DRAFT

PRELIMINARY ENGINEERING REPORT - website volume 1 of 3

Florida Department of Transportation

District Five

State Road 524 Project Development and Environment (PD&E) Study

Limits of Project: From Friday Road to Industry Road

Brevard County, Florida

Financial Management Number: 437983-1

Federal Aid Project No.: D518-034-B

ETDM Number: 14321

Date: June 2025

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated May 26, 2022, and executed by the Federal Highway Administration and FDOT.

SR 524 PD&E Study

Friday Road to Industry Road in Brevard County, FL

Preliminary Engineering Report

DRAFT

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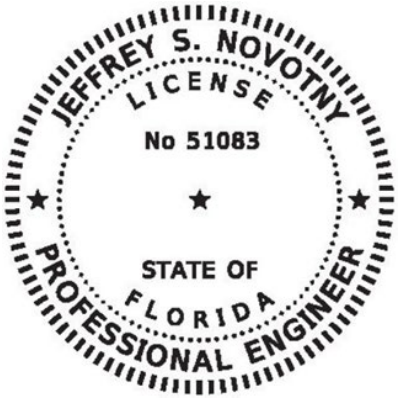
PROFESSIONAL ENGINEER CERTIFICATION
PRELIMINARY ENGINEERING REPORT

Project: State Road 524
ETDM Number: 14321
Financial Project ID: 437983-1-22-01
Federal Aid Project Number: D518-034-B

This preliminary engineering report contains engineering information that fulfills the purpose and need for the SR 524 Project Development and Environment Study from Friday Road to Industry Road in Brevard County, Florida. 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. I hereby certify that I am a registered professional engineer in the State of Florida practicing with CONSOR North America, Inc. and that I have prepared or approved the evaluation, findings, opinions, conclusions, or technical advice for this project.

_____
Jeffrey S. Novotny, Professional Engineer
State of Florida, License No. 51083



This item has been digitally signed and sealed by Jeffrey S. Novotny, P.E. on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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List of Acronyms

Acronym	Definition
AASHTO	American Association of State Highway Transportation Officials
ADA	Americans with Disabilities Act
ADMS	Arterial Dynamic Message Signs
AOI	Area of Influence
APE	Area of Potential Effect
ATC	Advanced Transportation Controller
ATMS	Advanced Traffic Management System
ATSPM	Automated Traffic Signal Performance Metrics
BHI	Bridge Health Index
CAC	Citizens Advisory Committee
CARS	Crash Analysis Reporting System
CCTV	Closed Caption Television
CD	Cross Drain
CFRPM	Central Florida Regional Planning Model
CMF	crash modification factor
CNE	Common Noise Environments
CRAS	Cultural Resource Assessment Survey
CSER	Contamination Screening Evaluation Report
CSRP	Conceptual Stage Relocation Plan
DDI	Diverging Diamond Interchange
DHW	Design High Water
DLT	Displaced Left Turn
EDR	Environmental Data Resources
EMO	Environmental Management Office
ETAT	Environmental Technical Advisory Team
ETDM	Efficient Transportation Decision Making
FDEP	Florida Department of Environmental Protection
FDM	FDOT Design Manual
FDOT	Florida Department of Transportation
FGT	Florida Gas Transmission
FHWA	Federal Highway Administration
FIB	Florida I-Beam
FNAI	Florida Natural Areas Inventory
FP&L	Florida Power & Light
FPID	Financial Project Identification
FTE	Florida Turnpike Enterprise
FWC	Florida Fish and Wildlife Conservation Commission
FY	Fiscal Year
GIS	Geographic Information System
HCM	Highway Capacity Manual
HDPE	High-Density Polyethylene
I-95	Interstate 95
ICE	Intersection Control Evaluation
ICMS	Integrated Corridor Management System

IMC	Intersection Movement Counts
IMR	Interchange Modification Report
IOAR	Interchange Operational Analysis Report
ITS	Intelligent Transportation Systems
LHR	Location Hydraulics Report
LJR	Lighting Justification Report
LOS	Level of Service
LRE	Long Range Estimate
LRTP	Long Range Transportation Plan
MPH	Miles Per Hour
MSE	Mechanically Stabilized Earth
MUT	Median U-Turn
MVMT	Motor Vehicle Miles Traveled
NB	Northbound
NPVC	Net Present Value of Cost
NRCS	Natural Resources Conservation Service
NRE	Natural Resource Evaluation
NSA	Noise Study Areas
NSR	Noise Study Report
PD&E	Project Development and Environment
PER	Preliminary Engineering Report
PIP	Public Involvement Plan
PM	Project Manager
PSR	Pond Siting Report
PTAR	Preliminary Traffic Analysis Report
RCRA	Resource Conservation and Recovery Act
RCUT	restricted crossing U-turn
ROW	Right of Way
S4	Signal Four Analytics
SB	Southbound
SCAT	Space Coast Area Transit
SCS	Soil Conservation Service
SCTPO	Space Coast Transportation Planning Organization
SERT	State Emergency Response Team
SIS	Strategic Intermodal System
SJRWMD	St. Johns River Water Management District
SR	State Road
STIP	State Transportation Improvement Program
TAC	Technical Advisory Committee
TIP	Transportation Improvement Program
TMP	Transportation Management Plan
TPO	Transportation Planning Organization
TSM&O	Transportation Systems Management and Operations
UAO	Utility Agency Owner
UAR	Utility Assessment Report
US	United States

USACE	United States Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	United States Fish and Wildlife Service
VC	Vertical Curve
VE	Value Engineering
VPM	Virtual Public Meeting
WB	Westbound

1. PROJECT SUMMARY

This *Preliminary Engineering Report* (PER) contains detailed information that fulfills the purpose and need for the State Road (SR) 524 Project Development and Environment (PD&E) Study from Friday Road (South) to Industry Road in Brevard County, Florida.

1.1 PROJECT DESCRIPTION

The project involves the two-lane to four-lane widening of the approximately 3.15-mile portion of SR 524 between Friday Road (South) and Industry Road in the City of Cocoa in Brevard County in addition to modifications of the existing interchange at Interstate 95 (I-95) and SR 524 (**Figure 1-1**).

Existing Conditions

Within the project limits, SR 524 exists as a two-lane urban minor arterial comprised of one 12-foot lane in each direction with 10-foot shoulders (4-foot paved). Intermittent sidewalks are located along the north side of SR 524 between Cox Road and Industry Road and along the south side from the Cirrus Drive intersection to Industry Road, while the existing paved shoulders serve as undesignated bike lanes. Stormwater flows off the roadway into roadside ditches.

The existing roadway corridor is offset from the center of a typical 200-foot right-of-way (ROW). The ROW varies from 200 to 230 feet through the horizontal curve located near the London Boulevard intersection and widens to 230 feet to the intersection at Industry Road. The SR 524 corridor contains an interchange with I-95 between Friday Road (South) and Friday Road (North) and seven signalized intersections.

Proposed Improvements

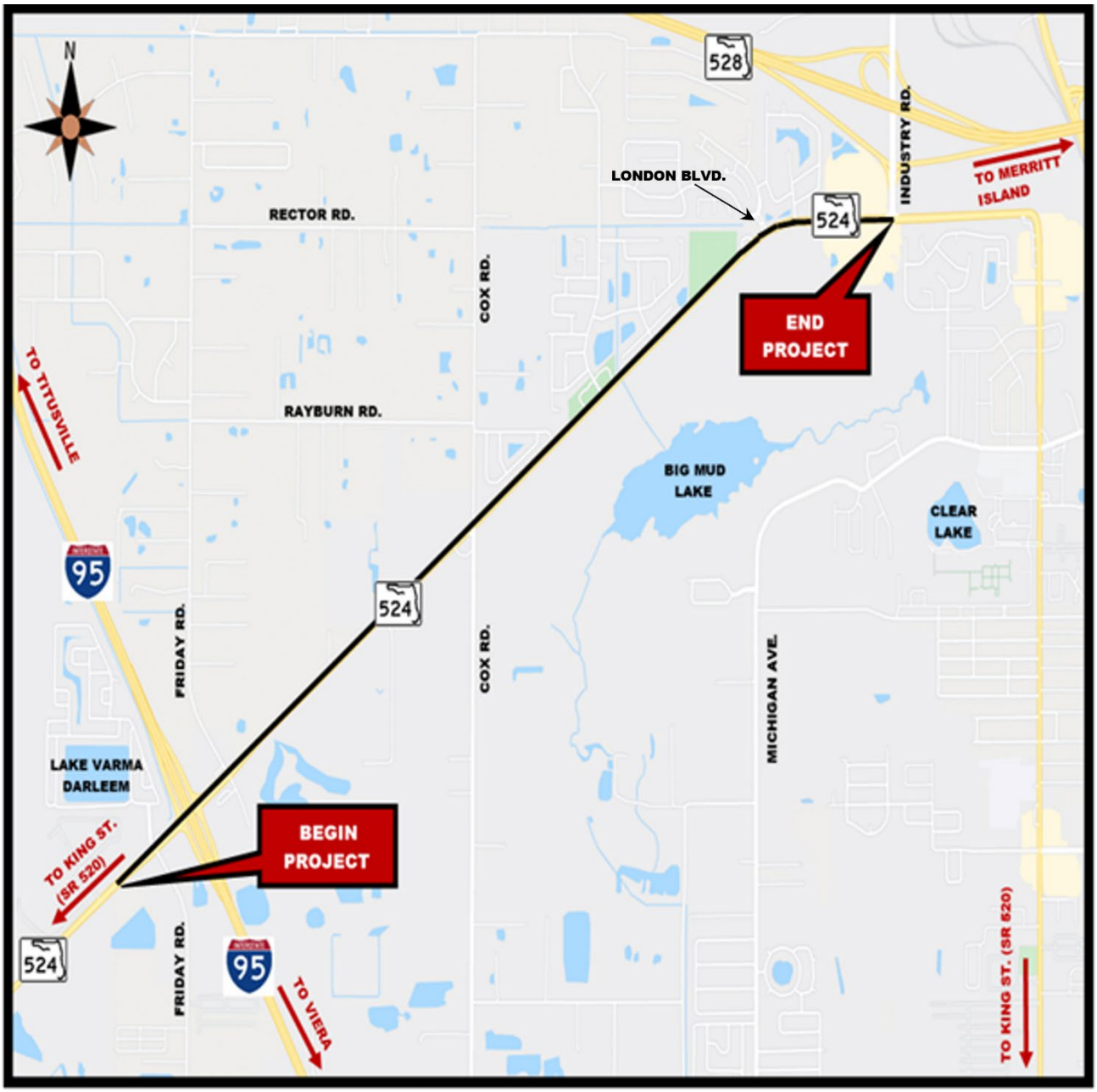
Proposed improvements include widening SR 524 to a four-lane divided urban arterial generally with a 22-foot wide median. The lane width will include a combination of 11- and 12-foot-wide lanes throughout the corridor. Curb and gutter with a 14-ft wide shared use path will be included on both sides of the roadway. Intersection improvements include converting the existing Interstate 95 (I-95) interchange to a Diverging Diamond Interchange type (DDI), roundabouts at Cox Road and London Boulevard and signalized intersections at Friday Road (South), Friday Road (North), and Industry Road. The proposed DDI at the I-95 interchange will require replacement of the I-95 bridges over SR 524. Three noise barriers are proposed to mitigate noise impacts along the corridor. The proposed improvements include construction of two new off-site ponds and two ponds within Florida Department of Transportation (FDOT) ROW.

1.2 PURPOSE AND NEED

The purpose of this project is to accommodate year 2045 future travel demand, improve traffic flow and improve safety for vehicles, bicycles and pedestrians.

The need for the project is based on transportation demand/capacity and safety.

Figure 1-1 Project Location Map



1.2.1 Project Status

The project lies within the jurisdictions of the Space Coast Transportation Planning Organization (SCTPO), Brevard County, and the city of Cocoa. The SCTPO governing board adopted the 2045 Long Range Transportation Plan (LRTP) on September 20, 2020. An amendment was adopted on December 15, 2023 which added all phases of this project to the Cost Feasible Plan. The project is also listed in the Fiscal Year (FY) 2024/25-2028/29 Transportation Improvement Program (TIP). Currently the Preliminary Engineering (design) phase is fully funded in the FY 2024/2025 FDOT Work Program and State Transportation Improvement Program (STIP). Neither the ROW phase nor the construction phases are currently funded the TIP nor the STIP.

1.2.2 Roadway Capacity

Along SR 524 within the project limits, the existing Annual Average Daily Traffic (AADT) ranges from 9,400 to 17,000 vehicles per day in 2022 and is expected to grow to a range of 16,000 to 27,000 vehicles per day by year 2045. The following segments are projected to operate below the target level of service (LOS) D within future No-Build conditions.

Year 2025: Eastbound SR 524 between I-95 Northbound (NB) Ramps and Friday Road (North), eastbound SR 524 between Cirrus Drive and Industry Road, and westbound SR 524 between Friday Road (South) and I-95 Southbound (SB) ramps.

Year 2035: Eastbound SR 524 between I-95 NB Ramps and Friday Road (North), eastbound SR 524 between Cirrus Drive and Industry Road, and westbound SR 524 between Friday Road (South) and I-95 SB ramps.

Year 2045:

AM – Eastbound SR 524 between I-95 NB Ramps and Friday Road (North), between Walmart and Cox Road, and between London Boulevard and Industry Road. Westbound SR 524 between the Cirrus Drive and Industry Road.

PM – Eastbound and westbound SR 524 between I-95 SB Ramps and Walmart and between Cirrus Drive and Industry Road.

Additionally, the Florida Department of Emergency Management's State Emergency Response Team (SERT) maps for Brevard County identify multiple areas within and surrounding the project limits, including Merritt Island, Cocoa Beach, and Cape Canaveral, designated as hurricane evacuation Zone A. The designated evacuation routes for this area include I-95, SR 528, SR 520, US 1, and SR 524. Constructed in 2018, Fire Station No. 3 is located along the southeast side of SR 524, just west of the London Boulevard intersection. Capacity improvements to the SR 524 corridor can save valuable time for the evacuation of residents during emergencies and response times for the fire station.

1.2.3 Safety

Five years of crash data (from January 1, 2019, to December 31, 2023) along SR 524 were obtained from the Signal Four Analytics (S4) and supplemented with data from the FDOT Crash Analysis Reporting System (CARS). A total of 297 crashes occurred within the project limits, with approximately 60 crashes per year. Nearly 82% (243) of the crashes were located at the seven signalized intersections and more than 31% of crashes at intersections resulted in injuries. The most common crash types involved rear ends (31.0%), left-turns (20.2%), and head on (18.2%). A total of 54 crashes within the 5-year period were head-on crashes that typically involve more severe results. The existing two-lane undivided roadway plays a major factor in this type of crash. Overall, the total number of crashes accounted for three fatalities and 164 injuries. Within the study limits, the calculated crash rate in million vehicle miles traveled is 3.71, more than 185% higher than the statewide average of 1.29 for a similar roadway type.

1.3 COMMITMENTS

To be completed after the public hearing.

1.4 ALTERNATIVE ANALYSIS SUMMARY

The Alternatives Analysis identified the project alternatives to be evaluated in the PD&E Study. For this project, the following alternatives were reviewed: No-Build, Transportation Systems Management and Operations (TSM&O), Multimodal, and Build. The No-Build, TSM&O nor the Multimodal Alternatives met the purpose and need of the project; however, the No-Build Alternative was carried out as a basis for comparison to the Build Alternatives. TSM&O options will be provided within the build alternatives.

For the Build Alternatives, the project corridor was divided into four segments. The segments are labeled numerically from west to east, separated by intersections. Segment 1 starts at the beginning of the project, South Friday Road intersection and goes through the I-95 interchange, and ends at the North Friday Road intersection. Segment 2 starts at the North Friday Road intersection and ends at the Cox Road intersection. Segment 3 starts at the Cox Road intersection and ends at the London Boulevard intersection. Segment 4 starts at the London Boulevard intersection and ends at the end of the project, Industry Road. The intersections are analyzed separately and will have their own alternatives, just like the roadway segments. The intersections being evaluated for change are Cox Road, London Boulevard, and Industry Road. The I-95 interchange is being treated as an intersection and includes Friday Road (North and South) in this study**. Table 1-1** and **Figure 1-2** represent the individual SR 524 corridor segments.

Table 1-1 Context Classification

Corridor Segment	Begin Limits	End Limits	Segment Description
1	Friday Road (South)	Friday Road (North)	Context Classification C3C (includes I-95 Interchange)
2	Friday Road (North)	Cox Road	Context Classification C3R
3	Cox Road	London Boulevard	Context Classification C3R
4	London Boulevard	Industry Road	Context Classification C3C

The FDOT Design Manual (FDM) defines C3C as Suburban Commercial, which the adjacent land use is mostly non-residential uses with large building footprints and large parking lots. Buildings are within large blocks and a disconnected/sparse roadway network. C3R (Suburban Residential) is defined with an adjacent land use as mostly residential uses within large blocks and a disconnected/sparse roadway network.

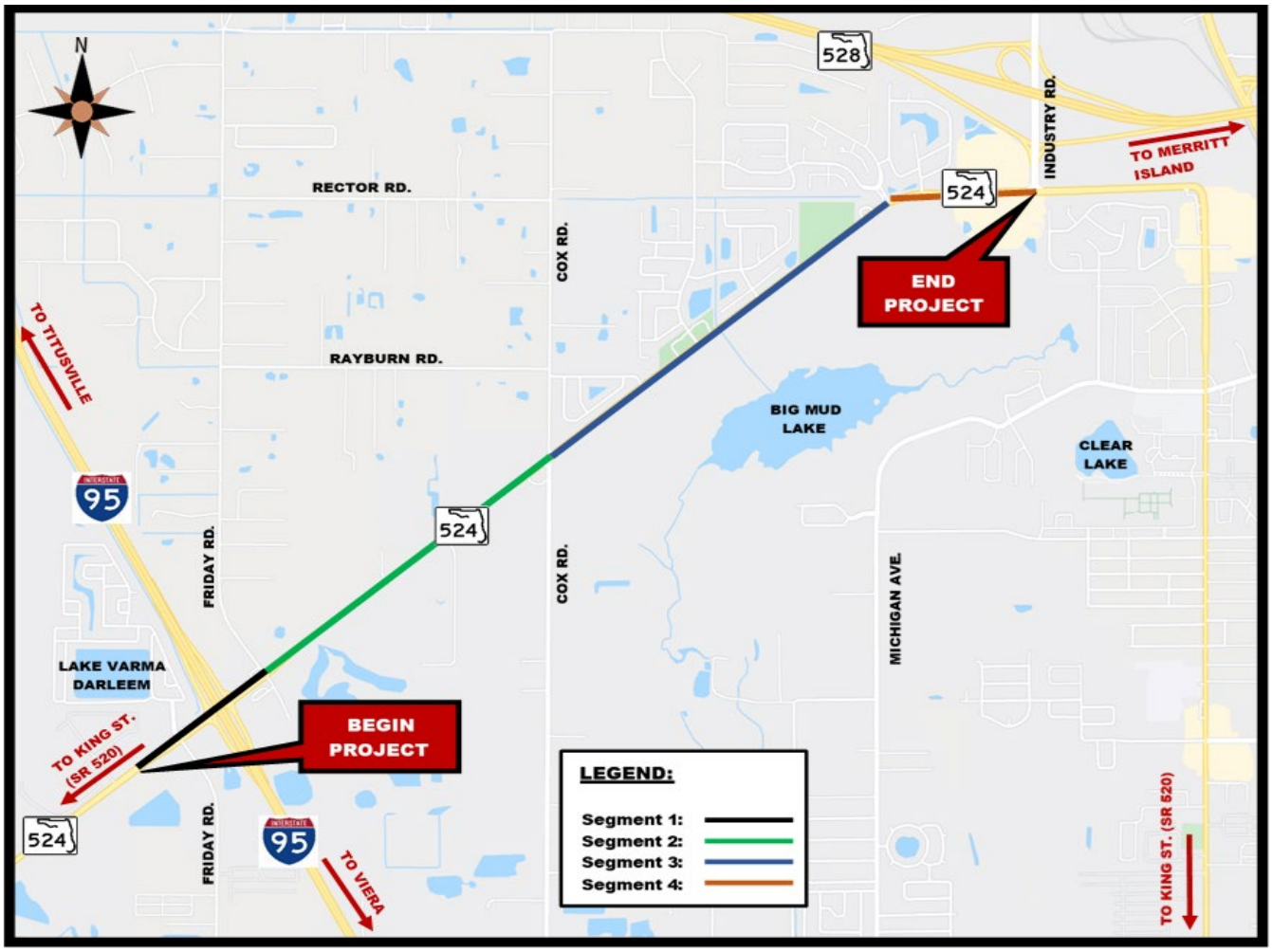
Standard typical sections from the FDM were evaluated for each of the corridor segments, including the four-lane curbed section, the four-lane high speed curbed section, and the four-lane flush shoulder.

In addition to the corridor segments, an Intersection Control Evaluation (ICE) was performed for the intersections of SR 524 at the I-95 Interchange, Cox Road, London Boulevard, and Industry Road.

Potential intersection improvements for each intersection included the following:

I-95 Interchange: Modified Tight Urban Diamond Interchange / DDI
Cox Road: Signalized / Roundabout / Restricted Crossing U-Turn (R-Cut) / Median U-Turn (MUT)
London Boulevard: Signalized / Roundabout / R-Cut
Industry Road: Signalized / Displaced Left-Turn (DLT)

Figure 1-2 Project Segmentation Map



1.5 DESCRIPTION OF PREFERRED ALTERNATIVE

The Preferred Alternative for each corridor segment is identified below based on engineering and environmental factors and public and agency input.

Segment 1

Segment 1 will be a four-lane divided section that runs between Friday Road (South) and Friday Road (North) with a DDI at I-95. The typical section outside the DDI has 12-foot travel lanes, Type F outside curb and gutter, Type E inside curb and gutter, 14-foot shared-use paths on both sides of the corridor, and a varying median (22 – 80 feet). The travel lanes widen to 14-foot within the DDI limits and include an additional 14-foot left-turn lane. The I-95 overhead bridge will be replaced. This typical section can be seen in Figure 7-1 in this report.

Segment 2

Segment 2 will be a four-lane divided section that runs from Friday Road (North) to Cox Road. This section has Type F outside curb and gutter, 12-foot outside lanes, 11-foot inside lanes, Type E inside curb and gutter, and a 22-foot median. Each side of the corridor has 14-foot shared-use paths 2-foot from the existing ROW. Drainage swales with

1:4 front and back slopes will be placed between the shared-use path and the outside curb and gutter. This typical section can be seen in **Figure 7-2** in this report.

Segment 3

Segment 3 will be a four-lane divided section that runs from Cox Road to London Boulevard. This section has Type F outside curb and gutter, 11-foot travel lanes, Type E inside curb and gutter, and a varying median (22 – 60 feet). Each side of the corridor has 14-foot shared-use paths 2-foot from the existing ROW. Drainage swales with 1:4 front and back slopes will be placed between the shared-use path and the outside curb and gutter. This typical section can be seen in **Figure 7-3** in this report.

Segment 4

Segment 4 will be a four-lane divided section that runs from London Boulevard Industry Blvd. This section has Type F outside curb and gutter, 11-foot travel lanes, Type E inside curb and gutter, and a 22-foot median. Each side of the corridor has 14-foot shared-use paths. The existing ROW widens on the north side, but the horizontal alignment will be at the same offset from the centerline as in segments 2 and 3 (50-foot). Drainage swales with 1:4 front and back slopes will be placed between the shared-use path and the outside curb and gutter except where the shared-use path comes in closer to the road and at a cross drain at station 527+00 and to tie back into the existing curb ramp .-configuration at Industry Road. This typical section can be seen in **Figure 7-4**.

Intersection improvements include a DDI at I-95 (**Figure 7-17**), roundabouts at Cox Road (**Figure 7-9**) and London Boulevard (**Figure 7-13**), and the intersection's will continue to be signalized at Friday Road (South), Friday Road (North), Walmart Distribution, Cirrus Drive, and Industry Road.

The Preferred Alternative also includes four proposed stormwater pond sites 1A, 2F, 3A and 3B. Sites 1A and 2F will require the acquisition of additional right of way, while sites 3A and 3B are within FDOT ROW. Full or partial ROW acquisition of 13 parcels (approximately 8.2 acres) are anticipated for the roadway widening, roundabouts and the pond sites.

The Preferred Alternative meets the purpose and need of the project by providing additional capacity through the expansion to a four-lane section. Operational improvements at the intersections will reduce congestion and provide less delay than the No-Build Alternative. The introduction of a divided median with directional and full openings, conversion of the I-95 diamond interchange to a DDI, and roundabouts at two intersections will reduce vehicle conflicts throughout the project limits and at the intersection locations and hence improve safety along the corridor. The addition of 14-foot-wide shared-use paths on both sides of the widened roadway will provide continuous and safer mobility for pedestrians and bicyclists.

The overall cost of the Preferred Alternative with design, ROW acquisition, construction engineering & inspection, utilities relocation and construction is approximately $179.1 million. The conceptual plans for the Preferred Alternative are shown in **Appendix C**.

1.6 LIST OF TECHNICAL REPORTS COMPLETED FOR THE PROJECT

A series of supporting documents, including technical reports and memorandums, were prepared as part of the PD&E Study for this project. Information from these reports was used to evaluate and develop the alternatives and design recommendations. The engineering, environmental and public involvement documents are listed below for reference.

1.6.1 Engineering Reports

- *Aesthetic Plan Report* (May 2022)
- *Highway Lighting Justification Report* (LJR) [March 2022]
- *Interchange Modification Report* (IMR) *I-95 at SR 524* [January 2022]
- *Intersection Control Evaluation (ICE)* [July 2021]
- *Pond Siting Report* (PSR) [May 2023]
- *Preliminary Geotechnical Report* [October 2021]
- *Project Traffic Analysis Report* (PTAR) [July 2019]
- *PTAR Reevaluation Assessment Memorandum* [April 2024]
- *Utility Assessment Report* (UAR) [April 2023]
- *Value Engineering (VE) Final Resolution Memorandum* [November 2021]

1.6.2 Environmental Reports

- *Conceptual Stage Relocation Plan (CSRP) [October 2024]*
- *Contamination Screening Evaluation Report (CSER) [October 2024]*
- *Cultural Resource Assessment Study (CRAS) [July 2020]*
- *ETDM Programming Summary Report [February 2023]*
- *Farmlands Form NRCS-CPA-106 [December 2024]*
- *Location Hydraulics Report (LHR) [May 2023]*
- *Natural Resource Evaluation (NRE) [March 2025]*
- *Noise Study Report (NSR) [September 2024]*
- *Section 4(f) Documentation [November 2024]*
- *Type 2 Categorical Exclusion [Draft, June 2025]*
- *Water Quality Impact Evaluation [December 2024]*

1.6.3 Public Involvement Items

- *Comments and Coordination Report [to be completed after public hearing]*
- *Public Hearing Transcript [to be completed after public hearing]*
- *Public Involvement Plan (PIP) [December 2018]*

2. EXISTING CONDITIONS

Existing conditions for the SR 524 PD&E Study were evaluated based on a review of existing plans and documents, desktop and geospatial data analysis, field reviews, and coordination with regulatory agencies. Data collection included identifying existing roadway, interchange, and intersection configurations and obtaining vehicular traffic volumes throughout the SR 524 PD&E project limits.

2.1 PREVIOUS PLANNING STUDIES

In addition to being listed on the SCTPO LRTP and on the priority list for the TIP for needed capacity improvements, previous studies have been completed for the SR 524 corridor and various intersections within the corridor. The most recent studies include the 2017 *Corridor Planning Study* and the 2017 I-95/SR 524 *Interchange Operational Analysis Report* (IOAR). The *Corridor Planning Study* was used as the basis for the PD&E Study while the IOAR was used as the precursor to the *Interchange Modification Report* (January 2022).

2017 Corridor Planning Study

In 2016, FDOT initiated a *Corridor Planning Study* to evaluate the need for potential multimodal transportation improvements along SR 524 in Brevard County, extending 3.1 miles from Friday Road (South) to Industry Road. The SR 524 Corridor Study engaged local agencies, community leaders, and other stakeholders to provide the study team with a comprehensive understanding of the groundwork for determining the needs of current and future users. Their input helped establish a long-term plan that appropriately balances land use and transportation planning.

Similar to this PD&E Study, the SR 524 corridor was divided into four segments representing the surrounding characteristics. The following design features were consistent across each of the corridor segments.

- Two through travel lanes in each direction
- Center raised median
- Multi-use path on the north side of the roadway
- Sidewalk on the south side of the roadway
- Buffered bike lanes on both sides of the roadway
- Enhanced crosswalks and pedestrian signals at all intersections
- 45 mph posted speed limit
- Curb and gutter
- Grass buffer between the back of curb and sidewalks/shared-use path
- Stormwater treatment, floodplain compensation, and wetland mitigation will be required along the corridor

Recommendations from the *Corridor Planning Study* for each segment are described below:

Segment 1: SR 524 at I-95 Typical Section: Consists of two 12-foot through travel lanes in the eastbound direction; a single left-turn lane onto the I-95 northbound; one 12-foot through lane, and one 12-foot shared through and left-turn lane (to provide dual left-turn lanes) onto I-95 southbound; a 7-foot buffered bicycle lane on both sides of the roadway; and modification to the bridge abutments to provide 6-foot sidewalks on both sides of SR 524.

Segment 2: SR 524: Friday Road (North) to Cox Road Typical Section: Generally consists of a 22-foot median, raised and landscaped; two through lanes in each direction, the inside lanes at 11-foot and the outside lanes 12-foot; 7-foot

buffered bicycle lanes on both sides of the roadway; a 6-foot sidewalk on the south side of SR 524 and a 12-foot shared-use path on the north side of SR 524. Grass buffers are to be provided between the bicycle lane and the shared use path/sidewalk and to the edge of the ROW.

Segment 3: SR 524: Cox Road to Coventry Court Typical Section: This section continues the 22-foot, landscaped and raised median; as well as the 12-foot shared-use path, 6-foot sidewalk, 7-foot buffered bicycle lanes, and grass buffers between the bicycle lane and the sidewalk, as well as between the shared-use path/sidewalk and the edge of ROW. This section reduces all travel lanes to 11-foot. The planning study recommended further consideration for a roundabout at the intersection of Cox Road which was carried forward into the PD&E Study and ICE analysis.

Segment 4: SR 524: Coventry Court to the west of Industry Road Typical Section: This section replaces the raised, landscaped median with a raised impervious surface median. The median width will vary depending on the location along the segment. It also provides left and right turn lanes into the commercial shopping areas and consideration of green bicycle lanes. Two through travel lanes remain at 11-foot, 7-foot buffered bicycle lanes, 12-foot shared-use path, 6-foot sidewalk, and grass buffers remain consistent with the segment to the west.

A major difference between the *Corridor Planning Study* and this PD&E Study is the segmenting of the project study length, i.e., the PD&E Study separated Segment 3 from Segment 4 at the existing signalized intersection of London Boulevard while the Corridor Planning Study used Coventry Court. The major similarity which was reinforced by the stakeholders was using a consistent typical section, whether it is the urban, rural, or suburban typical section.

From this *Corridor Planning Study*, the typical section and intersection alternatives that had already been established were taken and further analyzed when the PD&E study began. This helped establish the roadway alignment early on since the typical sections could be modeled and analyzed on various alignments to quickly determine which options were the most cost-effective and least impactful. It was also known that improved bicycle and pedestrian facilities in the corridor were highly requested by the public, so designs implementing shared-use paths, sidewalks, and bicycle lanes were developed.

While the *Corridor Planning Study* did not recommend roundabout locations, the Level One roundabout screening tool results were reviewed and helped identify that roundabouts were viable alternatives at Cox Road and London Boulevard. A preliminary access management plan and traffic analysis from the planning study also proved valuable by recommending which intersections should have full, directional, or right-in and right-out access and which should be signalized or unsignalized. Additionally, a noise study analysis was recommended from the Corridor Planning Study to identify ways to mitigate noise in the proposed design. This was included when the PD&E study began.

2017 Interchange Operations Analysis Report (IOAR)

The purpose of the 2017 IOAR was to facilitate safety improvements and provide additional vehicular capacity at the I-95 and SR 524 interchange ramp terminals. An IOAR was conducted to evaluate the following:

- Replacement of an unsignalized free-flow, right-turn lane on an off-ramp with a signalized right-turn or installation of a signal or roundabout to a stop-controlled ramp terminal intersection.
- Addition of a lane (or lanes) to an existing on-ramp while maintaining existing lanes at the interstate gore point.
- Any proposal that results in the shortening of an off-ramp.

Traffic operations were analyzed for the existing year (2017), for the opening year (2018), and the design year (2038) and recommended signalizing the ramp terminal intersection.

2.2 EXISTING ROADWAY NETWORK

The SR 524 corridor is primarily an east-west corridor through Brevard County that has direct access to I-95 and indirect access to the high-speed limited access roadway. The project limits extends from SR 528 to the west and SR 501 (Clearlake Road) to the east and includes the I-95 interchange and the Industry Road / SR 528 Interchange. The surrounding roadway network associated with the SR 524 corridor includes:

I-95

I-95 is part of Florida's Strategic Intermodal System (SIS) and is functionally classified as an urban principal arterial interstate. Within the project limits, I-95 is a six-lane median divided limited access facility with three 12-foot travel lanes with paved inside and outside shoulders in each direction from south of SR 520 to the north of SR 528. The posted speed limit is 70 miles per hour (mph) within the project limits.

SR 528

Also known as the Beachline East Expressway, SR 528 is an east-west corridor located just north of the SR 524 project limits. SR 528 is part of Florida's SIS, is functionally classified as an urban other expressway, and falls under the jurisdiction of FDOT District 5. SR 528 exists as a four-lane divided highway with paved inside and outside shoulders in each direction. The SR 528 / Industry Road interchange lies just north of the SR 524 corridor with entrance / exit ramps that tie directly to the intersection at Industry Road and SR 524. The posted speed limit of SR 528 is 55-mph within the project limits.

SR 501 (Clearlake Road)

Located at the eastern terminus of the project is SR 501 (Clearlake Road). Existing as a two-lane undivided roadway, SR 501 is under design, FPID 433605-1, as of March 2023, to add capacity to a four-lane divided urban roadway that includes sidewalks and bike lanes for multimodal users.

2.3 TYPICAL SECTIONS

Within the project limits, SR 524 is a two-lane urban minor arterial comprised of one 12-foot lane in each direction with 4-foot paved outside shoulders. Specific typical sections along SR 524 are described in greater detail below and refer to **Figure 2-1**.

Figure 2-1 Existing SR 524 Typical Sections Map

Friday Road (South) to I-95 (#1 on Figure 2-1)

Lying within 200-foot of ROW, SR 524 has one 12-foot lane in each direction separated by a 40-foot grassed median. A westbound left-turn lane is located at the Friday Road (South) intersection, while eastbound and westbound auxiliary lanes are present to and from southbound I-95. See **Figure 2-2** for the typical section.

I-95 Interchange (#2 on Figure 2-1)

Beneath the I-95 overpass, SR 524 has one lane in each direction with 12-foot left-turn lanes in the median to access I-95 entrance ramps. The travel lanes are bordered with 20-foot outside shoulders. See **Figure 2-2** for the typical section.

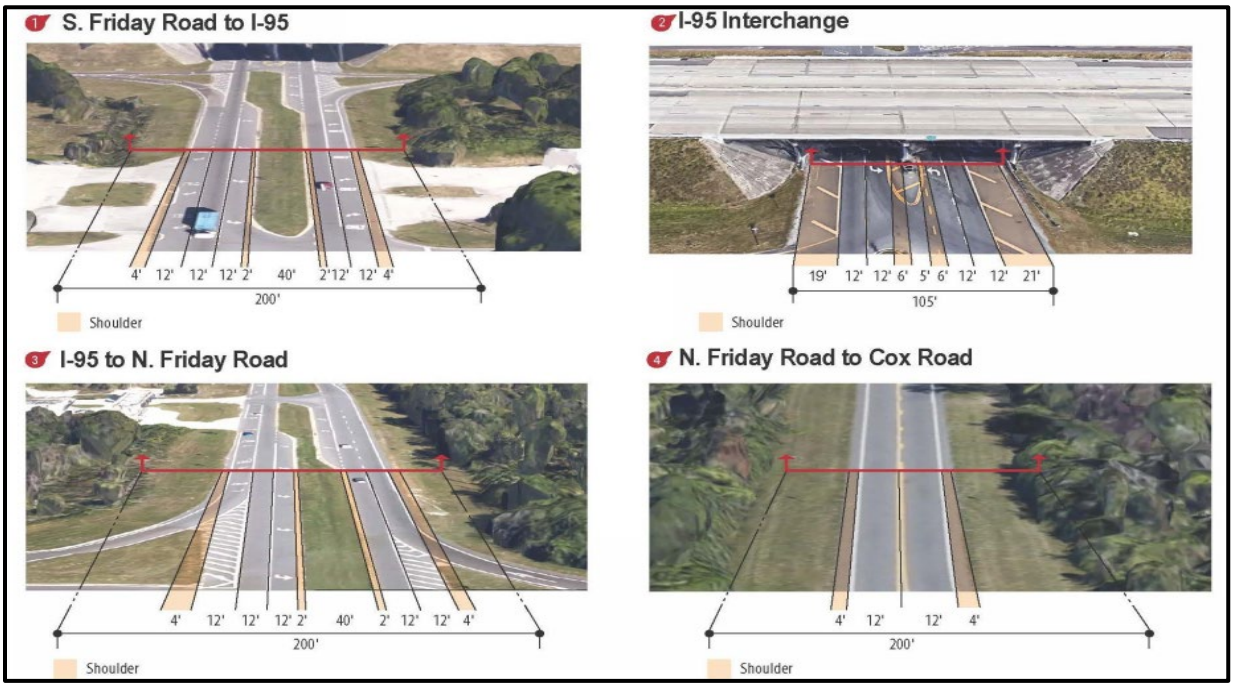
I-95 to Friday Road (North) (#3 on Figure 2-1)

Similar to the typical section between Friday Road (South) and I-95, this section of SR 524 has one12-foot lane in each direction separated by a 40-foot grassed median. An eastbound left-turn lane is located at the Friday Road (North) intersection, while eastbound and westbound auxiliary lanes are present to and from northbound I-95. The SR 524 ROW for this section is 200-foot wide. See **Figure 2-2** for the typical section.

Friday Road (North) to Cox Road (#4 on Figure 2-1)

This section of SR 524 exists as a two-lane undivided roadway with one 12-foot lane and 4-foot paved shoulders in each direction lying within a 200-foot ROW. Roadside ditches capture stormwater runoff and convey it to outfall locations. The roadway typical section widens to include a westbound left-turn lane and an eastbound right-turn lane into the signalized intersection at the Walmart Distribution Center. See **Figure 2-2** for the typical section.

Figure 2-2 Existing SR 524 Typical Sections



Cox Road to London Boulevard (#5 on Figure 2-1)

The existing roadway consists of an undivided two-lane roadway with one 12-foot lane and 4-foot paved shoulders in each direction and roadside ditches to capture rainfall runoff. The roadway typical section widens at Cox Road (signalized), Pinyon Drive, Westminster Drive, Lance Boulevard, and London Boulevard (signalized) to allow for left and right-turn lanes. The ROW for this stretch of SR 524 is 200-foot wide. See **Figure 2-3** for the typical section.

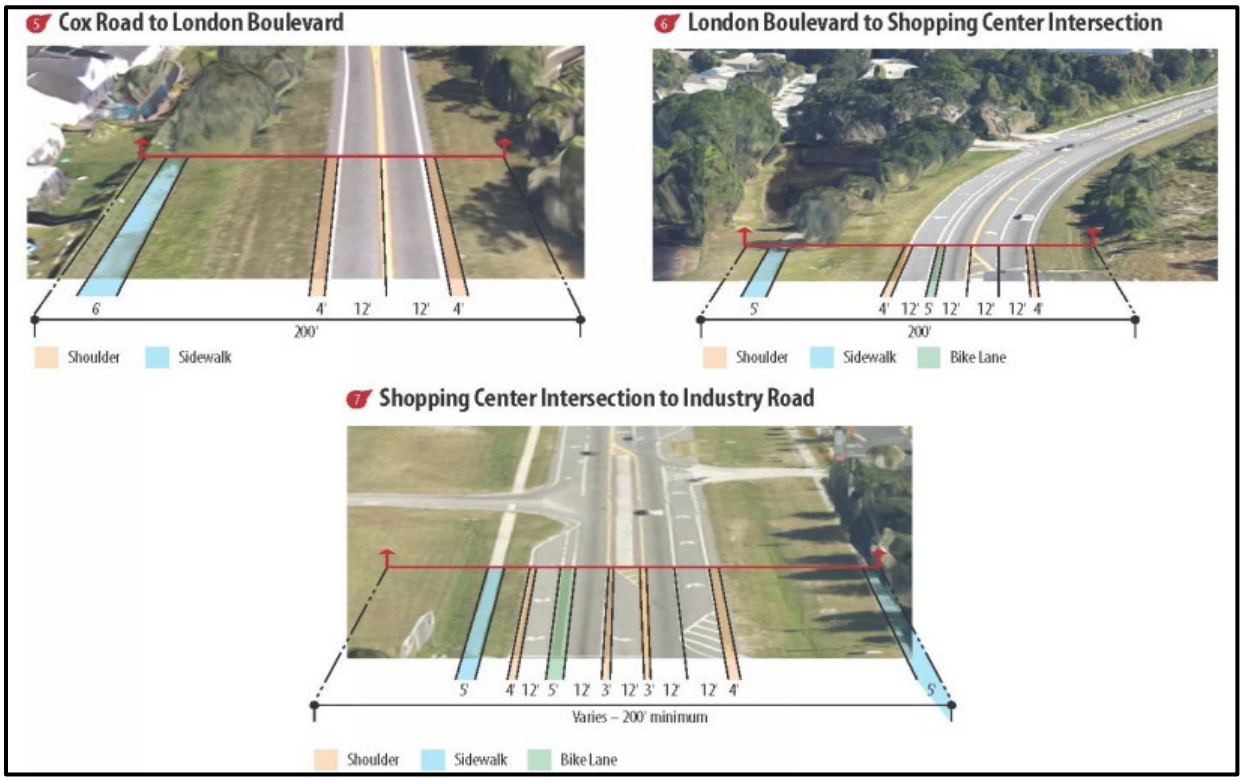
London Boulevard to Cirrus Drive (#6 on Figure 2-1)

Between London Boulevard and Cirrus Drive, SR 524 exists as a two-lane roadway with one 12-foot lane and 4-foot paved shoulder in each direction, as well as a 5-foot westbound bike lane. There is a continuous left-turn lane for the intersections of London Boulevard, Coventry Court, and Cirrus Drive access road. The ROW varies from the typical 200-foot to 225-foot just east of Coventry Court. A westbound right-turn lane is provided at London Boulevard and Coventry Court, while an eastbound right-turn lane is provided at the CVS signalized intersection. See **Figure 2-3** for the typical section.

Cirrus Drive Plaza to Industry Road (#7 on Figure 2-1)

This 1,100-foot section consists of a two-lane divided roadway with one12-foot lane and 4-foot outside shoulder in each direction, as well as a 5-foot westbound bike lane. The east approach at the signalized Cirrus Drive has left and right-turn lanes in the west direction, while the west approach at the signalized intersection at Industry Road has eastbound left and right-turn lanes. This section of SR 524 lies within a typical ROW width of 250-foot. See **Figure 2-3** for the typical section.

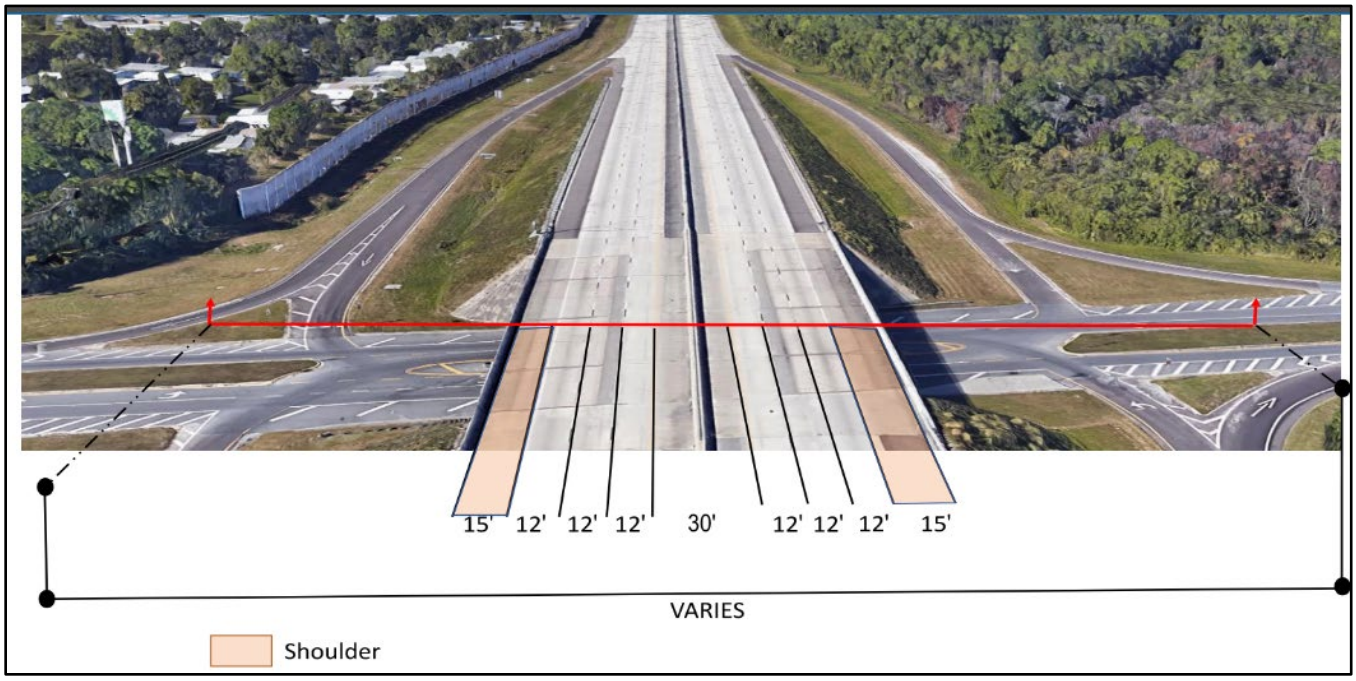
Figure 2-3 Existing SR 524 Typical Sections



Interstate 95 (I-95)

The I-95 typical section consists of a six-lane divided concrete roadway with three 12-foot lanes and 12-foot inside and outside shoulders in each direction separated by a concrete barrier wall. Northbound and southbound bridges (Bridge Numbers 700128 and 700054, respectively) span the SR 524 roadway corridor with an existing vertical clearance of 16.48-foot. The I-95 typical section lies within an existing 300-foot of limited-access ROW. The limited-access ROW expands to 500-foot where the SR 524 on and off-ramps are introduced. See **Figure 2-4** for the typical section.

Figure 2-4 Existing I-95 Typical Section



2.4 RIGHT-OF-WAY

The existing ROW width along SR 524 is approximately 200-foot from Friday Road (South) to the I-95 Bridge before narrowing to approximately 105-foot under the I-95 Bridge. Following the interchange, the ROW width is again 200-foot until Coventry Court. Approximately 100-foot after Coventry Court, the ROW expands to approximately 220-foot over a length of 644-feet. Finally, the ROW is approximately 250-foot to Industry Road.

Along the I-95 corridor, the existing ROW outside of the ramp area is approximately 300-foot. The north ROW widens to an approximate max of 492-foot when the ramps begin. The south ROW widens to a max of 519-foot. Where the ramps intersect with SR 524, the ROW again widens out to 747-foot on the north side and 719-foot on the south side.

2.5 PAVEMENT TYPE AND CONDITIONS

A flexible pavement condition survey was conducted by FDOT for the project corridor on August 19, 2024. Each section of pavement was rated for cracking and ride on a 0-10 scale with 0 the worst and 10 the best. Any rating of 6.4 or less is considered deficient pavement. **Table 2-1** identifies the existing pavement condition ratings by segment. The entire project length is deficient for cracking.

Table 2-1 Pavement Condition Survey Results

Beginning Milepost	Ending Milepost	Most Recent Surveyed Year	Condition Category	Ratings	Year Finished Paving
Brevard County					
1.514 (Friday Road South)	1.977	2024	Cracking	6	2006
			Ride	7.6	
1.977	4.762 (Industry Road)	2024	Cracking	6	2006
			Ride	7.6	

2.6 ROADWAY CLASSIFICATION

SR 524 is a Two-Lane Urban Minor Arterial. It is not part of the SIS. SR 524 is designated as an evacuation route by the Florida Division of Emergency Management. I-95 is a six-lane divided limited-access freeway designated as an evacuation route. The approved context classifications on SR 524 are:

Segment 1: Friday Road (South) to Friday Road (North)	C3C (Suburban Commercial)
Segment 2: Friday Road (North) to Cox Road	C3R (Suburban Residential)
Segment 3: Cox Road to London Boulevard	C3R (Suburban Residential)
Segment 4: London Boulevard to Industry Road	C3C (Suburban Commercial)

2.7 ADJACENT LAND USE

The overall project study area, including area of potential pond sites evaluated later, encompasses a mixture of land use classifications: industrial, institutional, conservation, residential, commercial, recreational parks, and vacant lands. See **Figure 2-5** through **2-9.**

Industrial: Industrial land uses include the Walmart Distribution center and multiple facilities located south of SR 524 along Cox Road.

Institutional: The Eastern Florida State College Fred Gay Golf Academy is part of the Florida Education system and is located immediately adjacent to the SR 524 corridor along the north side. The US Post Office is located in the northeast corner of the Industry Road intersection. The City of Cocoa Fire Station No. 3 is located along the south side of SR 524, just west of London Boulevard.

Religious: Multiple religious facilities are located either along the SR 524 corridor or down a side street and include the Dieu Nhan Buddhist Monastery, the New Hope Fellowship, the Surfside Community Fellowship, and the Cocoa Seventh-Day Adventist Church.

Residential: The communities of Cocoa Pines, Cocoa Woods, and Coventry of Cocoa exist along the northern boundary of SR 524 between Cox Road and Coventry Court. Residential developments of Cocoa Landings, Integra Preserve, and London Cove are in various stages of the approval process and are located along the south side of SR 524 between Cox Road and London Boulevard.

Figure 2-5 Existing Land Use Maps

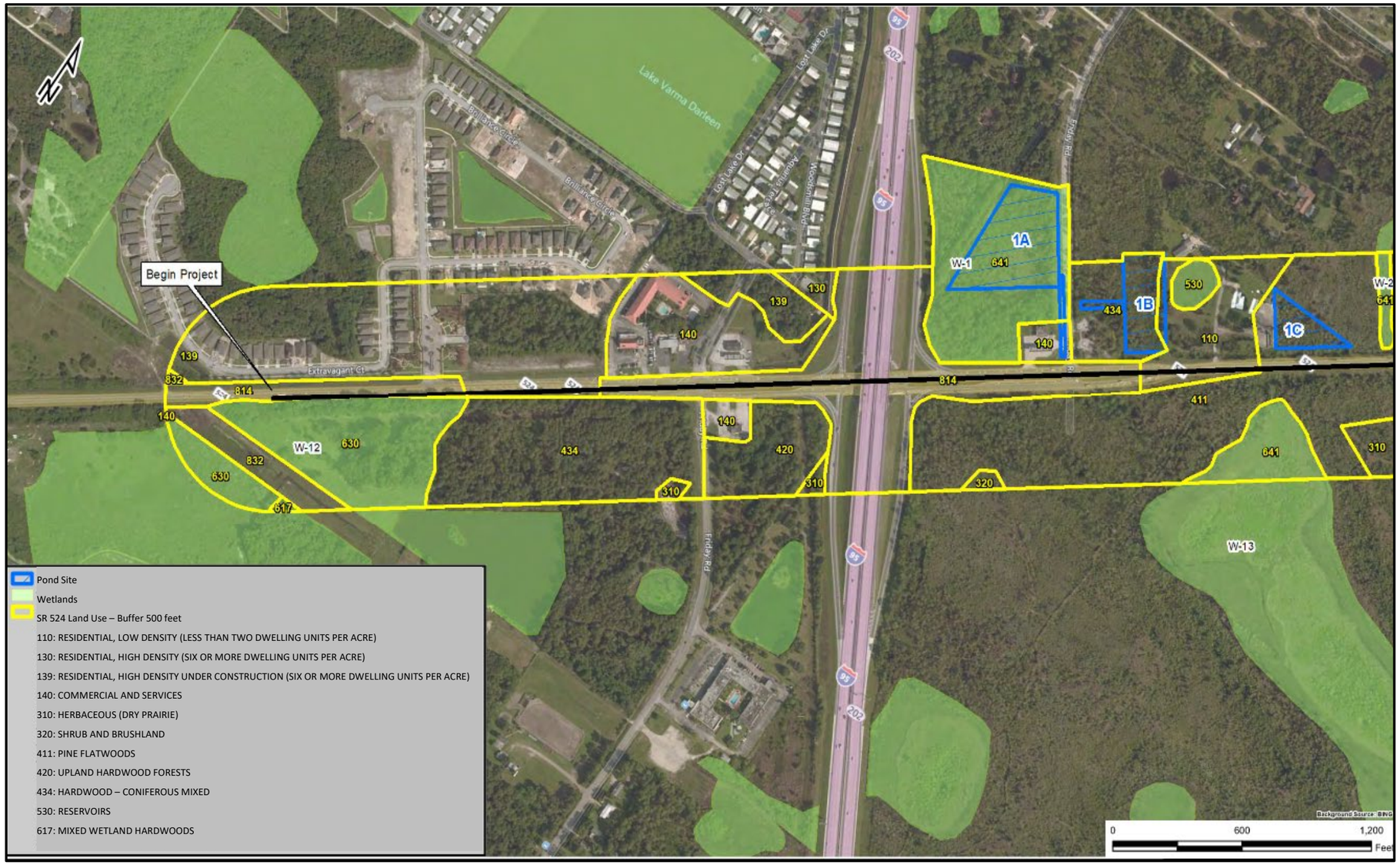


Figure 2-6 Existing Land Use Maps

Figure 2-7 Existing Land Use Maps

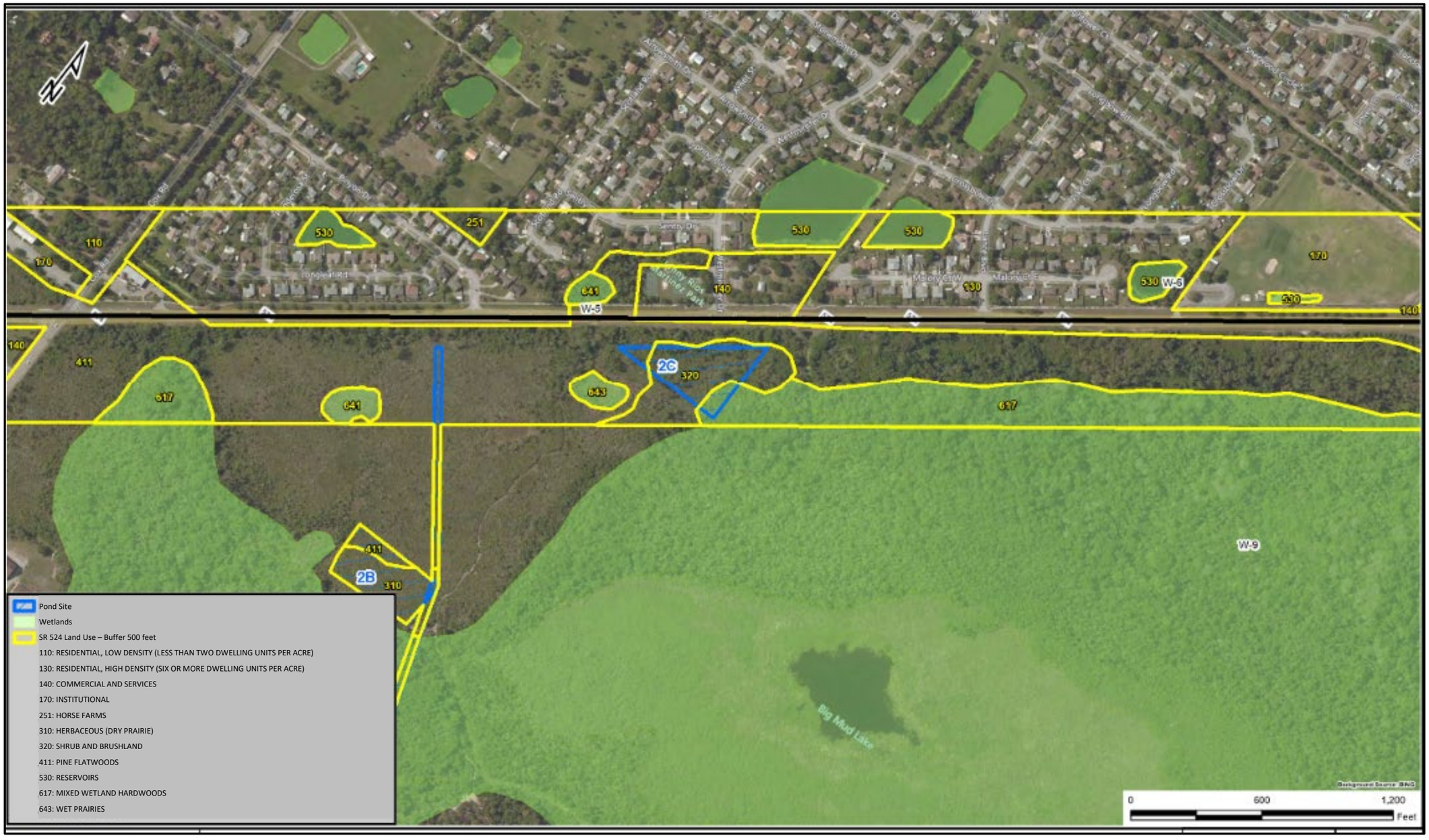


Figure 2-8 Existing Land Use Maps

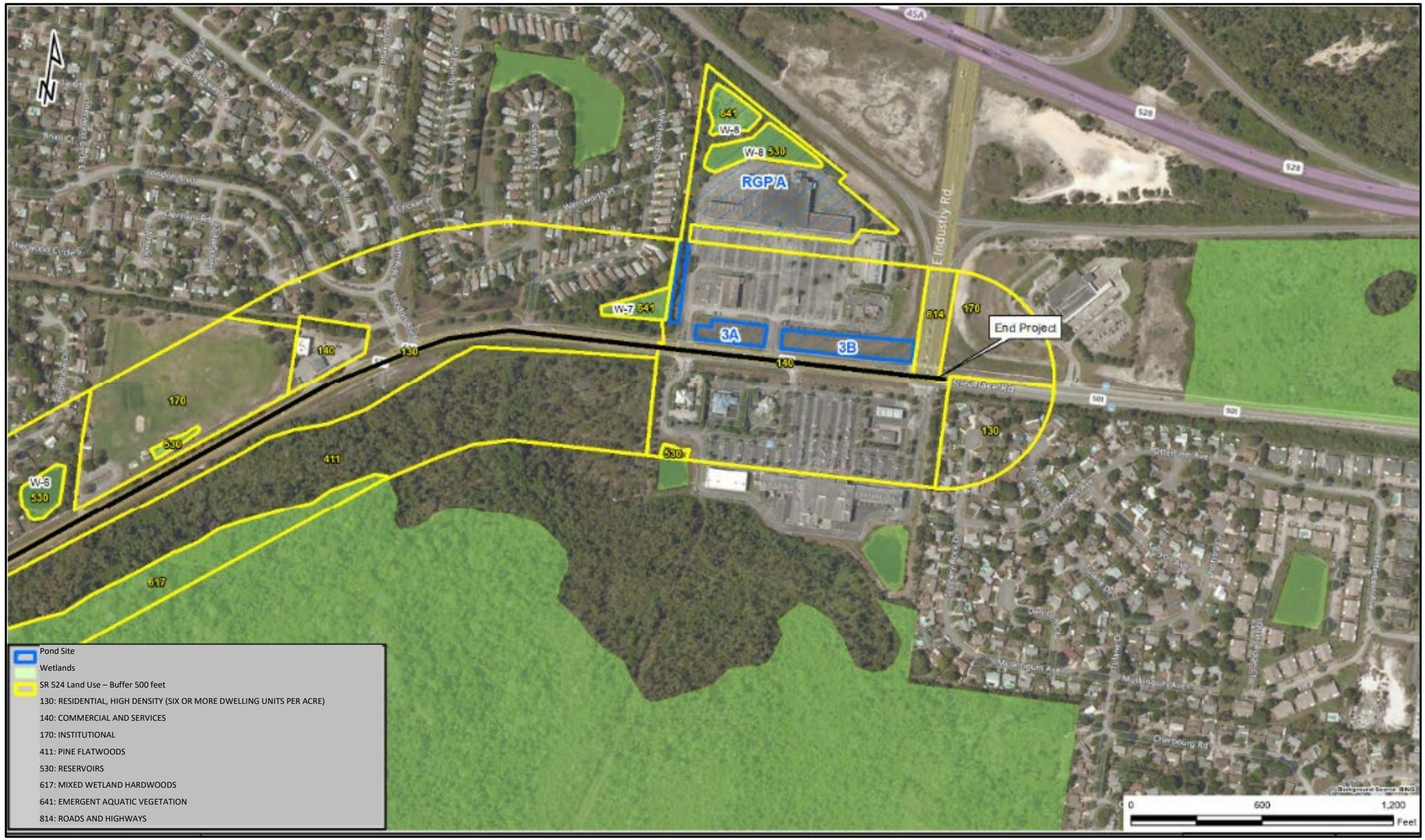
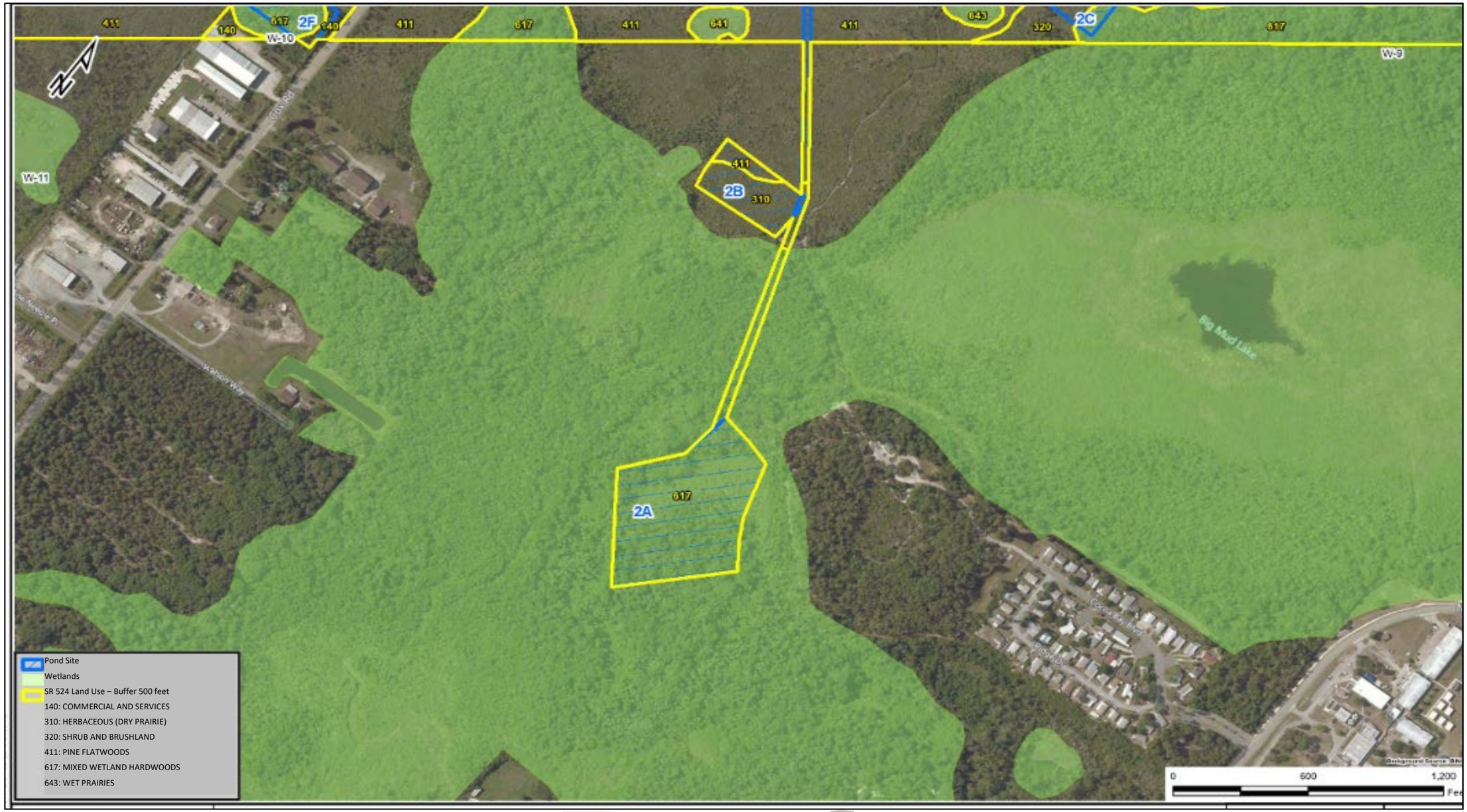


Figure 2-9 Existing Land Use Maps



Commercial: Multiple gas stations are located along the SR 524 corridor, including a BP Station at Friday Road (South), the Flying J and Shell Gas at Friday Road (North), Sunoco Gas at London Boulevard, and 7-Eleven at Industry Road. Along the SR 524 corridor, other commercial sites include the Days Inn, CVS, MacDonalds, and the Publix Shopping Plaza.

Recreational Parks: Junny Rios Martinez Recreational Park is located along the north side of SR 524 at the Westminster Drive intersection on property owned by the City of Cocoa and managed by Brevard County Parks and Recreation Department . The park includes a basketball and tennis court for sporting activities while also providing a playground for children's activities. The Fred Gay Golf Academy is owned by Eastern Florida State College and located along the north side of SR 524 between Lance Boulevard to the west and London Boulevard to the east. The Launch Pad Sports Complex and the Don 'Mo' Stradley Memorial Park are located along Friday Road (South) and SR 520 (King Street), outside the study limits.

2.8 ACCESS MANAGEMENT CLASSIFICATION

Florida Administrative Rule Chapter 14-97 establishes the classifications for state highways and contains separation standards for access features by Access Class. The existing corridor is officially classified by FDOT as Access Classification 3 (between Friday Road (South) and Cox Road) and Access Classification 4 (between Cox Road and Industry Road). The spacing requirements for these classifications are shown on **Table 2-2**.

Table 2-2 Existing Access Management Classification

SR 524 Segment	FDOT Context Classification	Roadway Access Classification	Median Type	Connection Spacing (Feet)		Median Opening Spacing (Feet)		Minimum Signal Spacing (Feet)
				≤45 MPH Posted Speed	>45 MPH Posted Speed	Directional	Full	
1	CRC	3	Restrictive	440	660	1,320	2,640	2,640
2	C3R	4	Non-Restrictive	440	660	N/A	N/A	2,640
3	C3R	4	Non-Restrictive	440	660	N/A	N/A	1,320
4	C3C	4	Non-Restrictive	245	440	N/A	N/A	1,320

2.9 DESIGN AND POSTED SPEEDS

Per record as-built roadway plans (FPID 413586-1-52-01), the design speed is 45 mph along SR 524, while the posted speed varies from 45 MPH between Friday Road (South) and Friday Road (North) to 55 mph between Friday Road (North) and west of London Boulevard to 45 mph between west of London Boulevard to Industry Road. The design and posted speed limits along I-95 are 70 mph and 65 mph, respectively.

2.10 HORIZONTAL AND VERTICAL ALIGNMENTS

Horizontal Alignment

The existing baseline alignment data for SR 524 was provided via survey. SR 524 follows a southwest to northeast alignment in the project limits with a curve to the east at London Boulevard. This alignment is offset north 32-foot from the centerline of ROW. The existing curve data are summarized in **Table 2-3** and are consistent with current standards.

The existing I-95 baseline alignment was also provided via survey. In the project limits, I-95 follows a North 30°19'01" West bearing, which intersects where SR 524 Sta. 188+64.00 = I-95 Sta. 2254+06.75 at an 83°41'58" intersecting angle.

Table 2-3 Existing Horizontal Curve Data

PC Station	PI Station	PT Station	Delta	Degree of Curve
23+45.31	27+98.14	32+22.49	35°05'14"	04°00'00"
Tangent (foot)	**Length (foot)**	**Radius (foot)**	**Super-Elevation**	**Design Speed (mph)**
452.83	877.18	1432.40	+0.061	45

Vertical Alignment

The existing alignment has predominantly level terrain with grades never exceeding 1%. There are no changes in grade exceeding the maximum FDOT design requirements (0.7 for 45 MPH design speed); thus, no existing vertical curves are within the project limits.

2.11 PEDESTRIAN ACCOMMODATIONS

There are two existing pedestrian facilities along the SR 524 corridor. A sidewalk begins east of Cox Road and runs through Industry Road on the north side. West of Coventry Court, this sidewalk hugs the ROW line and is between 7–foot to 8-foot wide. East of Coventry Court, the sidewalk is 7-foot to 12-foot from the edge of the pavement and between 4–foot to 5-foot wide.

On the south side, an existing sidewalk between 4-foot to 5-foot-wide hugs the ROW line between the Cocoa Veterinary Hospital and Industry Road. A proposed commercial and residential development west of the Veterinary Hospital will require additional pedestrian facilities.

I-95 is a limited access facility that does not permit pedestrian traffic.

2.12 BICYCLE FACILITIES

The existing paved shoulder is too small to serve as a bicycle lane in segment 1. The outside paved shoulder in segments 2, 3, and 4 serves as a 4-foot undesignated bicycle lane in both directions along SR 524. I-95 is a limited access facility that does not permit bicycle traffic.

2.13 TRANSIT FACILITIES

The SR 524 project limits lies within the jurisdiction of the Space Coast Area Transit (SCAT) system. Route 6 (Cocoa/Rockledge) and Route 11 (Port St. John) connect SR 524 with Central/South Cocoa/Rockledge and Port St. John respectively. Although Routes 6 and 11 do not traverse the SR 524 corridor, they do serve the east end of the project limits and makes a loop at the Publix Shopping Plaza. For FY 2021, Route 6 had the second-highest ridership numbers among all SCAT routes.

2.14 EXISTING INTERSECTIONS AND TRAFFIC SIGNALS

Within the project limits, thirteen existing side streets intersect with SR 524, eight of which are signalized while the other five are stop controlled. None of the stop-controlled intersections are four-way stop controlled. Table 2-4 summarizes each of these intersections.

Table 2-4 Intersections

Intersection	Signalized
SR 524 and Friday Road (South)	No
SR 524 and I-95 Ramps (West)	Yes
SR 524 and I-95 Ramps (East)	Yes
SR 524 and Friday Road (North)	Yes
SR 524 and Walmart Distribution	Yes
SR 524 and Cox Road	Yes
SR 524 and Pinyon Drive	No
SR 524 and Westminster Drive	No
SR 524 and Lance Boulevard	No
SR 524 and London Boulevard	Yes
SR 524 and Coventry Court	No
SR 524 and Cirrus Drive	Yes
SR 524 and Industry Road	Yes

2.15 RAILROAD CROSSINGS

There are no railroad crossings within the project limits.

2.16 PHYSICAL OR OPERATIONAL RESTRICTIONS

There are no multimodal use lanes, parking or passing restrictions within the limits of this study.

2.17 TRAFFIC DATA AND ROADWAY OPERATIONAL CONDITIONS

2.17.1 Traffic Data

A detailed traffic analysis was conducted and documented in the *Project Traffic Analysis Report* (PTAR, July 2019) and the *Interchange Modification Report* (IMR, January 2022) prepared for this PD&E Study. An analysis of the existing traffic operations included the collection of geometric conditions, daily traffic volumes for SR 524, I-95 Entrance / Exit Ramps, and AM and PM peak hour turning movements at key study intersections. Each intersection's daily year 2019 traffic counts are shown in **Figure 2-10** while their turning volumes are shown in **Figure 2-11**.

The weekday turning movement counts were collected for the intersections between the peak hours of 7:00-9:00 AM, 11:00 AM – 1:00 PM and 4:00-6:00 PM. The traffic count data (volume and classification counts) collected were adjusted utilizing the FDOT axle and seasonal adjustment factors for Brevard County to provide 2019 annual average conditions.

Figure 2-10 Existing Annual Average Daily Traffic

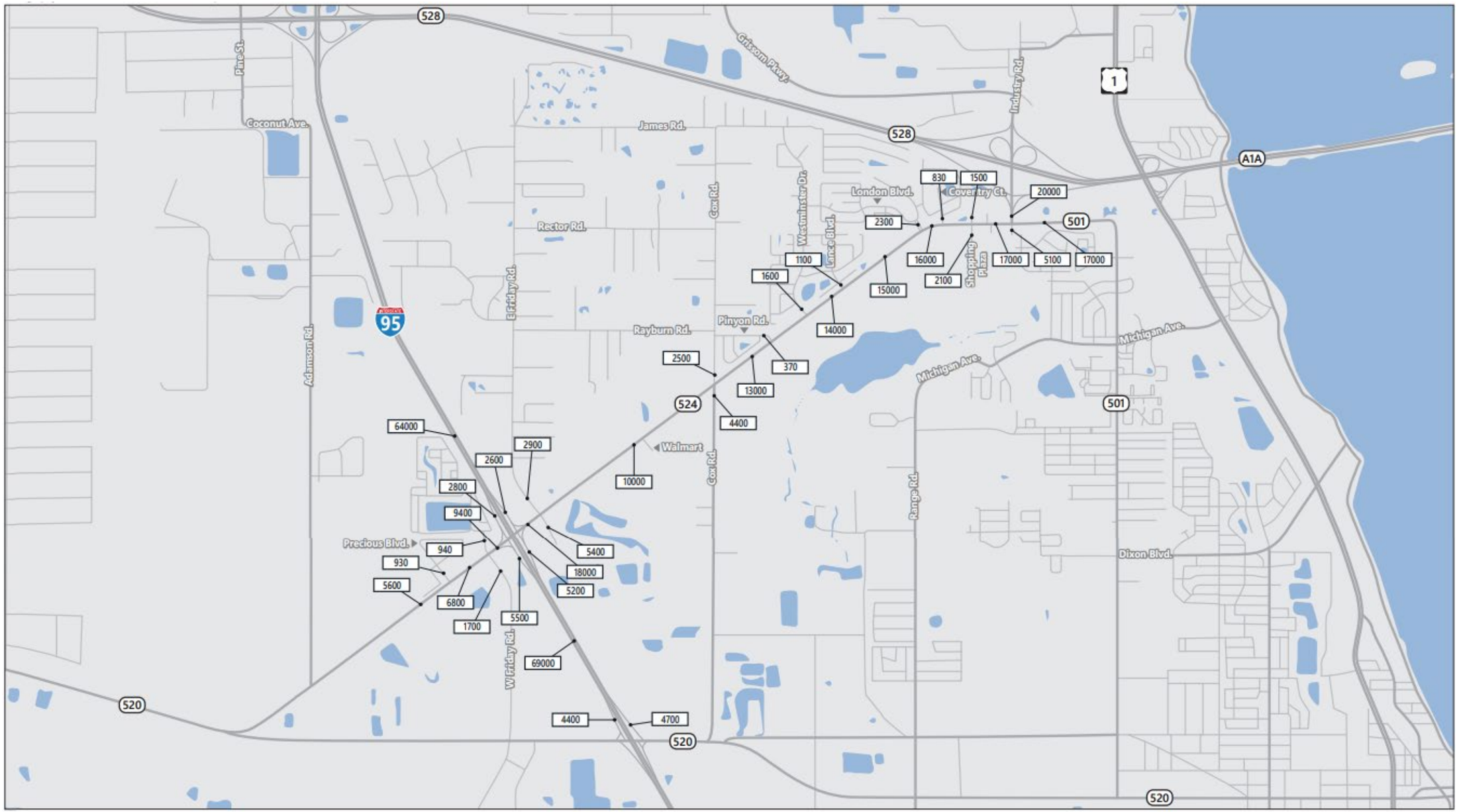
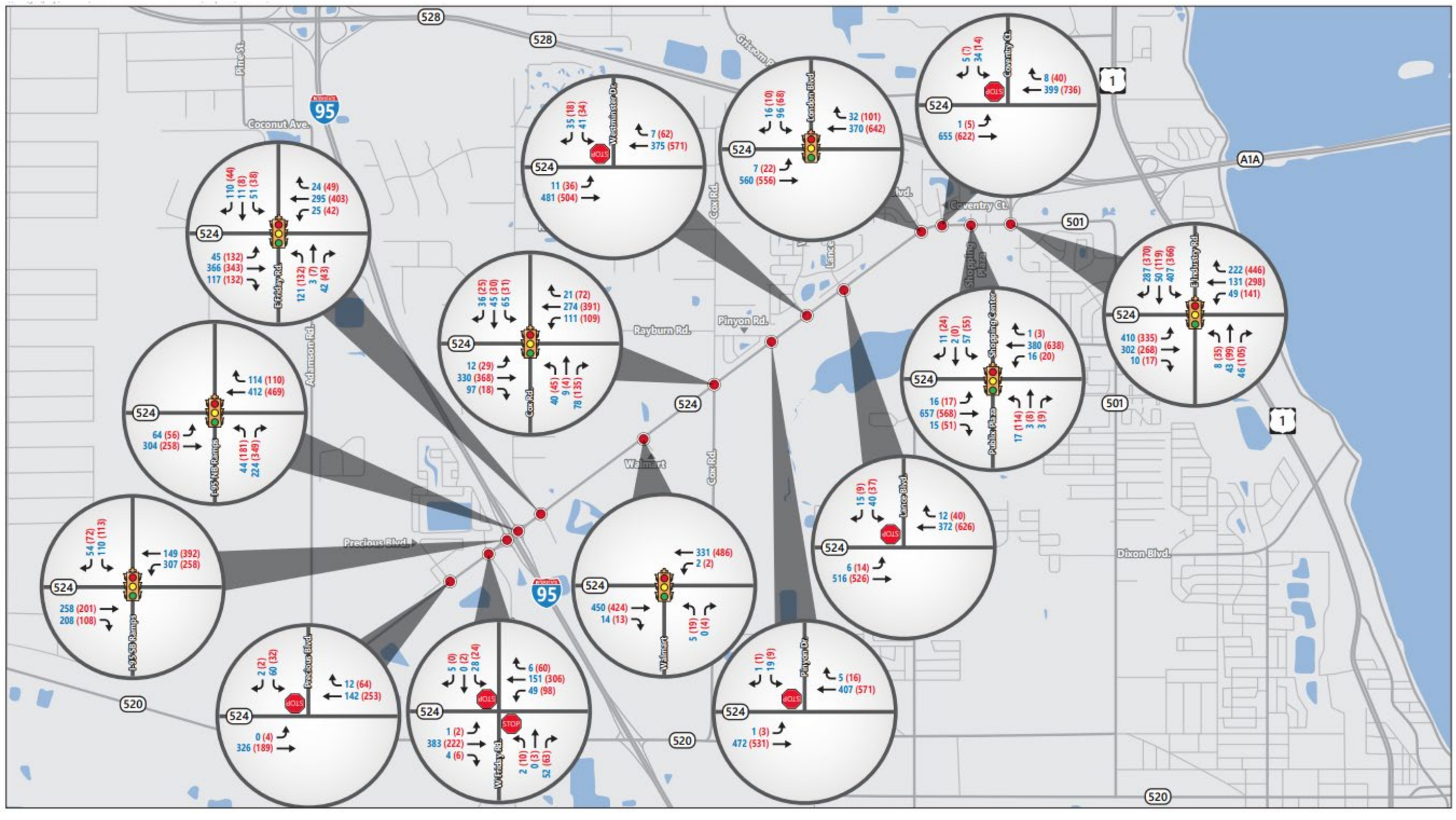


Figure 2-11 Existing Peak Hour Turning Movement Volumes



→ Traffic Movement

AM (PM) Peak Hour Traffic Volumes

N.T.S.

Based on the 48-Hour volume counts and 72-Hour classification counts, peak hour traffic flow (K measured), and directional split (D measured) for the roadways in the study area were derived. The directional split averaged approximately 55%. The measured T factor from the 2019 traffic counts is 18.2%, which is comparable to the T factor from FDOT station 700411 located between Friday Road (North) and Cox Road. Based on comparative analysis of available count information, a daily truck factor T of 18.0% (9.0%) is recommended for SR 524 between W. Friday Road and Cox Road, and a T factor of 11.0% (6%) is recommended for SR 524 between Cox Road and Industry Road. Based on historical T factors, a T factor of 19.0% (10.0%) is recommended for I-95. The adjusted Annual Average Daily Traffic (AADT) volumes for the individual roadway segments are provided in **Figure 2-10**In analyzing the existing operating conditions of the intersections and roadway segments, traffic counts collected from the field during January and February 2019 were used along with the existing roadway and intersection geometry. The actual turning movement volumes collected in the field were balanced and used for the year 2019 LOS analysis for the intersections and roadway segments. The intersection LOS analysis for the existing year 2019 was performed using signal timing data provided by Brevard County.

Intersection levels of service were determined utilizing the Highway Capacity Manual (HCM) 6th edition methodologies within Synchro software. For the study's roadway segments, LOS was determined using arterial speeds from Synchro. The signal timing data provided by Brevard County was used in the intersection LOS analysis for all the signalized intersections.

The year 2019 AM and PM peak hours turning movement volumes along with the year 2019 intersection geometry were used in the intersection LOS analysis. As shown in **Table 2-5**, during the year 2019 AM and PM peak hour conditions, the intersections along SR 524 were observed to be operating at or better than the target LOS (LOS D). Existing peak hour turning movement volumes are shown in **Figure 2-11**.

Table 2-5 Existing Year 2019 Intersection LOS Analysis Summary

Study Intersection	Control Type	Targeted LOS	AM Peak Hour		PM Peak Hour	
			Delay (s)	LOS	Delay (s)	LOS
Precious Boulevard	Stop	D	12.8	B	11.8	B
Friday Road (South)	Stop	D	18.9	C	20.3	C
I-95 SB Ramps	Signal	D	14.2	B	10.8	B
I-95 NB Ramps	Signal	D	15.0	B	16.5	B
Friday Road (North)	Signal	D	25.1	C	22.8	C
Walmart	Signal	D	10.2	B	8.4	A
Cox Road	Signal	D	12.7	B	12.9	B
Pinyon Drive	Stop	D	17.7	C	21.8	C
Westminster Drive	Stop	D	16.3	C	24.4	C
Lance Boulevard	Stop	D	17.9	C	27.5	D
London Boulevard	Signal	D	8.5	A	8.0	A
Coventry Court	Stop	D	23.6	C	33.6	D
Cirrus Drive	Signal	D	11.4	B	13.7	B
Industry Road	Signal	D	36.1	D	41.8	D

The arterial segments' operating conditions were evaluated using Synchro software. The LOS results shown in **Table 2-6** are reported based on the LOS criteria in HCM 6th edition. All existing segments operate within the target LOS D except for the segments between the I-95 SB Ramps and East Friday Road and between Cirrus Drive and Industry

Road. Roadway LOS along SR 524 near the western and eastern limits operating at LOS E or F is anticipated as these parts of the study roadway are defined by closely spaced signalized intersections.

Table 2-6 Existing Year 2019 Arterial LOS Analysis Summary

Segment	Travel Time (Sec.)	Speed (MPH)	LOS	Travel Time (Sec.)	Speed (MPH)	LOS
	Northbound/Eastbound			Southbound/Westbound		
AM						
I-95 SB Ramps to I-95 NB Ramps	18.1	18.9	E	17.1	20.0	D
I-95 NB Ramps to Friday Road (North)	47.0	9.3	F	30.2	14.4	F
Friday Road (North) to Walmart Distribution	46.4	37.2	B	77.6	22.2	C
Walmart Distribution to Cox Road	72.6	29.8	C	49.8	43.5	A
Cox Road to London Boulevard	111.9	41.1	A	111.2	41.4	A
London Boulevard to Cirrus Drive	39.4	22.4	D	33.4	26.4	C
Cirrus Drive to Industry Road	51.5	14.7	F	32.3	22.7	C
Overall	386.9	28.2	C	352.6	30.9	C
PM						
I-95 SB Ramps to I-95 NB Ramps	19.4	17.6	E	17.7	19.6	E
I-95 NB Ramps to Friday Road (North)	38.6	11.3	F	29.8	14.6	F
Friday Road (North) to Walmart Distribution	49.1	35.1	B	81.0	21.3	D
Walmart Distribution to Cox Road	62.3	34.7	B	43.4	49.9	A
Cox Road to London Boulevard	91.5	50.3	A	91.5	50.3	A
London Boulevard to Cirrus Drive	42.9	20.6	D	34.3	25.7	D
Cirrus Drive to Industry Road	54.0	14.0	F	41.0	18.4	E
Overall	357.8	30.5	C	338.7	32.2	C

2.18 CRASH DATA AND SAFETY ANALYSIS

The latest available five years of crash data (January 2019 to December 2023) at the beginning of the PD&E Study along SR 524 was obtained from the S4 Analytics and supplemented with data from the FDOT CARS. Based on the crash data obtained from these databases, a total of 297 crashes occurred within the project limits during the study period.

On average, approximately 59 crashes have occurred per year within the study period. Nearly 82% (243) of the crashes were located at the seven signalized intersections within the project limits. More than 31% of them resulted in injuries. A breakdown of the crashes at the signalized intersections is shown in **Table 2-7**, while the three locations (I-95 SB/NB Ramps, Cox Road, Industry Road) with the highest number of crashes are described in greater detail below.

Table 2-7 Crash Summary by Intersections (Jan 2019 – Dec 2023)

Study Intersection	Total	Fatal	Injury	Property Damage Only	Night	Wet
I-95 Ramps (NB+SB)	100	1	35	64	12	18
Friday Road (North)	15	1	5	9	5	3
Cox Road	30	0	5	25	6	4
London Boulevard	7	0	1	6	1	1
Cirrus Drive	6	0	2	4	1	0
Industry Road	85	0	28	57	15	10
Total	243	2	76	165	40	36

I-95 Ramps (NB and SB) Intersections

This intersection experienced 100 crashes (41.2% of the signalized intersection crashes) during the study period, averaging 20 crashes per year. The majority of these were left-turn crashes (30.0%), followed by angle crashes (28.0%). No bicycle or pedestrian crashes were reported for these intersections. No crosswalks or any pedestrian signal equipment is present at these locations. One fatal crash was reported for this interchange. The fatal crash occurred when a vehicle failed to yield to the ROW while making a left-turn to get on the I-95 northbound on-ramp resulting in a head-on collision.

Cox Road Intersection

This intersection experienced 30 crashes (12.3% of the signalized intersection crashes) averaging five crashes per year within the study period. Most of these crashes were left turn crashes (31.6%) followed by rollover crashes (21.1%). No bicycle or pedestrian-related crashes were reported for this intersection. No crosswalks or any pedestrian-related equipment are present at this intersection. No fatal crashes were reported for this intersection.

Industry Road Intersection

This intersection experienced 85 crashes (35.0% of the signalized intersection crashes) during the study period, averaging 17 crashes per year. The majority of the crashes are rear ends (32.9%), followed by head on (23.5%) and left turns (14.1%). No bicycle or pedestrian-related crashes were reported for this intersection. Crosswalks are present along the three legs of this intersection. No fatal crashes were reported.

Table 2-8 represents the summary of the crashes by crash type. According to the summary and ignoring 'other' type crashes, rear ends accounted for the majority of the crashes (31.0%), followed by left turns (20.2%), head on (18.2%), and angle crashes (8.0%).

Within the project limits, the calculated crash rate in Million Vehicle Miles Traveled (MVMT) is 3.71. In comparison, the statewide average value is 1.29 for suburban 2-lane undivided roadways. The crash rate for this project area is more than 185% higher than for a similar roadway type across the state.

Table 2-8 Crash Summary by Crash Types (Jan 2019 – Dec 2023)

Crash Type	2019	2020*	2021	2022	2023	2019-2023	Per Year	Percent
Angle	2	2	4	5	3	16	3.2	5.4%
Animal	0	0	0	0	0	0	0	-
Bicycle	0	0	0	0	0	0	0	-
Head On	7	9	12	12	14	54	10.8	18.2%
Left Turn	4	9	20	22	5	60	12.0	20.2%
Off Road	1	1	4	1	4	11	2.2	3.7%
Pedestrian	0	0	0	0	0	0	0	-
Rear End	13	18	22	20	19	92	18.4	31.0%
Right Turn	0	0	0	0	0	0	0	--
Rollover	0	0	0	0	1	1	0.2	0.3%
Sideswipe	5	2	4	7	2	20	4.0	3.7%
Unknown	1	0	1	0	0	2	0.4	0.7%
Other	4	9	8	11	8	40	8.0	13.5%
Total	38	50	75	78	56	297	-	100.0%

* Note that year 2020 was during the height of the COVID pandemic

2.19 MANAGED LANES

There are no managed lanes, express lanes nor toll lanes within the limits of the project.

2.20 DRAINAGE AND FLOODPLAINS

The existing drainage and floodplains are documented in the *Pond Siting Report* (May 2023) and in the *Location Hydraulics Report* (May 2023). SR 524 is within the jurisdiction of the St. Johns River Water Management District (SJRWMD). There is no existing stormwater management for the project limits. There are no existing floodways or Outstanding Florida Waters within the limits of the project. The runoff within the project limits is collected by swales or ditches on both sides of the road and then conveyed to cross drains along SR 524. There are seven existing cross drains within the project limits crossing the SR 524 centerline (See **Table 2-9**). The runoff from South Friday Road to Thien Thai Lane is part of the SR 520 Basin. It flows from north to south, then southwest, discharging into the SR 520 outfall ditch and eventually discharging into St. John's River. The runoff from Thien Thai Lane to Cox Road is part of the Pluckebaum Basin. It flows from north to south through swales, ditches, and the Cox Road conveyance system discharging into the Pluckebaum Road outfall ditch and then to the St. John's River. The runoff from Cox Road to Industry Road is part of the Mud Lake Basin. It is conveyed from north to south through swales, ditches, and the Clear Lake conveyance system, outfalling into Mud Lake. Maps showing the existing drainage and floodplains are in **Appendix F**.

The project is located within Federal Emergency Management Agency (FEMA) panels 12009C0425G, dated March 17, 2014, and 12009C0320H, dated January 29, 2021. A letter of map revision (LOMR) determination updated both FEMA FIRM panels, 12009C0425G and 12009C0320H, in the area of the Walmart Distribution Center near the I-95/SR 524 Interchange. The effective date for LOMR determination was July 13, 2021. The existing floodplains does not appear to encroach within the SR 524 ROW except at existing cross drains CD-2, CD-5, and CD-6.

Table 2-9 Summary of Existing Cross Drains

Structure No.	Station	Size	Flow Line Left	Flow Line Right
CD-1	407+00.00	2 - 24″ RCP	20.65 (west) 20.62 (east)	19.61 (west) 19.66 (east)
CD-2	431+00.00	1 - 24″ RCP	21.98	22.33
CD-3	447+00.00	1 - 30″ RCP	20.63	20.92
CD-4	453+98.72	1 - 30″ RCP	19.77	16.73
CD-5	460+43.81	2 - 36″ RCP	17.50 (west) 17.58 (east)	16.94 (west) 16.92 (east)
CD-6	488+65.23	3 - 42″ RCP	15.99 (west) 15.96 (center) 16.13 (east)	15.20 (west) 15.19 (center) 15.26 (east)
CD-7	427+03.17	1 - 24″ RCP	22.76	22.05

2.21 SOILS AND GEOTECHNICAL DATA

A Preliminary Geotechnical Report was prepared in October 2021. The "Soil Survey of Brevard County, Florida," published by the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS), was reviewed for general near-surface soil information within the general project vicinity. This information indicates that there are fifteen soil groups within the vicinity of the proposed project. The general information provided by the SCS for the mapped soil units is summarized in **Table 2-10** and **Figures 2-12** thru **2-15**. Proposed pond sites documented later this report are shown so the map is complete with the project area.

Table 2-10 Soil Classification

Soil Series	Depth (inches)	Unified Classification	USDA Seasonal High Groundwater Table Depth (feet)
2 – Anclote Sand, frequently ponded, 0 to 1% slopes	0 to 80	A-3	0 to 1
28 – Immokalee sand, 0 to 2% slopes	0 to 80	A-3, A-2-4	0.5 to 1.5
7 – Basinger fine sand	0 to 80	A-3	0 to 1.5
30 – Malabar sand, 0 to 2% slopes	0 to 80	A-3	0 to 1
36 – Myakka sand, 0 to 2% slopes	0 to 80	A-3, A-2-4	0 to 1.5
38 – Myakka sand, depressional	0 to 80	A-3, A-2-4	0 to 1.5
43 – Paola fine sand, 0 to 8% slopes	0 to 80	A-3	>6
49 – Pomello sand, 0 to 5% slopes	0 to 80	A-3, A-2-4	1.5 to 4
54 – St. Johns sand, 0 to 2% slopes	0 to 80	A-3	0 to 1.5
55 – St. Johns sand, depressional	0 to 80	A-3	0 to 1
56 – St. Lucie fine sand, 0 to 5% slopes	0 to 80	A-3	>6
57 – St. Lucie fine sand, 5 to 12% slopes	0 to 80	A-3	>6
64 – Terra Ceia muck, frequently flooded	0 to 80	A-3	0 to +2
67 – Tomoka muck, frequently flooded, 0 to 1% slopes	0 to 80	A-3	0 to +2
91 – Anclote sand	0 to 80	A-3	0 to 1

Figure 2-12 USDA Soil Classification Map

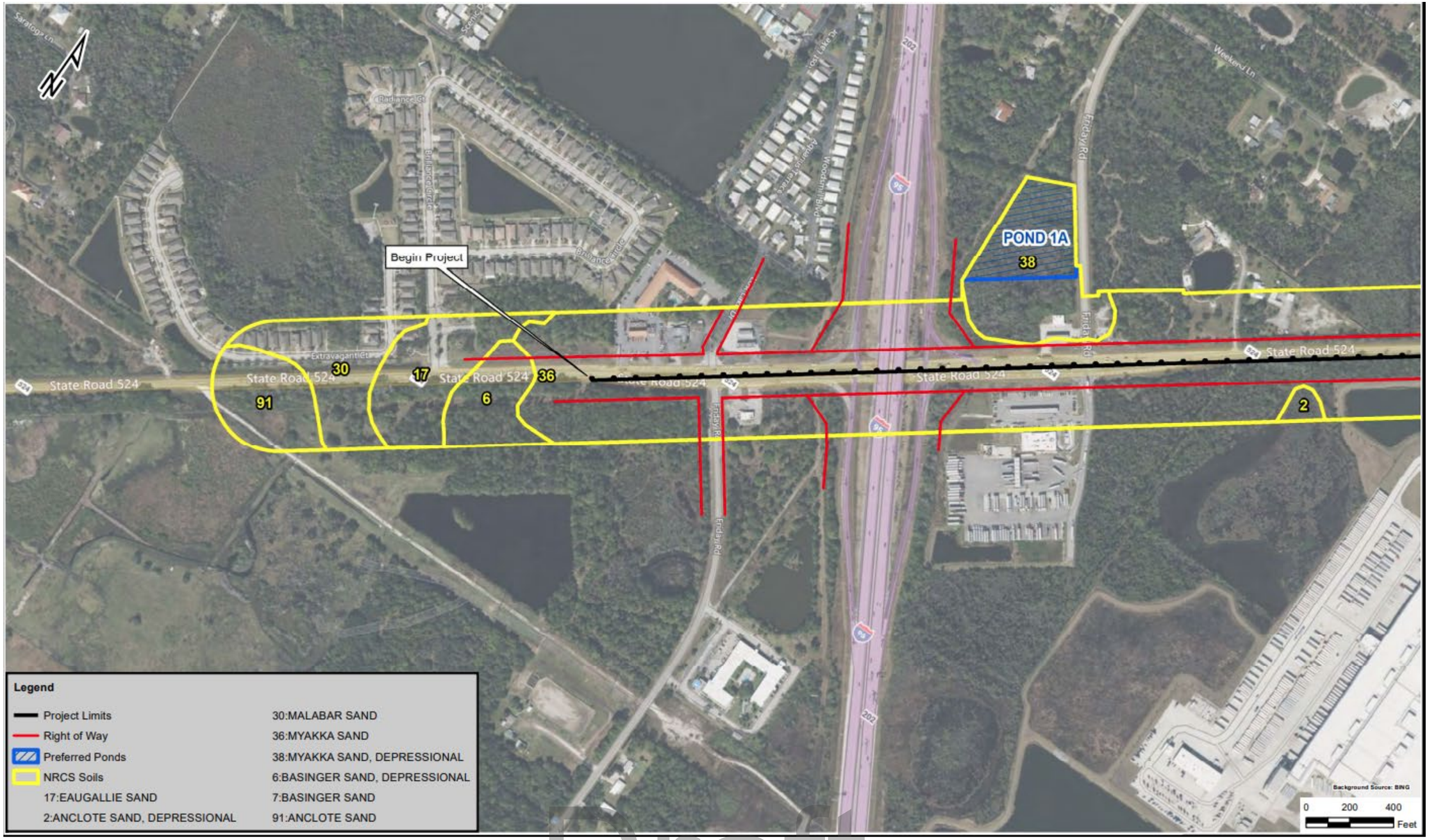


Figure 2-13 USDA Soil Classification Map

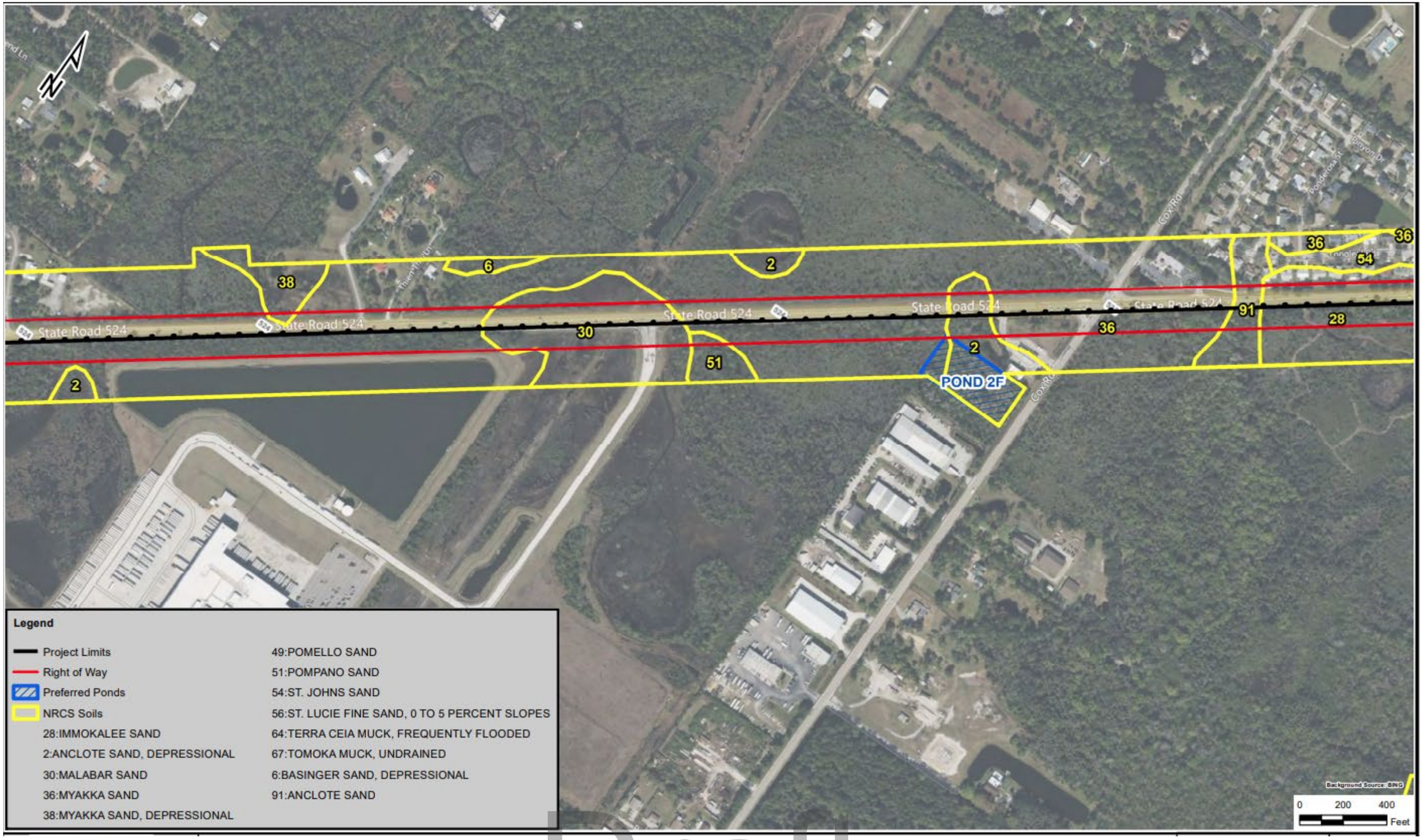


Figure 2-14 USDA Soil Classification Map

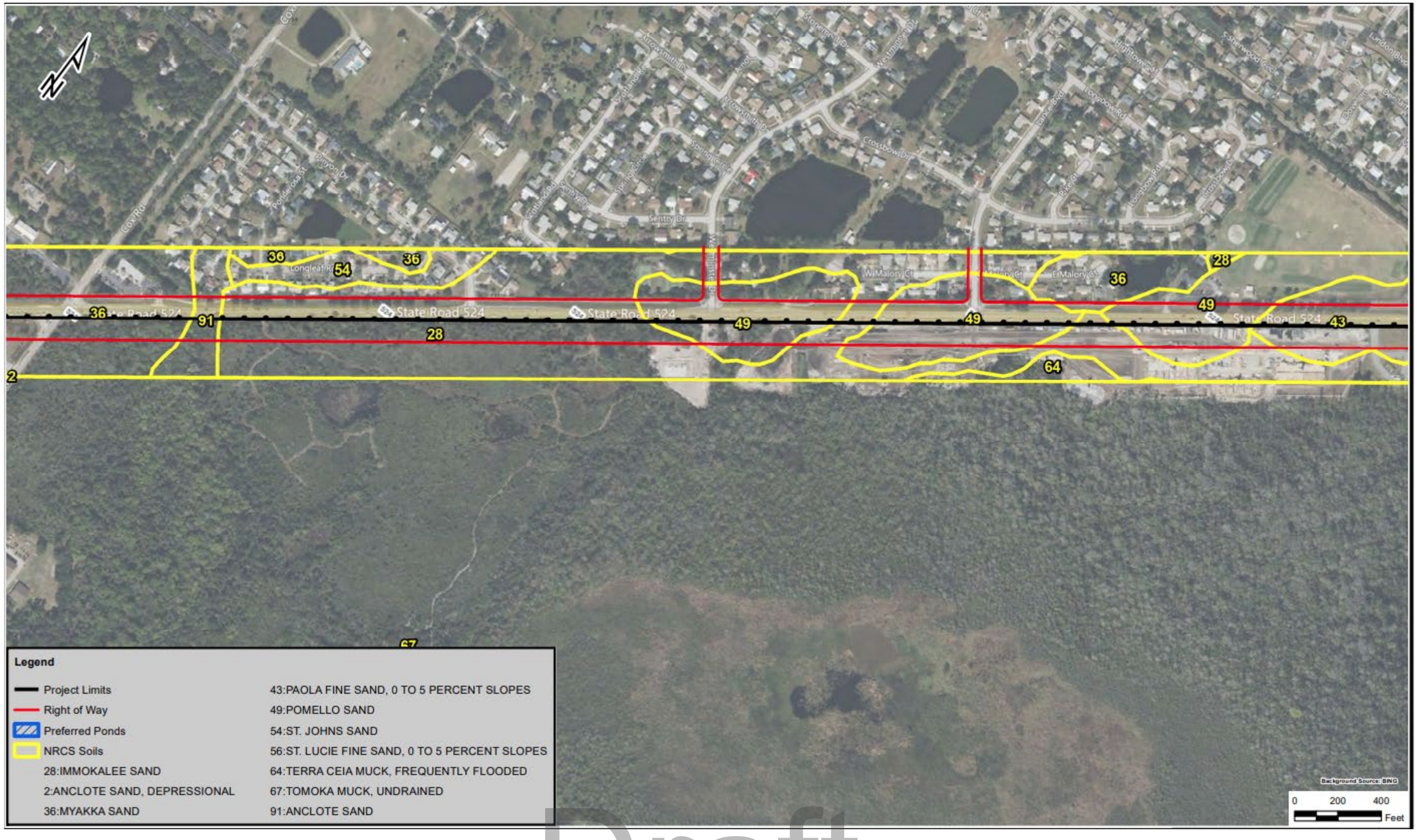
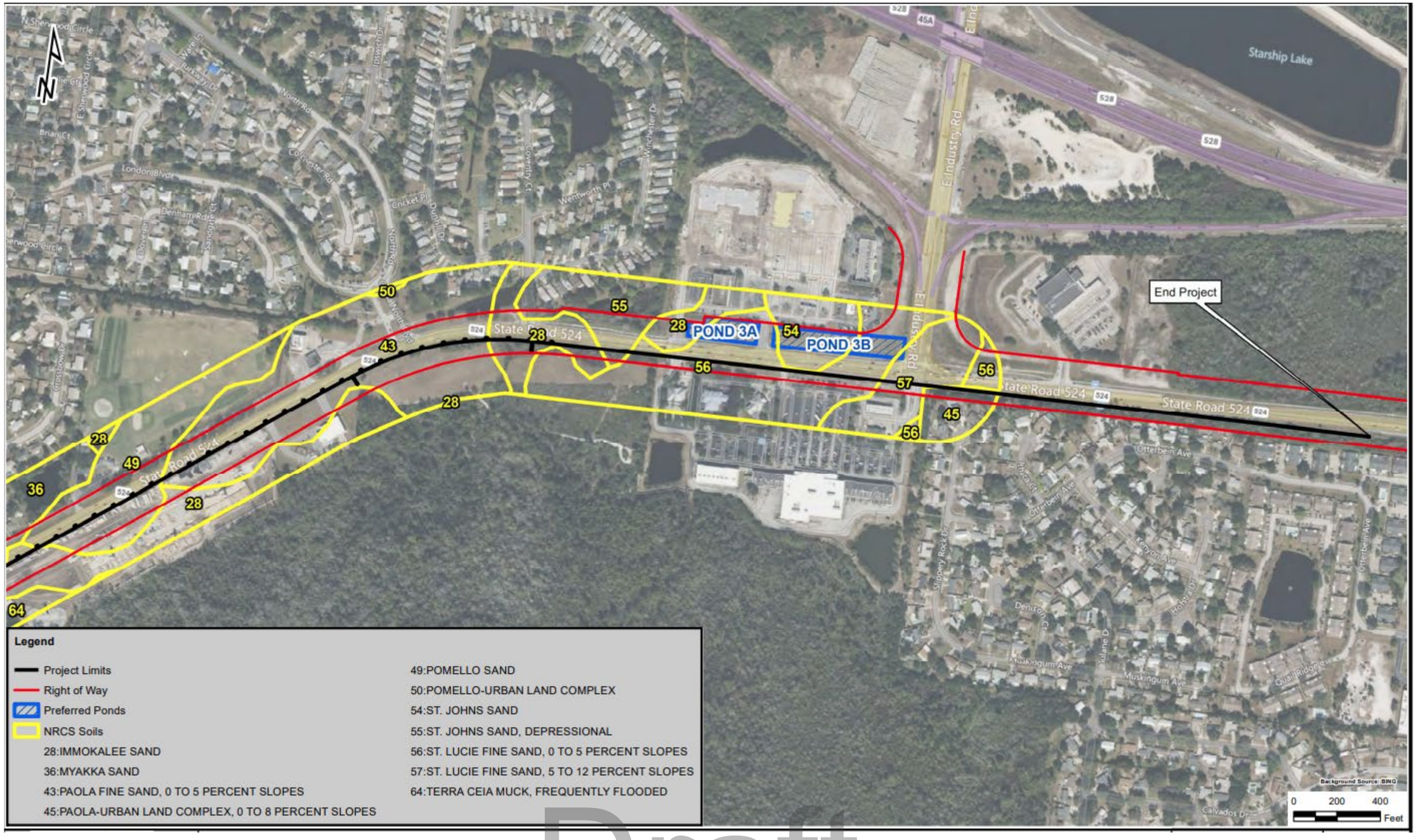


Figure 2-15 USDA Soil Classification Map



2.22 UTILITIES

Preliminary utility coordination and investigation effort was conducted through written and verbal communications with the existing utility owners. A Sunshine 811 Florida Design Ticket System listing of existing utility owners was acquired on October 12, 2021. **Table 2-11** summarizes the utility contact information; **Table 2-12** summarizes the information received from the utility contacts, which can be found in the *Utility Assessment Report* (UAR, April 2022).

Table 2-11 Existing Utility Owners

Agency	Name	Phone Number	Email
AT&T	Luke Folkerts	321.953.6172	LF3290@att.com
Brevard County Public Works	Devin Swanson	321.633.2077	devin.swanson@brevardfl.gov
Charter Communication	Paul Rymer	321.757.6503	paul.rymer@charter.com
City of Cocoa (Water)	Katherine Ennis	321.433.8797	kennis@cocoafl.org
City of Cocoa (Sewer)	Katherine Ennis	321.433.8797	kennis@cocoafl.org
Crown Castle	Chris Perkins	813.947.6009	christopher.perkis@crowncastle.com
Florida Gas Transmission (FGT)	Joseph E. Sanchez	407.838.7171	joseph.e.sanchez@energytransfer.com
Florida City Gas	Holly Coombs	321.638.3419	holly.coombs@nexteraenergy.com
Florida Power and Light	Sue Williams	321.455.6125	andrew.zicker@fpl.com
Verizon (f/k/a MCI)	Timothy Cole	407.618.2078	timothy.cole@verizon.com
Florida Turnpike Traffic (FTE)	Deanna Campbell	407.264.3420	deanna.campbell@dot.state.fl.us
Uniti Fiber, LLC	Bob Mensching	904.718.8152	bob.mensching@uniti.com

2.23 LIGHTING

Corridor lighting does not exist within the SR 524 project limits. Existing lighting along the SR 524 corridor is confined to the I-95 interchange and at the signalized intersection to the entrance of the Walmart distribution center. Lighting at the I-95 interchange consists of conventional aluminum poles lying between the I-95 on- and off-ramps and is maintained by FDOT, while the lighting at the Walmart entrance consists of light poles attached to the existing signalized strain poles that is maintained by Brevard County.

2.24 AESTHETIC FEATURES

There are no aesthetic features including scenic views, decorative lighting, landscaping, vegetation or hardscaping treatments within the project limits. Corridor lighting does not exist within the SR 524 project limits. Several existing residential developments have decorative entrance monument signs with landscaping outside the SR 524 ROW including the communities of Lost Lakes at Friday Road (south), Cocoa Pines at Pinyon Drive, Integra Trails apartment complex opposite Lance Boulevard, and Coventry of Cocoa at Coventry Court.

Table 2-12 Description of Existing Utilities

Utility Type	Utility Owner	Summary of Facilities
Communications / Cable TV / Fiber Optic / Buried Conduit	AT&T	Buried/aerial fiber and buried conduit run parallel along SR 524 on the north and south sides with intermittent breaks between Precious Boulevard and Friday Road (North)(also running parallel down South and North Friday roads). Multiple runs of underground fiber continue east from Friday Road (North) and terminate at the Walmart Distribution Road. Combinations of aerial and underground fiber run parallel to Cox Road on the east side while crossing SR 524. The underground fiber runs outside the project limits through Cocoa Pines until Pinyon Drive, where it comes within the existing ROW and continues at varying offsets on either side of the road to Industry Road. Multiple underground runs continue past Westminster Drive along with varying aerial fiber runs and a buried conduit. All facilities have numerous connections to the residences and businesses along the corridor between Cox Road and Industry Road.
	Charter Communication	Buried fiber runs parallel down Thien Thai Lane and along the north side of SR 524 until Cox Road. Overhead fiber also runs along the FP&L poles on the north side of SR 524 until London Boulevard. Buried fiber runs across SR 524 at the Walmart Distribution Road. Overhead fiber runs along the east side of Cox Road and terminates at the Surfside Community Fellowship building. Seven hundred feet east of Cox Road, the underground fiber picks up on the north side of SR 524 again and continues until Lance Boulevard, where it crosses the road and terminates in the proposed Integra Preserve development. At London Boulevard, underground fiber runs to the south side of SR 524 and continues past Industry Road with various connections to the adjacent businesses. A small section of underground cable also runs along the north side of SR 524 between London Boulevard and Coventry Court.
	Crown Castle	32-count buried fiber cable running north-south parallel to the power lines west of the Walmart Distribution Road. Crown Castle stated they are within an existing easement.
	Verizon	2-2″ HDPE buried fiber running along the south side of SR 524 throughout the project limits.
	FTE Turnpike	Buried facilities are present along the Martin Anderson Beachline Expressway (SR 528) and the associated on and off-ramps outside this study's limits.
	Uniti Fiber	Buried fiber running parallel to I-95 in the northwest quadrant. Buried fiber crossing SR 524 roughly halfway between Westminster Drive and Lance Boulevard. Both runs are not expected to conflict.
Water / Sewer	City of Cocoa	An 18″ reclaimed water line runs along SR 524 between Industry Road and Cox Road. In addition, water mains run along SR 524 between South and North Friday Roads. Various water and sewer connections to the residential and commercial properties exist between Lance Boulevard and Industry Road; however, these are largely outside the existing ROW.
Electric	FP&L	23 kV overhead electric lines run on the north side of SR 524 from Precious Boulevard for 1.25 miles. Then, the overhead line changes to 13 kV and continues to London Boulevard, crossing to the south side of SR 524 until Industry Road. There are various secondary overhead and buried connections from the primary line to residential and commercial properties.
Gas	Florida City Gas	2″ steel gas main running parallel along the westernmost Days Inn driveway. The main crosses SR 524 and runs along 524's south side until it turns and runs parallel to Friday Road (South) on the west side. An 8″ steel gas main runs along the west side of Cox Road towards SR 524 and then runs parallel along SR 524 on the south side until Industry Road.
	FGT	8-inch Gas transmission line is located within a 30' FGT easement that crosses SR 524 and runs through the Cocoa Veterinary Hospital, PNC Bank, and Publix properties. A 26-inch gas transmission pipe also runs parallel to I-95 on the west side and crosses SR 524.

2.25 EXISTING ITS INFRASTRUCTURE

The following describes the existing ITS infrastructure within the SR 524 project limits. **Figure 2-16** illustrates the existing ITS infrastructure.

Fiber optic communications: Enables communication between ITS field devices and agency operators at a central location (e.g., Traffic Management Center or Traffic Operations Center). Fiber also enables advanced data collection, signal control, and other operations due to its increased bandwidth.

Fiber is present along most of the SR 524 PD&E project limits, from the I-95 southbound ramps east to Industry Road.

Advanced Transportation Controller (ATC) Devices: These controllers enable advanced traffic signal functionality, including signal phasing, vehicle detection processing, coordination, preemption, communications, and operation.

The SR 524 project limits intersections are equipped with Trafficware 980 ATC Traffic Signal Controllers. These devices may need to be upgraded to enable full functionality with their processor. This upgrade may entail upgrading the processor within the ATC controller or upgrading the entire controller.

Closed-Circuit Television (CCTV) Cameras: Enable operators to view intersections or long stretches of a corridor remotely. The cameras can pan, tilt, and zoom, allowing users to view traffic patterns, respond to incidents, adjust traffic signal timings, and verify operations of other ITS devices.

There are two CCTV cameras within the SR 524 project area. One is at the I-95 northbound on-ramp, and the other is at the Cox Road intersection.

Blank Out Signs: Blank out signs can provide basic instructions to travelers, including lane closures and detour routing. These signs do not offer the same flexibility as Arterial Dynamic Message Signs (ADMS), but they can provide targeted information for specific scenarios such as detours. There are five blank-out signs located along the SR 524 corridor. Three devices are located at the Cox Road intersection; two are located at the Industry Road intersection.

2.26 TRAFFIC SIGNS

There are existing guide signs in advance of the I-95 ramp intersections and the signalized intersection at Industry Road. There are two cantilevered traffic signs in the project area along I-95, shown in **Figures 2-17** and **2-18**.

Figure 2-16 Existing ITS Infrastructure

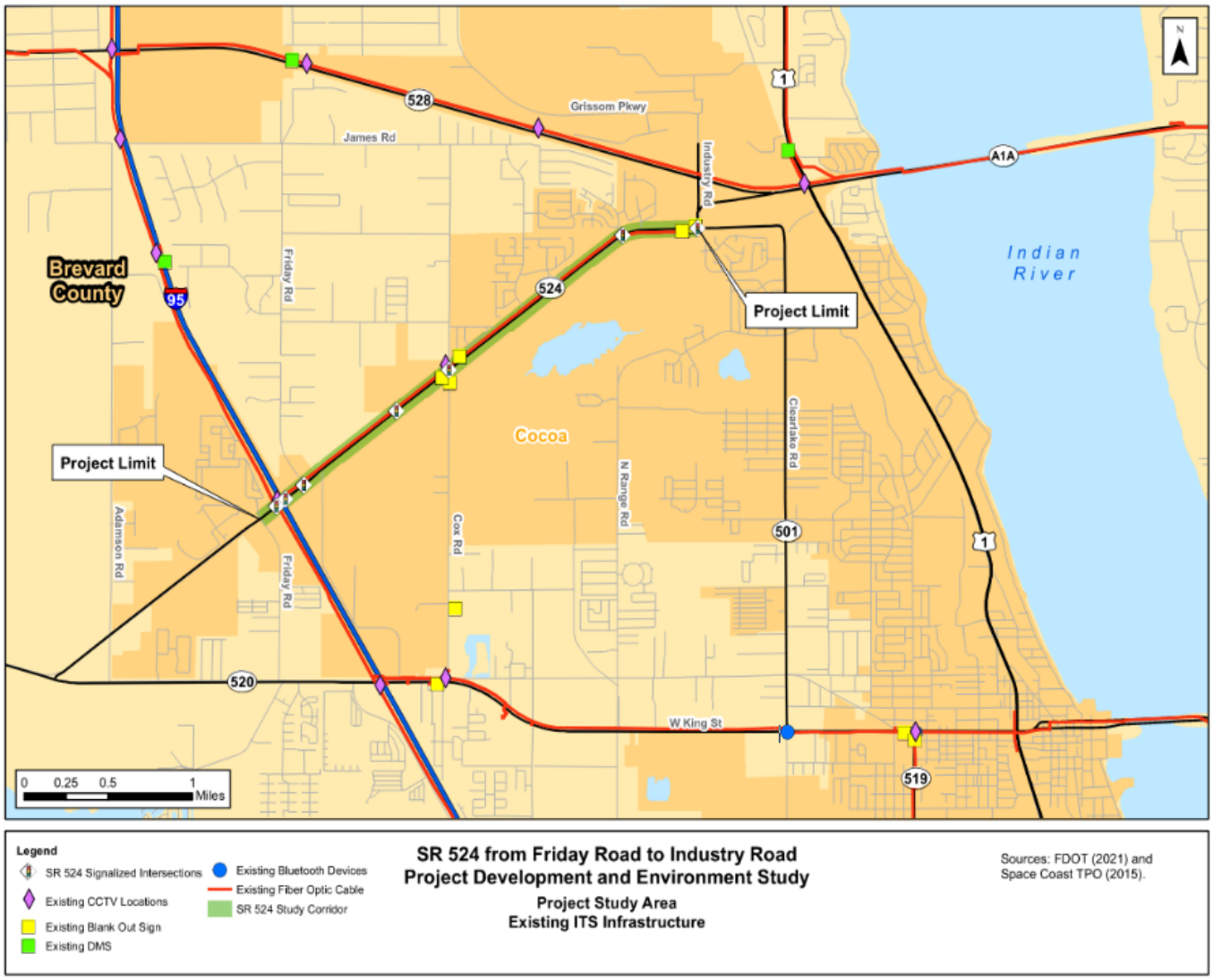


Figure 2-17 Southbound I-95 Off Ramp Exit Sign

Figure 2-18 Northbound I-95 Off Ramp Exit Sign

2.27 EXISTING STRUCTURES

The I-95 overpass consists of two separate bridges (Bridge Numbers 700054 [SB] and 700128 [NB]) that were originally built in 1966 and widened to the inside in 2009. **Table 2-13** summarizes information from the existing bridge plans and the Bridge Inspection Reports dated January 21, 2021.

Table 2-13 Existing Bridges

Item	Southbound I-95 over SR 524	Northbound I-95 over SR 524
Bridge Structure Number	700054	700128
Bridge Crosses	Over SR 524	Over SR 524
Average Daily Traffic	34,500	34,500
Bridge Length	187′-2″	187′-2″
Number of Spans	4 Spans	4 Spans
Span Arrangements	37′-7″, 56′-0″, 56′-0″, 37′-7″	37′-7″, 56′-0″, 56′-0″, 37′-7″
Deck Width	67.5′	67.5′
Typical Section Elements	3 lanes at 12′, Outside shoulder at 15′, Inside Shoulder ~13′	3 lanes at 12′, Outside shoulder at 15′, Inside Shoulder ~13′
Vertical Clearance	16′-0.5″	16-‘0.5″
Horizontal Clearance	Piers Protected by Barrier Walls	Piers Protected by Barrier Walls
Superstructure Type	Concrete - AASHTO Type II or AASHTO Type II Modified	Concrete - AASHTO Type II or AASHTO Type II Modified
Sufficiency Rating	98.0	98.0
Bridge Health Index	97.29	97.58
Year Built	1966	1966
Year Widened	2009	2009
NBI Deck Rating	6 (Satisfactory)	7 (Good)
NBI Superstructure	6 (Satisfactory)	7 (Good)
NBI Substructure	7 (Good)	7 (Good)
Bridge Railing	Meets FDOT standard◆	Meets FDOT standard◆
Mean High Water	N/A	N/A
Scour Evaluation	N/A	N/A
Inventory Rating (HS)	Open, No Restriction	Open, No Restriction
Operating Rating (HS)	Open, No Restriction	Open, No Restriction
Posting	Not Posted	Not Posted
◆ Per FDOT Structures Design Manual 6.7.4		

Per the latest inspection reports, the existing I-95 southbound bridge has outstanding work-order items that must be addressed, including:

- Replacing all 40 original elastomeric bearings.
- Repair spall in the top face of Span 3 west barrier near Pier 3.
- Repair tears in Pier 2 joint sealant in lane 3; deficiency is recurring.

Per the latest inspection reports, the existing I-95 northbound bridge has outstanding work-order items that must be addressed, including:

- Replacing all 40 original elastomeric bearings.
- Install barrier-mounted reflectors along both barriers.

Both existing bridges are structurally adequate, as indicated by their Sufficiency Rating of above 95. The Sufficiency Rating also considers serviceability and functional obsolescence factors, and public use factors, per the Federal Highway Administration (FHWA) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges.

The Bridge Health Index (BHI) is a tool that measures bridge performance based on the overall condition of the bridge and typically involves the evaluation of 10 to 12 different bridge elements by the FDOT. A lower BHI suggests work may be required to improve a bridge to an ideal condition. A BHI below 85 generally indicates that some repairs are needed, although it does not mean the bridge is unsafe. A low BHI may also be influential in the decision to replace the bridge versus repair it. For both bridges evaluated in this report, the BHI is well above 85, which indicates that the bridges are in good condition and will only require small repairs. There have been no documented security concerns with these bridges.

Existing cantilever sign structures are noted in **Section 2.26**.

2.28 NOISE AND PERIMETER WALLS

There are no existing noise walls nor perimeter walls within the project limits along SR 524. There is an existing noise barrier located along the I-95 southbound off-ramp adjacent to the Lost Lakes community

2.29 EXISTING ENVIRONMENTAL FEATURES

2.29.1 Cultural Features and Community Facilities

Cultural features and community services were identified through field review and desktop analysis of Geographic Information System (GIS) data. Within the immediately adjacent areas of the project study area, SR 524 contains existing community facilities and cultural sites such as medical facilities/hospitals, fire and rescue services, religious centers, federal post office, parks and recreation facilities, and other cultural features. These facilities are shown in the concept plans in **Appendix C**.

Parks and Recreational Facilities

Several parks and recreational facilities exist immediately adjacent to SR 524 and within the surrounding project study area. For example, Junny Rios Martinez Park and the Fred Gay Golf Academy are located immediately adjacent to the SR 524 corridor, while the Launch Pad Sports Complex is located along Friday Road (South).

Schools

The schools closest to the project study area include Eastern Florida State College and Cocoa High School, which are located just west of SR 501 (Clearlake Road). They do not directly access SR 524 and are outside the study area.

Religious Institutions

Multiple religious facilities are located along the SR 524 corridor or down a side street. They include the Dieu Nhan Buddhist Monastery, the New Hope Fellowship, the Surfside Community Fellowship, and the Cocoa Seventh-Day Adventist Church.

Medical and Emergency Health

The Smiles Dental Design and Cocoa Veterinary Hospital are located at Cox Road and within the Publix Shopping Plaza. No major emergency facilities were identified in the study area.

Fire, Rescue, and Police

The City of Cocoa Fire Department's Station 3 is located along the south side of SR 524, just west of the London Boulevard intersection. No other fire or police services were identified in the project study area.

Other Public Buildings/Facilities

The United States (US) Post Office is located on the northeast corner of SR 524 and Industry Road, while the Brevard Museum of History and Natural Science is located just west of SR 501 (Clearlake Road).

Evacuation Routes/Emergency Services

The designated evacuation routes for this area include I-95, SR 528, SR 520, US 1, and SR 524.

2.29.2 Archaeological and Historical Sites

A *Cultural Resource Assessment Survey* (CRAS, July 2020) was completed as part of this PD&E Study. The CRAS included archaeological and architectural surveys within the Area of Potential Effect (APE). The APE for the roadway corridor was defined as the maximum SR 524 ROW, incorporating all potential alternatives, extended to the back or side property lines of parcels adjacent to the proposed new ROW, or a distance of no more than 328-foot (100 meters) from the maximum ROW line to encompass all potential improvements. The APE was defined as the pond footprint with an additional 100-foot (30.5-meter) buffer for the proposed ponds. The archaeological survey was conducted within the existing and proposed right-of-way and within the pond footprints. The historic structure survey was conducted within the entire SR 524 Improvements APE and SR 524 Improvements Ponds APE.

The archaeological field survey included visual reconnaissance and intensive systematic subsurface examination of the project ROW and pond footprints. A total of 75 shovel tests were excavated, with three shovel tests positive for cultural material, resulting in the identification of one newly recorded prehistoric archaeological site, Cocoa Hill (8BR04221). This site was identified approximately ¼ mile south of SR 524 and ½ mile east of Cox Road. The narrow footprint limited delineation of the site to a single transect of shovel tests. Although the shovel tests produced a moderate to high density of prehistoric cultural materials, including 164 pottery shards, 37 charcoal fragments, and two animal bone fragments, the nature of the artifact assemblage is unexceptional. Considering the lack of stone tools, diagnostic artifacts, subsurface features, and evidence of occupation during multiple periods, it does not appear that the archaeological deposits within Cocoa Hill (8BR04221), as expressed within the current project limits, have the potential to yield further information important in the prehistory of the region.

The architectural survey identified and evaluated six historic resources within the SR 524 Improvements APE and SR 524 Improvements Ponds APE, including one previously recorded resource and five newly recorded resources. The previously recorded historic resource is a structure, 2921 Slippery Rock Drive (8BR03331). The newly recorded historic resources include one resource group – State Road 524 (8BR04195) and four structures (8BR04196-8BR04198 and 8BR04214) located at 5580, 5550, 5555 and 5600 State Road 524 respectively. None of the historic resources are considered eligible for listing on the National Register of Historic Places. The State Historic Preservation Officer concurred with this determination on October 2, 2020.

2.29.3 Wetlands and Surface Water

Wetland community types found within the SR 524 study area consist of Mixed Wetland Hardwoods, Wetland Forested Mixed, Freshwater Marsh, Wet Prairie, and Emergent Aquatic Vegetation. The wetland areas are shown on the existing land-use maps in **Figures 2-5** through **2-9**.

2.29.4 Protected Species

Information regarding the occurrence, or likelihood of occurrence, for protected species was gathered for the project area to comply with these federal and state regulations is documented in the *Natural Resources Evaluation* (NRE-March 2025). A literature review was conducted to identify those species classified by United States Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) as being Endangered, Threatened, or Species of Special Concern within the project corridor. In addition to the literature review, the Florida Natural Areas Inventory (FNAI), USFWS, and FWC databases were consulted regarding the current state and federally protected wildlife species known or have the potential to occur within certain habitats found in the project area.

Field reconnaissance to assess the potential occurrence of protected species within the study corridor was conducted in April 2019, February 2020 and September 2024 by a team of two environmental scientists. They conducted wildlife observations by recognizing tracts, scat, calls, and other visual observations. The purpose of the reconnaissance was to evaluate the project area for the presence of protected flora and fauna. The available habitat, habitat preferences, or critical habitat, if applicable, for these species, as well as others not expressly protected but managed through state or federal laws, such as Florida black bear (Ursus americanus floridanus) and bald eagle (Haliaeetus leucocephalus), were also evaluated throughout the project area. A summary of protected wildlife species and their potential for occurrence within the project corridor and surrounding area is provided in **Table 2-14**.

Table 2-14 Protected Wildlife Species

Scientific Name	Common Name	Potential for Occurrence	Federal or State Listing	Protection Status
Reptiles				
Drymarchon corais couperi	Eastern Indigo Snake	Low	Both	Threatened
Gopherus polyphemus	Gopher Tortoise	Low	State	Threatened
Pituophis melanoleucus	Florida pine snake	Low	State	Threatened
Drymarchon corais couperi	Eastern Indigo Snake	Low	Both	Threatened
Birds				
Aphelocoma coerulescens	Florida scrub-jay	None	Both	Threatened
Athene cunicularia floridana	Florida burrowing owl	Low	State	Threatened
Caracara cheriway	Audubon's crested caracara	Low	Both	Threatened
Egretta caerulea	Little blue heron	Moderate	State	Threatened
Egretta tricolor	Tricolored heron	Moderate	State	Threatened
Falco sparverius paulus	Southeastern American kestrel	Low	State	Threatened
Grus canadensis	Florida sandhill crane	Low	State	Threatened
Haliaeetus leucocephalus	Bald eagle	Low	Federal	Managed*
Mycteria americana	Wood stork	Low	Both	Threatened
Grus canadensis	Florida sandhill crane	Low	State	Threatened
Haliaeetus leucocephalus	Bald eagle	Low	Federal	Managed*
Mycteria americana	Wood stork	Low	Both	Threatened
Mammals				
Ursus americanus floridanus	Florida black bear	Low	State	Managed**
Insects				
Danaus plexippus	Monarch butterfly	Low	Federal	Candidate
*Bald and Golden Eagle Protection Act, 16 U.S.C. 668-668c **Florida's Endangered and Threatened Species Rule, 68A-27, F.A.C.				

All project roadway alternatives and stormwater pond sites were surveyed for protected plants (See **Table 2-15**).

Table 2-15 Protected Plant Species

Scientific Name	Common Name	Potential for Occurrence	Federal or State Listing	Protection Status
Sporobolus vaseyi	Curtiss' sandgrass	Low	State	Threatened
Calopogon mutliflorus	Many-flowered grass-pink	Low	State	Threatened
Carex tenax	Chapman's sedge	Low	State	Threatened
Centosema arenicola	Sand butterfly pea	Low	State	Endangered
Euphorbia cumulicola	Sand-dune spurge	Low	State	Endangered
Conradina brevifolia	Short-leave rosemary	Low	Both	Endangered
Conradina grandiflora	Large-flowered rosemary	Low	State	Threatened
Asimina pulchellus	Beautiful pawpaw	Low	Both	Endangered
Dicerandra thinicola	Titusville balm	Low	State	Endangered
Glandularia maritima	Coastal vervain	Low	State	Endangered
Glandularia tampensis	Tampa berbain	Low	State	Endangered
Lechea cernua	Nodding pinweed	Low	State	Threatened
Lechea divaricata	Pine pinweed	Low	State	Endangered
Linum carteri var. smallii	Small's flax	Low	State	Endangered
Nemastylis floridana	Celestial lily	Low	State	Endangered
Nolina atopocarpa	Florida's beargrass	Low	State	Threatened
Coleataenia abscissa	Cutthroat grass	Low	State	Endangered
Polygala lewtonii	Lewton's Polygala	Low	Both	Endangered
Orthochilus ecristata	Giant orchid	Low	State	Threatened
Warea carteri	Carter's Mustard	Low	Both	Endangered

2.29.5 Farmland

A review was conducted of the ETDM environmental screening tool run in February 2018. The Natural Resources Conservation Service (NRCS) assigned a minimal degree of effect for this issue because the project is strictly a widening effort and is within the Palm Bay-Melbourne Urbanized Area. A Farmland Conversion Impact Rating form NRCS-CPA-106 was completed for the project with input from NRCS on December 16, 2024. There are approximately 48 acres of prime and unique farmland within the study area. Based on the scoring in the NRCS-CPA-106 form, no further coordination was needed and no additional corridors or alternatives need to be evaluated.

2.29.6 Noise Sensitive Sites

This project meets the a Type I project under *23 CFR Part 772*, which is defined as a highway construction project on new location or a physical alteration of an existing highway which substantially changes horizontal and vertical alignment, profile or adds a through lane(s). Through the SR 524 study corridor, land use is a mixture of low and medium-density residential (Category B), recreational and institutional (Category C), lodging and retail (Category E), agriculture (Category F), and undeveloped lands (Category G). No land uses in the study corridor warrant an Activity Category A analysis. Analysis of interior (Category D) noise levels was not required for this project as all Category C locations have areas of exterior use. Records searches for active building permits within the corridor have been conducted. As of the date of this report, the searches have not identified any active permits for buildings that would be considered noise sensitive.

For this PD&E Study, as documented in the *Noise Study Report* (September 2024), 149 noise-sensitive sites were analyzed for project-related impacts. Due to the number of receptors, the analysis divided the study corridor into twelve Noise Study Areas (NSA). The reporting of project noise levels was further simplified by using representative receptors within each NSA to represent Common Noise Environments (CNE), which FDOT defines as a group of receptors within the same Activity Category that are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features.

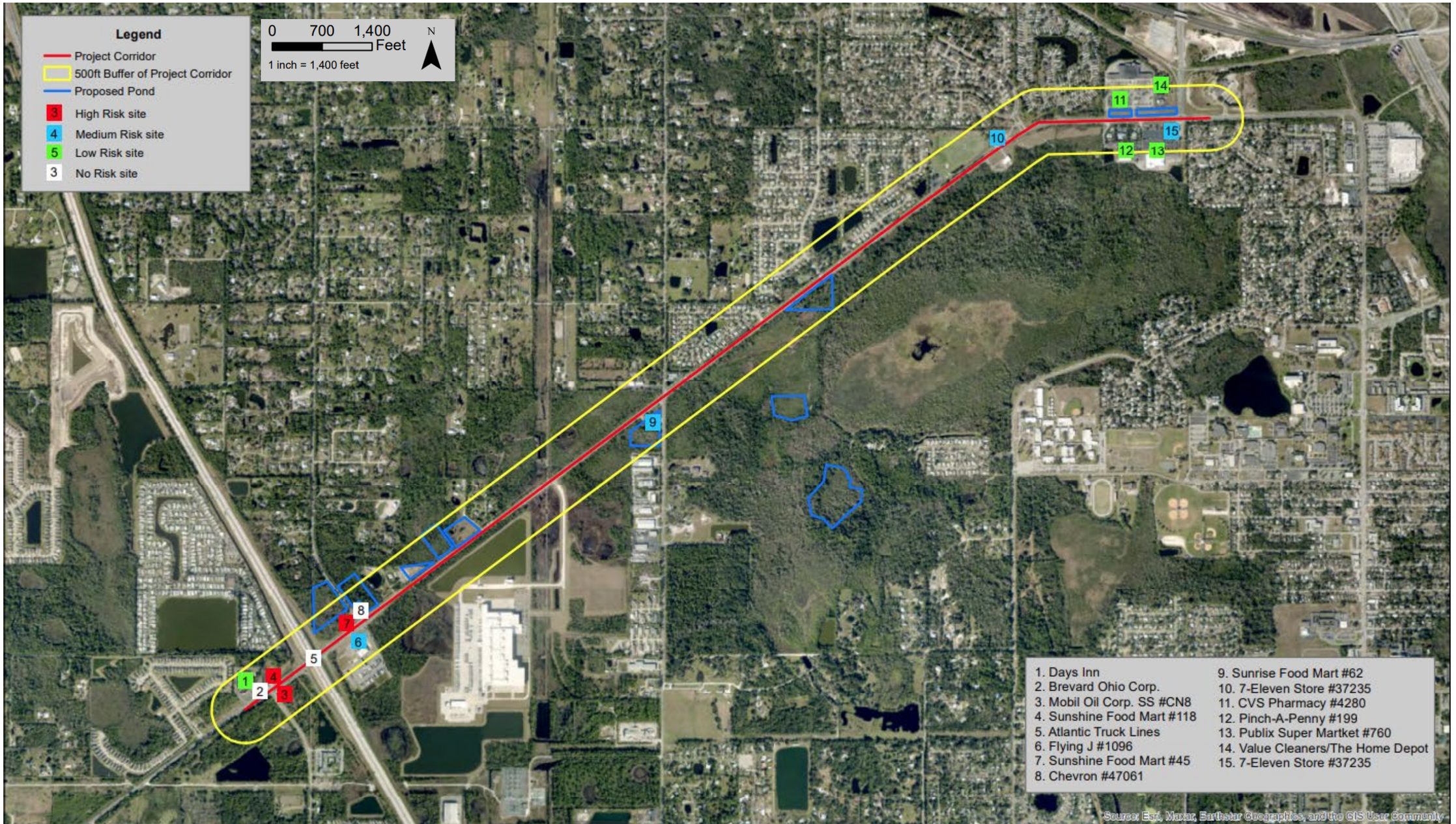
2.29.7 Contamination

A *Contamination Screening Evaluation Report* (CSER, October 2024) was prepared to assess the risk of encountering petroleum or hazardous substance contamination of soil, groundwater, surface water, or sediment that could adversely affect this project. Based on the review of the Environmental Data Resources (EDR) Radius Map Report, site reconnaissance, aerial photograph review, city directory review, interviews, and file review conducted on the Florida Department of Environmental Protection (FDEP)'s online database, a total of 15 sites with potential for hazardous material or petroleum impact to the soil and/or groundwater were identified. Of these sites, three facilities have been assigned a No-Risk, five locations have been assigned a Low Risk, four sites have been assigned a Medium Risk, and three facilities have been assigned a High Risk. Below is a list of the sites identified, site numbers, and their risk rating. The sites listed below are located in a southwest to northeast direction, and they are visualized in **Figure 2-19** and listed in **Table 2-16**.

Table 2-16 Summary of Potential Site Contaminations

No.	Name	Address	Risk	Potential COC
1	Days Inn	5600 SR 524	Low	Diesel Fuel and Unleaded Gas
2	Brevard Ohio Corp.	5580 SR 524	No	Petroleum Products
3	Mobil Oil Corp.	5555 SR 524	High	Diesel Fuel and Unleaded Gas
4	Sunrise Food Mart	5550 SR 524	High	Diesel Fuel and Unleaded Gas
5	Atlantic Truck Lines	I-95 and SR 524	No	Diesel Fuel
6	Flying J	1101 Friday Road	Medium	Diesel Fuel and Unleaded Gas
7	Sunshine Food Mart	4900 SR 524	High	Diesel Fuel and Unleaded Gas
8	Chevron (vacant land)	4880 SR 524	No	Waste Oil / Leaded and Unleaded Gas
9	Sunrise Food Mart	4301 SR 524	Medium	Diesel Fuel and Unleaded Gas
10	7-Eleven	3500 SR 524	Medium	Diesel Fuel and Unleaded Gas
11	CVS Pharmacy	2324 SR 524	Low	RCRA Hazardous Waste
12	Pinch A Penny	2311 SR 524	Low	Pesticide-Sodium Hypochlorate Solution
13	Publix Super Market	2301 SR 524	Low	Diesel Fuel
14	The Home Depot	2300 SR 524	Low	Solvents and Dry-Cleaning Fluids
15	7-Eleven	2201 SR 524	Medium	Diesel Fuel and Unleaded Gas

Figure 2-19 Potential Contamination Sites



REFERENCE: THE 2018 AERIAL PHOTOGRAPH WAS OBTAINED FROM ESRI. THE LAND USE DATA WAS OBTAINED FROM THE SJRWMD. THE PRESENTED DATA IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. PSI ASSUMES NO RESPONSIBILITY FOR ANY DECISIONS MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON INFORMATION OBTAINED FROM THE ABOVE DATA.

3. FUTURE CONDITIONS

A *Project Traffic Analysis Report* (PTAR, July 2019) and a *PTAR Reevaluation Memo* (May 2024) were prepared to evaluate the widening impacts on the corridor, including the I-95 interchange, Cox Road, Industry Road, and South and North Friday Roads. The PTAR was completed as part of the PD&E Study to support project-level engineering and environmental analyses. The PTAR included the development of No-Build and Build future year traffic volumes and traffic operations analyses for opening year 2025 and design year 2045. Detailed methodology, assumptions, and analyses are provided in the supplemental PTAR provided under separate covers.

3.1 FUTURE LAND USE

The future land use maps for the City of Cocoa and Brevard County included in **Figure 3-1** and **Figure 3-2**.

3.2 ROADWAY CONTEXT CLASSIFICATION

There are no changes to land use planned along SR 524. A *Context Classification Memorandum* (July 2019) was prepared which evaluated the existing context classification and evaluated primary and secondary measures and whether a change would be considered. The recommendation was for the context classification to remain the same as existing as follows:

Segment 1: Friday Road (South) to Friday Road (North)	C3C (Suburban Commercial)
Segment 2: Friday Road (North) to Cox Road	C3R (Suburban Residential)
Segment 3: Cox Road to London Boulevard	C3R (Suburban Residential)
Segment 4: London Boulevard to Industry Road	C3C (Suburban Commercial)

3.3 FUTURE TRAFFIC VOLUMES

The Central Florida Regional Planning Model (CFRPM V6.2) travel demand model was used to forecast volumes for this project located in Brevard County. The version V6.2 has been calibrated and validated for a base year of 2015, and a future year (2045) subarea model scenario was then developed based on the calibration efforts to obtain future year volume forecasts. The intersection and arterial analysis results indicate that most of the study intersections and segments will operate with LOS below LOS “D” by 2045. With the improvements suggested in the Build Alternative, all the study intersections are anticipated to operate at or above LOS “D” in the year 2045. However, under the future build conditions, segments along SR 524 between Friday Road (South) and Friday Road (North) and between Cirrus Drive and Industry Road are anticipated to operate at LOS E or F due to closely spaced signalized intersections. The overall intersection and roadway LOS results for the Build alternative show significant improvement over the No-Build alternative.

The resulting Annual Average Daily Traffic is shown in **Figures 3-3** and **3-4** for No-Build and Build alternatives. In addition, the future peak hour and turning movement volumes at project limits intersections are depicted in **Figures 3-5** and **3-6**.

Figure 3-1 Future Land Use Map – City of Cocoa

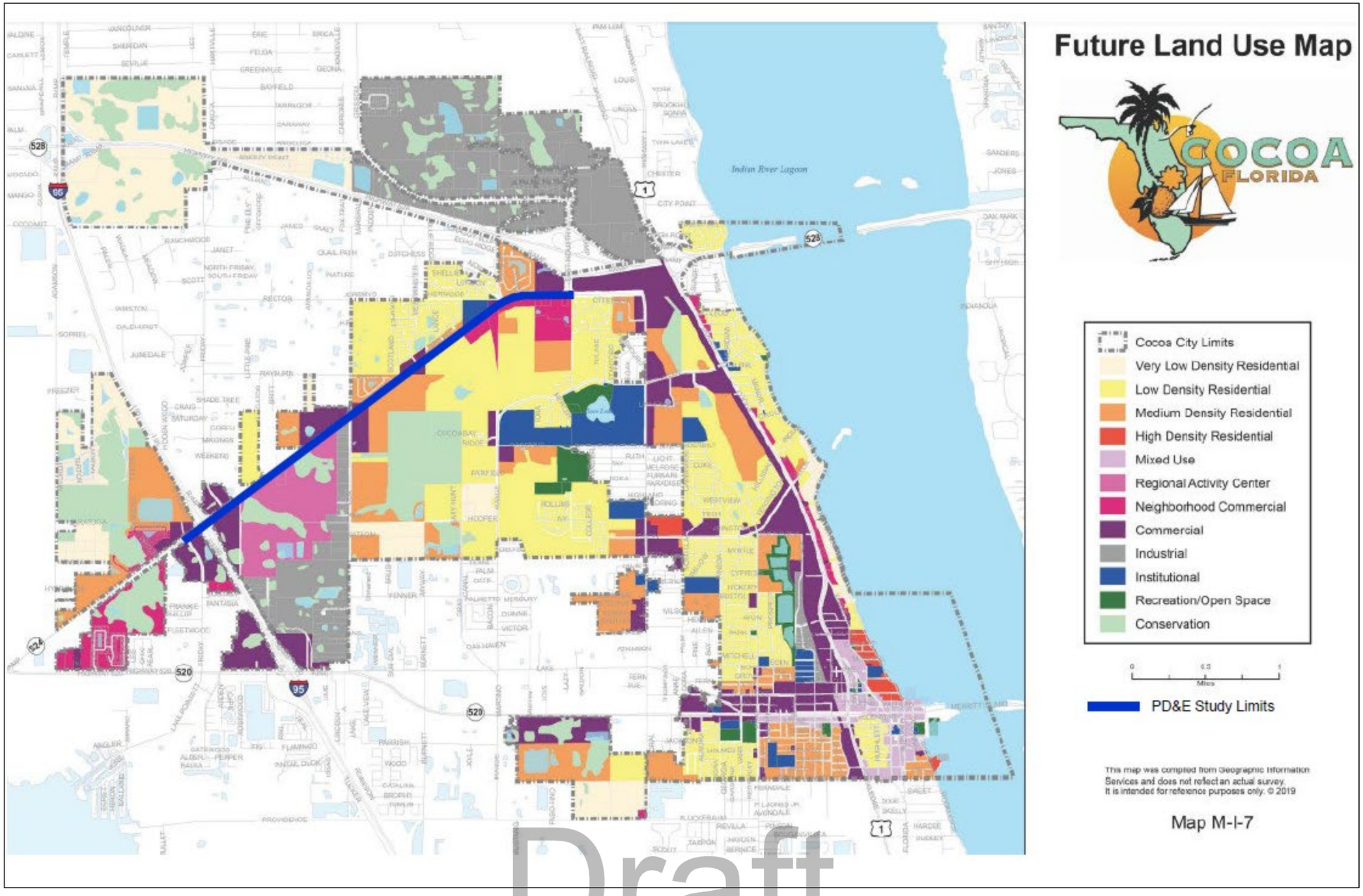


Figure 3-2 Future Land Use Map – Brevard County

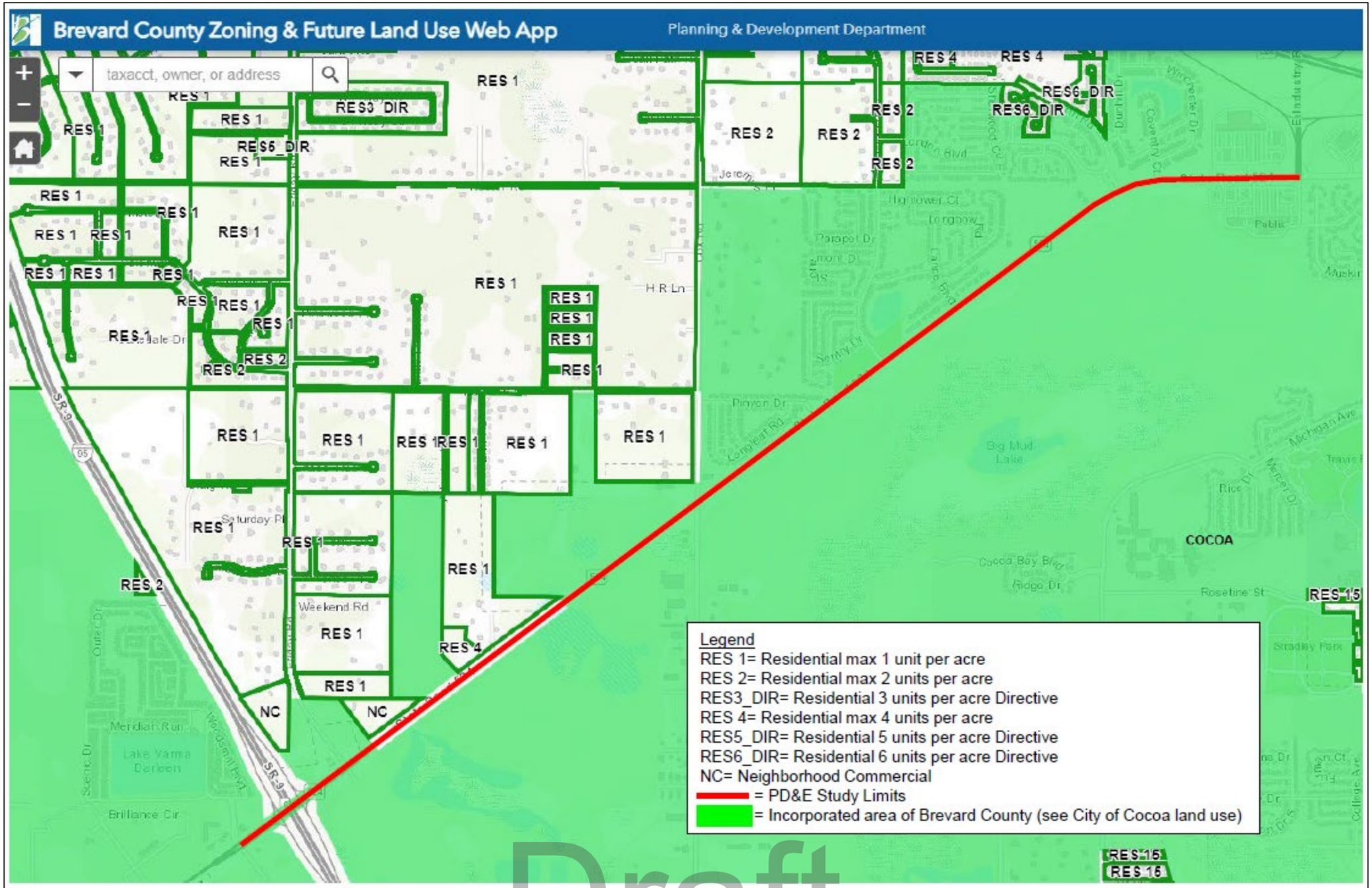
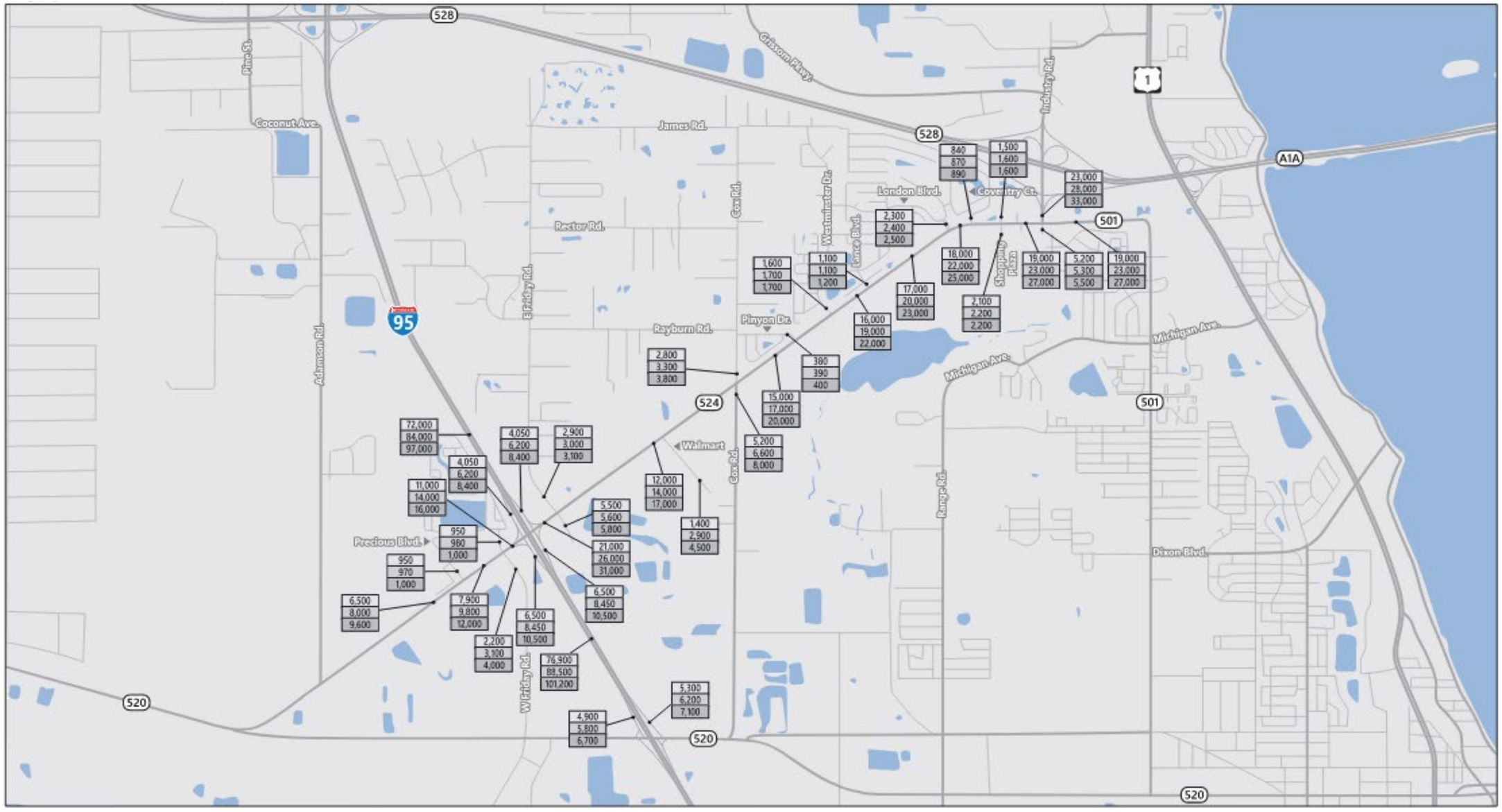


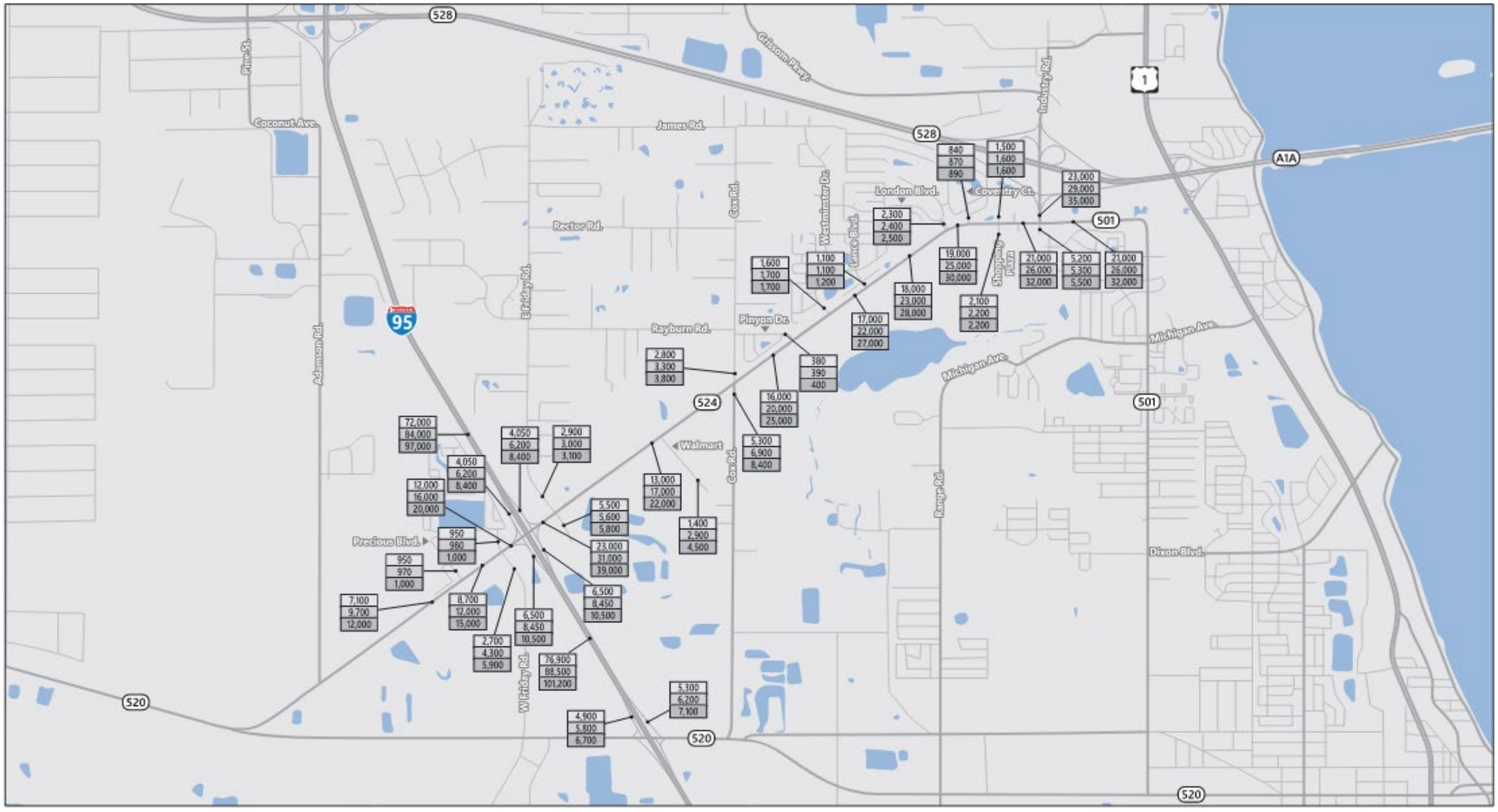
Figure 3-3 Future No-Build Average Annual Daily Traffic



00,000 Year 2025 AADT
00,000 Year 2035 AADT
00,000 Year 2045 AADT

N.T.S.

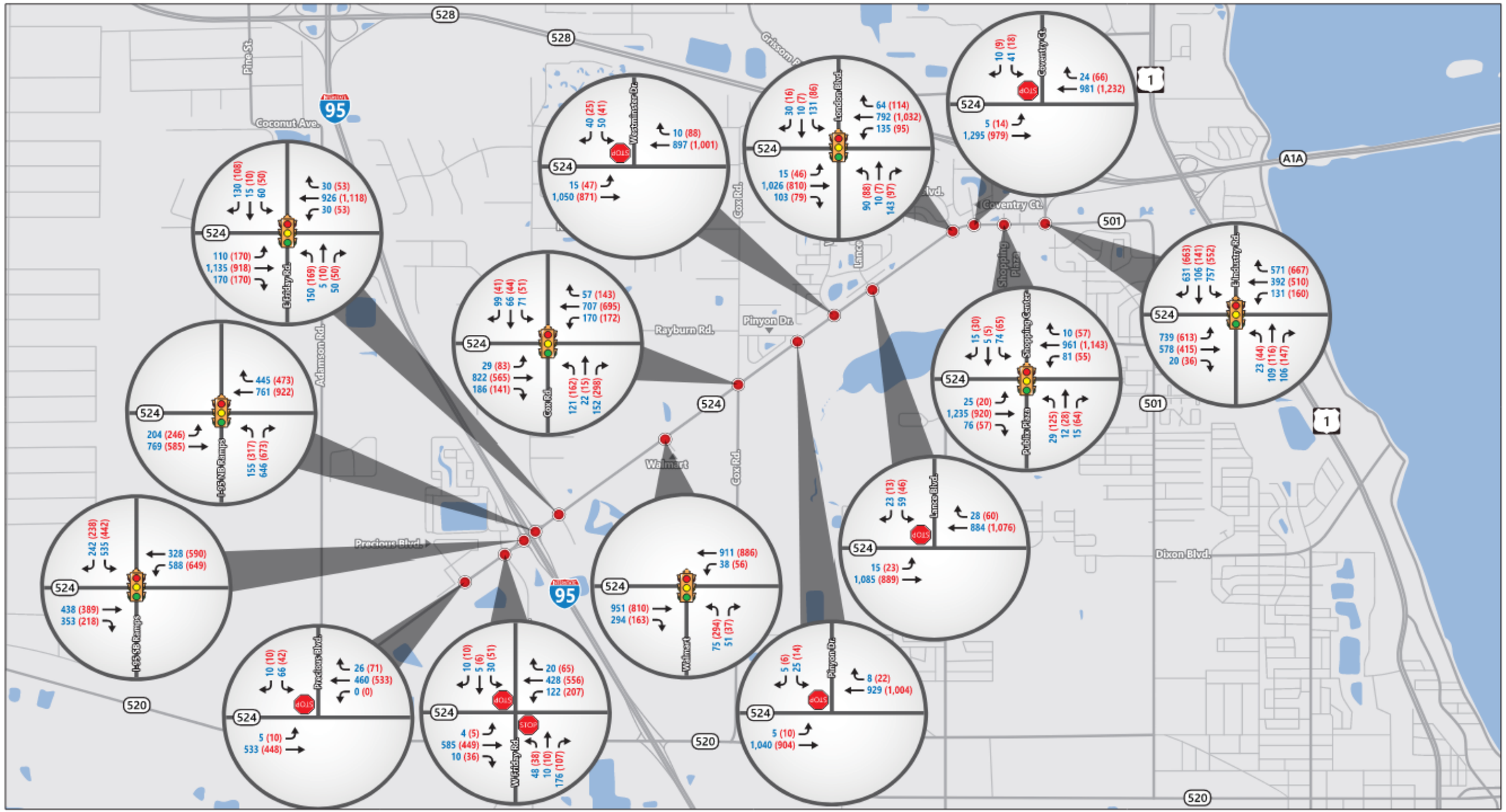
Figure 3-4 Future Build Average Annual Daily Traffic



00,000 Year 2025 AADT
00,000 Year 2035 AADT
00,000 Year 2045 AADT

N.T.S.

Figure 3-5 Year 2045 No-Build Peak Hour Turning Movement

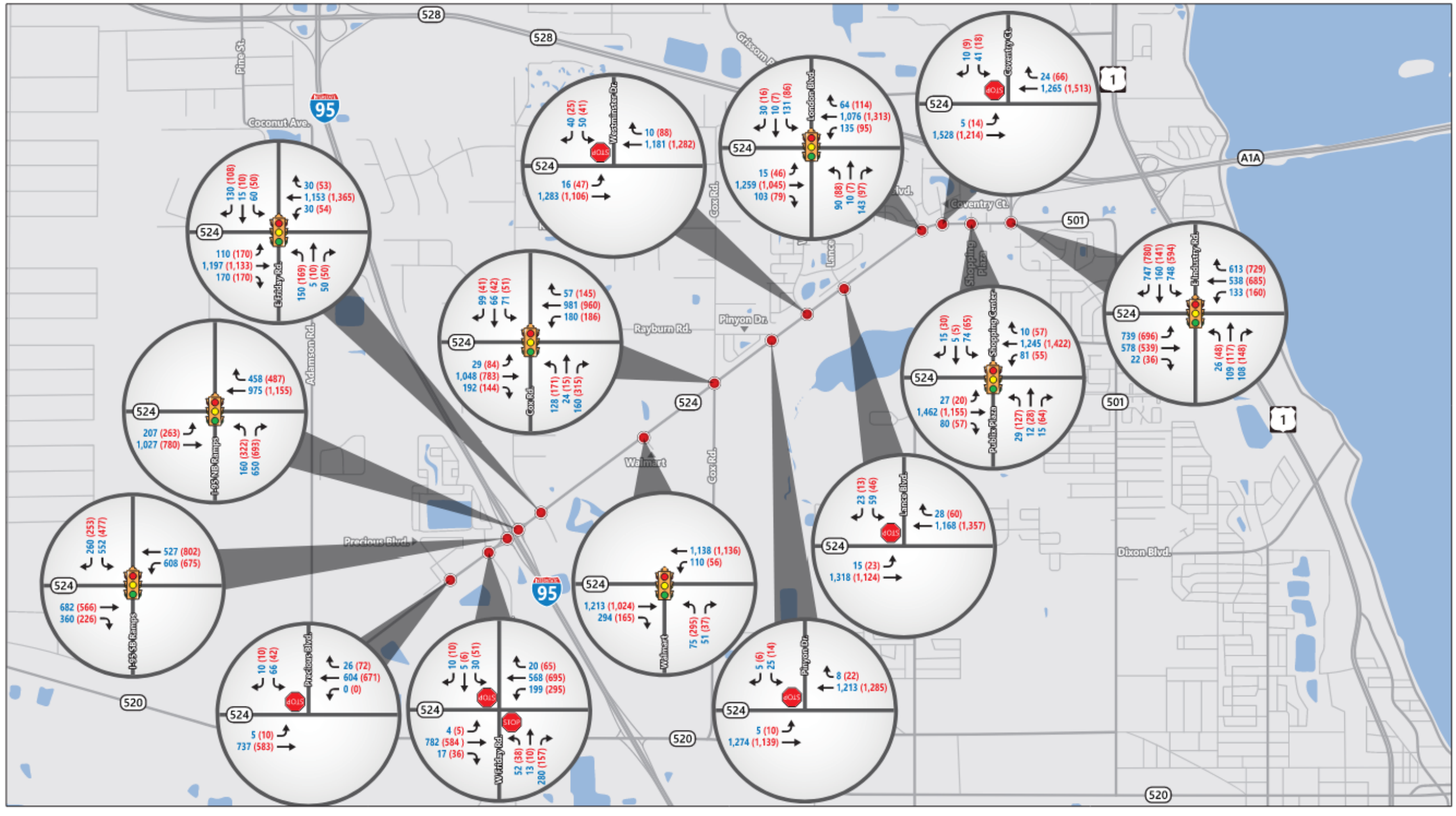


→ Traffic Movement

AM (PM) Peak Hour Traffic Volumes

N.T.S.

Figure 3-6 Year 2045 Build Peak Hour Turning Movement



3.4 FUTURE NO BUILD CONDITIONS

The PTAR provides the analysis of future conditions. The No Build alternative assumes the same geometric configurations as the existing conditions. Intersection analysis was performed to determine if there are any deficiencies for the signalized and unsignalized intersections for the future years. The following list summarizes the No Build analysis intersection results:

- All the signalized intersections are projected to operate at or better than the target LOS (LOS D) during 2025 AM and PM design hours.
- SR 524 at I-9 SB Ramps and SR 524 at Industry Road intersections are projected to operate below the target LOS during 2035 AM design hour and SR 524 at I-9 NB Ramps is projected to operate below the target LOS during 2035 PM design hour.
- SR 524 at I-9 SB Ramps, SR 524 at I-9 NB Ramps, SR 524 at E. Friday Road and SR 524 at Industry Road intersections are projected to operate below the target LOS during 2045 AM and PM design hour conditions.
- The unsignalized intersection at SR 524 & Coventry Court is projected to operate below the target LOS from opening year 2025 PM design hour. However, the delay was high (>300 seconds) only during 2045 AM design hour conditions.
- The unsignalized intersection at SR 524 & Lance Boulevard is projected to operate below the target LOS during 2025 PM design hour conditions and during 2035 and 2045 for both AM and PM design hours.
- The rest of unsignalized intersections at W. Friday Road, Pinyon Drive and Westminster Drive were projected to operate below the target LOS from 2035 AM and PM design hour conditions.

The following segments operate below target LOS:

Year 2025

- SR 524 EB between I-95 NB Ramps & E. Friday Road, SR 524 EB between Shopping Plaza & Industry Road and SR 524 WB between E. Friday Road & I-95 SB Ramps.

Year 2035

- SR 524 EB between I-95 NB Ramps & E. Friday Road and between Shopping Plaza & Industry Road
- SR 524 WB between E. Friday Road and I-95 SB Ramps

Year 2045

- AM - SR 524 EB between I-95 SB Ramps & E. Friday Road, between Walmart & Cox Road, between London Boulevard & Industry Road. SR 524 WB between Walmart & I-95 SB Ramps and between Shopping Plaza & Industry Road.
- PM - SR 524 between I-95 SB Ramps & Walmart. SR 524 WB between Shopping Plaza & Industry Road.

Roadway LOS along SR 524 near the western and eastern limits operating at LOS E or F is anticipated as these parts of the study corridor are defined by closely spaced signalized intersections. **Table 3-1** provides the 2045 intersection analysis of the No Build condition. Red text denotes LOS exceeds target.

Table 3-1 Design Year 2045 No Build Intersection LOS Analysis Summary

Study Intersection	Control Type	Targeted LOS	AM Peak Hour		PM Peak Hour	
			Delay (s)	LOS	Delay (s)	LOS
Precious Boulevard	Stop	D	25.0	D	22.6	C
Friday Road (South)	Stop	D	119.7	F	253.4	F
I-95 SB Ramps	Signal	D	86.1	F	57.3	E
I-95 NB Ramps	Signal	D	75.1	E	85.8	F
Friday Road (North)	Signal	D	77.5	E	68.8	E
Walmart	Signal	D	20.4	C	29.7	C
Cox Road	Signal	D	42.5	D	34.5	C
Pinyon Drive	Stop	D	108.1	F	78.8	F
Westminster Drive	Stop	D	190.3	F	160.4	F
Lance Boulevard	Stop	D	262.5	F	205.0	F
London Boulevard	Signal	D	48.8	D	37.8	F
Coventry Court	Stop	D	>300	F	164.8	F
Cirrus Drive	Signal	D	33.1	C	37.0	D
Industry Road	Signal	D	122.8	F	82.2	F

The arterial segments' operating conditions were evaluated using Synchro software. The LOS results shown in **Table 3-2** are reported based on the LOS criteria in HCM 6th edition. Red text denotes LOS exceeds target of LOS D.

Table 3-2 Design Year 2045 No Build Arterial LOS Analysis Summary

Segment	Travel Time (Sec.)	Speed (MPH)	LOS	Travel Time (Sec.)	Speed (MPH)	LOS
	Northbound/Eastbound			Southbound/Westbound		
AM						
I-95 SB Ramps to I-95 NB Ramps	57.2	6.0	F	25.5	13.4	F
I-95 NB Ramps to Friday Road (North)	69.6	6.3	F	85.8	5.1	F
Friday Road (North) to Walmart Distribution	70.1	24.6	D	83.0	20.8	E
Walmart Distribution to Cox Road	140.7	15.4	F	51.3	42.2	A
Cox Road to London Boulevard	128.4	35.8	B	105.8	43.5	A
London Boulevard to Cirrus Drive	62.4	14.1	F	29.6	29.8	C
Cirrus Drive to Industry Road	40.3	18.8	E	39.7	19.0	E
Overall	568.7	19.2	E	420.7	25.8	D
PM						
I-95 SB Ramps to I-95 NB Ramps	16.8	20.3	E	23.4	14.6	F
I-95 NB Ramps to Friday Road (North)	28.9	15.1	F	75.5	5.8	F
Friday Road (North) to Walmart Distribution	95.2	18.1	E	132.1	13.1	F
Walmart Distribution to Cox Road	93.3	23.2	D	66.4	32.6	C
Cox Road to London Boulevard	109.8	41.9	B	111.9	41.1	B
London Boulevard to Cirrus Drive	34.1	25.9	D	43.4	20.3	E
Cirrus Drive to Industry Road	39.6	19.1	E	44.5	17.0	E
Overall	417.7	26.1	D	497.2	21.9	D

3.5 FUTURE BUILD CONDITIONS

Intersection operations were evaluated under the Build Alternative. The Build Alternative improvements include widening SR 524 from 2 to 4 lanes throughout the project study corridor as well as the required improvements at the study intersections. A new traffic signal is proposed at SR 524 & Friday Road (south) intersection by year 2035 based on the delays observed as an unsignalized intersection.

Intersection analysis was performed to determine if there are any deficiencies for the signalized and unsignalized intersections for the future years. Forecasted turning movement volumes as shown in **Figure 3-6** were used to analyze the Build alternative. The results of the intersection analysis are summarized in **Table 3-3**. **Figure 3-7** provides the initial intersection geometry evaluated for the 2045 build condition.

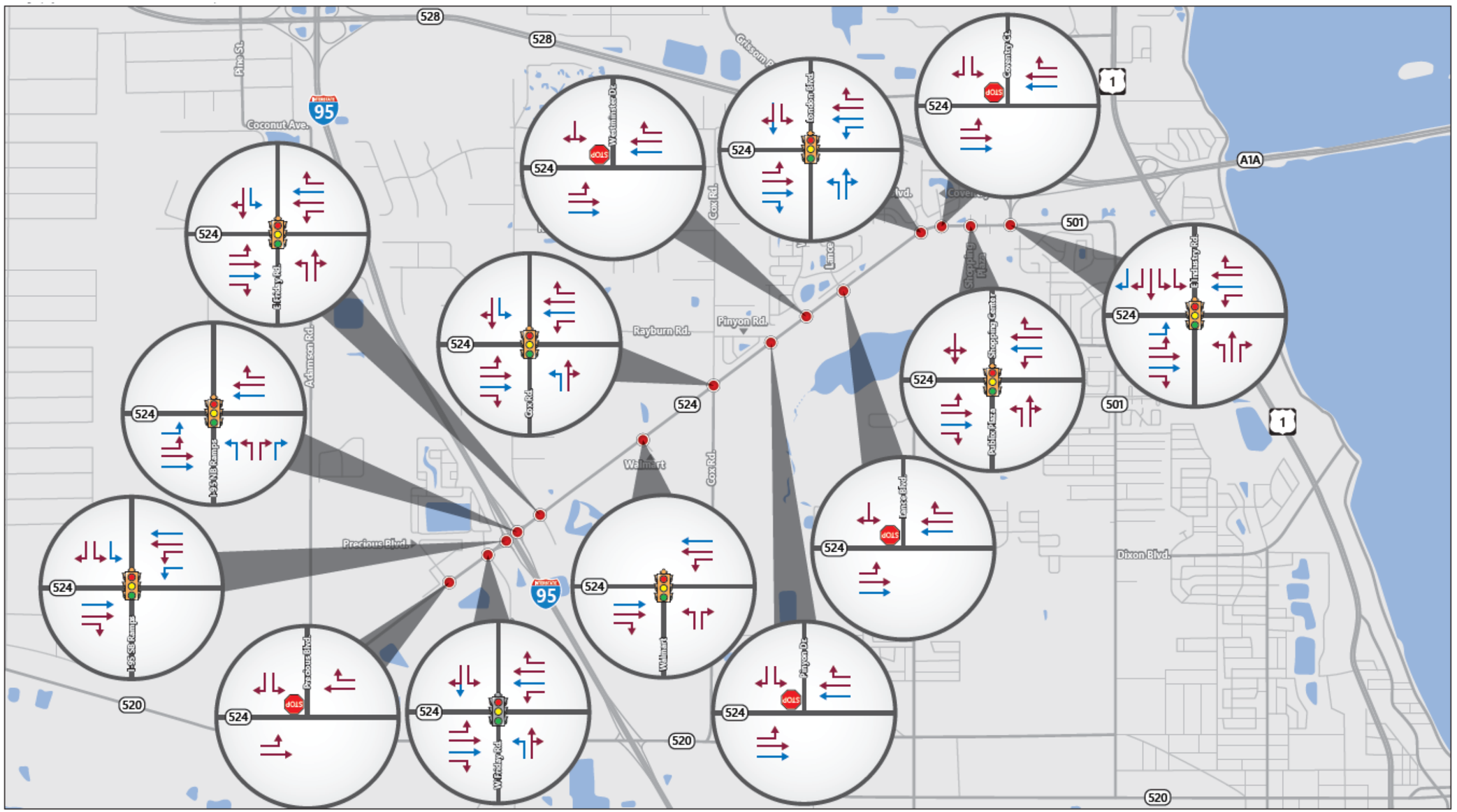
As shown in **Table 3-3**, most of the signalized study intersections are projected to operate at or better than target LOS D through the design year 2045 conditions. Some of the unsignalized study intersections operate at LOS E in 2045, but with significantly lower delays. **Table 3-4** provides the arterial analysis of the Build condition. Red text denotes LOS exceeds target.

Table 3-3 Design Year 2045 Build Intersection LOS Analysis Summary

Study Intersection	Control Type	Targeted LOS	AM Peak Hour		PM Peak Hour	
			Delay (s)	LOS	Delay (s)	LOS
Precious Boulevard	Stop	D	20.6	C	18.7	C
Friday Road (South)	Proposed Signal	D	17.9	B	12.3	B
I-95 SB Ramps	Signal	D	42.7	D	38.7	D
I-95 NB Ramps	Signal	D	23.5	C	42.4	D
Friday Road (North)	Signal	D	38.9	D	32.5	C
Walmart	Signal	D	10.1	B	15.2	B
Cox Road	Signal	D	26.5	C	30.9	C
Pinyon Drive	Stop	D	31.7	D	36.8	E
Westminster Drive	Stop	D	32.6	D	36.8	E
Lance Boulevard	Stop	D	37.6	E	43.0	E
London Boulevard	Signal	D	40.1	D	34.5	C
Coventry Court	Stop	D	40.4	E	42.8	E
Cirrus Drive	Signal	D	21.2	C	20.5	C
Industry Road	Signal	D	53.3	D	54.0	D

The arterial segments' operating conditions were evaluated using Synchro software. The LOS results shown in **Table 3-2** are reported based on the LOS criteria in HCM 6th edition. Under future build conditions, except for the segments along SR 524 between Friday Road (south) & I-95 SB Ramps, between I-95 NB Ramps & Friday Road (north) and between Cirrus Drive & Industry Road, all other segments operate within the target LOS D. These segments along SR 524 operating at LOS E or F is anticipated due to closely spaced signalized intersections. Red text denotes LOS exceeds target.

Figure 3-7 Year 2045 Initial Build Intersection Geometry



N.T.S.

- Lane Geometry
- Proposed Lane Geoemetry
- Stop-Controlled Intersection
- Signalized Intersection
- Proposed Signalized Intersection by Year 2035

Table 3-4 Design Year 2045 Build Arterial LOS Analysis Summary

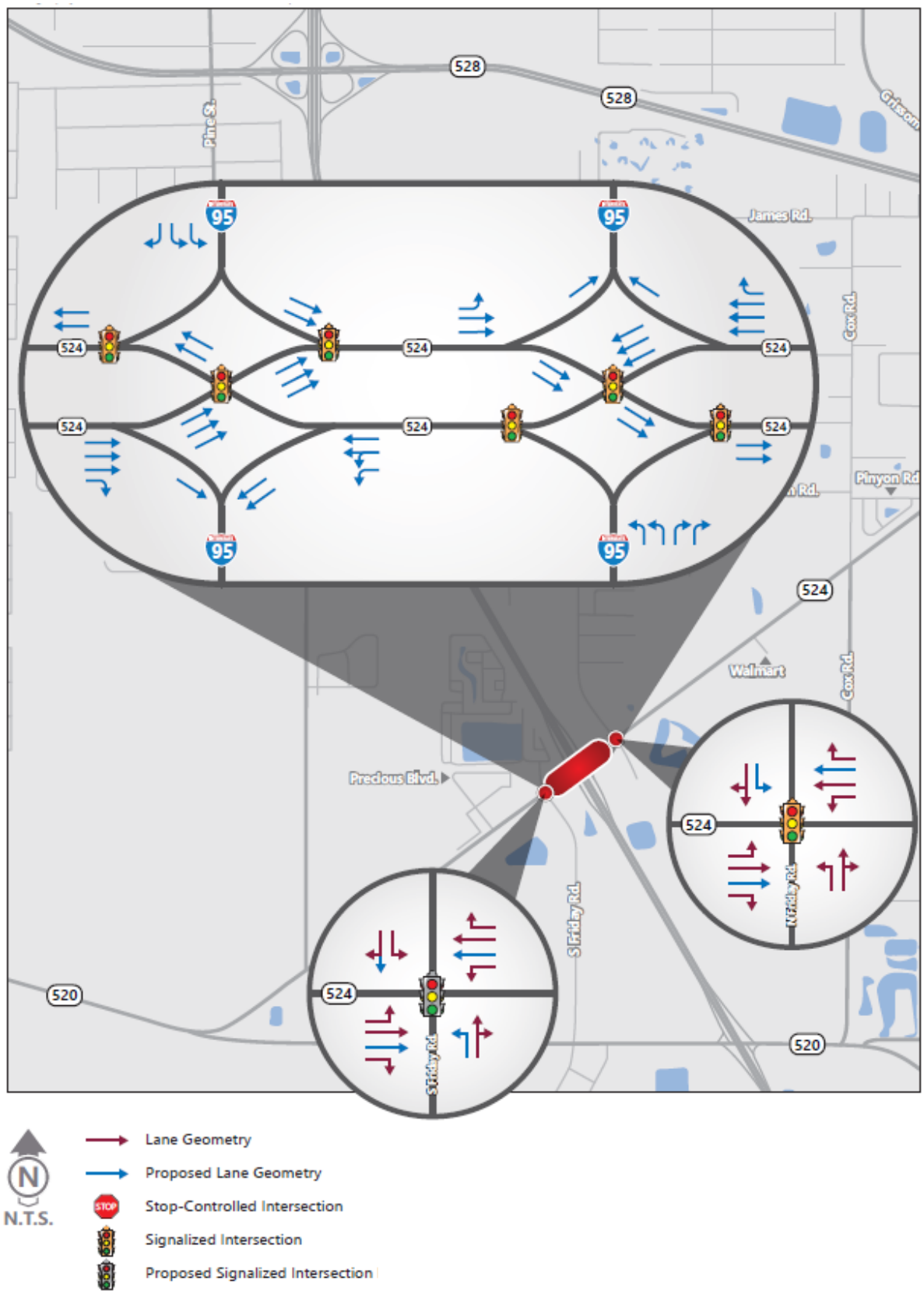
Segment	Travel Time (Sec.)	Speed (MPH)	LOS	Travel Time (Sec.)	Speed (MPH)	LOS
	Northbound/Eastbound			Southbound/Westbound		
AM						
I-95 SB Ramps to I-95 NB Ramps	12.4	27.5	C	11.2	30.5	C
I-95 NB Ramps to Friday Road (North)	33.2	13.1	F	26.8	16.3	E
Friday Road (North) to Walmart Distribution	56.1	30.7	C	69.0	25.0	D
Walmart Distribution to Cox Road	69.7	31.0	C	45.2	47.9	A
Cox Road to London Boulevard	111.1	41.4	B	102.2	45.0	A
London Boulevard to Cirrus Drive	30.2	29.2	C	38.4	23.0	D
Cirrus Drive to Industry Road	42.4	17.8	E	33.7	22.4	E
Overall	355.1	30.6	C	326.5	33.3	C
PM						
I-95 SB Ramps to I-95 NB Ramps	10.3	33.2	C	11.9	28.7	C
I-95 NB Ramps to Friday Road (North)	33.0	13.2	F	23.1	18.9	E
Friday Road (North) to Walmart Distribution	65.5	26.3	D	81.4	21.2	D
Walmart Distribution to Cox Road	68.5	31.6	C	54.5	39.7	B
Cox Road to London Boulevard	106.5	43.2	A	107.0	43.0	A
London Boulevard to Cirrus Drive	36.1	24.4	D	39.6	22.3	D
Cirrus Drive to Industry Road	52.3	14.5	F	35.9	21.1	D
Overall	372.2	29.2	C	353.4	30.8	C

Additional analysis was performed in the IMR which evaluated a DDI configuration as opposed to the existing diamond configuration. The lane configuration from Friday Road (south) to Friday Road (north) was altered with this different configuration. **Figure 3-8** provides the modified lane configuration. **Table 3-5** shows the updated intersection analysis included in the IMR. The delay is reduced with the DDI configuration by 19-57% in the AM period and 19-70% in the PM period.

Table 3-5 Design Year 2045 Build DDI Intersection LOS Analysis Summary

Study Intersection	Control Type	Targeted LOS	AM Peak Hour		PM Peak Hour	
			Delay (s)	LOS	Delay (s)	LOS
Friday Road (South)	Signal	D	9.6	A	10.0	B
I-95 SB Ramps	Signal	D	18.2	B	14.2	B
I-95 NB Ramps	Signal	D	19.1	B	12.8	B
Friday Road (North)	Signal	D	23.0	C	24.4	C

Figure 3-8 Year 2045 DDI Intersection Geometry



An ICE evaluation was performed for the Cox Road and London Boulevard intersections as multi-lane roundabouts instead of as signalized intersections. Table 3-6 shows the updated intersection analysis included in the ICE document. The delay is reduced at the Cox Road intersection by 41% in the AM period and 58% in the PM period. The delay is reduced at the London Boulevard intersection by 64% in the AM period and 64% in the PM period.

Table 3-6 Design Year 2045 Build Roundabout LOS Analysis Summary

Study Intersection	Control Type	Targeted LOS	AM Peak Hour		PM Peak Hour	
			Delay (s)	LOS	Delay (s)	LOS
Cox Road	Roundabout	D	15.7	C	16.9	C
London Boulevard	Roundabout	D	14.6	B	12.5	B

4. DESIGN CONTROL AND CRITERIA

4.1 ROADWAY DESIGN CRITERIA

The design standards utilized in the preliminary design of the alternatives for this project are based on the FDM January 2024. The Design Speed should be selected early in the design process and should reflect the Target Speed of 45 mph for corridor except 35 mph within limits of approved I-95 DDI interchange. **Table 4-1** provides design criteria for SR 524 for design speed 45 mph which was included for the initial alternative typical sections for the high speed curbed and flush shoulder options in **Section 5.4.1**. **Table 4-2** provides design criteria for I-95. Existing conditions within the study limits that do not meet the criteria are designated below with red color text

Table 4-1 SR 524 Design Criteria

DESIGN CRITERIA		SOURCE
Context Classification	C3R/C3C	
Functional Classification	Principal Arterial	
Access Management Class	Class 3 or 5	FDM Section 201.4
Design Speed	45 mph	FDM Section 201.5 (Table 201.5.1)
Design Vehicle	WB-62FL	FDM Section 201.6
Typical Section		
Lane Widths		
• **Travel**	11'	FDM Section 210.2 (Table 210.2.1)
• **Auxiliary**	11'	FDM Section 210.2 (Table 210.2.1)
Cross Slope	0.02	FDM Section 210.2 (Figure 210.2.1)
Median Widths	22'	FDM Section 210.3 (Table 210.3.1)
Shoulders		
• **Median**	13.5' (6' Paved)	FDM Section 210.4 (Table 210.4.1)
• **Outside**	15.5' (8' paved)	FDM Section 210.4 (Table 210.4.1)
Border Width	14'	FDM Section 210.7 (Table 210.7.1)
Bike Lane Width (Buffered)	7'	FDM Section 223.2.1.1
Sidewalk Width	6'	FDM Section 222.2.1.1 (Table 222.1.1)
Shared or Multi-Use Path	8-12'	FDM Section 224.4
Horizonal Alignment		
Deflection (Max.)	0°45' (flush shldr) 1°00' (curbed)	FDM Section 210.8.1
Deflection thru Intersection (Max.)	3°00'00"	FDM Section 212.7 (Table 212.7.1)
Length of Horizontal Curve (Min.)	675'	FDM Section 210.8 (Table 210.8.1, Note 2)
Superelevation Rate	0.05	FDM Section 210.9
Curvature with NC (Max.)	7639'	FDM Section 210.9.2.1 (Table 210.9.1)
Clear Zone (CZ)		
• **Travel Lane**	24'	FDM Section 215.2.3 (Table 215.2.1)
• **Auxiliary Lane**	14'	FDM Section 215.2.3 (Table 215.2.1)
Lateral Offset	4'	FDM Section 215.2.4 (Table 215.2.2)
Vertical Alignment		
Grade (Max.)	6%	FDM Section 210.10.1 (Table 210.10.1)
Grade Change w/o VC (Max.)	0.70	FDM Section 210.10.1 (Table 210.10.2)
Grade (Min.)	0.30%	FDM Section 210.10.1.1
Vertical Curves		
• **K-Value (Sag)**	79	FDM Section 210.10.2 (Table 210.10.3)
• **K-Value (Crest)**	98	FDM Section 210.10.2 (Table 210.10.3)
Vertical Curve Length (Min.)		
• **Sag**	135'	FDM Section 210.10.2 (Table 210.10.4)
• **Crest**	135'	FDM Section 210.10.2 (Table 210.10.4)
SSD (≤ 2.0)(Min.)	360'	FDM Section 210.11 (Table 210.11.1)
Vertical Clearance (Bridge)	16.5'	FDM Section 260.6 (Table 260.6.1)

Table 4-2 I-95 Design Criteria

I-95		
DESIGN CRITERIA		**SOURCE**
Design Controls		
Context Classification	Interstate Highway	
Functional Classification	Interstate Highway	
Access Management Class	Class 1 (Area 2)	FDM Section 201.4
Design Speed	70 mph	FDM Section 201.5 (Table 201.5.1)
Design Vehicle	WB-62FL	FDM Section 201.6
Typical Section		
Lane Widths		
• Travel	12’	FDM Section 211.2
• Auxiliary	12'	FDM Section 211.2
Cross Slope	0.02 / 0.03	FDM Section 211.2 (Figure 211.2.1)
Median Widths	64'	FDM Section 211.3 (Table 211.3.1)
Shoulders		
• Median	12' (10' Paved)	FDM Section 211.4 (Table 211.4.1)
• Outside	12' (10' paved)	FDM Section 211.4 (Table 211.4.1)
Border Width	94'	FDM Section 211.6
Bike Width	N/A	N/A
Sidewalk Width	N/A	N/A
Multi-Use Path	N/A	N/A
Horizonal Alignment		
Deflection (Max.)	0°45'00"	FDM Section 211.7.1
Deflection thru Intersection (Max.)	N/A	N/A
Length of Horizontal Curve (Min.)	1050'	FDM Section 211.7.2 (Table 211.7.1)
Superelevation Rate	0.10	FDM Section 211.8 (Table 210.9.1)
Curvature with NC (Max.)	1637'	FDM Section 211.8 (Table 210.9.1)
Clear Zone		
• Travel Lane	36’	FDM Section 215.2.3 (Table 215.2.1)
• Auxiliary Lane	24'	FDM Section 215.2.3 (Table 215.2.1)
Lateral Offset	N/A	N/A
Vertical Alignment		
Grade (Max.)	3%	FDM Section 211.9.1 (Table 211.9.1)
Grade Change w/o VC (Max.)	0.20	FDM Section 210.10.1 (Table 210.10.2)
Grade (Min.)	N/A	N/A
Vertical Curves		
• K-Value (Sag)	206	FDM Section 211.9.2 (Table 211.9.2)
• K-Value (Crest)	506	FDM Section 211.9.2 (Table 211.9.2)
Vertical Curve Length (Min.)		
• Sag	800’	FDM Section 211.9.2 (Table 211.9.3)
• Crest	1000'	FDM Section 211.9.2 (Table 211.9.3)
SSD (≤ 2.0)(Min.)	820’	FDM Section 211.10 (Table 211.10.1)
Vertical Clearance	16.5'	FDM Section 260.6 (Table 260.6.1)

4.2 DRAINAGE DESIGN CRITERIA

The design of stormwater management facilities for this project is governed by the rules and criteria set forth by the SJRWMD, FDEP, Brevard County, and FDOT. The project area is within the Upper St. Johns River Basin. Background information was gathered from design and permit documentation, technical reports covering the project limits, and field reconnaissance. Regulatory agency guides and manuals referenced are as follows:

- FDOT Drainage Manual, 2025
- FDOT Drainage Design Guide, 2024
- FDOT Flexible Pavement Design Manual, 2024
- SJRWMD Applicant's Handbook, Volume I, December 2020
- SJRWMD Permit Information Manual, June 2018

The proposed stormwater management system was designed to minimize offsite impacts. Minimizing impacts includes preventing damage to critical environmental resources and protecting developed areas from flooding. The following design criteria apply to this project's proposed wet detention ponds.

1. Stormwater Treatment (SJRWMD)

a. The design treatment volume is the greater of the following:

i. One inch of runoff over the drainage area, or

ii. 2.5" times the impervious area (excluding water bodies).

b. Treatment Volume Recovery: For wet detention, the outfall structure shall be designed to drawdown one-half of the required treatment volume within 24–30 hours following a storm event, but no more than one-half of this volume will be discharged within the first 24 hours.

c. Skimmers: Systems that receive stormwater from areas with a greater than 50% impervious area (excluding water bodies) must include a skimmer, baffle, grease trap, or other mechanism.

2. Stormwater Attenuation (SJRWMD)

Open Basin (Positive Outfall): The post-development peak discharge rate is not to exceed the pre- development peak discharge rate for the SJRWMD 25-year / 24-hour and mean annual storm events.

3. Pond Geometry (FDOT and SJRWMD)

a. Slopes (Wet Detention):

i. Side slopes 1:4 to 2-foot below control elevation

ii. Maintenance Berm: 20-foot (min.) measured from control elevation to ROW line. Maintenance Berm shall be at least 15 feet with a slope of 1:8 or flatter.

iii. 1-foot free board below the bottom of the maintenance berm to Design High Water (DHW)

iv. The inside edge of the maintenance berm to have a minimum radius of 30 feet toward the pond and a minimum of 1-foot above the mean design stage elevation.

v. Pond ratio at least 2:1 (length: width)

b. Pond Depth (Wet Detention):

i. Maximum pond depth of 12-foot

ii. Mean depth between 2-foot and 8-foot

4. Floodplain (SJRWMD)

Traversing works, works, or other structures shall cause no more than a 1-foot increase in the 100-year flood elevation immediately upstream and no more than one-tenth of a foot increase in the 100-year flood elevation 500-foot upstream. A system will not cause a net reduction in flood storage within a 10-year floodplain if compensating storage is provided outside the 10-year floodplain.

5. Base Clearance (FDOT)

If the base clearance is less than three feet, the pavement design engineer must reduce the Design Resilient Modulus.

6. Ditches and Swales (FDOT)

a. Design frequency for roadside, median and interceptor ditches or swales is 10-years

b. Design frequency for outfall ditches and canals is 25-years

c. The minimum slope for ditches for positive flow conditions is 0.05%

7. Closed Drainage System (FDOT)

a. Design frequency for roadside, median and interceptor ditches or swales is 10-years

b. Design frequency for outfall ditches and canals is 25-years

c. The minimum slope for ditches is 0.05%

5. ALTERNATIVES ANALYSIS

The analyses discussed in this section follow the project development process detailed in Part 1, Chapter 4 of FDOT's PD&E Manual. In addition to Build Alternatives, the PD&E Study examined a No-Build Alternative, Multimodal Alternative and the TSM&O Alternative.

5.1 NO-BUILD (NO-ACTION) ALTERNATIVE

The No-Build Alternative provides no improvements to SR 524 within the project limits. The absence of construction-related operational impacts associated with the Build Alternative is a benefit of the No-Build Alternative. Long-term benefits accrued from serving future traffic demands would not be realized with this alternative.

Continued traffic growth on SR 524 will fail with LOS below target LOS "D" by 2045, as shown in **Table 3-2**, therefore creating significant congestion. Distinct advantages and limitations associated with the No-Build Alternative are as follows:

Advantages

- No impediment to traffic flow during construction.
- No disruption to existing land uses because of construction activities.
- No ROW acquisition or relocations.
- No expenditure of funds for engineering design or construction.
- No impacts on the adjacent social, cultural, natural, and physical environments.

Disadvantages

- Increased traffic congestion and user cost are associated with increased travel time and decreased fuel efficiency.
- Increased carbon monoxide and other pollutants due to increased traffic congestion.
- Increased maintenance costs due to roadway and structural deterioration.
- Increased emergency vehicle response time (e.g., fire trucks, ambulances, etc.)
- Increased evacuation time during weather emergencies as a result of heavy congestion.
- Increased crash potential because of increased congestion.
- Incompatible with the area's future development, particularly with the planned residential developments.
- No improvements for bicycle or pedestrian traffic

5.2 TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS ALTERNATIVE

As part of the SR 524 PD&E Study, the corridor was reviewed for existing Intelligent Transportation Systems (ITS) infrastructure. The following sections describe the existing ITS infrastructure and TSM&O strategies deployed along the SR 524 study corridor, including:

- The existing ITS infrastructure along the SR 524 corridor.
- Existing TSM&O deployments along the SR 524 corridor.
- The recommendations for TSM&O improvements along the corridor.

5.2.1 Existing TSM&O Deployments

Advanced Traffic Management System (ATMS): ATMS is a central management strategy for traffic operations. It allows local agencies more awareness and control over their traffic operations. An ATMS system is powered by the ATMS central software, which pulls in data, camera feeds, and other information and disseminates it to operators and other personnel with access to the ATMS system. Operators can also interact with the County's field devices through the ATMS platform.

Through its fiber infrastructure, SR 524 is connected to the Brevard County ATMS (ATMS.now).

5.2.2 TSM&O Recommendations

The project's PTAR concluded that the need for additional traffic capacity required along SR 524 cannot be provided solely through the implementation of TSM&O improvements. Additional thru lanes were found to be required to improve or meet Design Year acceptable LOS along SR 524 Drive and for intersections within the project limits.

Based on the existing and future conditions of the corridor and the recommendations from the District Five TSM&O Engineer, the following TSM&O improvements and strategies are recommended as part of the PD&E Study:

- Incorporate SR 524 corridor into the District Five Integrated Corridor Management System (ICMS) program as a Diversion Route for SR 528
- In support of the recommended Diversion Route designation, upgrade SR 524 corridor intersections to the Department's Smart Signal package, which includes:
    - ATCs that meet Section 671 requirements of the FDOT Standard Specifications
    - Automated Traffic Signal Performance Metrics (ATSPM)
    - Intersection Movement Counts (IMC)
    - Vehicle Detection
    - Advance Detection (Loops / Zones)
    - TS2 Type 1 Size 6 Cabinet
- Deploy Bluetooth travel-time devices along SR 524
    - One device midway between the Friday Road intersection and the Walmart Distribution Center intersection
    - One device west of the London Boulevard intersection
- In support of the recommended Diversion Route designation, deploy Arterial Dynamic Message Sign (ADMS) along SR 528 westbound approaching the Industry Road interchange
    - The construction limits (not the project limits) of the SR 524 project would have to be extended to include ADMS deployments on SR 528 as it approaches the Industry Road interchange
- While blank-out signs are present along the SR 524 corridor, they may not meet FDOT standards. For this reason, it is recommended that the existing blank-out signs (at the Cox Road and Industry Road intersections) be replaced and brought up to current FDOT standards.

5.3 MULTIMODAL ALTERNATIVES

As noted in **Section 2.13**, SCAT maintains bus routes 6 and 11 that enter the eastern study limit at Industry Road, but do not operate along the SR 524 corridor. There are no multimodal alternatives identified in SCTPO LRTP. Multimodal alternatives generally include bicycle/pedestrian improvements or enhanced connections to intermodal facilities.

Therefore, a multimodal alternative without roadway widening is not considered a viable alternative, however, bicycle/pedestrian improvements will be considered as part of the Build Alternative.

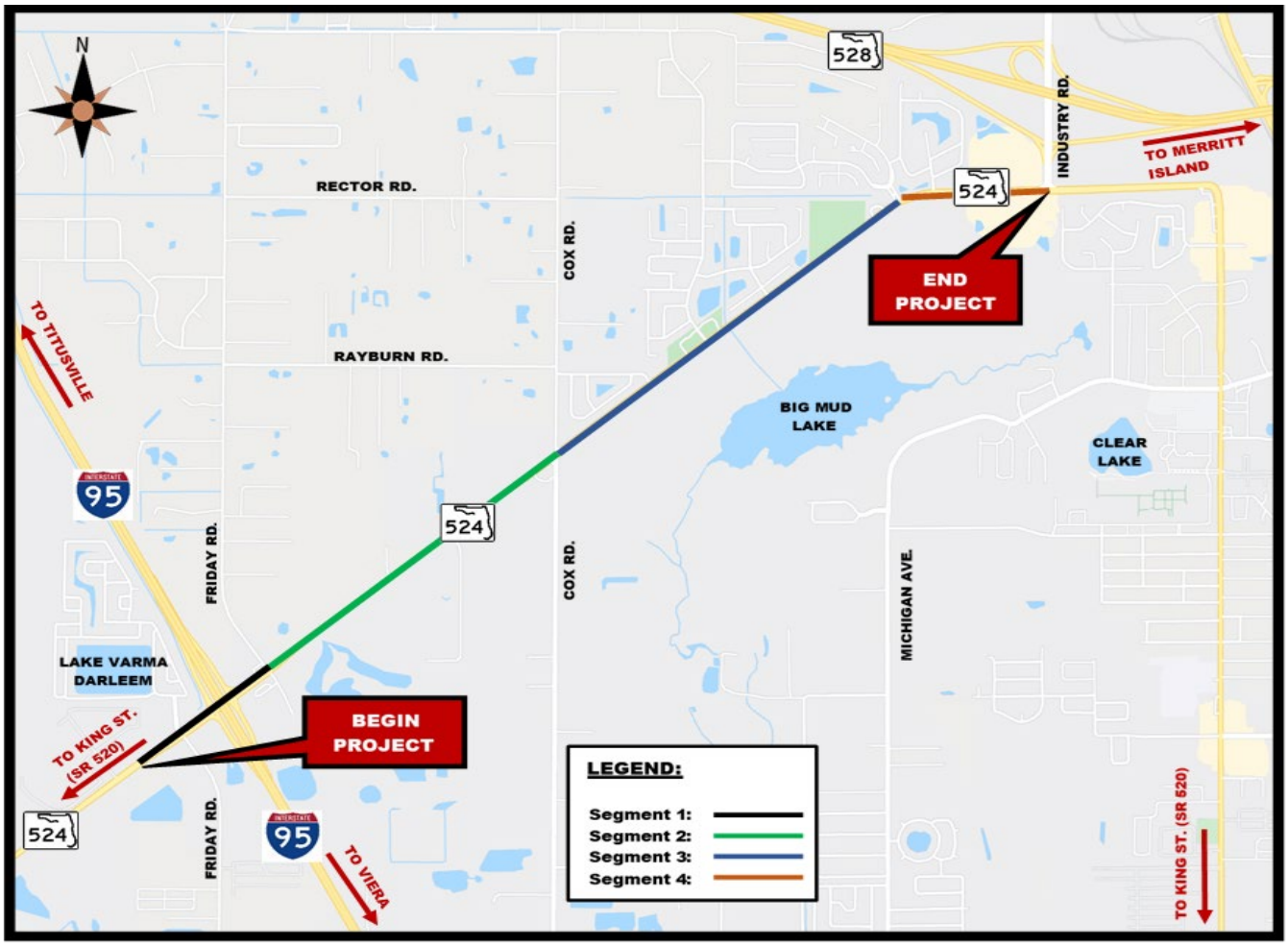
5.4 BUILD ALTERNATIVES

The project was split into four segments to analyze the build alternatives:

- Segment 1 – Between Friday Road (South) and Friday Road (North), including the I-95 Interchange
- Segment 2 – Friday Road (North) to Cox Road
- Segment 3 – Cox Road to London Boulevard
- Segment 4 – London Boulevard to Industry Road

The project segments are shown in **Figure 5-1**.

Figure 5-1 Project Segment Map



5.4.1 Roadway Typical Sections

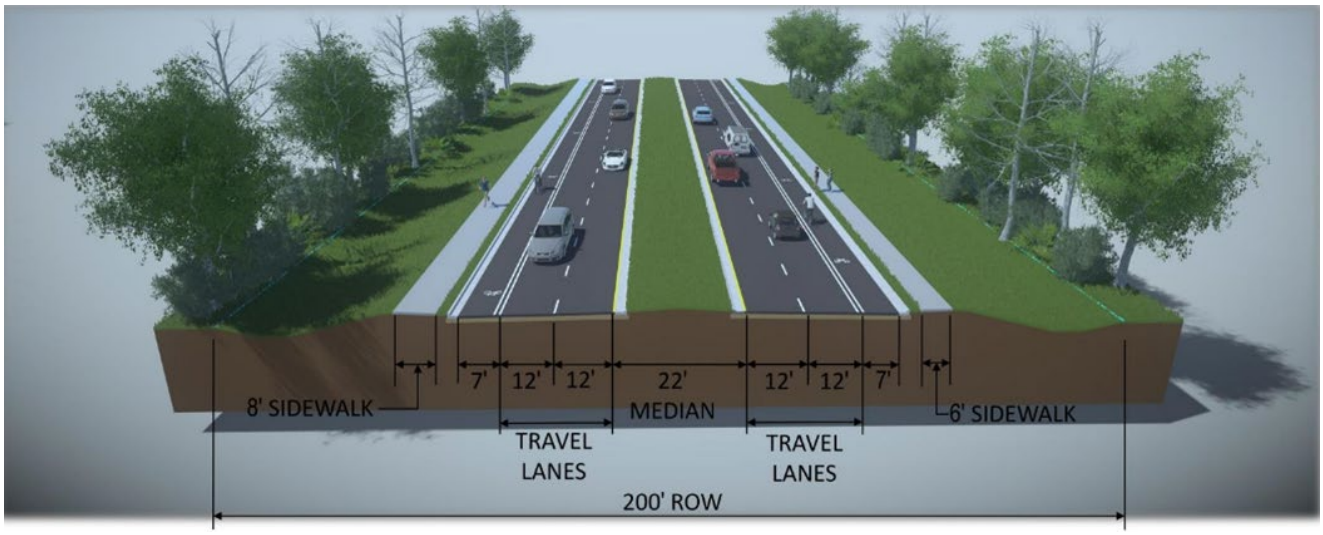
The PTAR provided an evaluation of the existing two-lane undivided and a divided four-lane condition in the design year and the multi-lane condition performed better at the project intersections and between intersections as noted in **Section 3.5**. The future arterial predictive crashes were reduced with a multi-lane divided roadway along SR 524 within the study limits. Three typical sections have been considered viable for this corridor. With a context

classification of C3C (Segments 1 and 4) and C3R (Segments 2 and 3), the possible typical sections are curbed, high-speed curbed, and flush shoulder. An important goal of this study is to analyze ways in which pedestrians and bicyclists will access all portions of the corridor. To accomplish this goal, all typical sections will feature pedestrian and bicycle facilities on either side of the road throughout all segments. Each typical section is also designed with ditches outside the roadway for the flush shoulders will commingle onsite and offsite runoff, as well as to reduce surface water and puddling. The three typical sections analyzed are described below:

Curbed

The curbed alternative follows the typical section shown in 2022 version of FDM 306.5, Exhibit 306.5. It is a four-lane roadway with a 22-foot median, Type E curb and gutter in the median, Type F outside curb and gutter, a 7-foot buffered bike lane, 8-foot sidewalk on the southbound side, and 6-foot sidewalk on the northbound side. Depending on the segment, the inside lane will be 11-foot or 12-foot wide, and the outside lane will be 12-foot wide. This section's design speed is 45 mph to provide a traffic calming effect through the residential segments and reduce unwanted truck traffic heading through segments 3 and 4. This typical section is shown in **Figure 5-2**.

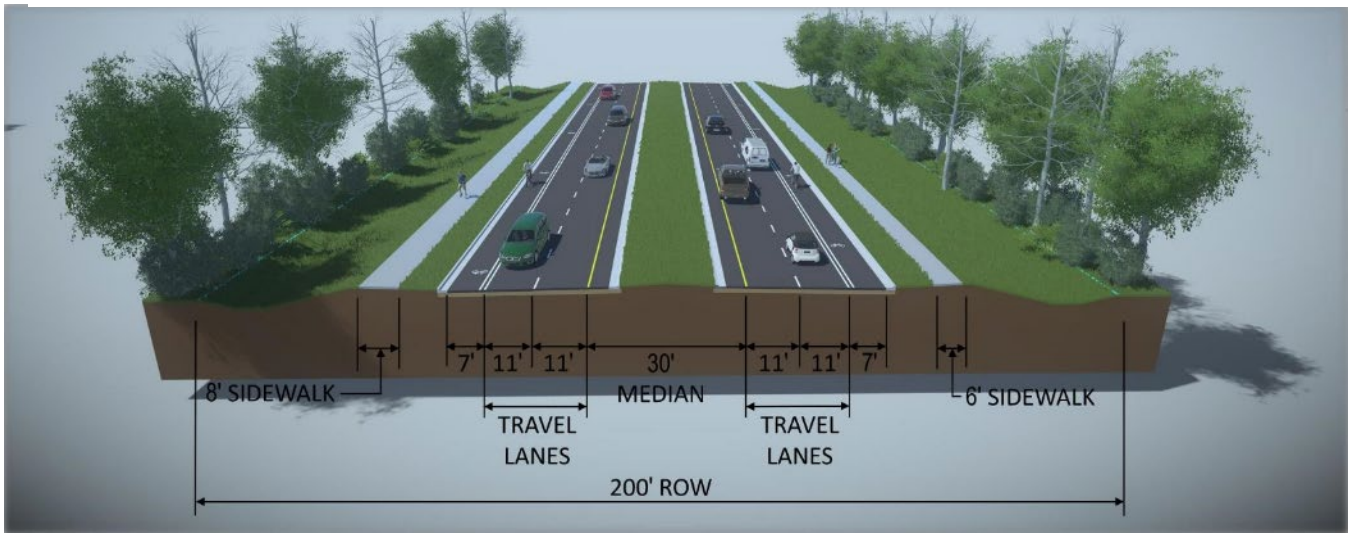
Figure 5-2 Curbed Alternative Typical Section



High Speed Curbed

The high-speed curbed alternative is based on the typical section shown in 2022 version of FDM 306.5, Exhibit 306.6. The median will be 30-foot wide, including the 4-foot paved inside shoulder and Type E curb and gutter. It is designed as a four-lane, two-way typical section with 12-foot lanes, 7-foot buffered bike lanes, Type F curb and gutter on the outside, 8-foot sidewalk on the southbound side, and 6-foot sidewalk on the northbound side. This alternative will be able to increase pedestrian safety along the corridor by offsetting the sidewalk a larger distance from the road, and it will reduce median crashes with the inside shoulder. The design speed for this typical section will be 45 mph. This typical section is shown in **Figure 5-3**.

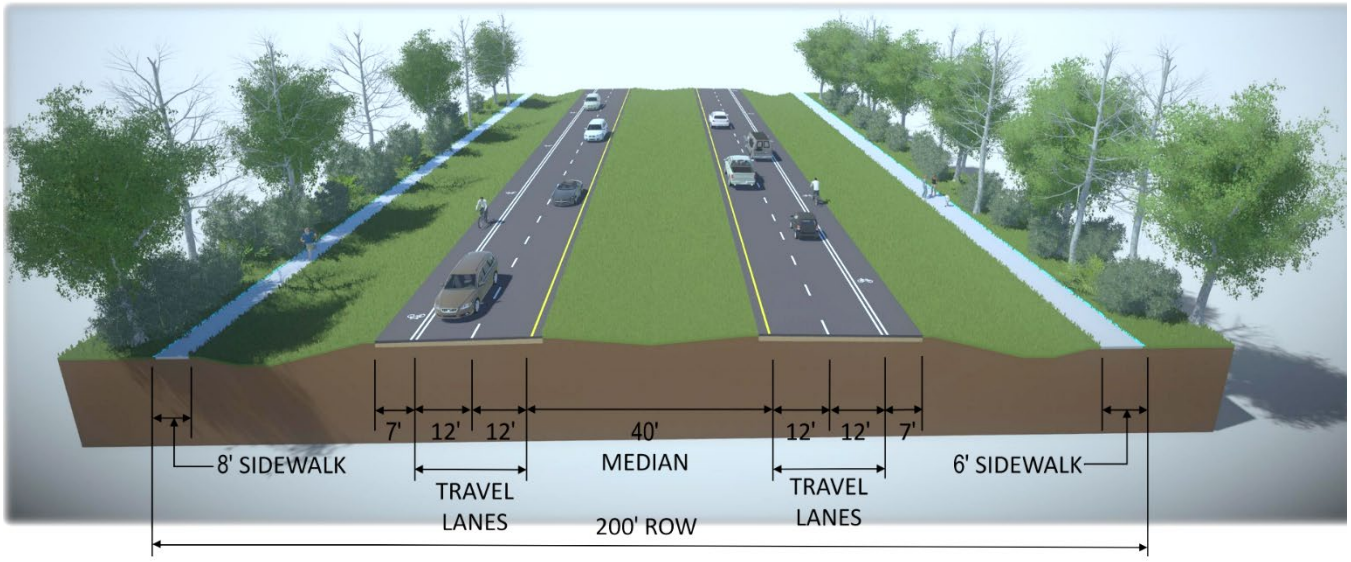
Figure 5-3 High Speed Curbed Alternative Typical Section



Flush Shoulder

The flush shoulder alternative follows the typical section shown in 2022 version of FDM 306.5, Exhibit 306.8. It will have a 40-foot median, including 8-foot inside shoulders and 10-foot (7-foot paved) outside shoulders that will serve as an unmarked bicycle lane. Both travel lanes will be 12 feet wide. The sidewalk's offset from the road will vary but will always meet a minimum of 15-foot from the edge of pavement. This alternative does require ROW acquisition throughout Segment 2. However, it remains a viable alternative because of the possibility of salvaging the existing southbound roadway. This would reduce construction costs significantly but would also introduce separate profile grade lines for the northbound and southbound lanes, creating numerous drainage challenges. The design speed for this typical section will be 45 mph. This typical section is shown in **Figure 5-4**.

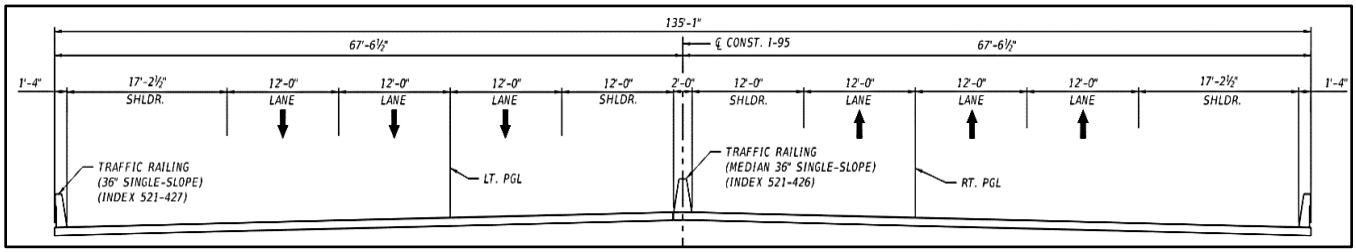
Figure 5-4 Flush Shoulder Alternative Typical Section



5.4.2 Bridge Typical Sections

Two alternatives were considered for the I-95 bridge over SR 524, modifying the existing bridge or replacing the existing bridge. Both alternatives are described in detail in **Section 5.6.2** of this report. The typical section for both alternatives will be the same. The northbound and southbound bridges will have three 12-foot lanes, with a 12-foot inside shoulder separated by a 36-in. median single-slope traffic railing. The outside shoulders will be 17'-2½" each and will be protected by a 36-in. single-slope traffic railing. The overall width will be 135'-1" as seen in **Figure 5-5**.

Figure 5-5 Proposed I-95 Bridge Typical Section



5.5 HORIZONTAL AND VERTICAL ALIGNMENT

5.5.1 Horizontal Alignment

Four horizontal alignments were studied per each typical section alternative. These were a best fit, left offset, right offset, and a centerline of ROW alignment.

The existing ROW is variable, so the centerline would be a 100-foot offset from the ROW on either side throughout most segments. The southern ROW line was used to create the offset centerline because the northern ROW line in segment 4 varies. This alternative was created to reduce the amount of ROW acquisition. Keeping the centerline of the road in the center of the ROW creates a typical section with equal amounts of space on either side for drainage, shoulders, and sidewalk/bicycle facilities.

The left and right offsets from the centerline were primarily created due to the possibility of one side requiring more drainage needs or construction limits than the other side. This offset approach would only be viable if the construction limits on one side were offset more from the alignment than on the other side. Thus, offsetting the alignment would then place the average center of the construction limits to the centerline of the ROW. During the study's initial phases, it was thought ROW acquisition in the typical section would be inevitable, and these two alignments were more viable. However, refining the design showed that the urban and suburban typical section alternatives could fit within the existing ROW if built along the ROW's centerline, which effectively eliminated the offset alignments from consideration.

The variable "best fit" alignment was also deemed necessary for consideration. This alternative would move the alignment to the offset that would require the least amount of ROW and could change in each segment. Similar to the single left or right offset alternatives discussed, the best-fit alternative was eliminated from consideration when the centerline of the ROW alternative was modeled and shown to fit within the existing ROW.

During the best fit alignment analysis, varying curves were introduced along the alignment to reduce impacts and reduce speeds throughout the corridor. While the best fit alignment was eliminated, the use of curves to reduce speeds was revisited after the overall Preferred Alternative was selected. This is discussed further in **Section 7.3**.

5.5.2 Vertical Alignment

For each alternative, the critical piece for the vertical alignment was the groundwater table level. Many profile concepts were considered during the initial concept development, but the designs could not be truly finalized without geotechnical borings . One alternative tested was maintaining the existing profile in segment 2, but this did not meet the 3-foot clearance required from the groundwater table. The existing pavement on the north side could be salvaged; however, differing profile grade lines would introduce numerous drainage issues.

Once geotechnical borings confirmed the groundwater level, the proposed will be finalized in the design phase, and to maintain 3 feet of clearance between pavement and the groundwater. The profile will also meet the minimum 0.3% grade and 250-foot distance between VPIs required for curbed roadways by FDM 210.10.1.1. Since the existing ground is very flat, no vertical curves are required, and the profile typically can roll from positive to negative 0.3% every 250-foot. The profile will tie into existing at Industry Road and Precious Boulevard at flat grades.

The groundwater levels noted in the Geotechnical Report (October 2021) along SR 524 through the I-95 interchange show there is approximately 3-4 feet of base clearance, so the roadway below the I-95 bridge will not need to be raised to meet base clearance criteria.

5.6 INTERCHANGE AND INTERSECTION BUILD ALTERNATIVES

Each intersection was evaluated separately to measure which layout would be the most efficient and safe for motorists, bicyclists, and pedestrian traffic. The intersections were designed to accommodate the projected traffic counts of the design year 2045. The sharp rise in truck traffic in segments 1 and 2, due to the developments of the Flying J and the Wal-Mart Distribution Center, was a concern and was considered. As noted in **Section 3.5**, a stage 2 Intersection Control Evaluation (ICE) analysis was performed on the Cox Road, London Boulevard, and Industry Road intersections. The results of the ICE analysis showed roundabouts at Cox Road and London Boulevard resulted in less delay, improved safety in a reduction of the severity of crashes and lower net present value. The ICE evaluation for Industry Road intersection showed a signalized intersection as the preferred intersection type. As noted in **Section 3.5**, an IMR was prepared for the I-95 interchange and approved by the FDOT Chief Engineer on March 7, 2022. The IMR showed the DDI interchange as the preferred type was shown as preferred based on improved traffic operations and safety benefits over the existing diamond configuration. The preferred intersection build alternatives were selected based on the analysis from these reports. The ICE analysis and IMR supplement this report under separate covers. Concept plans for each alternative in the intersection and ICE analysis can be found in **Appendix A**.

5.6.1 I-95 Interchange

The I-95 Interchange alternative designs that were evaluated were selected because of their ability to meet future traffic demand. The alternatives are a partial cloverleaf, double roundabout, DDI, and a modified diamond interchange. The complete analysis for each interchange alternative can be found in the IMR. Only the modified diamond interchange and DDI alternatives were evaluated in the PTAR.

Partial Cloverleaf

The partial cloverleaf alternative includes loop ramps in the northwest and southwest corners of the SR 524 and I-95 interchange enabling motorists to bypass one of the two lights present on either side of the bridge.

The northwest loop ramp allows westbound traffic on SR 524 free flow access to I-95 southbound instead of progressing through the signalized intersection after crossing under the bridge. The loop ramp is designed to meet the minimum radius of 286-foot with a 10% superelevation. The southwest loop ramp allows free-flow access from I-95 southbound onto SR 524. Vehicles can bypass the signalized intersection and the left turn they would have had to otherwise take without the loop ramp. This loop ramp maintains the same geometry: 286-foot radius at 10% superelevation.

The partial cloverleaf alternative would increase the flow of traffic and help meet the new traffic demands for connecting I-95 southbound to the interchange in either direction. The major downside to the partial cloverleaf is the considerable ROW and parcel impacts. In addition, the Friday Road (South) intersection would be very close to the SR 524 and I-95 southbound ramp terminal, which would be a major safety concern. This alternative was eliminated and not considered for traffic evaluation for these reasons.

Dual Roundabouts

The dual-roundabout interchange features roundabouts at both ramp terminal intersections in place of the existing signalized intersections. Though the roundabouts improve the interchange capacity, the proximity of the intersections at Friday Road (South) and Friday Road (North) is a major concern. With short distances between the intersections and the interchange, traffic can potentially back up into the roundabouts and negate the free flow movements. Safety issues will also exist for pedestrians and bicyclists looking to cross the interchange via many free flow sections. Finally,

based on preliminary SIDRA roundabout analysis, the SR 524 and I-95 southbound ramp terminal will fail under the 2045 build condition. For these reasons, this alternative was eliminated early in the design process.

Modified Diamond Interchange

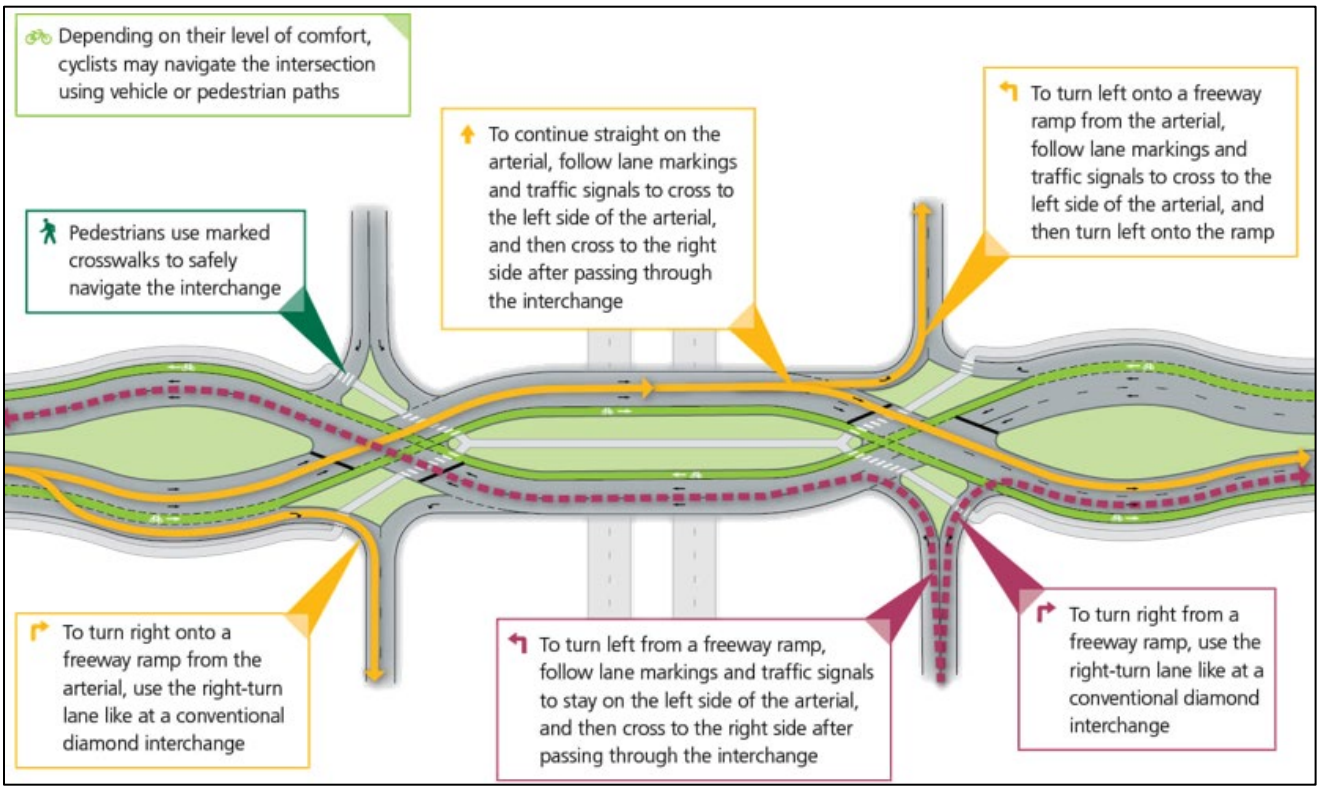
The existing interchange layout between SR 524 and I-95 is a typical diamond interchange. This alternative improves the existing configuration through turn lane improvements and widening SR 524 through the interchange area. The ramp terminal intersections will be signalized. The modified diamond interchange layout is shown in **Figure 5-7**.

The reasoning for why the modified diamond interchange was eliminated as an alternative is described in the diverging diamond interchange section below.

DDI

A DDI was also designed and evaluated as the final alternative for this analysis. Since DDI concepts are still fairly new to the public, **Figure 5-6** was created for use in earlier public workshops and stakeholder meetings to demonstrate how the DDI operates. The DDI layout for SR 524 is shown in **Figure 5-8**.

Figure 5-6 Standard Diverging Diamond Interchange Diagram



When combined with the benefits of widening SR 524, preliminary analysis showed that the DDI alternative is anticipated to ensure the interchange operates within the target LOS D through the design year 2045 by:

- Helping to avoid queue backups from the ramp terminals to the freeway mainline
- Increasing roadway efficiency since the crossovers can operate with only two traffic signal phases and thus fewer delays
- Enabling easier access to the freeway by allowing traffic to enter and exit the freeway without crossing opposing lanes of traffic

Adequately accommodating increased levels of truck traffic through the use of 14-foot lane widths

Figure 5-7 Modified Diamond Interchange Alternative

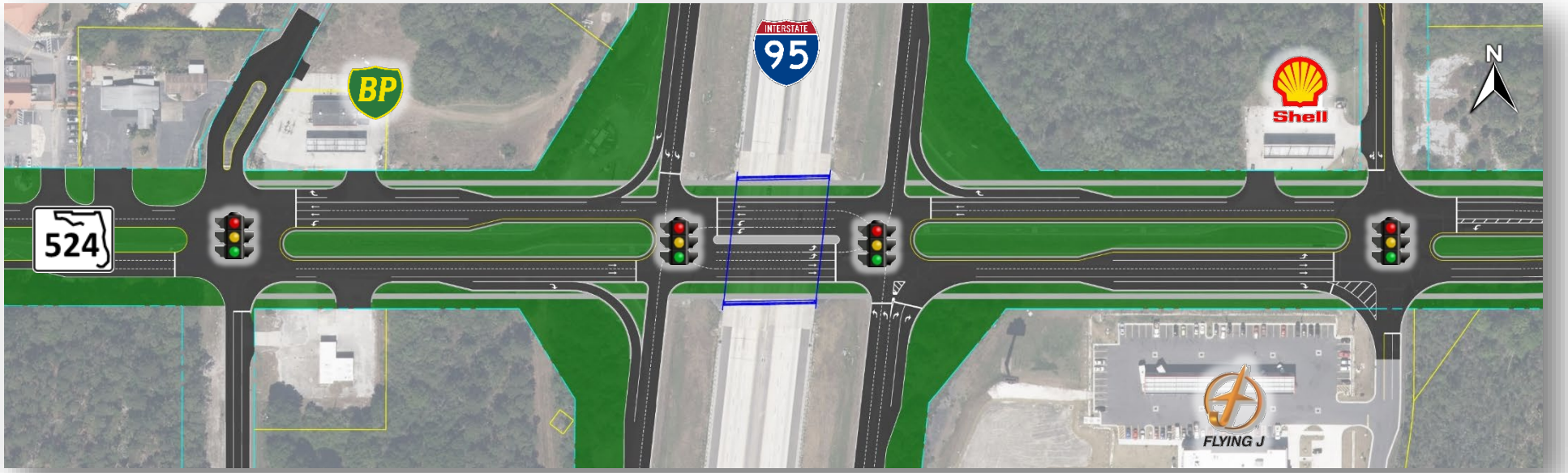


Figure 5-8 Diverging Diamond Interchange (DDI) Alternative

The DDI also significantly enhances safety within the interchange. According to the IMR and crash modification factor (CMF) Clearinghouse database, the CMF to convert a diamond interchange to a DDI is 0.858. Therefore, a DDI can approximately reduce the estimated number of crashes by 14% when compared to the diamond interchange. The DDI achieves this by reducing the number of points where vehicles may cross paths with other vehicles or with pedestrians/bicyclists. This leads to:

- A reduction in the number of crashes by approximately 57 over a period of 20 years, and therefore saving approximately $14.3 million in crash costs (fatalities, injuries, and property damage only) compared to the no-build alternative
- Improved levels of service and mobility for pedestrian and bicycle traffic

There were no significant environmental considerations within the interchange area that could influence the alternative analysis. The DDI and the modified diamond interchange will not cause negative environmental impacts, nor will they negatively influence surrounding businesses, residences, recreational areas, or cultural resources.

The reduction in crashes, improved levels of service for pedestrian and bicycle traffic, and better efficiency for the DDI alternative eliminated the modified diamond interchange from further analysis. Following the public involvement meeting, the public favored the DDI alternative, as well. The DDI was then chosen as the Preferred Alternative for the I-95 and SR 524 interchange improvement.

5.6.2 I-95 Bridges

Two alternatives were considered in the IMR for proposed changes to the I-95 bridge over SR 524. These were the modified diamond interchange (alternative 1A) and the DDI (alternative 1B).

Alternative 1A – Modified Diamond Interchange

This alternative involves modifying the existing bridge structure so that a complete replacement is not necessary. Both bridges are considered to be in good condition and have an excellent sufficiency rating. Two main modifications will need to be made to fit with the proposed SR 524 improvements. One is to upgrade the outside pier protection barriers, while the other is to push back the existing spill slopes to accommodate a sidewalk on both sides. In order to accommodate the proposed sidewalks within the end bridge spans, modifications can be made to the concrete slope pavement. These modifications can be accomplished by installing sheet pile wall, Schnabel wall, or gravity wall. The issues associated with modifying the slope pavement are mostly associated with construction under span 1 and 4 of the existing bridges. The low head room presents concerns for any potential contractor to place the needed construction equipment for driving sheet piles. The modified diamond interchange layout is shown in **Figure 5-7**.

Although modifying the bridge approaches and upgrading the pier protection is more economical than a complete bridge replacement, the life cycle costs associated with maintenance and the future cost of replacing the aging structures warranted an investigation of Alternative 1B.

Alternative 1B – Diverging Diamond Interchange

Alternative 1B involves converting the interchange into a DDI configuration (**Figure 5-8**), requiring the bridge to be replaced. Two additional options for this alternative involve a proposed bridge with either one span or two spans.

The single-span option, option 1, spans approximately 206-foot over SR 524 using Florida-I 96 Beams (FIB-96s). The advantage of using option 1 is that SR 524 can be spanned without the need for a middle pier. However, the FIB-96 beams are 96 inches tall and would increase the I-95 profile by approximately 5-foot. This would raise the overall cost

and lead to a significant geometric camber at midspan. Spanning such a long distance with a single span also pushes the envelope of FIB-96 span limitations set by the FDOT. A final disadvantage of the single span is that cranes would be required on both sides of the bridge to lift the beams during the construction of the bridge. This would require a detour off of SR 524.

The second bridge replacement option is to build a two-span bridge with a support at the middle of the symmetric typical section of SR 524 (shown in **Figure 7-1**). The new bridge piers would fall in the middle of the DDI's proposed central median. This option would allow for the use of FIB-45s, each with a span of about 103-foot. These beams are comparatively light at 93 kips compared to the 264-kip FIB-96 beams. Costs would then be reduced with the less robust substructure, but piers and associated construction activities along the median may have an offsetting effect. Unlike the single span alternative, traffic on SR 524 could be re-routed during construction while the beams are placed, and a detour off of SR 524 would no longer be required. However, this option would require a longer construction time.

Both alternatives share the same typical section as described in **Section 5.4.2**, and either option would utilize wrap-around Mechanically Stabilized Earth (MSE) walls at the bridge's begin and end to limit the length of each bridge span. Roadway components of the diverging diamond interchange can be constructed in unison with bridge construction. The design life of the proposed bridges at I-95 over SR 524 is 75 years. For Alternative 1A, the bridges will need to be replaced within the next 20 years or so. When this future replacement occurs, there will be additional costs associated with roadway improvements on SR 524.

The Preferred Alternative is Alternative 1B with two spans. This alternative allows for constructing the proposed diverging diamond interchange and allows the vertical clearance to meet current standards. Although the No-Build alternative would be less costly in the short term, the bridge would still require replacement prior to the year 2045, and long-term costs would increase. A no-build scenario also means that the bridge will have to function with a substandard vertical clearance. The two-span alternative was chosen since estimated costs are anticipated to be similar but the bridge profile will not need to be raised and construction will not require a detour.

The bridge's alternative costs are presented in **Table 5-1**.

Table 5-1 Bridge Alternative Costs

Bridge Alternative	Cost
No-Build	$384,991
Replacement Option 1 (FIB-96)*	$5,175,853
Replacement Option 2 (FIB-45)*	$5,175,853
* Costs increased by 20% for phased construction from the medium range costs per square foot given in the Structures Design Manual Chapter 9	

5.6.3 Cox Road

Alternatives analyzed in the Stage 2 ICE analysis for the Cox Road and SR 524 intersection included modifying the existing signalized intersection, a roundabout, a signalized restricted crossing U-turn (RCUT), a MUT, and a Partial DLT. Concept plans for each design can be found in **Appendix A**.

The signalized intersection design adds right and left dedicated turn lanes on SR 524. Cox Road southbound and northbound will both have a combined through and right-turn lane and a dedicated left-turn lane. The signalized intersection scores the lowest on predicted total crashes, predicted fatal and injury crashes, and traffic operation.

The next Cox Road alternative analyzed was a roundabout. The roundabout will have two lanes on the east and west sides to accommodate the two through lanes for SR 524, and it will have only one lane on the north and south sides to accommodate the single through lanes on Cox Road. It will also include a right bypass turn from SR 524 onto Cox Road in either direction. This alternative is an efficient free-flow method for traffic to pass through in any direction and was the public's Preferred Alternative.

The proposed RCUT design's main feature is a restricted median opening which allows left-turns from SR 524 onto Cox Road but prohibits left-turns and through movements from Cox Road onto SR 524. Instead, the RCUT intersection accommodates these movements by requiring drivers to turn right onto SR 524 and then make a U-turn at a one-way median opening after the intersection.

The RCUT intersection's primary benefits are a reduction in vehicle conflict points which leads to fewer crashes, and a reduction in traffic delays compared to the signalized alternative. On the other hand, the RCUT increases distance and travel time for left turn and through movements from Cox Road. Pedestrian movements may also be confusing, especially to visually impaired pedestrians, since one southwest-northeast path is provided across SR 524. This path directs pedestrians to cross to the center island and then continue across to the opposite corner. Pedestrian-vehicle conflict points are reduced, but pedestrians must travel a larger distance.

Like the RCUT, the MUT intersection's aim is to eliminate left turns at the intersection but it also removes left-turns from SR 524 onto Cox Road. Vehicles looking to turn left from SR 524 onto Cox Road must travel through the intersection and make a U-turn at a one-way median opening after the intersection. Vehicles looking to turn left from Cox Road onto SR 524 must make the same U-turn after turning right onto SR 524. However, vehicles on Cox Road are allowed to travel straight through the intersection to continue traveling on Cox Road.

MUT intersections reduce delays and stops for through traffic, increase intersection capacity, reduce risk to crossing pedestrians, provide fewer vehicle conflict points, and provide shorter signal cycle lengths. These traffic operation benefits resulted in the lowest delays and highest level of service of the five intersections analyzed. Disadvantages of MUT intersections include possible confusion and disregard of the left-turn prohibition at the intersection; increased delays, travel distances, and stops for left-turning traffic; and higher maintenance costs due to additional signal control equipment.

The final alternative analyzed was the partial DLT. This intersection reduces the number of traffic signal phases, conflict points, and delays while improving safety by removing the northbound left-turns from SR 524 to Cox Road. Instead, the left-turning traffic now must cross opposing through lanes at a signal-controlled intersection 500-foot before Cox Road. Vehicles then travel on a new lane parallel to the opposing lanes to complete the turn. This allows traffic to simultaneously turn with the through traffic at Cox Road. The signals are coordinated so vehicles do not stop multiple times within the intersection area. While the partial DLT intersection improves traffic operations and reduces crashes compared to the signalized option, it performs worse than the roundabout, RCUT, and MUT alternatives. In addition, this alternative requires the largest ROW costs and construction costs and was not favored by the public, so it was eliminated from consideration.

Predicted traffic operation delays and level of service from the ICE analysis for Cox Road are summarized in **Table 5-2**, as well as the predicted total crashes. Costs associated with each alternative are summarized in **Table 5-3**. The FDOT

ICE tool was used to determine the net present value of cost, or NPVC (of which the lower number is better), and the benefit to cost ratio of the roundabout, RCUT, MUT, and partial DLT alternatives compared with the signalized intersection. Note that the overall benefit to cost ratio of the roundabout compared with the signalized intersection could not be calculated. The NPVC is a financial modeling method used to evaluate investments and calculate the expected return on investment.

Based on NPVC, design, construction and ROW costs, crash reduction, and operational performance, the roundabout, RCUT, and MUT intersections are the best control strategies. Due to public comments during the Alternatives Analysis meeting held on Tuesday, May 4, 2021, the roundabout was strongly preferred over the RCUT or MUT intersections. Therefore, ICE analysis recommended that the roundabout move forward to the design phase.

Table 5-2 Cox Road ICE Operation Analysis Summary

Alternative	Predicted Total Crashes		Predicted Fatal + Injury Crashes		Delay (s) / LOS			
	Opening Year	Design Year	Opening Year	Design Year	2025 AM	2025 PM	2045 AM	2045 PM
Signalized Control	4.42	1.48	8.02	2.77	17.9 / B	20.0 / C	26.5 / C	30.9 / C
Roundabout	5.13	0.90	8.82	1.64	6.2 / A	6.2 / A	15.7 / C	16.9 / C
RCUT	3.76	1.04	6.82	1.94	15.0 / B	15.5 / B	14.5 / B	15.4 / B
MUT	3.76	1.15	6.82	2.16	5.1 / A	6.0 / A	7.9 / A	11.1 / B
Partial DLT	3.89	1.30	7.06	2.44	18.9 / B	19.2 / B	25.3 / C	22.8 / C

Table 5-3 Cox Road ICE Costs Summary

Alternative	ROW Cost	Design & Construction Cost	Net Present Value Cost	Benefit/Cost Ratio
Signalized Control	$152,000	$3,130,498	$31,678,090	1.0
Roundabout	$234,000	$3,150,636	$16,938,223	N/A
RCUT	$152,000	$3,935,769	$23,272,878	9.89
MUT	$152,000	$3,624,441	$15,998,128	25.73
Partial DLT	$1,409,892	$3,960,751	$30,711,599	2.00

The FDOT ICE tool was then used to determine the net present value of cost (NPVC) of each control strategy (for which lower is better) and the b/c ratio of the Roundabout, Signalized Restricted Crossing U-turn, Median U-Turn, and Partial Displaced Left-Turn compared with the Signalized Intersection. The NPVC and b/c ratio compared to the Signalized Intersection for the five control strategies are shown in **Table 5-3**. Note that the overall b/c ratio of the Roundabout compared with the Signalized Intersection could not be calculated. Based off NPVC, the Roundabout is preferred in comparison to the Signalized Intersection.

5.6.4 London Boulevard

Alternatives analyzed in the Stage 2 ICE analysis for the London Boulevard and SR 524 intersection included modifying the existing signalized intersection, a roundabout, RCUT intersection, and MUT intersection. Concept plans for each

design can be found in **Appendix A**. All the proposed designs consider the new development and its access requirements. Clearlake Cove is expected to be a two-lane, two-way access with a median island separating the lanes.

The signalized intersection design widens the existing layout and adds right and left dedicated turn lanes on SR 524. London Boulevard southbound is one lane and will facilitate left and right movements onto SR 524 and a through movement to Clearlake Cove. Clearlake Cove northbound into SR 524 will have one lane that allows left-turn and through movements and one lane for and right-turn and through movements. The signalized intersection scores the lowest on predicted total crashes, predicted fatal and injury crashes, and anticipated level of service. It is the only alternative to score a level of service below a B in the design year and was therefore eliminated from consideration.

The London Boulevard roundabout will have two lanes on the north and south sides to accommodate the two through lanes for SR 524, and it will have only one lane on the east and west sides to accommodate the single through lanes on London Boulevard. A roundabout at this location will allow efficient free-flow movements in all directions and reduce speeds coming into this residential area. The roundabout has the lowest predicted crash totals and was the public's Preferred Alternative.

The proposed RCUT design's main feature is a restricted median opening which allows left-turns from SR 524 onto London Boulevard but prohibits left-turns and through movements from London Boulevard onto SR 524. Instead, the RCUT intersection accommodates these movements by requiring drivers to turn right onto SR 524 and then make a U-turn at a one-way median opening after the intersection. The RCUT design's benefits and disadvantages are discussed above in **Section 5.6.3**.

Like the RCUT, the MUT intersection's aim is to eliminate left turns at the intersection but it also removes left-turns from SR 524 onto London Boulevard or Clearlake Cove. Vehicles looking to turn left from SR 524 onto London Boulevard or Clearlake Cove must travel through the intersection and make a U-turn at a one-way median opening after the intersection. Vehicles looking to turn left from London Boulevard onto SR 524 must make the same U-turn after turning right onto SR 524. However, vehicles on London Boulevard or Clearlake Cove are allowed to travel straight through the intersection. The MUT design's benefits and disadvantages are discussed above in **Section 5.6.3**.

The ICE analysis traffic operation results at London Boulevard are summarized in **Table 5-4**. Like Cox Road, the net present value of cost and benefit to cost ratio for each alternative were analyzed and are in **Table 5-5** along with ROW, design and construction costs. Based on these results, the roundabout offers the best net present value, lowest combined cost, and fewest predicted crashes. While it is the only option with ROW costs, it was still the preferred option by the public and local stakeholders. Thus, the ICE analysis recommended that the roundabout move forward to the design phase.

Table 5-4 London Boulevard ICE Operation Analysis Summary

Alternative	Predicted Total Crashes		Predicted Fatal + Injury Crashes		Delay (s) / LOS			
	Opening Year	Design Year	Opening Year	Design Year	2025 AM	2025 PM	2045 AM	2045 PM
Signalized Control	6.17	2.10	10.05	3.55	15.8 / B	11.5 / B	40.1 / D	34.5 / C
Roundabout	5.25	0.95	8.48	1.61	5.8 / A	6.4 / A	14.6 / B	12.5 / B
RCUT	5.24	1.64	8.54	2.77	9.2 / A	6.6 / A	11.5 / B	9.4 / A
MUT	5.24	1.47	8.54	2.49	5.6 / A	6.0 / A	11.0 / B	7.4 / A

Table 5-5 London Boulevard ICE Costs Summary

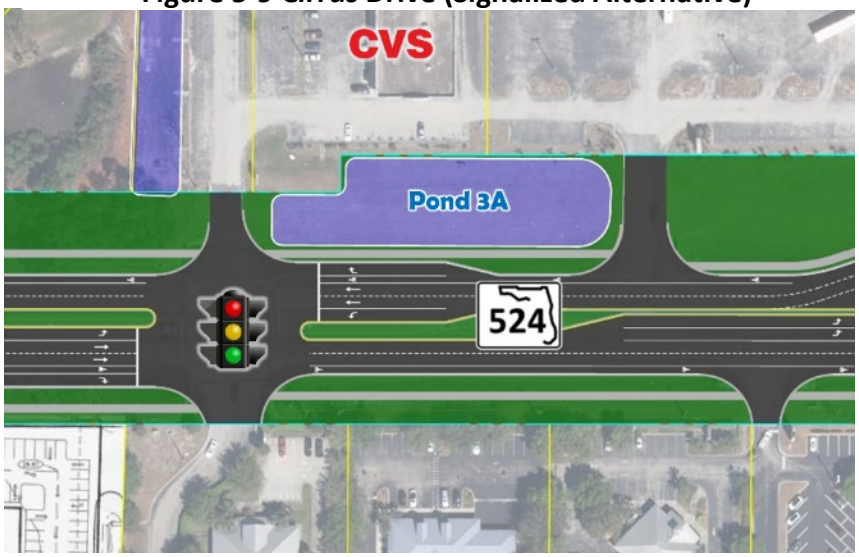
Alternative	ROW Cost	Design and Construction Cost	Net Present Value Cost	Benefit/Cost Ratio
Signalized Control	$0	$2,623,117	$37,609,784	1.0
Roundabout	$307,000	$2,432,361	$17,168,768	N/A
RCUT	$0	$3,165,954	$20,969,760	25.40
MUT	$0	$3,155,872	$18,458,970	29.46

The FDOT ICE tool was then used to determine the net present value of cost (NPVC) of each control strategy (for which lower is better) and the b/c ratio of the Roundabout, Signalized Restricted Crossing U-turn, and Median U-Turn compared with the Signalized Intersection. The NPVC and b/c ratio compared to the Signalized Intersection for the four control strategies are shown in **Table 5-5**. Note that the overall b/c ratio of the Roundabout compared with the Signalized Intersection could not be calculated. Based off NPVC, the Roundabout is preferred in comparison to the Signalized Intersection.

5.6.5 Cirrus Drive

The Cirrus Drive Intersection accommodates access to Publix, CVS, McDonald's, the Cocoa Veterinary Hospital, and other businesses in the shopping plazas directly to the north and south of SR 524. The site north of the CVS was recently purchased by a developer and a permit to construct apartment buildings was issued in March 2021. Construction has begun as of this report's date. Options for this intersection include removing the intersection or improving upon the current signalized configuration. Removing the intersection was eliminated as this would not meet traffic demands and would only allow right-in/right-out access to the businesses. Thus, the proposed design will be a widened version of the existing signalized intersection. The Cirrus Drive layout is shown in **Figure 5-9**. All build alternatives will have the same lane configuration.

Figure 5-9 Cirrus Drive (Signalized Alternative)



5.6.6 Industry Road

Alternatives analyzed in the Stage 2 ICE analysis for the Industry Road and SR 524 intersection included modifying the existing signalized intersection, a partial DLT intersection, and an RCUT intersection. Concept plans for each design can be found in **Appendix A**.

The Industry Road and SR 524 intersection currently exists as a signalized intersection. The first alternative design will widen the existing design to meet traffic demands. The proposed design adds two dedicated left-turn lanes and one right-turn lane. Industry Road southbound will have two dedicated left-turn lanes, a dedicated right-turn lanes, and one through lane. Industry Road northbound will have a through lane with dedicated left and right-turn lanes. While this design has the lowest construction cost, it has the highest predicted crashes. It is the only alternative to provide the necessary storage to accommodate the large projected left-turn traffic from SR 524 to Industry Road, however.

The other alternative for this intersection is a partial displaced left-turn (partial DLT). This intersection reduces the number of traffic signal phases, conflict points, and delays while improving safety by removing the north-bound left-turns from SR 524 to Industry Road. Instead, the left-turning traffic now must cross opposing through lanes at a signal-controlled intersection 400-foot before Industry Road. Vehicles then travel on new lanes parallel to the opposing lanes to complete the turn. This allows traffic to simultaneously turn with the through traffic at Industry Road. The signals are coordinated so vehicles do not stop multiple times within the intersection area.

The final alternative analyzed at Industry Road was an RCUT intersection. The RCUT design's main feature is a restricted median opening which allows left-turns from SR 524 onto Industry Road but prohibits left-turns and through movements from Industry Road onto SR 524. Instead, the RCUT intersection accommodates these movements by requiring drivers to turn right onto SR 524 and then make a U-turn at a one-way median opening after the intersection. The RCUT's benefits and disadvantages are summarized in **Section 5.6.3** of this report.

Table 5-6 summarizes the traffic operation results from the ICE analysis. **Table 5-7** summarizes the costs associated with each alternative. Note that the overall benefit to cost ratio of the RCUT intersection compared with the signalized intersection could not be calculated.

These results show that the partial DLT intersection offers the best level of service in the opening and design years, as well as the best net present value cost; however, it has a much larger footprint than the other intersection types. Furthermore, due to the location of another signalized intersection (Cirrus Drive) just 1000-foot west of Industry Road, there is not enough space available to provide long enough displaced left-turn lanes to accommodate the projected traffic from SR 524 to Industry Road. Selecting the partial DLT strategy would lead to left-turning traffic spilling out onto the SR 524 through lanes and severely impact the network and adjacent properties. For these reasons, the partial DLT was eliminated from consideration.

The RCUT intersection offers the highest reduction in predicted crashes, but completely fails operationally in the design year and was removed from consideration. The signalized intersection control strategy takes up less total area than the partial DLT, and it can accommodate the projected left-turn traffic from SR 524 to Industry Road. Therefore, the ICE analysis recommended that the signalized intersection alternative move forward to the design phase.

Table 5-6 Industry Road ICE Operation Analysis Summary

Alternative	Predicted Total Crashes		Predicted Fatal + Injury Crashes		Delay (s) / LOS			
	Opening Year	Design Year	Opening Year	Design Year	2025 AM	2025 PM	2045 AM	2045 PM
Signalized Control	8.08	2.88	13.70	4.93	36.5 / D	49.4 / D	53.3 / D	54.0 / D
Partial DLT	7.11	2.53	12.06	4.34	26.4 / C	25.9 / C	44.2 / D	49.3 / D
RCUT	6.87	2.25	11.65	3.85	40.3 / D	38.4 / D	185.5 / F	123.8 / F

Table 5-7 Industry Road ICE Costs Summary

Alternative	ROW Cost	Design and Construction Cost	Net Present Value Cost	Benefit/Cost Ratio
Signalized Control	$0	$3,428,538	$92,072,644	1.00
RCUT	$0	$4,186,649	$153,921,406	N/A
Partial DLT	$0	$4,037,220	$71,144,868	28.95

The FDOT ICE tool was then used to determine the net present value of cost (NPVC) of each control strategy (for which lower is better) and the b/c ratio of the Signalized Restricted Crossing U-Turn and Partial Displaced Left-Turn compared with the Signalized Intersection. The NPVC and b/c ratio compared to the Signalized Intersection for the three control strategies are shown in **Table 5-7**. Note that the overall b/c ratio of the Signalized Restricted Crossing U-Turn compared with the Signalized Intersection could not be calculated. Based off NPVC, and the presence of another signalized intersection just 1,000 feet west of Industry Road, the Signalized Restricted Crossing U-Turn is not preferred in comparison to the Signalized Intersection.

5.7 COMPARATIVE EVALUATION

Tables 5-8 through **5-11** summarizes and compares the No-Build and Build Alternatives' engineering and environmental analysis presented within this section. Note that wildlife & habitat impacts are the same for all build alternatives and are only considered for those with "may affect, not likely to adversely affect" effect determinations in the NRE.

For Segment 1, the DDI alternative performed better than the modified diamond in terms of the traffic operations and corridor safety. For Segment 2, 3, and 4, the urban typical section performed better than the urban and rural sections in corridor and safety as well as having a reduced footprint which results in less potential impacts to wetlands and construction costs.

Table 5-8 Segment 1 Evaluation Matrix

SEGMENT 1 : I-95 INTERCHANGE			
Evaluation Criteria	Alternative		
Classification	No-Build	Modified Diamond	DDI
Purpose & Need			
Design Year Level of Service	F/ E	D	C/D
Accommodates Future Traffic Demand	No	Yes	Yes
Corridor Safety (Rank)	3	2	1
Pedestrian Safety (Rank)	3	1	2
Social Environmental			
Business Estimated Impact	None	None	None
Residential Estimated Impact	None	None	None
Recreational 4(f) Estimated Impact	None	None	None
ROW Acquisition (Acres)	0	0	0
Cultural Environmental			
Archaeological Sites Estimated Impact	None	None	None
Historical Resources Estimated Impact	None	None	None
Natural Environment			
Wetland (Acres)	0	0	0
Floodplain (Acres)	0	0	0
Wildlife & Habitat (Protected Species)	None	Eastern Indigo Snake, Bald Eagle, Wood Stork	Eastern Indigo Snake, Bald Eagle, Wood Stork
Physical Environment			
Potential Contamination Sites	None	No ne	None
Projected Estimated Cost (Million)	$ -	$14.00	$14.00
Sites with Noise Level exceeding NAC	0	0	0
Potential Utility Impacts	None	AT&T Aerial Fiber /FP&L Aerial Electric and utility Poles	AT&T Aerial Fiber /FP&L Aerial Electric and utility Poles

Table 5-9 Segment 2 Evaluation Matrix

SEGMENT 2 : FRIDAY ROAD (NORTH) TO COX ROAD				
Evaluation Criteria	Alternative			
Classification	No-Build	Rural	Suburban	Urban
Purpose & Need				
Design Year Level of Service	D/E	C	C	C
Accommodates Future Traffic Demand	No	Yes	Yes	Yes
Corridor Safety (Rank)	4	3	2	1
Pedestrian Safety (Rank)	4	3	2	1
Social Environmental				
Business Estimated Impact	None	1 Parcel	None	None
Residential Estimated Impact	None	None	None	None
Recreational 4(f) Estimated Impact	None	None	None	None
ROW Acquisition (Acres)	None	1.40	None	None
Cultural Environmental				
Archaeological Sites Estimated Impact	None	None	None	None
Historical Resources Estimated Impact	None	None	None	None
Natural Environment				
Wetland (Acres)	0	2.29	2.11	1.96
Floodplain (Acres)	0	2.49	2.49	2.49
Wildlife & Habitat (Protected Species)	None	Eastern Indigo Snake, Bald Eagle, Wood Stork	Eastern Indigo Snake, Bald Eagle, Wood Stork	Eastern Indigo Snake, Bald Eagle, Wood Stork
Physical Environment				
Potential Contamination Sites	None	1 Medium	None	None
Estimated Cost (Million)	$ -	$6.40	$8.60	$8.10
Sites with Noise Level exceeding NAC	35	27	27	27
Potential Utility Impacts	None	AT&T Aerial Fiber / Charter Areial and Buried Fiber / Verizon Buried Fiber / FP&L Aerial Electric and utility Poles / FCG Gas Main	AT&T Aerial Fiber / Charter Areial and Buried Fiber / Verizon Buried Fiber / FP&L Aerial Electric and utility Poles / FCG Gas Main	AT&T Aerial Fiber / Charter Areial and Buried Fiber / Verizon Buried Fiber / FP&L Aerial Electric and utility Poles / FCG Gas Main

Table 5-10 Segment 3 Evaluation Matrix

SEGMENT 3 : COX ROAD TO LONDON BOULEVARD			
Evaluation Criteria	Alternative		
Classification	No-Build	Suburban	Urban
Purpose & Need			
Design Year Level of Service	A	A	A
Accommodates Future Traffic Demand	No	Yes	Yes
Corridor Safety (Rank)	3	2	1
Pedestrian Safety (Rank)	3	2	1
Social Environmental			
Business Estimated Impact	None	None	None
Residential Estimated Impact	None	None	None
Recreational 4(f) Estimated Impact	None	None	None
ROW Acquisition (Acres)	0	0	0
Cultural Environmental			
Archaeological Sites Estimated Impact	None	None	None
Historical Resources Estimated Impact	None	None	None
Natural Environment			
Wetland (Acres)	0	0	0
Floodplain (Acres)	0	0.11	0.11
Wildlife & Habitat (Protected Species)	None	Eastern Indigo Snake, Bald Eagle, Wood Stork	Eastern Indigo Snake, Bald Eagle, Wood Stork
Physical Environment			
Potential Contamination Sites	None	None	None
Estimated Cost (Million)	$ -	$10.20	$9.70
Sites with Noise Level exceeding NAC	0	0	0
Potential Utility Impacts	None	AT&T Aerial Fiber / Charter Areial and Buried Fiber / Verizon Buried Fiber & Utility Poles / FP&L Aerial Electric and utility Poles / FCG Gas Main / City of Cocoa 18" Reclaim Waterline	AT&T Aerial Fiber / Charter Areial and Buried Fiber / Verizon Buried Fiber & Utility Poles / FP&L Aerial Electric and utility Poles / FCG Gas Main / City of Cocoa 18" Reclaim Waterline

Table 5-11 Segment 4 Evaluation Matrix

SEGMENT 4 : LONDON BOULEVARD TO INDUSTRY ROAD			
Evaluation Criteria	Alternative		
Classification	No-Build	Suburban	Urban
Purpose & Need			
Design Year Level of Service	E	D	D
Accommodates Future Traffic Demand	No	Yes	Yes
Corridor Safety (Rank)	3	2	1
Pedestrian Safety (Rank)	3	2	1
Social Environmental			
Business Estimated Impact	None	None	None
Residential Estimated Impact	None	None	None
Recreational 4(f) Estimated Impact	None	None	None
ROW Acquisition (Acres)	0	0	0
Cultural Environmental			
Archaeological Sites Estimated Impact	None	None	None
Historical Resources Estimated Impact	None	None	None
Natural Environment			
Wetland (Acres)	0	0	0
Floodplain (Acres)	0	0	0
Wildlife & Habitat (Protected Species)	None	Eastern Indigo Snake, Bald Eagle, Wood Stork	Eastern Indigo Snake, Bald Eagle, Wood Stork
Physical Environment			
Potential Contamination Sites	None	None	None
Estimated Cost (Million)	$ -	$3.60	$3.10
Sites with Noise Level exceeding NAC	0	0	0
Potential Utility Impacts	None	AT&T Aerial Fiber / Charter Areial and Buried Fiber / Verizon Buried Fiber & Utility Poles / FP&L Aerial Electric and utility Poles / FCG Gas Main / City of Cocoa 18" Reclaim Waterline	AT&T Aerial Fiber / Charter Areial and Buried Fiber / Verizon Buried Fiber & Utility Poles / FP&L Aerial Electric and utility Poles / FCG Gas Main / City of Cocoa 18" Reclaim Waterline

5.8 VALUE ENGINEERING (VE) STUDY RESOLUTIONS

A VE Study was conducted the week of August 23-27, 2021 and can be found under a separate document. The purpose of the study was to analyze areas of potential cost savings or added value that could be incorporated into the design of the SR 524 corridor. The VE suggestions were categorized into three specific disciplines including traffic (7 suggestions), roadway (6 suggestions), and drainage (7 suggestions). Comment resolution of the VE study resulted in the recommendations shown in **Table 5-12**. VE alternative items 16, 20, and 22 were added to the concepts for the preferred alternative. Items 5, 32, and 38 will be considered further in the design phase. More information can be found in the separate VE study document.

Table 5-12 VE Study Summary

VE Alternative #	Potential Value Added/Costs Saved*	Response	Reason for Response
1 – Increase SR 524 typical section to six lanes between Friday Roads	+$1,251,000	Not Accepted	The IMR demonstrates that the I-95 interchange and both Friday Road intersections operate sufficiently in the design year without 6 lanes.
5 – use the infield areas at the I-95 interchange for drainage in basin one	-$649,000	Accepted	These areas can be used to reduce pond sites within basin one, although they will not completely eliminate pond needs.
11 – Connect I-95 Ramps to Friday Road on both sides	-$1,714,000	Not Accepted	The VE recommendation introduces unnecessary impacts to right-of-way, limited access right-of-way, Friday Road (North), and future maintenance along both Friday Roads.
15 – Extend the right-turn lane into the Flying J to the west	+$125,000	Not Accepted	Based on the IMR, this intersection operates sufficiently in the design year with the geometry recommended.
16 – Eliminate bike lanes and add shared-use paths on both sides of SR 524	$0	Accepted	Advantages for the shared-use path include: increased safety for bicyclists, potential connectivity with future city trails, better transitions with the Cox Road and London Boulevard Roundabouts. The paths also support the Vision Zero initiative of reducing traffic-related injuries and deaths.
18 – Expand median intersections and eliminate bulb-outs (R-CUT and MUT intersections)	-$44,000	Not Accepted	Per the stage 2 ICE analysis, the preferred intersection layouts do not include R-CUTs or MUTs.
19 – Maintain existing 6-foot and 8-foot sidewalk on SR 524	-$655,000	Not Accepted	It was noticed during multiple field reviews that the existing sidewalk experiences flooding, overtopping, and ponding during heavy rainfall events. Furthermore, the acceptance of VE recommendation #16 led to the resolution to not accept this recommendation.
20 – Slightly adjust the median for horizontal deflection via chicanes	$0	Accepted	This recommendation resolves public comments that suggest the community prefers to lower travelling speeds. In addition to the roundabouts at Cox Road and London Boulevard, the chicanes and landscaping features introduced in this VE recommendation will reduce speeds.
21 – Add a signal with the R-CUTS (Cox Road)	+$357,000	Not Accepted	The Preferred Alternative is a roundabout at Cox Road, not an R-CUT.
22 – Consider the roundabout to calm traffic at Cox Road	-$177,000	Accepted	Per the stage 1 and 2 ICE analysis, the preferred layout at Cox Road is a roundabout
26 – Add a signal with the R-CUT at London Boulevard	+$364,000	Not Accepted	The Preferred Alternative is a roundabout at London Boulevard, not an R-CUT.
28 – Consider two-stage crossing at signalized intersections	+$2,000	Not Accepted	With the Preferred Alternative's standard 22-foot median, the need to provide a median refuge is minimal due to turn lanes and sufficient turn radii at the signalized intersections

VE Alternative #	Potential Value Added/Costs Saved*	Response	Reason for Response
31 – Shift the alignment and add a displaced left turn to the south at Industry Road	+$533,000	Not Accepted	Stage 2 ICE analysis supports a traditional signalized intersection at Industry Road due to the proximity of the existing signal at Cirrus Drive to the west
32 – Consider advanced acquisition for pond sites	TBD	Added to the list of design suggestions	It is agreed that advance acquisition is recommended for obtaining the pond sites. However, the project is not funded for design, right-of-way, or construction, and as such, does not have planning consistency at this time. Without planning consistency, the PD&E study cannot proceed to public hearing, and no advanced right-of-way acquisition can occur.
33 – Buy the abandoned gas station and re-align the roundabout to avoid right-of-way impacts and to use the land area for pond needs	+$466,000	Not Accepted	Since the abandoned gas station has a medium contamination level, the remediation of this site could be extensive and costly. More suitable pond sites are available within the basin.
34 – Provide other amenities for the City to consider Pond 2A	+$3,838,000	Not Accepted	Mitigating costs of $2,095,200 would be required for wetland impacts within the pond 2A conservation area. An archaeological site also exists within this area. With other pond sites available, this VE recommendation is not accepted.
37 – Provide a pond as an amenity at Junny Rios Martinez Park	-$219,000	Not Accepted	After reviewing the existing permit for the park, the location of the VE pond would impact wetlands, eliminate the raised boardwalk, introduce a potential water hazard for park visitors, and impact the park's existing water treatment.
38 – Provide a pond at the Golf Academy	-$324,000	Added to the list of design suggestions	Since design, right-of-way, and construction are not currently funded at this time, and the project does not have planning consistency, it is recommended to defer discussions into the design phase where expectations can be better managed when funding becomes available.
39 – Consider drainage at the NE quadrant of the Cox Road roundabout	-$63,000	Not Accepted	Drainage swales here are better suited for conveyance. Historically, retention swales have not recovered as predicted. The lack of recovery introduces an unnecessary safety hazard, maintenance issues, and a non-compliant system that could require future right-of-way acquisition as a remedy.
41 – Joint-use pond with the Post Office at Industry Road	TBD	Not Accepted	This recommendation would be better served to be considered in the Clearlake Road (SR 501) Widening Project (FPID 433605-1-52-01) since it falls within those project limits

* (-) indicates potential cost savings while (+) indicates potential value added

5.9 SELECTION OF PREFERRED ALTERNATIVE

Section 5.2 indicated the TSM&O alternative does not meet the projects need and **Section 5.3** indicates that there are no viable Multimodal Alternatives for this corridor, which leaves the No-Build and Build Alternatives as remaining for consideration.

Although the No-Build Alternative will result in no direct impacts to the cultural, natural, and physical environment and will not require ROW acquisitions or relocations, it fails to meet the purpose and need of the project. The No-Build Alternative will not address the existing and future traffic congestion levels along SR 524 or at the I-95 interchange. Continued development and future growth are anticipated to occur in the region, and without transportation improvements, the project needs will not be met, resulting in decreased level of services that do not meet the minimum thresholds.

Through the comment resolution of the VE Study combined with the FDOT Workshop Number 4 held on November 11, 2021, the Preferred Alternative recommendation was agreed as shown in **Table 5-13**.

Based on the results of the comparative evaluation in **Section 5.7**, the urban curbed typical section was selected as the preferred and the DDI as the preferred interchange type at the I-95 interchange.

As noted in **Section 7**, the Preferred Alternative will provide superior traffic operations compared to the no-build alternative. Safety will be enhanced through reduced congestion and the inclusion of the intersection and access management improvements in addition to improved pedestrian and bicycle accommodations. The Preferred Alternative meets the purpose and need of the project better than the No-Build Alternative. The Preferred Alternative results in minimal environmental impacts as summarized in **Table 5-13**. Thus, the Build Alternative will be presented as the Preferred Alternative at the public hearing planned for Spring 2025.

Table 5-13 Preferred Alternative Recommendations

Description	Preferred Alternative Recommendations
Roadway Corridor	
Segment 1 (C3C)	DDI as shown in IMR
Segment 2 (C3R)	4-lane curbed (306.5) / No Bike Lane / 14’ Multi-Use Path (Both Sides) 11’ Inside, 12’ Outside Lanes
Segment 3 (C3R)	Similar to Segment 2 / Two 11’ Lanes Traffic Calming Measures (Median Adjustment / Landscape)
Segment 4 (C3C)	Similar to Segment 2 / Two 11’ Lanes
Intersections	
I-95 Interchange	DDI – Per approved Stage 2 ICE analysis / IMR
Cox Road	Roundabout – Per approved Stage 2 ICE analysis
London Boulevard	Roundabout – Per approved Stage 2 ICE analysis
Industry Road	Traffic Signal – Per approved Stage 2 ICE analysis

6. AGENCY COORDINATION AND PUBLIC INVOLVEMENT

Public involvement activities have been integrated into the PD&E Study process, allowing property owners, residents, businesses, government entities, and agencies to share their ideas and concerns with the study team. Using the ETDM process as the basis for potential alternatives, additional concerns were addressed through coordinated meetings with stakeholders, including FDOT, SCTPO, Brevard County, and the City of Cocoa. Multiple meetings were held with each stakeholder to identify their specific concerns regarding potential alternative improvements associated with the SR 524 study corridor. Input gained from the ETDM process, public meetings, and stakeholder meetings was used to define the decision-making process, develop alternative concepts, and reach final recommendations.

6.1 PUBLIC WEBSITE

Project details, including contact information and study documents, were made available on cflroads.com which was set up at the start of the PD&E Study:

https://www.cflroads.com/project/437983-1/SR_524_Corridor_Planning_Study

6.2 PUBLIC INVOLVEMENT

The ETDM process is FDOT's procedure for reviewing qualifying transportation projects to consider potential environmental effects in the Planning phase. FDOT has an Environmental Technical Advisory Team (ETAT) assigned to each District to facilitate intergovernmental interaction. ETAT members include representatives from MPOs/TPOs, state and federal agencies, and participating Native American Tribes. At the beginning of this SR 524 PD&E Study, an advance notification was sent to the ETAT members for input into potential capacity improvements. Feedback from the ETAT members can be found in the Project Summary Report under ETDM Number 14321 and was used as the initial basis of the study.

A *Public Involvement Plan* (PIP-December 2018) was also developed at the outset of the study that defined the public involvement process. Affected stakeholders, elected and public officials, state and federal agencies, and local businesses and communities were identified. Newsletters were distributed and an alternatives public meeting was held during the study process to seek and gather valuable information from individuals who use the roadway corridor the most. All project activities complied with Title VI of the 1964 Civil Rights Act and related statutes, as referenced in FDOT's Non-Discrimination Policy, Topic Number 001-275-006, and implemented procedure Topic Number 275-010-010. Comments from the public meetings are recorded in the *Comments and Coordination Report*.

6.2.1 Project Kickoff Notification Letter

A kickoff newsletter was mailed to 698 citizens (elected and appointed officials, local residents/property owners, and interested parties identified during the planning phase) on March 29, 2019.

6.2.2 Alternatives Public Meeting

The alternatives public meeting was held on Tuesday, May 4, 2021, from 5:30 p.m. to 7:30 p.m. at the Cocoa Civic Center, 430 Delannoy Avenue, Cocoa, FL. A hybrid public meeting was held, offering two options for the community to participate. Interested persons could either join the Virtual Public Meeting (VPM) from a computer, tablet, or cell

phone or participate in person by going to the Cocoa Civic Center. Regardless of the platform they chose, all participants were provided the same display materials and presentation.

The meeting was advertised through several methods, including:

- Advertisement in the Florida Administrative Register, Vol 47/79 on April 23, 2021.
- Direct mail notification to approximately 720 property owners/tenants.
- Notification letters and emails to approximately 120 state and local elected and appointed public officials and other agencies (including ETAT members and Tribal contacts).
- Display advertisement in the Friday, April 23, 2021, edition of the Florida Today.
- Press releases to local media outlets.
- Announcement of the FDOT website.
- Announcement on the project website https://www.cflroads.com/project/437983-1
- Coordination with local homeowner's associations and communities.

The meeting was conducted in an open house format, with a looping presentation provided for in-person citizen viewing at any time. The public was invited to attend in person between 5:30 pm and 7:30 pm. The VPM opened at 5:30 pm, and the presentation began at 5:45 pm. A handout with project information and details was prepared and distributed to all attendees.

Twenty citizens (including City and County representatives) and 16 project team members signed in at the in-person public hearing. Project team in-person attendees included the FDOT Project Manager (PM), ROW, Environmental Management Office (EMO), and the project consultants. While 51 people registered to attend the VPM, 37 people were in attendance during all or part of the virtual option.

Thirty-six comments were received through May 18, 2021:

- 12 comments were received during the public hearing
    - Four written comment forms from in-person attendees
    - Eight written comments/questions from virtual attendees
- 24 emailed comments were received after the meeting

Comments provided both support and opposition to specific typical section alternatives and intersection improvement options presented. No opposition to the SR 524 widening was expressed during the public meeting or comment period.

6.2.3 Public Hearing

This section will be updated after the public hearing has been conducted.

6.3 STAKEHOLDER MEETINGS

Individual meetings were conducted with the stakeholders involved along the corridor, including FDOT, SCTPO, Brevard County, and the City of Cocoa. Four design meetings were held with FDOT to analyze corridor typical sections, alignments, and intersection improvements. Design team meetings with FDOT were conducted on June 21, 2019, August 12, 2019, January 27, 2021, and September 14, 2021, to analyze the advantages and disadvantages of multiple potential alternative alignments. Meetings with the SCTPO, Brevard County, and City of Cocoa were conducted on

January 31, 2019 (Project Kick-Off) and February 19, 2020 (Update Meeting #1). Additional in-person presentations were provided to the SCTPO Citizens' Advisory Committee (CAC)/Technical Advisory Committee (TAC) and the SCTPO Board on September 8, 2021, and September 9, 2021.

A meeting was held on January 28, 2025 with a representative of Integra Trails apartment complex located on the south side of SR 524 with a main entrance opposite Lance Boulevard. The discussion included the proposed improvements including widening SR 524 to a four-lane section with shared use paths on both sides, a potential noise barrier along SR 524, converting the Lance Boulevard intersection a wider median not permitting left turn-out access, and providing a left turn-in directional median opening at their northern entrance. A roundabout is proposed at London Boulevard, east of Integra Trails to facilitate u-turn movements for both of their access points, and there is a proposed directional median opening for the Golf Academy on the north side of the road that vehicles exiting their main entrance could utilize for u-turning. Integra Trails indicated their northern access point is gate controlled and currently allows only egress access. There is no existing gate access box at that location, so ingress is not allowed. The representative did not raise concerns over the proposed improvements.

A meeting was held on February 5, 2025 with a representative with Eastern Florida State College who also manages the Fred Gay Golf Academy north of the Lance Boulevard intersection. The discussion included the proposed improvements including widening SR 524 to a four-lane section with shared use paths on both sides and installing a median not permitting left turn-out access, and providing a left turn-in directional median opening at their entrance. Traffic exiting to head north, would need to turn right and make a u-turn at a median opening proposed at the Lance Boulevard side street. The representative indicated there are no plans for changes to their site or access needs. The representative did not raise concerns over the proposed improvements.

7. PREFERRED ALTERNATIVE

7.1 TYPICAL SECTIONS

The Preferred Alternative is described in **Section 5.9**. Following the 2021 Alternatives Public Workshop, this typical was modified by replacing the 7-foot buffered bike lanes on either side of the road with 14-foot wide shared-use paths 4 feet from the existing ROW that will accommodate bicycle and pedestrian traffic. In addition, drainage swales will be placed between the outside curb and the shared-use paths. The swales are intended for offsite drainage bypass. Typical section details by segment are as follows:

Segment 1

Segment 1 will be a four-lane divided section that runs between Friday Road (South) and Friday Road (North) with a DDI at I-95. The typical section outside the DDI has 12-foot travel lanes, Type F outside curb and gutter, Type E inside curb and gutter, 14-foot shared-use paths on either side of the corridor 4-foot from the ROW, and a varying median (22-80 feet). The travel lanes widen to 14-foot within the DDI limits and include an additional 14-foot left-turn lane.

Segment 2

Segment 2 will be a four-lane divided section that runs from Friday Road (North) to Cox Road. This section has Type F outside curb and gutter, 12-foot outside lanes, 11-foot inside lanes, Type E inside curb and gutter, and a 22-foot median. 14-foot shared-use paths are on each side of the corridor 4-foot from the existing ROW. 5-foot-wide drainage swales with 1:4 front and back slopes will be placed between the shared-use path and the outside curb and gutter to capture off-site drainage as required.

Segment 3

Segment 3 will be a four-lane divided section that runs from Cox Road to London Boulevard. This section has Type F outside curb and gutter, 11-foot travel lanes, Type E inside curb and gutter, and a variable median (22-60 feet). The median widens to a maximum of 60-foot in the chicane section where the road diverges. 14-foot shared-use paths are on each side of the corridor 4-foot from the existing ROW. 5-foot-wide drainage swales with 1:4 front and back slopes will be placed between the shared-use path and the outside curb and gutter to capture off-site drainage as required.

Segment 4

Segment 4 will be a four-lane divided section that runs from London Boulevard to Industry Road. This section has Type F outside curb and gutter, 11-foot travel lanes, Type E inside curb and gutter, and a 22-foot median. 14-foot shared-use paths are on each side of the corridor. The existing ROW widens on the north side, but the centerline will be at the same offset from the southern ROW as in segments 2 and 3 (50-foot). 5-foot-wide drainage swales with 1:4 front and back slopes will be placed between the shared-use path and the outside curb and gutter except where the shared-use path comes in closer to the road to tie back into the existing curb ramp configuration at Industry Road.

The proposed roadway and bridge typical sections are shown in **Figures 7-1** through **7-4**. The approved typical section package is included in **Appendix B**.

Figure 7-1 Segment 1 Typical Section (Friday Road (South) to Friday Road (North))

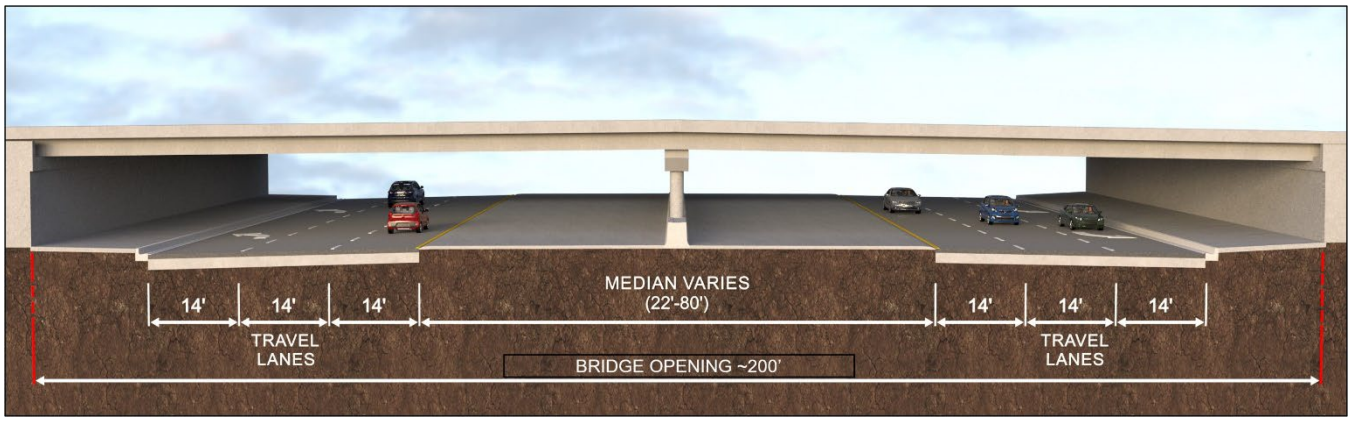


Figure 7-2 Segment 2 Typical Section (Friday Road (North) to Cox Road)

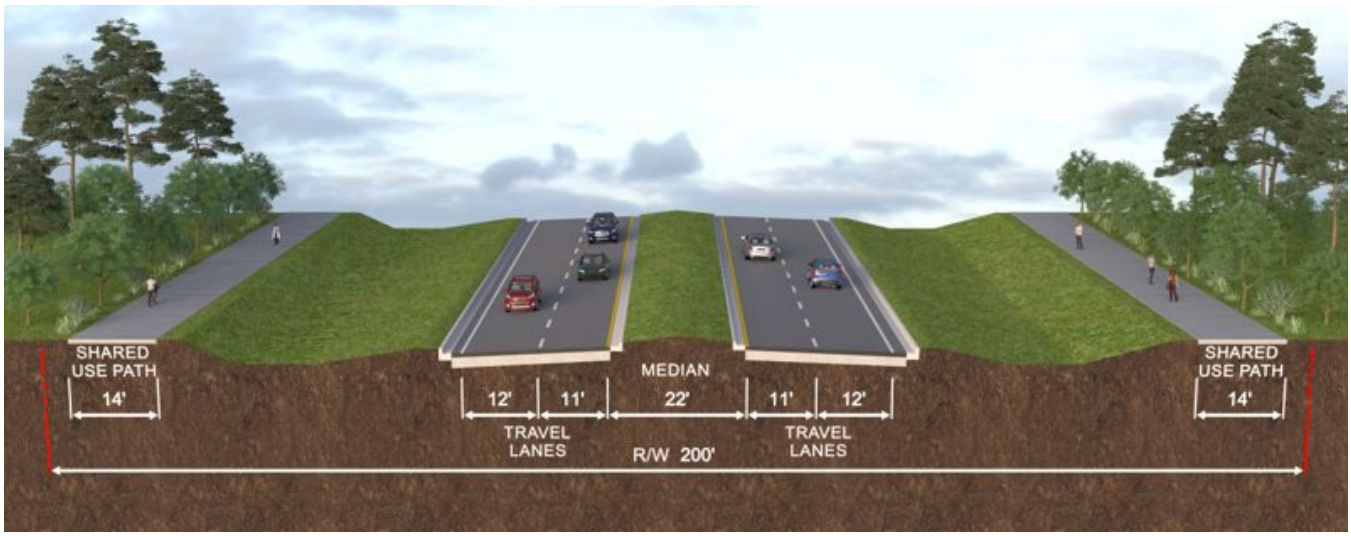


Figure 7-3 Segment 3 Typical Section (Cox Road to London Boulevard)

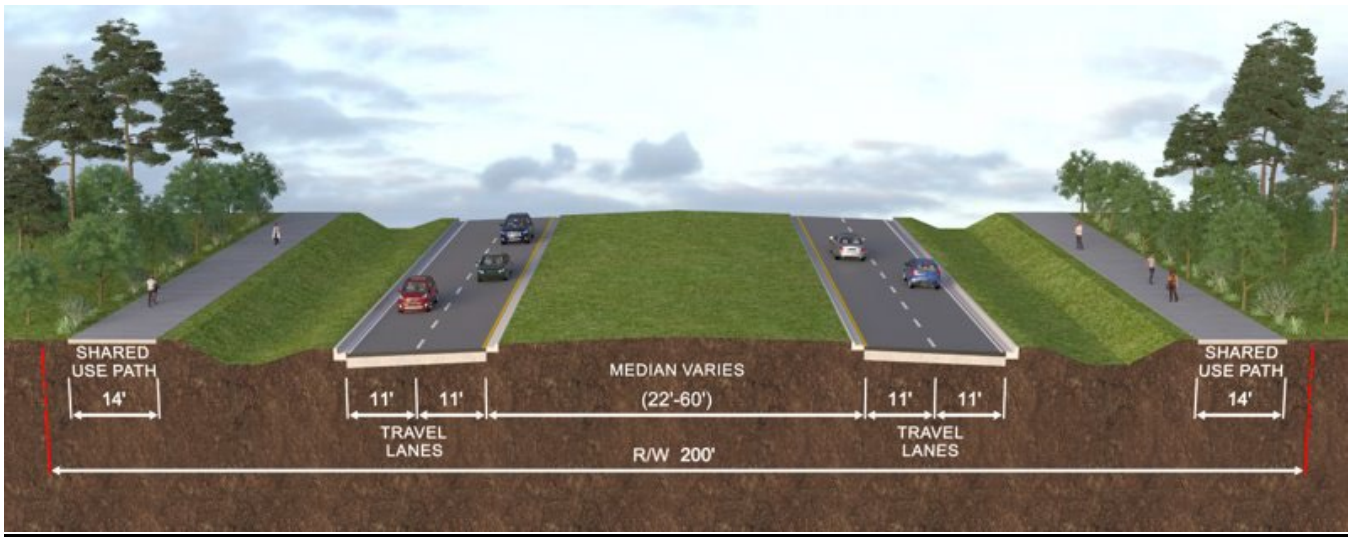
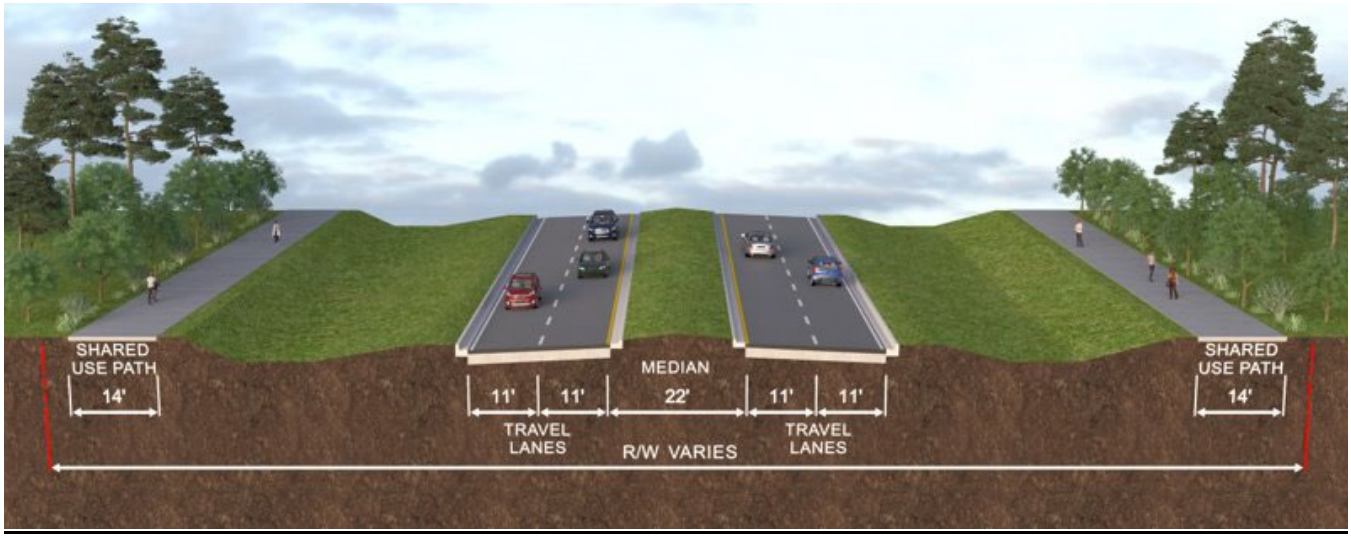


Figure 7-4 Segment 4 Typical Section (London Boulevard to Industry Road)

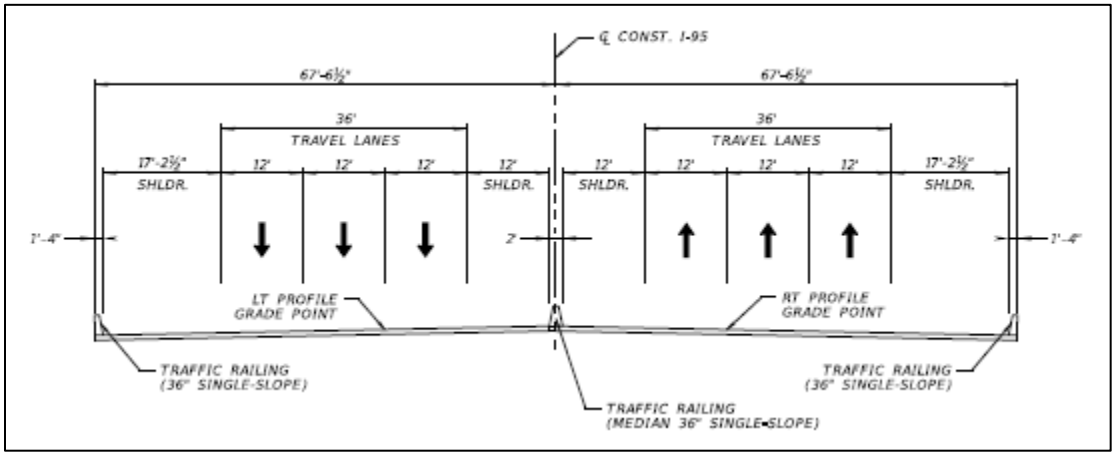


Bridges and Structures

The existing bridge structures over SR 524 will be replaced with a new two-span structure. This alternative features two 103-ft spans composed of 13 Florida I-45 beams (FIB-45s) spaced at about 12-foot. The spans will be supported by a structure centered within the DDI's central median.

Both the northbound and southbound I-95 bridge typical sections over SR 524, shown in **Figure 7-5**, include three 12-foot lanes, a 12-foot inside shoulder separated by a 36-in. median single-slope traffic railing, and 17'-2½" outside shoulders that will be protected by a 36-in. single-slope traffic railing. The overall width will be 135'-1".

Figure 7-5 I-95 Bridge Typical Section



7.2 RIGHT-OF-WAY AND RELOCATIONS

The Preferred Alternative can be built within the existing ROW for the majority of the project except for the proposed roundabouts at Cox Road and London Boulevard. As discussed in **Section 5.5.2**, the proposed profile will be raised by roughly 2-foot at each roundabout in order to maintain the 3-foot required clearance from the groundwater table. Thus, tie down slopes from the proposed sidewalk near the roundabouts will tie back to the existing ground past the ROW in the northwest and southeast quadrants. The sidewalk in the other two quadrants will tie down within the

existing ROW. Right-of-way acquisition will also be required for proposed driveway connections to the BP and Shell gas stations since these driveway returns must meet a 25-foot minimum radius as defined by FDM 214.3. Finally, the preferred pond alternatives will require additional ROW except for pond alternatives 3A and 3B. A total of 8.24 acres of ROW from 13 parcels (0.38 acres from 9 partial parcels for the roadway improvements and 7.86 acres for pond sites). A Conceptual Stage Relocation Plan (October 2024) was prepared to document impacts related to one business relocation proposed with the project. This business relocation is a gas station located at the Cox Road intersection associated with Pond 2F. FDOT will carry out a Right-of-way and Relocation Assistance Program in accordance with Florida Statute 421.55, Relocation of displaced persons, and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646 as amended by Public Law 100-17). All parcel impacts are summarized in **Table 7-1**. Concept plan exhibits showing each of the parcel impacts below can be seen in **Appendix D**.

Table 7-1 Parcel Impacts

Parcel Number	Area Impact	Cause of Impact
A3	423 sf. (0.01 acres)	Proposed driveway to BP gas station
A5	559 sf. (0.01 acres)	Proposed driveway to BP gas station
A7	1,045 sf. (0.02 acres)	Proposed driveway to Shell gas station
A11	190,971 sf. (4.38 acres)	Pond 1A (Preferred Site)
A28	5,661 sf. (0.13 acres)	Cox roundabout
A45	3,676 sf. (0.08 acres)	Cox roundabout
A22	46,023 sf. (1.06 acres)	Pond 2F (Preferred Site)
A24	45,821 sf. (1.04 acres)	Pond 2F (Preferred Site)
A26	62,528 sf. (1.44 acres)	Pond 2F (Preferred Site)
A237	543 sf. (0.01 acres)	London roundabout
A42	836 sf. (0.02 acres)	London roundabout
A243	1,672 sf. (0.04 acres)	London roundabout
A44	2,225 sf. (0.05 acres)	London roundabout

7.3 HORIZONTAL AND VERTICAL GEOMETRY

Horizontal Geometry

The horizontal alignment for the Preferred Alternative is primarily in the center of the 200-foot ROW. Past London Boulevard, the alignment continues to be offset 100-foot from the southern ROW line even though the northern ROW line widens. This preferred alignment is shown in the concept plans provided in **Appendix C**. The horizontal curve data are summarized in **Table 7-2**.

Table 7-2 Preferred Alternative Horizontal Alignment Curve Data

PC Station	PI Station	PT Station	Delta	Degree of Curve
520+04.29	524+87.45	529+40.20	35°05'38"	03°44'59"
Tangent (foot)	**Length (foot)**	**Radius (foot)**	**Superelevation**	**Design Speed (mph)**
483.15	935.90	1528.00	+0.06	45

In segment 3, the travel lanes are pushed further out via 2500-foot radii reverse curves to expand the median from 22 feet to 62 feet between Pinyon Drive and Westminster Drive. Similar reverse curves reduce the median back to 22 feet between Westminster Drive and Lance Boulevard. This creates an urban chicane and traffic calming effect to slow vehicles and deter truck traffic through this residential section.

Vertical Geometry

As discussed in **Section 5.5.2**, the conceptual vertical profile was determined by maintaining the necessary 3-foot minimum clearance from the groundwater table. The roadway below the I-95 bridge will not need to be raised to meet base clearance criteria. Since the existing ground is flat throughout the corridor, no vertical curves are required, and the profile typically rolls from positive to negative 0.3% every 250 feet as required by FDM 210.10.1.1. The profile will tie into existing at Industry Road and Precious Boulevard at flat grades.

7.4 DESIGN EXCEPTIONS / VARIATIONS

Table 7-3 lists the ten controlling design elements and states whether FDOT and AASHTO design criteria have been satisfied. As currently designed, the Preferred Alternative does not require any design exceptions or variations.

Table 7-3 Design Criteria Satisfaction

Controlling Design Element	FDOT Criteria	AASHTO Criteria
Design Speed	Satisfied	Satisfied
Lane Width	Satisfied	Satisfied
Shoulder Width	Satisfied	Satisfied
Structural Capacity	Satisfied	Satisfied
Vertical Clearance	Satisfied	Satisfied
Maximum Grade	Satisfied	Satisfied
Cross Slopes	Satisfied	Satisfied
Superelevation Rate	Satisfied	Satisfied
Horizontal Curve Radius	Satisfied	Satisfied
Stopping Sight Distance	Satisfied	Satisfied

7.5 MULTI-MODAL ACCOMMODATIONS

The Preferred Alternative does not impact existing railroads or the SCAT system's Routes 6 or 11. Both pedestrians and bicycle users will be accommodated through 14-foot wide shared-use paths on either side of the corridor. The shared-use paths will be 4-foot desired, 2-foot minimum from the ROW to satisfy clear zone criteria. Curb ramps, detectable warnings, and crosswalk markings meeting American with Disabilities Act (ADA) criteria will be provided at all intersections to provide safe and clear crossings.

7.6 ACCESS MANAGEMENT

Florida Administrative Rule Chapter 14-97 establishes the classifications for state highways and contains separation standards for access features by Access Class. The access management plan for SR 524 consists of an access class 3 for segment 2 and an access class 5 for segments 1, 3, and 4. Roadways with an access class 3 and a 45 mph design speed are limited to one-half mile (2,640-foot) between full median openings and one-quarter mile (1,320-foot) between directional median openings. Signal spacing is limited to one-half mile (2,640-foot), while roadway connections are restricted to one-twelfth mile (440-foot) between connections. Roadways with an access class 5 and a 45-mph design speed are limited to one-quarter mile (1,320-foot) between full median openings and one-eighth mile (660-foot) between direction median openings. Signal spacing is limited to one-quarter mile (1,320-foot), while roadway connections are restricted to 245-foot **Tables 7-4**, **7-5**, and **7-6** identify the median openings, signal spacings, and roadway connections for the approved access management plan along the SR 524 corridor for the Preferred Alternative alignment. This access management plan was approved on April 26, 2022. To provide emergency access to and from the fire station, a traversable median with mountable curb is proposed.

Table 7-4 SR 524 Median Types and Spacing

Existing Opening Location		Existing Opening Type	Proposed Opening Type	Distance Between Openings	Required Spacing	Deviation from Standard (%)
S	Friday Road (South)	Full	Full	---	---	---
S	I-95 SB Off Ramp / NB On Ramp	Full	Full	655’	1320’	50.4%
S	I-95 SB On Ramp / NB Off Ramp	Full	Full	312’	1320’	76.4%
S	Friday Road (North)	Full	Full	742’	1320’	43.8%
NS	Station 410+25	Non-Restrictive	Directional	1145’	1320’	13.3%
NS	Station 421+70	Non-Restrictive	Directional	1230’	1320’	8.3%
S	Walmart Distribution Center	Full	Full	3620’	2640’	---
R	Cox Road	Full	Full	2045’	2640’	22.5%
NS	Pinyon Drive	Full	Directional	1882’	660’	---
NS	Westminster Drive	Full	Full	1125’	660’ / 1320’	---
NS	Lance Boulevard	Full	Directional	1210’	660’	---
NS	Fred Gay Golf Academy	Non-Restrictive	Directional	870’	660’	---
NS	*Fire Station Emergency Access	Non-Restrictive	Emergency	---	---	---
R	London Boulevard	Full	Full	2550’	1320’	---
NS	Coventry Court	Full	Directional	575’	660’	12.9%
S	Cirrus Drive	Full	Full	720’	660’ / 1320’	1.7%
S	Industry Road	Full	Full	1095’	1320’	17.0%
NS = Non-Signalized / S = Signalized / R = Roundabout						

* a traversable median with mountable curb is shown on the concept plans to facilitate access to the fire station from the east on SR 524 into the western driveway, and access from the fire station to west on SR 524 from the eastern driveway.

Table 7-5 SR 524 Intersection Spacing

Existing Opening Location		Existing Opening Type	Proposed Opening Type	Distance Between Openings	Required Spacing	Deviation from Standard (%)
S	Friday Road (South)	Full	Full	---	---	---
S	I-95 SB Off Ramp / NB On Ramp	Full	Full	655’	1320’	50.4%
S	I-95 SB On Ramp / NB Off Ramp	Full	Full	312’	1320’	76.4%
S	Friday Road (North)	Full	Full	742’	1320’	43.8%
S	Walmart Distribution Center	Full	Full	3615’	2640’	---
R	Cox Road	Full	Full	2050’	2640’	22.5%
R	London Boulevard	Full	Full	6767’	1320’	---
S	Cirrus Drive	Full	Full	1295’	1320’	1.7%
S	Industry Road	Full	Full	1095’	1320’	17.0%
S = Signalized Intersection / R = Roundabout						

Table 7-6 SR 524 Roadway Connection Spacing

From	To	Connection Spacing	Required Spacing	Proposed Condition	Deviation from Standard (%)
Eastbound					
Friday Road (South)	Abandoned Service Station 1	90’	245’	Remain	---
Abandoned Service Station 1	Abandoned Service Station 2	90’	245’	Close	26.5%
Abandoned Service Station 2	I-95 SB On-Ramp	440’	245’	Remain	---
I-95 SB On-Ramp	I-95 NB Off-Ramp	330’	245’	Remain	---
I-95 NB Off-Ramp	North Friday Road	750’	245’	Remain	---
Friday Road (North)	Walmart Distribution	3500’	660’	Remain	---
Walmart Distribution	Service Station	1620’	660’	Remain	---
Service Station	Cox Road	440’	660’	Remain	33.3%
Cox Road	Cocoa Landings 1 (Future)	850’	245’	Proposed	---
Cocoa Landings 1 (Future)	Cocoa Landings 2 (Future)	1065’	245’	Proposed	---
Cocoa Landings 2 (Future)	Integra Preserve 1 (Future)	1440’	245’	Proposed	---
Integra Preserve 1 (Future)	Integra Preserve 2 (Future)	880’	245’	Proposed	---
Integra Preserve 2 (Future)	Integra Preserve 3 (Future)	1080’	245’	Proposed	---
Integra Preserve 3 (Future)	Fire Station Drive 1	760’	245’	Remain	---
Fire Station Drive 1	Fire Station Drive 2	260’	245’	Remain	---
Fire Station Drive 2	London Cove Entrance (Future)	450’	245’	Proposed	---
London Cove Entrance (Future)	Vet Hospital / Publix Drive 1	1290’	245’	Remain	---
Vet Hospital / Publix Drive 1	Publix Drive 2	500’	245’	Remain	---
Publix Drive 2	Industry Road	600’	245’	Remain	---
Westbound					
Friday Road (South)	Service Station 1	80’	245’	Remain	---
Service Station 1	Service Station 2	120’	245’	Close	18.4%
Service Station 2	I-95 SB Off-Ramp	460’	245’	Remain	---
I-95 SB Off-Ramp	I-95 NB On-Ramp	330’	245’	Remain	---
I-95 NB On-Ramp	Service Station Driveway	540’	245’	Remain	---
Service Station Driveway	North Friday Road	180’	245’	Remain	26.5%
Friday Road (North)	Driveway 1	680’	660’	Remain	---
Driveway 1	Driveway 2	1630’	660’	Remain	---

From	To	Connection Spacing	Required Spacing	Proposed Condition	Deviation from Standard (%)
Driveway 2	Thien Thai Lane	120’	660’	Remain	81.8%
Thien Thai Lane	Cox Road	3300’	660’	Remain	---
Cox Road	Dentistry Driveway	450’	245’	Remain	---
Dentistry Driveway	Pinyon Drive	1430’	245’	Remain	---
Pinyon Drive	Westminster Drive	1100’	245’	Remain	---
Westminster Drive	Easement Driveway	340’	245’	Remain	---
Easement Driveway	Lance Boulevard	860’	245’	Remain	---
Lance Boulevard	Fred Gay Golf Academy	885’	245’	Remain	---
Fred Gay Golf Academy	Sunoco Driveway 1	1215’	245’	Remain	
Sunoco Driveway 1	Sunoco Driveway 2	210’	245’	Remain	14.3%
Sunoco Driveway 2	London Boulevard	270’	245’	Right In Only	---
London Boulevard	Coventry Court	580’	245’	Remain	---
Coventry Court	CVS Driveway	700’	245’	Remain	---
CVS Driveway	Abandoned Plaza Drive	400’	245’	Remain	---
Abandoned Plaza Drive	Industry Drive	700’	245’	Remain	---

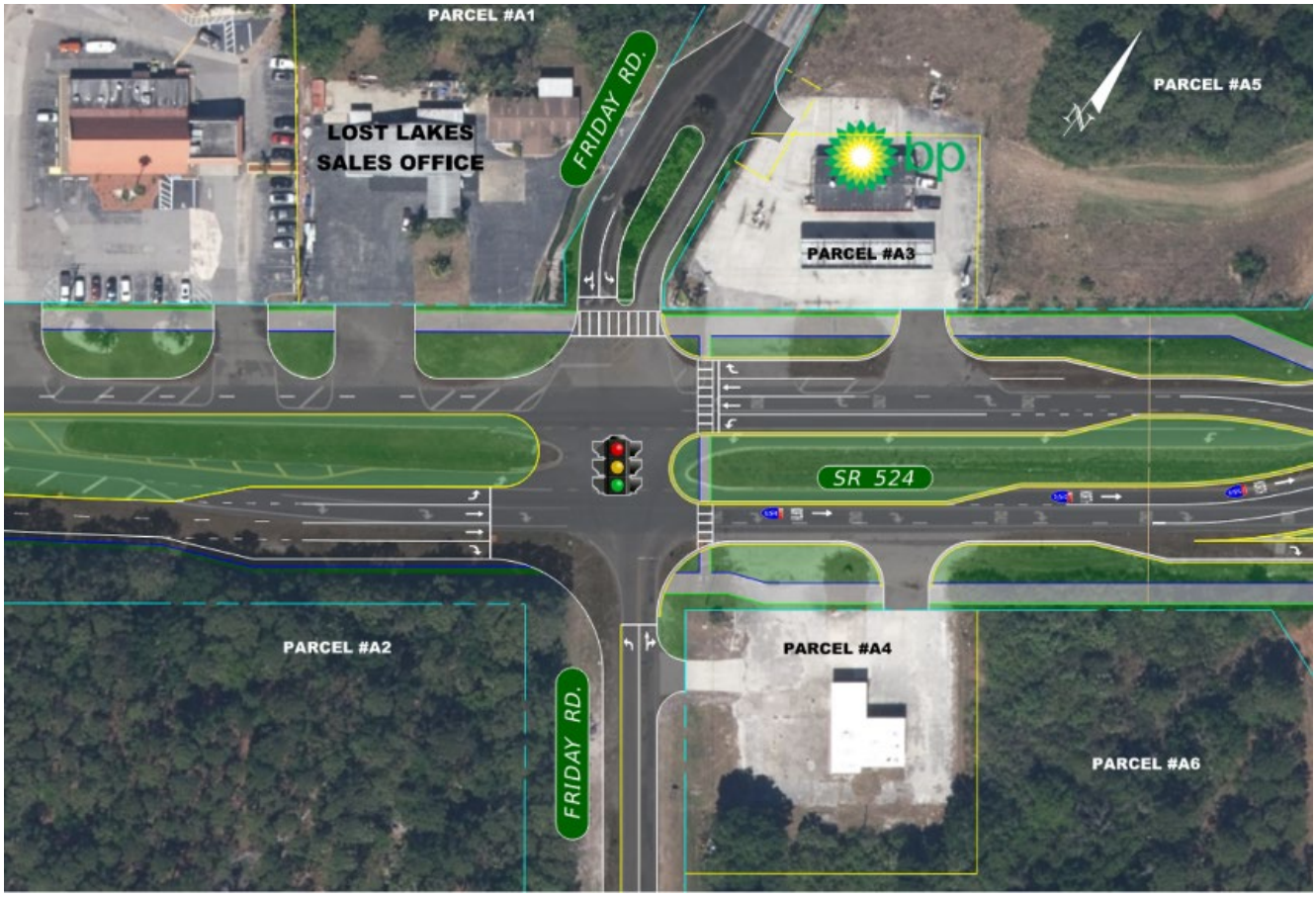
7.7 INTERSECTION CONCEPTS AND SIGNAL ANALYSIS

As part of the PD&E Study, different intersection concepts for Cox Road, London Boulevard, and Industry Road were evaluated as described in **Section 5.6**. The configurations of the South/North Friday Road, Walmart Distribution Center, and Cirrus Drive intersections will also be updated to accommodate the proposed improvements. The final concepts selected for each intersection are described below and are part of the Preferred Alternative. The sections below contain images from the concept plans showing the configuration for each intersection. Additional details can be found in the complete concept plans in **Appendix C**.

Friday Road (South)

South of I-95, Friday Road (South) and SR 524 intersection's proposed layout is shown in **Figure 7-6**. This intersection will remain signalized under the Preferred Alternative.

Figure 7-6 Friday Road (South) Intersection



Friday Road (North)

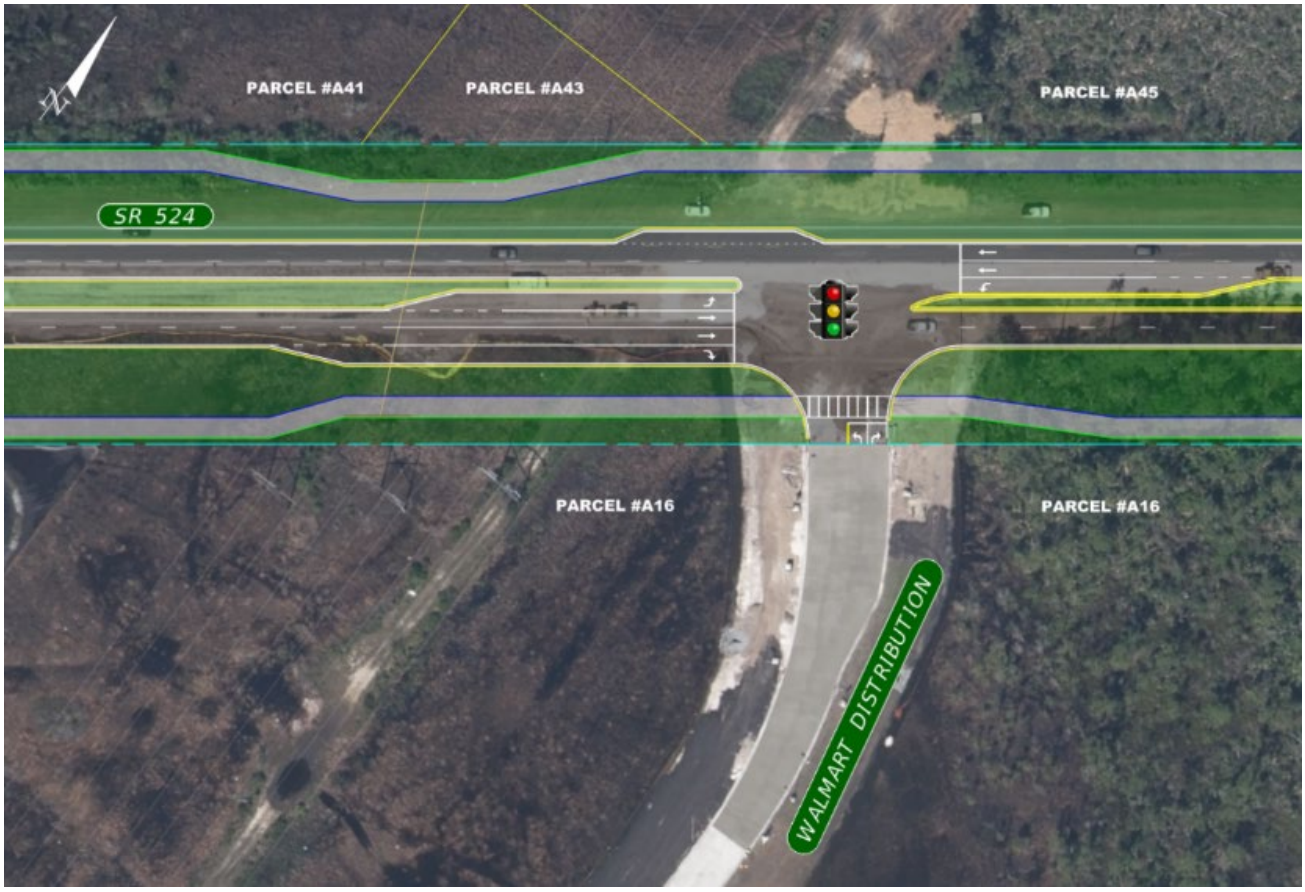
The Friday Road (North) and SR 524 intersection's layout is shown in **Figure 7-7**. The eastbound right-turn lane provides access to the Flying J and will be designed with a large radius (100-foot) to accommodate large truck traffic. The westbound left-turn lane will also enter the Flying J, but much less truck traffic is expected to come from the westbound direction, so a radius of 75-foot will be used. The PTAR determined that both the flying J exit and Friday Road (North) southbound will have a combined right-turn and through lane along with a dedicated left-turn lane. However, after further coordination with FDOT, a dedicated right-turn lane will also be added at Friday Road (North).

Figure 7-7 Friday Road (North) Intersection

Walmart Distribution Center

A signalized intersection exists at the entrance of the Walmart Distribution center, which will remain in the Preferred Alternative. This intersection's layout is shown in **Figure 7-8**. Note that an eastbound dedicated left-turn lane will be added to allow U-turn movements and for future anticipated developments north of the intersection.

Figure 7-8 Walmart Distribution Intersection



Cox Road

As discussed in **Section 5.7.3**, a roundabout was selected as the recommended alternative at the Cox Road intersection. Following the ICE Analysis, the roundabout design was adjusted and the Preferred Alternative design is presented in **Figure 7-9**. Due to the raised profile and roundabout geometry, ROW acquisition is required to cover tie down slopes from the shared-use path, as well as parts of the paths themselves.

Figure 7-9 Cox Road Roundabout

Pinyon Drive, Westminster Drive, and Lance Boulevard

Urban chicanes will be introduced along the corridor in Segment 3 as the 22-foot median widens to a 60-foot median at the Pinyon Drive and Lance Boulevard intersections to create a traffic calming effect. The chicanes were added to the Preferred Alternative in response to comments during the public involvement phase to slow down speeds throughout the residential neighborhoods in this section of the corridor. These intersections will be converted to directional median openings, while Westminster Drive between them will be a full median opening. The medians narrow again to 22-foot at Westminster to produce the chicane effect. All three intersections were also designed to connect to the proposed developments of Cocoa Landings and Integra Preserve.

Pinyon Drive, Westminster Drive, and Lance Boulevard's layouts are shown in **Figures 7-10 through 7-12**. The complete chicane section can be seen in the concept plans in **Appendix C**.

Figure 7-10 Pinyon Drive Intersection

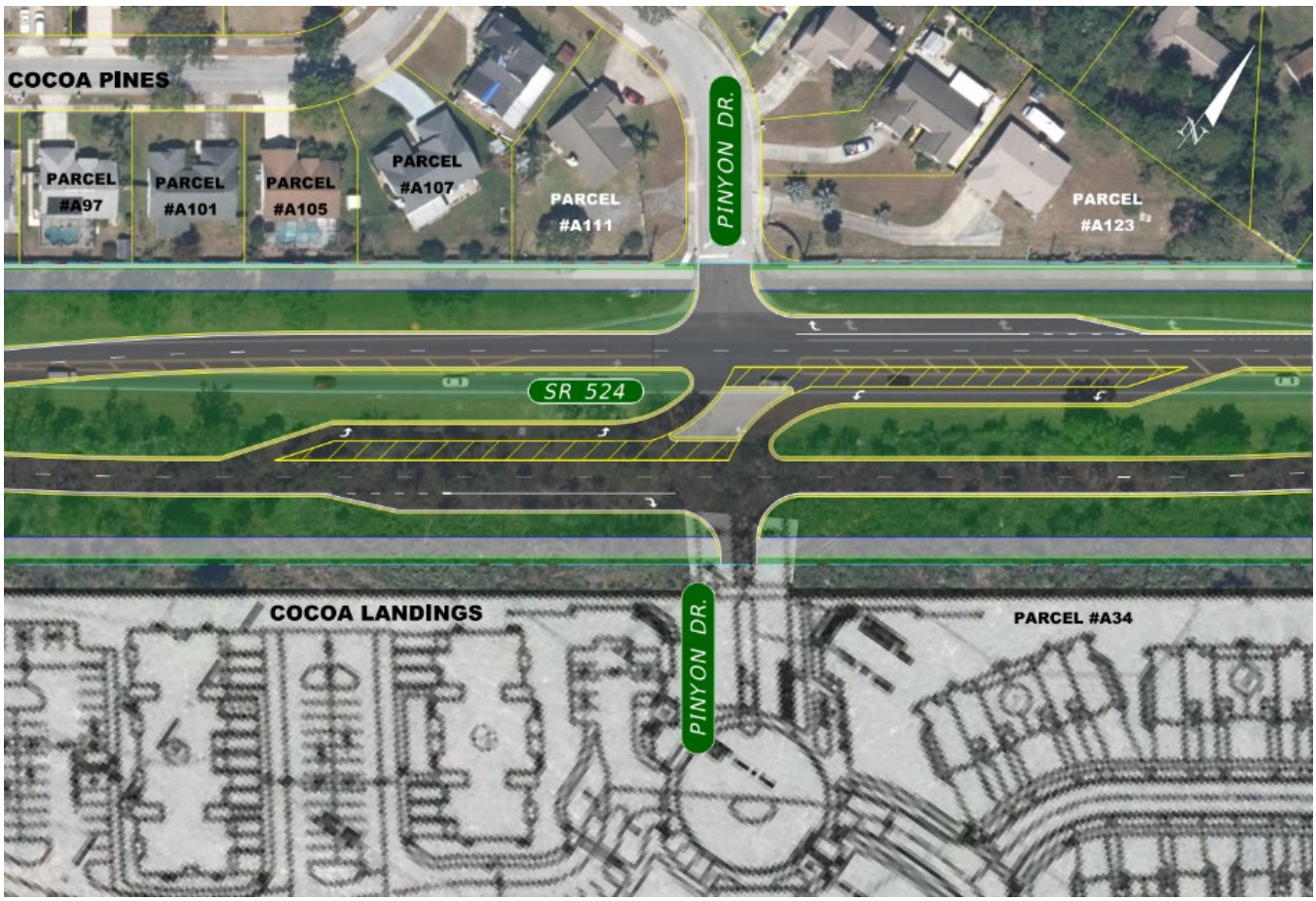
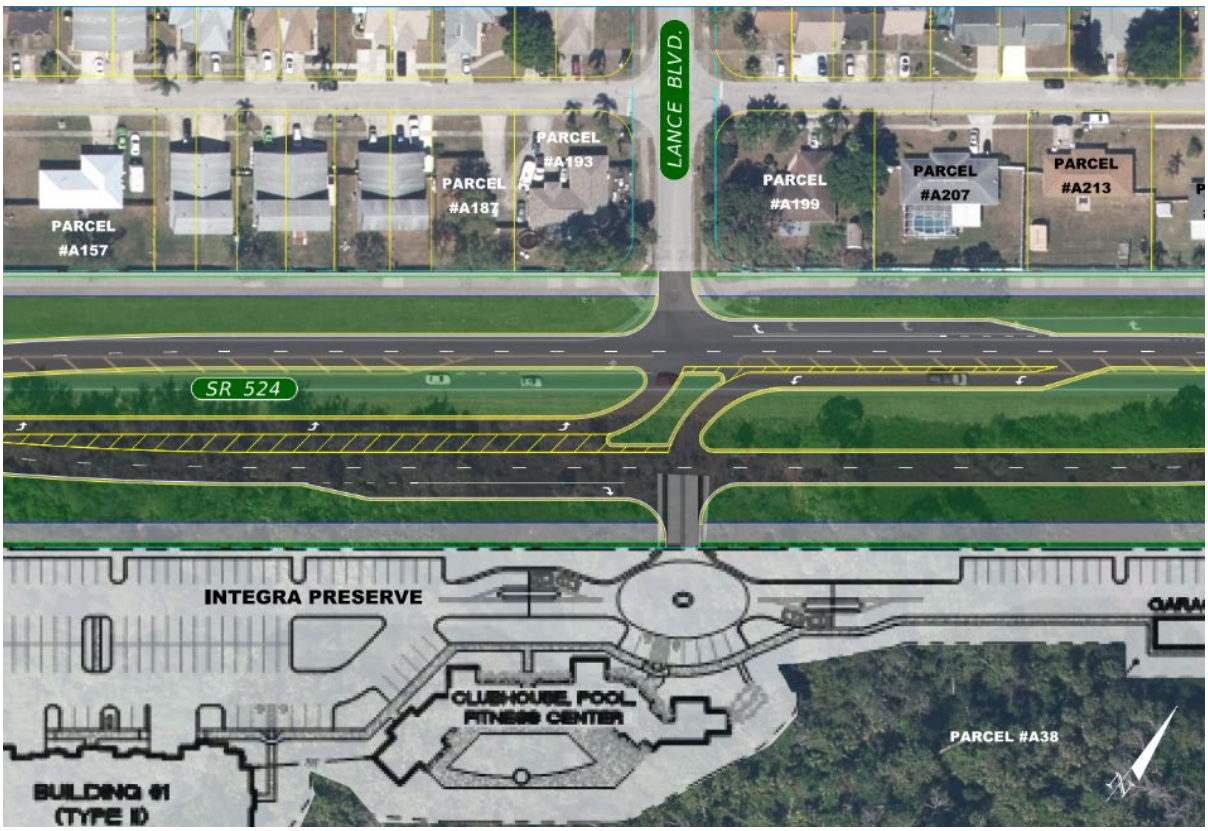


Figure 7-11 Westminster Drive Intersection

Figure 7-12 Lance Boulevard Intersection



As discussed in **Section 5.7.4**, a roundabout was selected as the recommended alternative at the London Boulevard intersection. Like Cox Road, London Boulevard was evaluated for a signalized, restricted crossing U-turn, a median U-turn, and roundabout intersection concepts. ROW acquisition is required to accommodate the shared-use path crossings and connections back to the existing road at London Boulevard and Clearlake Cove. The roundabout layout is shown below in **Figure 7-13**. This layout also shows the fire station west of Clearlake Cove. To provide emergency access to and from the fire station, a traversable median with mountable curb is proposed.

Figure 7-13 London Boulevard Roundabout

Coventry Court

SR 524 and Coventry Court currently exist as a full access opening that is stop-controlled from Coventry Court. In the proposed condition, the intersection will be a directional access opening with dedicated right and left-turn lanes from SR 524 onto Coventry Court. From Coventry Court, vehicles may only make a right turn but can use the nearby London Boulevard roundabout to then travel eastbound on SR 524. This configuration is shown in **Figure 7-14**.

Figure 7-14 Coventry Court Intersection

Cirrus Drive

As discussed in **Section 5.7.5**, traffic demands require Cirrus Drive's signalized remain but will be reconstructed to fit the Preferred Alternative typical section. This layout is shown in **Figure 7-15**.

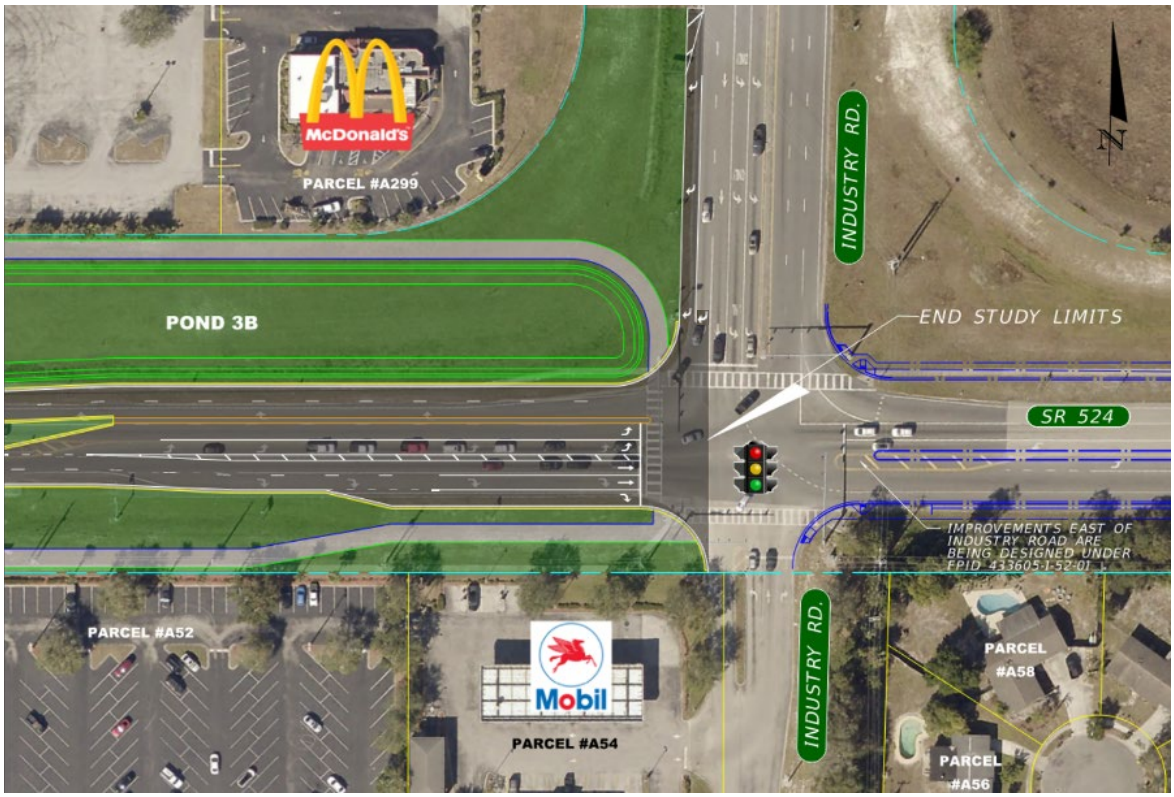
Figure 7-15 Cirrus Drive Intersection

Industry Road

This PD&E Study ends at the western side of Industry Road, but the design will match the east configuration designed as part of Financial Project Identification (FPID) No. 433605-1-52-01. Small shifting tapers will be introduced before the intersection, so the through lanes on either side align. An additional southbound right-turn lane (thus creating two total right-turn lanes) was also recommended following the 2021 Alternatives Public Workshop.

The intersection layout is shown in **Figure 7-16**.

Figure 7-16 Industry Road Intersection

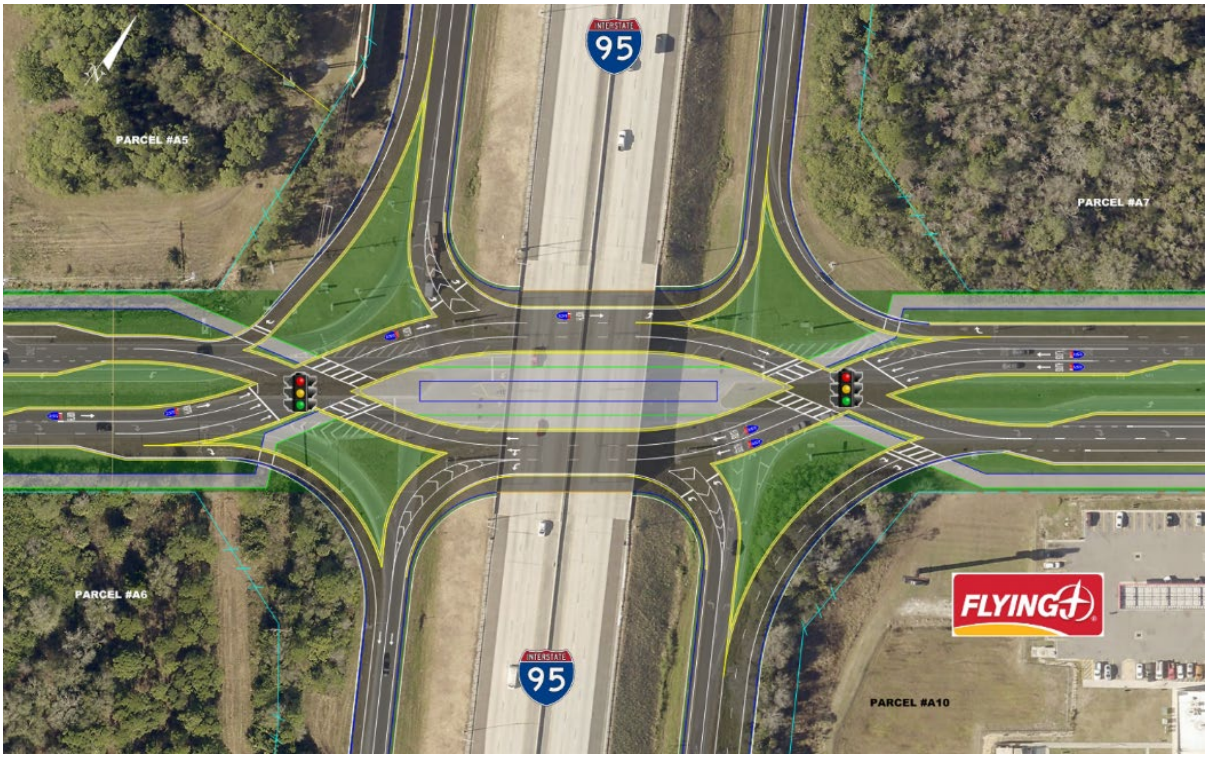


I-95 Interchange

As discussed in **Section 5.6.1**, the recommended option for improving the I-95 interchange was a DDI. Further details on the DDI can be found in that section. The DDI presented in this PD&E Study is a modified diverging diamond since the distance between Friday Road (South) and Friday Road (North) is not long enough to support a full-length DDI. The February 2022 IMR was approved by FDOT Systems Implementation Office and FDOT Chief Engineer on March 7, 2022.

Once the DDI was chosen as the recommended option, it was further refined and its final proposed layout is shown in **Figure 7-17**. Traffic volumes determined that the northbound on-ramp will have dual left and right-turning lanes while the southbound on-ramp will have dual lefts but only a singular right-turn lane. Auto Turn turning movements run using a WB-62FL design vehicle show that a striped gore area between the dual left on-ramp turning lanes is required to handle the anticipated truck traffic safely.

Figure 7-17 I-95 Interchange



7.8 TOLLED PROJECTS

There is no tolling involved with this project.

7.9 ITS AND TSM&O STRATEGIES

Based on the existing and future conditions of the corridor and the recommendations from the District Five TSM&O Engineer, the following TSM&O improvements and strategies are recommended as part of the PD&E Study.

- Incorporate SR 524 corridor into the District Five ICMS program as a Diversion Route for SR 528
- In support of the recommended Diversion Route designation, upgrade SR 524 corridor intersections to the Department's Smart Signal package, which includes:
  - ATCs that meet Section 671 requirements of the FDOT Standard Specifications
  - ATSPM
  - IMC
  - Vehicle Detection
  - Advance Detection (Loops / Zones)
  - TS2 Type 1 Size 6 Cabinet
- Deploy Bluetooth travel-time devices along SR 524
  - One device midway between the Friday Road (North) intersection and the Walmart Distribution Center intersection
  - One device west of the London Boulevard intersection
- In support of the recommended Diversion Route designation, deploy ADMS along SR 528 westbound approaching the Industry Road interchange
  - The construction limits (not the project limits) of the SR 524 project would have to be extended to include ADMS deployments on SR 528 as it approaches the Industry Road interchange
- While blank-out signs are present along the SR 524 corridor, they may not meet FDOT standards. For this reason, it is recommended that the existing blank-out signs (at the Cox Road and Industry Road intersections) be replaced and brought up to current FDOT standards.

Figure 7-18 illustrates the proposed ITS infrastructure. **Figure 7-19** shows the proposed diversion routes using SR 524.

7.10 LANDSCAPING

Initial landscaping recommendations were documented in the *Aesthetic Plan Report* (May 2022). Landscaping will be further evaluated in the design phase in coordination with Brevard County. The landscaping strategy prioritizes roundabouts, medians, and shared-use pathways for traffic calming, safety, and aesthetic enhancement, with specific guidelines for planting placement, soil preparation, and vegetation selection to ensure long-term growth and compliance with design standards. Additional focus is on preserving existing trees where feasible, mitigating vegetation impacts from roadway projects, and coordinating with local jurisdictions to integrate shade and buffering opportunities into future development plans.

7.11 LIGHTING

A *Highway Lighting Justification Report* (March 2022) was prepared which recommended roadway lighting be added to SR 524 along the limits of this project. Lighting will be further evaluated in the design phase in coordination with Brevard County.

7.12 WILDLIFE CROSSINGS

There are no proposed wildlife crossings within the project limits.

Figure 7-18 Proposed ITS Improvement

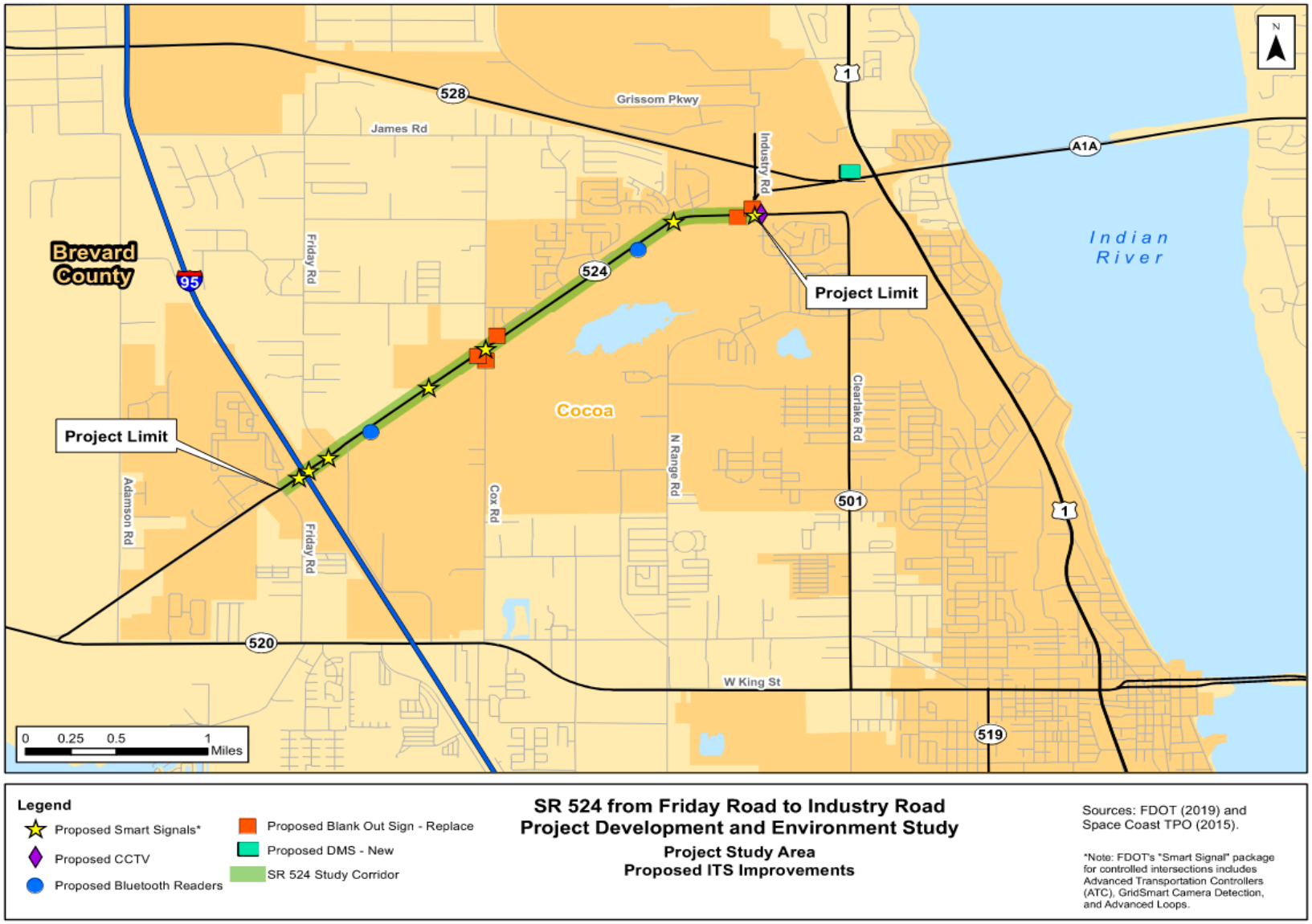


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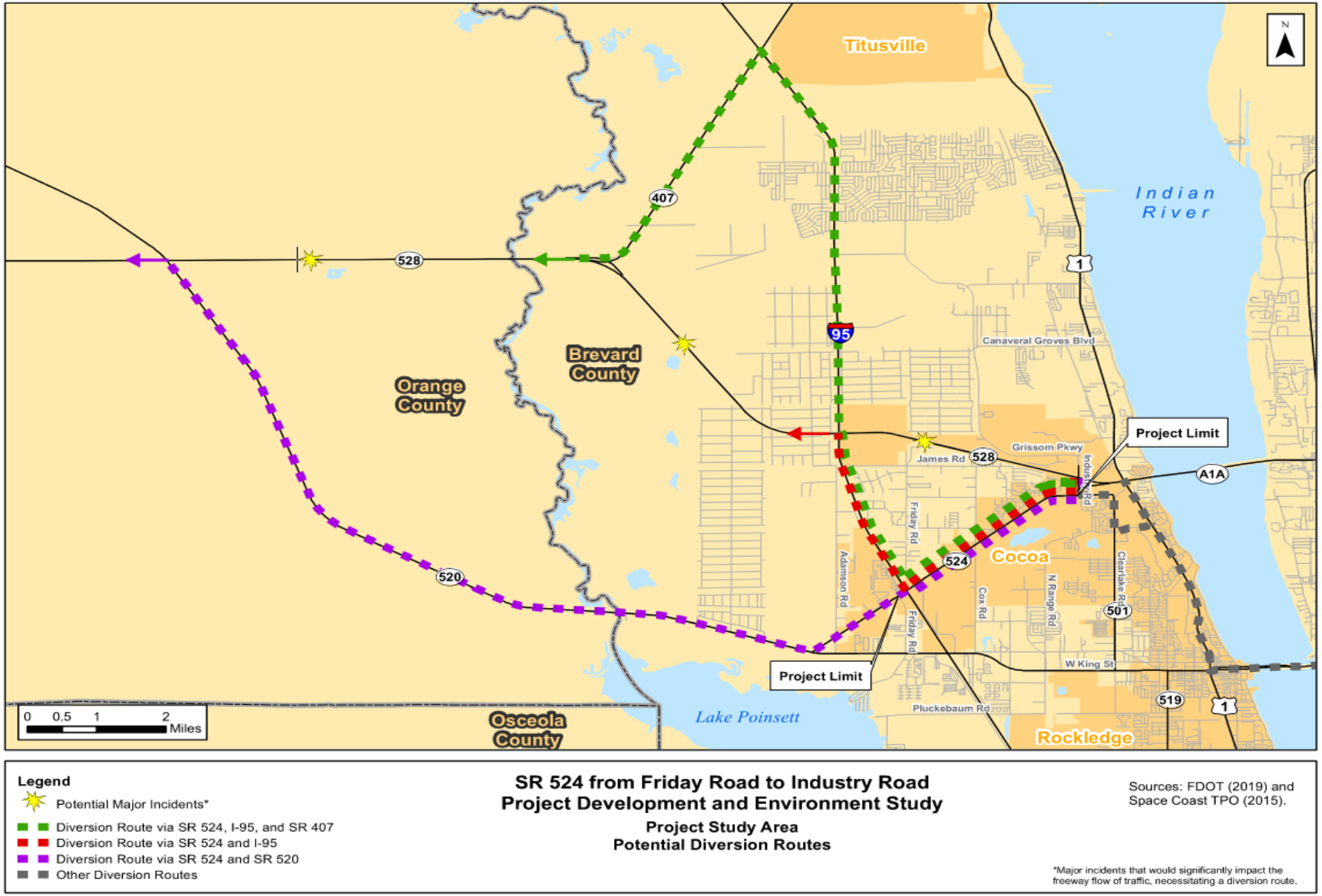
Figure 7-19 Potential Diversion Routes



7.13 UTILITY IMPACTS

Existing utilities within the project limits and utility contacts were previously identified in **Section 2.22** of this report. Most of the utilities are located within the existing ROW, but Florida Power and Light (FP&L) transmission and FGT do have facilities within existing easements. FGT has a 26-inch line west of I-95 and a 8-inch line in a 30 foot easement near the end of the project. These facilities will not be impacted. The Preferred Alternative was designed to minimize utility impacts, particularly among FP&L's overhead electric line. The 14-foot shared-use path will typically avoid the distribution poles on the north side. The proposed drainage swales and trunk line system, on the other hand, may impact other buried communication, water, or sewer facilities closer to the proposed roadway. In addition, the profile is being raised, and some buried facilities may need to be adjusted or relocated if they will be too deep so they will be easier to access and maintain.

Preliminary utility coordination revealed the following potential utility impacts:

- Florida City Gas's existing 8-in. steel gas main falls generally within the proposed median and may be adjusted/relocated depending on its depth.
- Similarly, Verizon has 2-2-inch High Density Polyethylene (HDPE) fiber optic cable on the south side of the existing road that will also fall underneath the proposed median and may be adjusted/relocated depending on depths.
- FP&L's existing overhead electric line will largely be unimpacted, but the Cox Road and London Boulevard roundabouts will require pole relocations and line adjustments. Cirrus Drive's proposed intersection will also impact the existing line.
- AT&T and Charter facilities that are attached to FP&L's impacted poles will similarly require adjustment and/or relocation. Many of Charter's underground facilities are outside of the existing ROW and will not be impacted, but some underneath the proposed road or median may require adjustment/relocation. AT&T also has buried lines underneath the proposed design that may be relocated or adjusted.

The full extent of utility impacts will be determined during the project's design phase; further coordination with utility owners during the design phase will help minimize impacts.

7.14 DRAINAGE AND STORMWATER MANAGEMENT FACILITIES

A *Pond Siting Report* (PSR-May 2023) was prepared under separate cover as part of this project. Wet detention ponds and dry retention swales will provide water quality treatment and water quantity attenuation for the project runoff.

There are currently three drainage basins within the project limits. Five pond alternatives for basin one and six pond alternatives for basin two are considered viable. Basin three has only one alternative, where the proposed roadway improvements will drain to existing swales within the FDOT ROW and will be treated utilizing ditch blocks. An additional alternative, pond alternative regional pond A, was recently sold and re-permitted as apartments, so it is no longer viable. Pond alternative 2C has been developed into a commercial property and is also no longer viable. The viable alternatives are shown in **Appendices C** and **D**. Further information can be found in the PSR.

Based on numerous factors (such as existing soil characteristics, hydrology features, outfall location, hydraulic conditions, environmental concerns, cultural resources, potential utility conflicts, ROW, and construction costs and contamination potential), **Table 7-7** provides recommendations for the stormwater management sites.

Table 7-7 Summary of Preferred Stormwater Pond Sites

Basin	Preferred Pond Alternative	Access Easement Area (ac)	Pond ROW Area (ac)	Total Required ROW Area (ac)
1	1A	0.70	2.22	2.92
2	2F	N/A	3.17	3.54
3	3A/3B	N/A	N/A	N/A

7.15 FLOODPLAIN ANALYSIS

A *Location Hydraulics Report* (LHR, May 2023) was prepared under separate cover as part of this project and provides a detailed discussion of the potential floodplain encroachments and preliminary cross-drain evaluation. The existing drainage and floodplain maps are included in **Appendix F**.

A preliminary analysis of the cross drains has been performed to determine whether the existing cross drains (CD) can be extended or would require a replacement because the increase in the cross-drain length caused an increase in the headwater elevations due to the wider roadway footprint. The decision to extend or replace a cross-drain may also be affected by each cross-drain's physical condition and age and should be examined further during the design phase. **Table 7-8** summarizes the cross-drains along the SR 524 corridor.

The resulting floodplain encroachment areas caused by the proposed SR 524 roadway widening were quantified. It was determined that, throughout the project limits, the floodplain associated with the proposed widening will be impacted at cross drains CD-2, CD-5, CD-6, and CD-7.

Table 7-8 Summary of Cross Drains

Structure No.	Station	Existing Condition				Proposed Condition			
		# of Barrels	Size	Type	Length (ft)	# of Barrels	Size	Type	Length (ft)
CD-1	407+00	2	24"	RCP	87	2	24"	RCP	195
CD-2	431+00	1	24"	RCP	113	1	24"	RCP	196
CD-3	447+00	1	30"	RCP	94	1	30"	RCP	192
CD-4	453+99	1	30"	RCP	191	1	30"	RCP	269
CD-5	460+44	2	36"	RCP	112	2	36"	RCP	198
CD-6	488+65	3	42"	RCP	114	3	42"	RCP	192
CD-7	527+03	1	24"	RCP	120	1	24"	RCP	162

It was concluded the project will impact approximately 0.11 ac-ft of the 100-year floodplain and 2.49 ac-ft of the 10-year floodplain based on the proposed roadway alignment. These impacts are minimal compared to the overall extent

of the floodplain; therefore, it was determined the floodplain encroachment is classified as “minimal.” Minimal encroachments on a floodplain occur when there is a floodplain involvement, but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts.

The following floodplain statement is a slightly modified version of statement Number 4 in the FDOT PD&E Manual (Part 2, Chapter 13 “Floodplains”), tailored for this project:

“The proposed structures will perform hydraulically in a manner equal to or greater than the existing condition, and backwater surface elevations are not expected to increase. As a result, there will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or in emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.”

7.16 PERMITS

The permits listed in **Table 7-9** are anticipated for this project and will be applied for during the design or construction phase as appropriate:

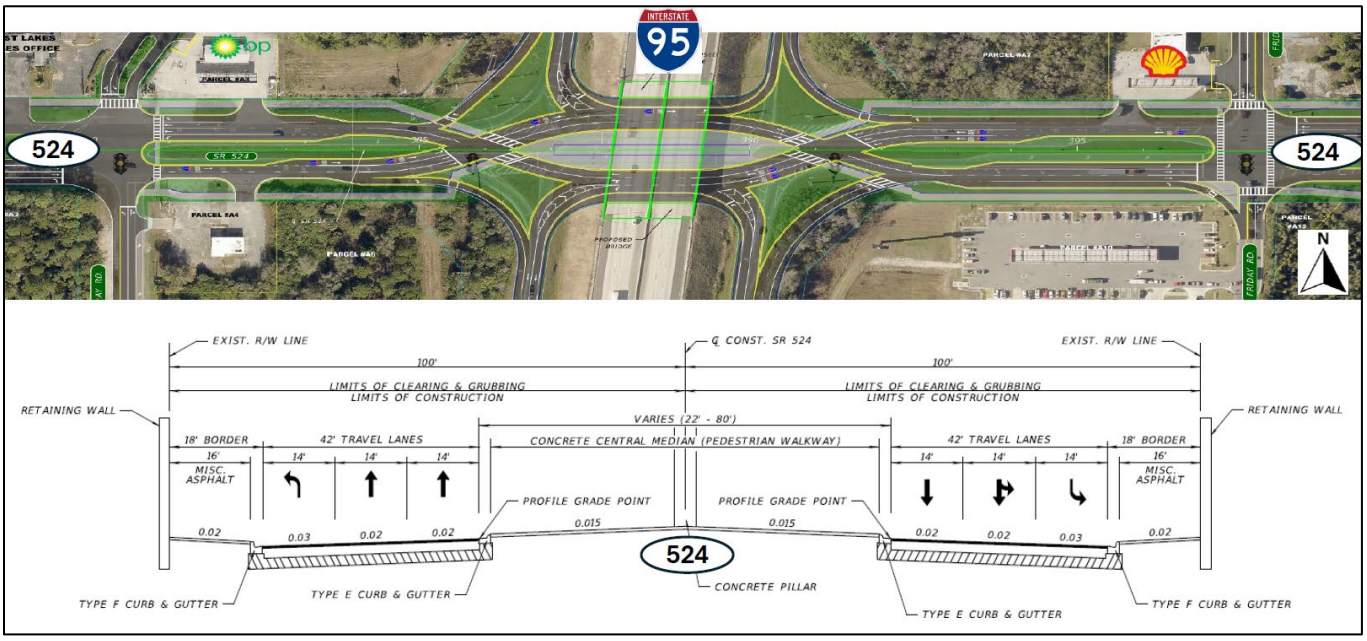
Table 7-9 Anticipated Permits

Coordinating Agency	Permit
US Army Corps of Engineers (USACE)	404 Permit
FDEP	NPDES Permit
SJRWMD	ERP Permit

7.17 BRIDGE AND STRUCTURE ANALYSIS

The reconfiguration of the I-95 interchange to a DDI, will necessitate the reconstruction of the I-95 bridges over SR 524. As of 2024, the existing bridges have approximately 17 years of remaining service life and the existing vertical clearance above SR 524 is 16’-0-1/2” which is below the current criteria of 16’-6”. The proposed typical section of the bridges is included in **Figure 7-5**. The overall width of the bridges is planned to be 135’-1” and will carry three 12 foot wide lanes, a 12-foot wide inside shoulder, 17’-2” outside shoulders and will be protected by 36-inch single slope traffic railings. The proposed concept plan and section under the new bridges is shown in **Figure 7-20**. The bridge is proposed as a two-span bridge with equal span lengths of approximately 103’ each. The superstructure is anticipated to include thirteen 45-inch Florida I-Beams spaced at about 12 feet. The spans will be supported by a center pier centered within the DDI’s central median.

Figure 7-20 Proposed I-95 Bridge over SR 524



7.18 TRANSPORTATION MANAGEMENT PLAN

A Conceptual Transportation Management Plan (TMP) that will include traffic control and potential work zone management strategies will be developed during the design phase, specifically:

- Temporary Traffic Control Plan
- Transportation Operations Plan
- Public Information Plan

A Temporary Traffic Control Plan will be developed during final design of this project following current FDM and Standard plans criteria and will address:

- Lane closure analysis identifying restrictions for SR 524 and I-95 travel lane closures during work hours, holidays, and special events
- Temporary overnight detour traffic routing may be needed for SR 524 traffic under the I-95 or along I-95 during removal of overhead elements of the existing bridge and setting of bridge beams for the new bridges. A detour routing plan will be developed during the final design of this project.
- Detailed traffic control schemes addressing construction of I-95 SR 524 DDI, Cox Rd and London Blvd roundabouts, bridge demolition and new bridge construction
- Detailed plans for pedestrian access from Cox Road to Industry Road
- Temporary drainage elements that allow for continuous stormwater conveyance during construction

7.19 CONSTRUCTABILITY

SR 524 will be constructed primarily in two phases. Due to the existing road being offset from the centerline of right of way, the eastbound travel lanes will be constructed first while maintaining traffic on existing lanes. Phase two will shift the traffic to the newly constructed westbound lanes while the eastbound lanes are constructed.

The preliminary plan for constructing the I-95 bridges also requires construction in phases and involves reducing the number of lanes in each direction from three to two. This step will allow both traffic directions to fit into a single existing bridge. After the traffic is shifted to the northbound side, the southbound bridge can be removed and replaced with the portion of the new structure. Once completed, the traffic can once again be shifted from the existing northbound bridge onto the newly constructed structure. Then the northbound bridge will be removed and replaced to tie into the new structure with a one-inch joint in between both phases of the superstructure. This preliminary plan will be further developed during final design and will adhere to all current FDOT criteria.

The project construction Public Information Plan will address coordination with the FDOT Public Information Office to disseminate information to the traveling public regarding construction activities that impact traffic flow through the project construction limits. Information to be made available to the public will include project begin and end construction dates, lane closure dates and times. Notice of construction activities will be provided to Brevard County emergency management, Brevard County School Board and Brevard County Public Works Department.

7.20 CONSTRUCTION IMPACTS

Construction activities may cause short-term air quality impacts in the form of dust from earthwork and unpaved roads. These impacts will be minimized by adherence to applicable state regulations and to applicable FDOT Standard Specifications for Road and Bridge Construction. An NPDES permit will be acquired along with development of the required Stormwater Management Pollution Prevention Plan during the design phase.

Entrances to all businesses and residential properties will be maintained to the maximum extent possible during project construction. A Maintenance of Traffic plan will be developed for the implementation of the Preferred Alternative.

Construction activities for the proposed project will have temporary noise, water quality, traffic flow, and visual effects for the travelers within the immediate vicinity of the project. These effects will be minimized through application of the FDOT Standard Specifications for Road and Bridge Construction.

7.21 SPECIAL FEATURES

In order to meet the target speed of 45 mph, specifically within the segment two sections between Cox Road and London Boulevard, it is recommended to place a visual buffer within the varying median via landscaping. This visual buffer is a speed management strategy to reduce the anticipated speed along the corridor. Further coordination during the design phase is recommended to provide the appropriate landscaping features to meet the 45-mph target speed.

A NSR was prepared for this project. Noise abatement consideration was given to all 63 impacted sites impacted by the Preferred Alternative. Three noise barrier systems were evaluated to provide abatement for these impacts. Optimizing the barrier height includes consideration of insertion loss, cost, and community context/aesthetics. A barrier height of 22-foot is recommended for barrier systems at Integra Trails (EB1) and 14-foot is recommended for barrier systems at Cocoa Pines (WB1) and Cocoa North Villas (WB2).

The noise barrier analysis results are summarized in **Table 7-10** and the proposed noise barrier wall is shown in the Concept Plans in **Appendix C**.

Table 7-10 Noise Barrier Analysis

Noise Study Area (Barrier No.)	Barrier Type	Feasible Barrier Length (foot)	Feasible Barrier Height (foot)	Estimated Barrier Cost[1]	Cost Per Benefited Receptor [4]	Recommended for Consideration in Final Design [2,3,5]
Integra Trails (EB1)	ROW	418	22	$982,960	$18,903	YES
		699	22			
Cocoa Pine (WB1)	ROW	1,360	14	$951,440	$50,076	YES
		339	14			
Cocoa North Villas (WB2)	ROW	739	14	$783,440	$41,234	YES
		660	14			

1 = Based on FDOT Statewide average of $40 per square foot
2 = Meets the minimum 5.0 dB(A) required noise at two impacted receptors
3 = Meets the FDOT Noise Reduction Design Goal of 7.0 dB(A) at one benefited receptor
4 = Meets FDOT cost reasonableness criterion of $64,000 per benefited receptor
5 = Coordination between the engineering / noise wall design team and the District EMO will be required before the noise walls can be considered final for inclusion in the contract plans.

Statement of Likelihood

The FDOT is committed to the construction of the feasible and reasonable noise abatement measures identified in **Table 7-10**, contingent upon the following conditions:

- Final recommendations on the construction of abatement measures are determined during the project's final design and through the public involvement process.
- During the final design process, detailed noise analyses support the need, feasibility, and reasonableness of providing abatement.
- Cost analysis indicates that the cost of the noise barrier will not exceed the cost-reasonable criterion.
- Community supporting the types, heights, and locations of the noise barrier(s) is provided to the District Office.
- Safety and engineering aspects related to the roadway user and the adjacent property owner have been reviewed, and any conflicts or issues have been resolved.

Noise abatement measures identified as reasonable and feasible during the PD&E phase are re-evaluated during the project's final design based on detailed design data and the public involvement process. Per the FDM, final determinations concerning noise abatement are based on contract plans developed during final design, thus requiring detailed, ongoing coordination between the project engineering/noise wall design team and the District Noise Specialist in the District Planning and Environmental Management Office (PLEMO) to ensure proper analysis, public involvement, aesthetic evaluation, and determination of final noise barrier top-elevations and lengths occurs before the finalization of contract plans.

7.22 COST ESTIMATES

The estimated cost of the Preferred Alternative is approximately $179.1 million which includes construction, design, utility, and right-of-way costs. The tables represented below depict the costs associated with each roadway segment along with the I-95 interchange and the roundabouts at Cox Road and London Boulevard (see **Table 7-11**).

The construction costs were estimated using the unit costs per centerline mile for new roadway construction found in the FDOT Long Range Estimates (LRE) system. The LRE can be found in **Appendix E**. In **Table 7-11**, also note that mitigation costs are not accounted for. These will be finalized during final design and permitting when additional survey can be performed and impacts quantified in detail.

Table 7-11 Estimated Project Costs

Estimated Costs Present Day Costs in $ Million Rounded up to the Nearest $0.1 Million $	Total Project
Construction Costs (See Note 1)	$138.9
Right of Way	$17.3
Design	$8.7
Construction Inspection (10% of construction)	$13.9
Utility Relocations (See Note 2)	$0.3
Total Project Estimated Costs	$179.1

Notes:
1 – Construction cost is based on the LRE system prepared May 2025
2 - Utility costs are estimated by the Utility Agency/Owner. Utility location impacts will be finalized during design and permitting when survey can be performed and impacts can be quantified in detail.

7.23 SUMMARY OF ENVIRONMENTAL IMPACTS OF THE PREFERRED ALTERNATIVE

A summary of potential environmental impacts of the Preferred Alternative are listed below and detailed in the *Type 2 Categorical Exclusion* and the technical documents noted. Project commitments are included in **Section 1.3**.

7.23.1 Future Land Use

The current future land use maps for the City of Cocoa and Brevard County are shown on **Figures 3-1** and **3-2**. The Preferred Alternative will require additional ROW at the Cox Road and London Boulevard intersections for construction of proposed roundabouts at those locations and at two off-site pond sites 1A and 2F. The project is consistent with the Brevard County future land use map and will not change the existing land use patterns. The project will not induce secondary development or change existing land use patterns. The proposed project is compatible with the *1988 Brevard County Comprehensive Plan*, the *City of Cocoa Comprehensive Plan 2020-2030*, and is included in the SCTPO's 2045 LRTP.

7.23.2 Farmlands

As noted in **Section 2.29.5**, a Farmland Conversion Impact Rating form NRCS-CPA-106 was completed for the project with input from NRCS on December 16, 2024. There are approximately 48 acres of prime and unique farmland within the study area. Based on the scoring in the NRCS-CPA-106 form, no further coordination was needed and no additional corridors or alternatives need to be evaluated.

7.23.3 Section 4(f)

There are two Section 4(f) resources located within the project limits that are documented in Section 2.7 and in greater detail in Section 4(f) Resources document. Junny Rios Martinez Park and Fred Gay Golf Academy are both located along the north side of SR 524. The proposed improvements adjacent to both resources is shown on the Concept Plans in **Appendix C**. No ROW is proposed for either site.

For Junny Rios Martinez Park, The SR 524 improvements will not directly impact any element or amenity within the west or east areas of the Park property, nor obstruct the existing Park sign. Access to the park will remain as existing, off Westminster Avenue. There are no off-site stormwater management ponds proposed within or adjacent to the limits of the Park. There will be no temporary occupancy for grading or to provide staging or access areas for the project. A Noise Study Report was prepared for this project. There are no noise impacts predicted for the Park receptors; therefore, abatement consideration is not required.

The SR 524 improvements will not directly impact any element or amenity within the Fred Gay Golf Academy, nor obstruct the existing Golf Academy sign. The existing entrance will remain. The ingress from the east and egress to the west will remain as in the existing condition. A directional median opening providing a dedicated left turn lane for vehicles along SR 524 is proposed which will provide ingress access to the Golf Academy from the west. Egress from the Golf Academy to the east will require vehicles to turn right onto SR 524, travel approximately 800-feet to the west and make a u-turn at the proposed median opening at Lance Boulevard to head east on SR 524.There are no off-site stormwater management ponds proposed within the limits of the Golf Academy. There will be no temporary occupancy for grading or to provide staging or access areas for the project. There are no noise impacts predicted for the Golf Academy receptor; therefore, abatement consideration is not required.

No acquisition or occupation of land from the protected properties, on either a temporary or permanent basis, will occur. Additionally, there are no meaningful proximity impacts to the protected properties, and there will be no impacts to the access and usage of the protected properties. Therefore, the project will have No Use for either Section 4(f) resource. FDOT concurred with these No Use findings on November 19, 2024.

7.23.4 Cultural Resources

A survey of potential archaeological and historic resources in the project area of potential effect are included in the *CRAS* and summarized in **Section 2.29.2**. None of the sites evaluated meet the eligibility criteria for inclusion on the National Register of Historic Places. The SHPO concurred with this determination on October 2, 2020. Therefore, FDOT, in consultation with SHPO has determined that the proposed project will result in No Historic Properties Affected. The SHPO indicated if pond site 2B is selected, additional close interval testing to determine whether a documented site extends into that area. Pond site 2F was selected as the preferred alternative site, not pond site 2B.

7.23.5 Wetlands

An assessment of existing wetlands is provided in **Section 2.29.3**, shown on the land use figures on **Figures 2-5** through **2.9** and documented in the *NRE*. The roadway widening is anticipated to impact a total of 1.6 acres of wetlands, 0.17 acres of forested wetlands and 1.43 acres of herbaceous wetlands. An additional 5.76 acres of impacts are anticipated from proposed pond sites. Pond site 1A with 3.87 acres of herbaceous wetlands and pond site 2F with 1.89 acres of forested wetlands. The total impact area of 7.36 acres is anticipated to have a functional loss of 4.91 acres.

Secondary wetland impacts for the roadway improvements are limited, since most of the area within the existing ROW had previously been cleared. Secondary wetland impacts that may result from the construction of the proposed pond sites will be addressed in the design phase by creating onsite upland buffers averaging 25 feet in width along the wetland boundary. In areas where buffers are not feasible, secondary impacts will be calculated and mitigation will be provided in accordance with *Section 373.4137 F.S.* Cumulative impacts are not anticipated because of this project due to the wetland mitigation occurring within the same drainage/mitigation basin as the proposed wetland impacts.

A final mitigation plan for the project will be developed during the design and permitting phase with input from FDOT, SJRWMD, and USACE.

7.23.6 Protected Species and Habitat

A list of protected federal and state species documented in the *NRE* are included in **Section 2.29.4** and on **Tables 2-14** and **2-15**. No federal or state species were observed in the project area. The project area does not include USFWS designated Critical Habita for any species. The Eastern indigo snake, Eastern black rail and wood stork were given "may affect, not likely to adversely affect" effect determinations. **Section 1.3** lists project commitment for the Eastern indigo snake, bald eagle monitoring, reinitiating consultation for the eastern black rail and if listing status changes for the tricolored bat and monarch butterfly. On December 11, 2019, USFWS concurred with the effect determinations outlined in the Preliminary Florida Scrub-Jay and Caracara Survey and Evaluation, that no other survey effort will be required, and consultation is complete. USFWS concurred with the Preliminary Eastern Black Rail Habitat Suitability Evaluation on December 2, 2024 effect determination and no additional surveys will be required for this species during the design phase of the project and consultation is complete. On April 24, 2025, FWC agreed with the effect determinations in the updated NRE and supports the project implementation measures and commitments.

7.23.7 Essential Fish Habitat

There is no Essential Fish Habitat in the project area.

7.23.8 Highway Traffic Noise

A list of potential noise sensitive sites is listed in **Section 2.29.7** documented in the *NSR*. **Section 7.21** provides the location of three potential noise barriers recommended as part of the analysis and additional evaluation that will be performed in the design phase. A project commitment pertaining to further noise evaluation and coordination is included in **Section 1.3**.

7.23.9 Contamination

Potential contamination sites are listed in **Section 2.29.6** and documented in the *CSER*. Of the 15 potential sites identified, three were rated No Risk, five Low Risk, four Medium Risk, and three High Risk. Based on an investigation of the properties for evidence of potential contamination issues and other environmental issues, further assessment may be required to determine the absence or presence and/or levels of soil and/or groundwater impact within the roadway expansion area at the sites identified as medium and high risk. Depending on the time frame of construction activities, an updated Public Records review may be warranted prior to construction activities to determine current conditions. Sites having a High Risk of contamination potential should have a Public Records review update prior to construction activities. Should dewatering activities be anticipated along the study corridor, then additional assessment activities may be warranted at the above-mentioned sites to obtain information about the current quality

of groundwater before the dewatering activities. For those locations with a risk rating of "Medium" or "High", including preferred pond sites, a Level II field screening will be conducted during the design phase.