2	3	2	7	7	14	5.1	$588,000	$42,000
Noise Barrier for Pine Island Mobile Villas (North of SR 408 Extension)													
NC-PIMHP-03	Varies 16-20	900	Right of Way	12	6	0	6	12	0	12	5.8	$504,000	$42,000
Noise Barrier for Bithlo (North of SR 408 Extension)													
NC-C-04	Varies 8-18	3,500	Mainline Shoulder & Right of Way	76	10	19	47	76	3	79	5.8	$1,488,000	$18,835

Table 7-11 – Summary of Impacts

Summary of Issues		No Build			Build - Preferred Alternative		
		Segment 1	Segment 2	Segment 3	Segment 1	Segment 2	Segment 3
Description		Eastern terminus of SR 408 remains the same at SR 50/Challenger Parkway with no extension of SR 408.			An extension of SR 408 from its current eastern terminus at SR 50 to the vicinity of the SR 50 and SR 520 interchange.		
Purpose and Need	Provide Additional Capacity	Potentially worse due to increased congestion.			Planned project improvements are anticipated to accommodate the expected increase in traffic due to population and employment growth along the corridor. The SR 408 Eastern Extension to the vinicity of SR 520 would help alleviate this increase by diverting the traffic from SR 50 to SR 408.		
	Evacuation/Emergency Response	Potentially worse due to increased congestion.			Improved with additional capacity provided.		
	Transportation Connectivity	The current transportation connectivity will remain the same.			As traffic continues to grow within the study corridor due to the rapid develoment projected within the area it is essential to maintain adequate mobility on this critical roadway link. A new expressway facility would improve mobility and the at-grade conflict points associated with traffic signals, and local access issues through the use of ramps and bridges.		
	Transit Support	Potentially worse due to the buses needing to travel on heavily congested roadways.			A new limited access facility could support inter-agency transit service between Orange and Brevard counties. The proposed roadway would support improved regional travel times and provide realistic options for commuters and visitors traveling between the two counties.		
	Safety	Potentially worse due to lack of improvements.			Potential Reduction in societal and safety cost*		
Social Environment	Right-of-way Impacts	None			65.82 Acres / 32 Parcels	86.20 Acres / 114 Parcels	105.79 Acres / 117 Parcels
Planning Consistency	Consistency with Long Range Transportation Plan	No			All proposed improvements are consistent with the CFX Master Plan, CFX Five-year Work Plan, and MetroPlan Orlando 2040 Long Range Transportation Plan		
Engineering	Utility Impacts	None			Yes - Transmission Lines, Electric, Pump Station, Telephone and Gas	Yes - Electric, Telephone, and Pump Station	Yes - Transmission Lines and Electric
	Pond Acreage	None			47.06 Acres	18.13 Acres	48.87 Acres
	Number of Ponds	None			8	7	7
	Proposed Bridges	None			14	8	12
	Traffic Volumes 2045 - SR 408	None			35,500	23,700	8,600
	Level of Service 2045 - SR 408	None			B	B	B
	Traffic Volumes 2045 - SR 50	86,600	60,700	50,100	65,300	43,600	36,200
	Level of Service 2045 - SR 50	F	F	F	F	C	C
Environmental	Contamination Site Impacts	None			5 Total Sites - 1 None and 4 Medium	6 Total Sites - 1 None, 2 Low, and 3 Medium	11 Total Sites - 1 None, 2 Low, 7 Medium, and 1 High
	Number of Impacted Noise Receptors	None			251	108	88
	Proposed Noise Walls	None			4 Walls (Total Length 14,900 ft)	3 Walls (Total Length 6,850 ft)	2 Walls (Total Length 4,400 ft)
	Wetland Impacts	None			31.3 Acres	20.9 Acres	21.2 Acres
	Riparian Habitat Protection Zone Impacts	None			-	14.7 Acres	8 Acres
	Other Surface Waters	None			9 Acres - Reservoirs 0.5 Acres - Roadside Ditches and Swales		
	Wood stork Suitable Foraging Habitat	None			70.6 Acres		
	SJWRMD Regulaory Easement	None			25.9 Acres	-	17.4 Acres
	Orange County Green Places	None			-	2.61 Acres	0.07 Acres
Cost	Construction	0			$168.9 Million	$190.4 Million	$119.0 Million
	Right-of-way	0			$91.3 Million	$64.3 Million	$44.4 Million
	Mitigation	0			$6.2 Million	$3.9 Million	$5.2 Million
					*includes savings from reduced fuel consumption, delay and crash reduction.		

8 SUMMARY OF PUBLIC INVOLVEMENT ACTIVITIES

A public involvement program was developed and implemented for this SR 408 Eastern Extension PD&E study. The program is documented in the Public Involvement Program (PIP) (see **Appendix I)**, a companion document to this PD&E study. The purpose of the program is to outline the public involvement approach to be taken with the project, provide and share project information with persons living and working in the area, listen to ideas and concerns and to solicit and incorporate input received during the study process.

Public information meetings began in October 2015 and have continued throughout the study process. The public involvement effort for this phase of the project included five (5) public meetings (the Public Hearing was held on April 26, 2018), with six (6) additional Project Advisory Group (PAG) meetings and six (6) Environmental Advisory Group (EAG) meetings. **Table 8-1** lists the members of both groups and the respective company/organization. It should be noted that the first two public meetings as well as the EAG and PAG meetings 1 through 3 were held during the initial phase of the PD&E study that included alternatives along SR 50.

Table 8-1 PAG / EAG Group Members

Group	Name	Company/Organization
PAG	Frank Sheperd	American Legion Post 242
	Joe Wallace	Central Florida Research Park
	Sean Froelich	"Sustany" Development (Formerly Lake Pickett North)
	Hugh Harling, Jr.	East Central Florida Regional Planning Council
	Stephanie Lerret	East Orlando Chamber of Commerce
	Amy Sirmans	FDOT District Five
	RJ Mueller	FixMyRoad.Org
	Scott Merritt	Greater Orlando Builders Association
	Dwight Saathoff, Esq	Project Finance and Development, LLC (Formerly Lake Pickett South)
	Edward Johnson	LYNX
	Tiffany Homler	LYNX
	Gary Huttman	MetroPlan Orlando
	Keith Caskey	MetroPlan Orlando
	Renzo Nastasi	Orange County Community Env. & Dev Services/Transportation Planning
	Marcos Bastian	Orange County Community Env. & Dev Services/Transportation Planning
	Greg Golgowski	Orange County Community Env. & Dev Services/Transportation Planning
	Mark Massaro	Orange County Public Works
	Ron Toporek	Orlando Utilities Commission
	Jean Jreij	Seminole County Public Works
	Frank Consoli	Seminole County Public Works
	Lynda Glinski	Simon Properties/Waterford Lakes Town Center
	Tim McKinney	United Global Outreach (Florida Hospital Affiliate)
	Maria Yebra-Teimouri	University of Central Florida
	Loren Bender	Valencia State College – East and Winter Park
	Bob Kamm	Space Coast MPO (Brevard County)
	Georganna Gillette	Space Coast MPO (Brevard County)
	Bobby Beagles	Christmas Community Association/Florida Farm Bureau Orange County
	W. Don Whyte	Deseret Cattle & Citrus Company
	Mohammed Abdallah, P.E	Traffic & Mobility Consultants, LLC
* Also with Avalon Park Group		

Table 8-1 PAG / EAG Group Members (Continued)

Group	Name	Company/Organization
EAG	Terry Zable	Atkins North America, Inc.
	Ryan Smart	1000 Friends of Florida
	David Clark	FDEP Division of State Lands
	Paula Allen	FDEP Division of State Lands
	William Walsh	FDOT District Five
	Catherine Owen	FDOT District Five
	Dave Herbster	Florida Dept. of Environmental Protection
	Brian Barnett	Florida Fish & Wildlife
	Stan Austin	National Park Service
	Deborah Green	Orange Audubon Society
	Dennis Weatherford	Orange County Environmental Protection Division
	Marge Holt	Sierra Club
	David Eunice	SJRWMD (St. Johns River Water Management District)
	Ken Lewis	SJRWMD (St. Johns River Water Management District)
	James Hollingshead	SJRWMD (St. Johns River Water Management District)
	Temperince Morgan	The Nature Conservancy
	Zakia Williams	US Fish & Wildlife Service
	Darci McGee	Brevard County Department of Natural Resources
	Charles Lee	Audubon Florida

Appendix G includes sign-in sheets and meeting summaries from each of the meetings held to date. For a complete list of all public involvement activities and coordination meetings held see **Appendix I**. Exhibits and project information were provided for public review and comment at each meeting. All input received served as valuable information that was taken into consideration for the refinement of the alternatives and the development of the preferred alternative. Representatives from the CFX were available at each meeting to discuss the project and answer questions.

Environmental Advisory Group (EAG) Meeting 4

An EAG meeting was held on January 10, 2017. The meeting was held to provide an opportunity for input from stakeholders, agencies and public participation. The project study was introduced as well as the study overview, history and purpose was presented. Five (5) corridor alternatives were identified to the group. A total of 15 people attended the meeting, and the sign-in sheets and meeting minutes are included in **Appendix I**.

Project Advisory Group (PAG) Meeting 4

A PAG meeting was held on January 10, 2017. The meeting was held to provide an opportunity for input from stakeholders, agencies and public participation. The project study was introduced as well as the study overview, history and purpose was presented. Five (5) corridor alternatives were identified to the group. A total of 21 people attended the meeting, and the sign-in sheets and meeting minutes are included in **Appendix I**.

Alternatives Corridor Public Workshop

An Alternatives Corridor Public Workshop was held on February 16, 2017. The meeting was an open-house format and presented the Corridor Alternatives that were developed in order to obtain public feedback. The workshop provided an opportunity for residents, business owners, stakeholders and other interested parties to view the project alternatives with members of CFX and the consultant team to get answers to questions and responses to their concerns. Four hundred sixty two (462) people attended the meeting and one hundred forty eight (148) comment sheets were received. The sign-in sheets and comment sheets are included in **Appendix I**.

Environmental Advisory Group (EAG) Meeting 5

An EAG meeting was held on June 1, 2017. The meeting was held to provide an opportunity for input from stakeholders, agencies and public participation. The evaluation of the 13 corridor alternatives that were created was presented. Also, the meeting provided the introduction of the preferred corridor (Corridor 4) and the alignment within the corridor being studied. A total of 18 people attended the meeting, and the sign-in sheets and meeting minutes are included in **Appendix I**.

Project Advisory Group (PAG) Meeting 5

A PAG meeting was held on June 1, 2017. The meeting was held to provide an opportunity for input from stakeholders, agencies and public participation. The evaluation of the 13 corridors was introduced with the preferred corridor (Corridor 4) being introduced at the PAG meeting. A total of 24 people attended the meeting, and the sign-in sheets and meeting minutes are included in **Appendix I**.

Alternatives Public Workshop

An Alternatives Public Workshop was held on Thursday, June 8, 2017. The meeting was an open-house format and presented the alternatives developed in order to obtain public feedback. The workshop provided an opportunity for residents, business owners, stakeholders and other interested parties to view the project alternative with members of CFX and the consultant team to get answers to questions and responses to their concerns. Five hundred ten (510) people from the general public, not including media/elected officials, consultants and CFX representatives, attended the meeting and one hundred twenty-eight (128) comment sheets were received. The sign-in sheets and comment sheets are included in **Appendix I**.

Environmental Advisory Group (EAG) Meeting 6

An EAG meeting was held on October 10, 2017. The meeting was held to provide an opportunity for input from stakeholders, agencies and public participation. An update of the preferred corridor (Corridor 4) was provided based on the latest information and refinements to the alignment and the preferred alternative was presented. A total of 15

people attended the meeting, and the sign-in sheets and meeting minutes are included in **Appendix I**.

Project Advisory Group (PAG) Meeting 6

A PAG meeting was held on October 10, 2017. The meeting was held to provide an opportunity for input from stakeholders, agencies and public participation. An update of the preferred corridor (Corridor 4) was provided based on the latest information and refinements to the alignment and the preferred alternative was presented. A total of 23 people attended the meeting, and the sign-in sheets and meeting minutes are included in **Appendix I**.

Public Hearing

The Public Hearing was held on April 26, 2018 at East River High School. A formal presentation was conducted and a project fact sheet was available. The Hearing was advertised in the Orlando Sentinel on April 8, 2018 and on April 15, 2018. Copies of the following reports were on display at Orange County Library – Alafaya Branch and the Central Florida Expressway Authority headquarters office twenty one (21) days before the Public Hearing: Preliminary Engineering Report, Design Traffic Technical Memorandum, Project Environmental Impact Report, Air Quality Screening Test, Contamination Screening Evaluation Report, Natural Resources Evaluation, Noise Study Report, Bridge Analysis Report, Utility Assessment Package, Cultural Resources Assessment Survey, Pond Siting Report, Location Hydraulics Report, and the Water Quality Impact Evaluation Checklist. Five hundred and eighty-three (583) attendees, interested parties, elected and appointed officials, CFX staff and consultants attended the Public Hearing. Eighty-two (82) comment cards were submitted at the public hearing and twenty-three (23) comments were submitted via mail/email. All comments submitted can be seen in **Appendix I**.

Twenty-seven (27) attendees spoke before the panel of the project team following a formal PowerPoint presentation. All comments from the public can be seen in the Certified Transcript in **Appendix I**.