

*The findings and recommendations provided in this document are provided for discussion purposes only.
This document is not complete and the process of acquiring relevant data is still on-going.*

HIGHWAY LIGHTING JUSTIFICATION REPORT

DRAFT

For

SR 524 from South Friday Road to Industry Road

Section 70070: M.P. 1.514 to M.P. 4.649

Brevard County

Prepared for:

FLORIDA DEPARTMENT OF TRANSPORTATION

DISTRICT 5 TRAFFIC OPERATIONS

719 South Woodland Boulevard, MS 3-562

DeLand, Florida 32720



Financial Project ID: 437983-1-22-01

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EXECUTIVE SUMMARY

A Lighting Justification Analysis was conducted on State Road (SR) 524 from South Friday Road to Industry Road in Brevard County to determine if roadway lighting should be installed. Per FDM Part 2, Section 231.4, all interchanges on the interstate highway system shall be lighted; thus, it is recommended the segment of SR 524 that includes the interchange area, from South Friday Road to North Friday Road, have continuous roadway lighting installed. Based on the data collected and engineering judgment, it is recommended to install continuous roadway lighting along SR 524 from North Friday Road to Industry Road in Cocoa (Brevard County), Florida.

INTRODUCTION

Traffic Engineering Data Solutions, Inc. (TEDS) was retained on behalf of the Florida Department of Transportation (FDOT) to prepare a lighting justification report for SR 524 from South Friday Road to Industry Road in Brevard County, Florida. While the initial study request included the portion of SR 524 from South Friday Road to North Friday Road, the FDM states “all interchanges on the interstate highway system shall be lighted.” Therefore, the segment of SR 524 from South Friday Road to North Friday Road, in the vicinity of Interstate 95, is justified to have continuous roadway lighting installed and the analysis will only consider SR 524 from North Friday Road to Industry Road. The analysis is based on the Preferred Alternative, as presented in the SR 524 Project Development and Environment (PD&E) Study, and available in the **Appendix**. A location map of the study area is shown below as **Figure 1**.

The analysis methods used in completing this study are in accordance with the requirements of the Manual on Uniform Traffic Studies (MUTS) along with completion of the Transportation Association of Canada (TAC) Guide for the Design of Roadway Lighting and the American Association of State Highway and Transportation Officials (AASHTO) Roadway Lighting Design Guide Warranting System.

Figure 1
General Location Map



Source: MapQuest

EXISTING CONDITIONS

SR 524 is an arterial roadway that extends from SR 520 to Industry Road in Cocoa. For the purposes of this study, SR 524 will be referred to as an east/west corridor. **Table 1** summarizes the existing conditions for the study corridor.

Table 1
Summary of Existing Conditions

Feature	Description
Main Street	<ul style="list-style-type: none"> SR 524 from North Friday Road to Industry Road (2.813 miles)
Area Location	<ul style="list-style-type: none"> Cocoa, Florida
Adjacent Land Uses	<ul style="list-style-type: none"> Residential, commercial, and undeveloped land uses
SR 524	<ul style="list-style-type: none"> <u>Cross Section</u>: Two (2) lane undivided arterial with 12-foot lanes with no curb and gutter. <u>Access</u>: Access Class 4 (MP 1.84 to 4.65) <u>Context Classification</u>: Varies <ul style="list-style-type: none"> C3R - Suburban Residential (MP 1.84 to 4.30) C3C - Suburban Commercial (MP 4.30 to 4.65) <u>Posted & Regulatory Speed Limit</u>: Varies <ul style="list-style-type: none"> 45 mph (MP 1.836 to 2.006, MP 4.166 to 4.649) 55 mph (MP 2.006 to 4.166) <u>Alignment</u>: Predominantly straight with one (1) slight horizontal curve <u>Pedestrian Crossings</u>: Crosswalks are provided across most sidestreet and major driveway approaches and across SR 524 at Industry Road as well as the plaza entrance signal west of Industry Road. <u>Sidewalks</u>: Continuous sidewalks are provided on the north side of the roadway throughout the corridor. <u>Street Lighting</u>: Existing lighting provided at the signalized intersection at the Wal-Mart Distribution Center and Cox Road. <u>Utilities</u>: Existing overhead utility lines on the north side of the roadway from North Friday Road to London Boulevard and along the south side of the roadway from London Boulevard to Industry Road.
Signalized Intersections	<ul style="list-style-type: none"> North Friday Road – MP 1.836 Wal-mart Distribution Center – MP 2.518 Cox Road – 2.916 London Boulevard – 4.194 Shopping Center Entrance – 4.439 Industry Road – MP 4.649

LIGHTING JUSTIFICATION ANALYSIS

While the roadway is currently a two-lane arterial, the lighting justification analysis was performed under its future four-lane typical section conditions (as shown in the PD&E Study Preferred Alternative concept plans in the **Appendix**). **Table 2** summarizes the proposed build conditions (if different from existing).

Table 2
Summary of Proposed Build Conditions

Feature	Description
SR 524	<ul style="list-style-type: none"> • Cross Section: Four (4) lane divided arterial with a raised median, and 11-foot lanes with curb and gutter. • Median Openings: <ul style="list-style-type: none"> ○ Three (3) full median openings (two (2) signalized and one (1) unsignalized). ○ Eight (8) directional median openings (three (3) bi-directional, four (4) eastbound only, and one (1) west bound only). ○ Two (2) roundabouts. • Access: Varies <ul style="list-style-type: none"> ○ Access Class 3 (MP 1.836 to 2.916) ○ Access Class 5 (MP 2.916 to 4.651) • Context Classification: Varies <ul style="list-style-type: none"> ○ C3C - Suburban Commercial (MP 1.836 to 2.916, MP 4.194 to 4.651) ○ C3R - Suburban Residential (MP 2.916 to 4.194) • Posted & Regulatory Speed Limit: 45 mph • Pedestrian Crossings: Crosswalks are provided across most sidestreet and major driveway approaches and across SR 524 at Industry Road as well as the roundabout locations (Cox Road and London Boulevard). • Sidewalks: Continuous shared use paths are provided on both sides of the roadway throughout the corridor. • Street Lighting: Intersection lighting will be provided at the roundabout locations (Cox Road and London Boulevard).

According to Chapter 14 from the Manual on Uniform Traffic Studies (MUTS), the procedures outlined in Section 4 of the August 2012 FHWA Lighting Handbook should be followed to determine roadway lighting justification. For collectors, major arterials, and local streets, the warrant system is based on the Transportation Association of Canada (TAC) Guide for the Design of Roadway Lighting. The study corridor of SR 524 is a major arterial. The Lighting Geometric and Operational Factors (Form No. 750-020-20) form was used to evaluate the existing geometry, existing operational and environmental factors, as well as the ratio of night-to-day crash rate. The factors are described below for each study segment.

Geometric Factors:

Geometric conditions of a roadway facility, to a large extent, determine the driving task and the information needs necessary to perform the task safely and efficiently. Included in the geometric factors are the following:

Number of Lanes	4-lanes
Lane Width	11 feet
Median Openings per mile	4.6/mi = (13 openings/2.813 mi)
Driveways and Entrances per mile	13/mile
Horizontal Curve Radius	>1,969 feet
Vertical Grades	<3%
Sight Distance	>689 feet
Parking	Prohibited on both sides

Operational Factors:

The operational factors are evaluated to provide an indication of how well the facility operates to satisfy its intended function. Included in the operational factors are the following:

Signalized Intersections	0 to 50%
Left Turn Lane	Most major intersections
Median Width	22 to 60 feet
Operating/Posted Speed	45 mph
Pedestrian Activity Level	Low

Environmental Factors:

The environmental factors are evaluated to consider their effects on nighttime driving. Included in the environmental factors are the following:

Percentage of Development	60 to 90%
Area Classification	Residential/Commercial
Distance from Development to Roadway	50 to 100 feet
Ambient Lighting	Sparse
Raised Curb Median	Continuous

Crash Rates

The desired end result of improving the nighttime driving environment is to reduce the nighttime crash rate and potential for nighttime crashes. Therefore, historical nighttime crash analysis serves as a means of determining the need for fixed roadway lighting. This analysis evaluates the ratio of night-to-day crash rates.

Crash rates for this study were determined by utilizing the last three years of crash data (January 1, 2019 to December 31, 2021) obtained from the Department's Crash Analysis Reporting System (CARS) database and the University of Florida's Signal Four Analytics. Day and night crashes were defined in the data set by lighting conditions. The five lighting conditions are defined by CARS as daylight, dusk, dawn, dark (street light) and dark (no street light). For the purpose of this study, collisions that occurred in any other condition than daylight were considered nighttime collisions.

The night-to-day crash rate is based on the percentage of traffic that occurs during dark hours (percent night AADT). For this study, the hours from 7:00 p.m. to 6:00 a.m. were used in determining the percent night AADT depending upon the time of the year. Several of the crash times (before 7:00 p.m. and after 6:00 a.m.) were cross referenced with the sunrise and sunset information provided on the timeanddate.com website and included as nighttime crashes when appropriate. A total of 18 nighttime crashes were reported along the corridor, with 16% of the AADT occurring at nighttime, resulting in a night-to-day crash ratio of 2.80. The calculated nighttime crash rate is shown in **Table 3**.

Table 3
Night-to-day Crash Rate

CRASH SEGMENT LENGTH: 2.813 miles

YEAR	2019	2020	2021	TOTAL	% AADT	CRASH RATE
No. of NIGHTTIME CRASHES	5	12	1	18	16%	2.54
No. of DAYTIME CRASHES	18	13	3	34	84%	0.91
AADT	14,636	14,236	14,380	-	-	-

AVG. AADT 14,417

NIGHT TO DAY CRASH RATE = 2.80

Per NCHRP 152 Lighting Installation Justifiable at rate ≥ 2.0

The night-to-day crash rate of 2.80 exceeds the minimum value of 2.0. The total warranting points of 66.21, as shown in **Table 4**, exceeds the minimum 60 points needed to warrant lighting. Therefore, **the installation of continuous roadway lighting is warranted along the study segment of SR 524 from North Friday Road to Industry Road.**

Conclusion

The segment of SR 524 from South Friday Road to North Friday Road shall have continuous roadway lighting installed per FDM Part 2, Section 231.4. The study segment of SR 524 from North Friday Road to Industry Road meets the lighting requirements of the MUTS, AASHTO Roadway Lighting Design Guide Warranting System and the TAC Guide for the Design of Roadway Lighting. The night-to-day crash rate of 2.80 exceeds the minimum value of 2.0 and the total warranting points of 66.21 also exceeds the minimum 60 points needed to warrant lighting. **The installation of continuous roadway lighting is recommended along SR 524 from South Friday Road to Industry Road, including the I-95 interchange.**

Table 4
Lighting Justification Warrant Analysis

Form 750-020-20
TRAFFIC ENGINEERING
10/15

State of Florida Department of Transportation									
LIGHTING GEOMETRIC AND OPERATIONAL FACTORS									
Item No.	Classification Factor	Rating Factor "R"					Weight "W"	Enter "R" Here	Score "R"x"W"
		1	2	3	4	5			
Geometric Factors (See Note 6)									
1	Number of Lanes	≤4	5	6	7	≥8	0.15	1	0.15
2	Lane Width (ft.)	>11.8	11.2 to 11.8	10.5 to 11.2	9.8 to 10.5	<9.8	0.35	3	1.05
3	Median Openings/mile	<4 or 1-way	4 to 8	8 to 12	12 to 15	>15 or No Median	1.40	2	2.8
4	Driveways and Entrances/mile	<32	32 to 64	64 to 97	97 to 129	>129	1.40	1	1.4
5	Horizontal Curve Radius (ft.)	>1969	1476 to 1969	738 to 1476	574 to 738	<574	5.90	2	11.8
6	Vertical Grades (%)	<3	3 to 4	4 to 5	5 to 7	>7	0.35	1	0.35
7	Sight Distance (ft.)	>689	492 to 689	295 to 492	197 to 295	<197	0.15	1	0.15
8	Parking	Prohibited	Loading	Off Peak	One Side	Both Sides	0.10	1	0.1
Subtotal Geometric Factors									17.8 G
Operational Factors									
9	Signalized Intersections (%)	80 to 100	70 to 80	60 to 70	50 to 60	0 to 50	0.15	5	0.75
10	Left Turn Lane	All Major Intersections or 1-way	Substantial Number of Major Intersections	Most Major Intersections	Half of the Intersections	Infrequent Number or TWTL (See Notes 1 & 3)	0.70	3	2.1
11	Median Width (ft.)	> 32	20 to 32	10 to 20	4 to 10	0 to 4	0.35	2	0.7
12	Operating or Posted Speed (mph) (See Note 5)	≤ 25	30	35	45	≥ 50	0.60	4	2.4
13	Pedestrian Activity Level (See Note 2)			Low	Medium	High	3.15	3	9.45
Subtotal Environmental Factors									15.4 O
Environmental Factors									
14	Percentage of Development Adjacent to Road (%) (See Note 4)	nil	nil to 30	30 to 60	60 to 90	>90	0.15	4	0.6
15	Area Classification	Rural	Industrial	Residential	Commercial	Downtown	0.15	4	0.6
16	Distance from Development to Roadway (ft) (See Note 4)	>200	150 to 200	100 to 150	50 to 100	<50	0.15	4	0.6
17	Ambient (off Roadway) Lighting	Nil	Sparse	Moderate	Distracting	Intense	1.38	2	2.76
18	Raised Curb Median	None	Continuous	At All Intersections (100%)	At Most Intersections (51% to 99%)	At Few Intersections (≤50%) (See Note 7)	0.35	2	0.7
Subtotal Environmental Factors									5.26 E
Collision Factors									
19	Night-to-Day Collision Ratio	<1	1.0 to 1.2	1.2 to 1.5	1.5 to 2.0	>2.0 (See Note 1)	5.55	5	27.75
Subtotal Collision Factors									27.75 A

Notes: 1 Lighting Warranted

2 Pedestrian Activity Level

3 Two Way Left Turn Lane

4 Development defined as Commercial, Industrial or Residential Buildings

5 85th Percentile night speed should be used if available, otherwise posted Speed Limit shall be used

6 Worst case geometric factors for a segment of roadway shall apply

7 Also includes isolated medians (non-continuous) between intersections

G + O + E + A = Total Warranting Points 66.21

Warranting Condition 60.00

Difference ± 6.21 D

RECOMMENDATIONS

Based on the data collected and engineering judgment, continuous roadway lighting is recommended along SR 524 from South Friday Road to Industry Road, in Cocoa (Brevard County), Florida.

APPENDIX

STRAIGHT LINE DIAGRAM

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CRASH HISTORY

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Signal Four and CAR Crash Summary
SR 524 from North Friday Road to Industry Road

Crash_Time	HSMV_Report_Number	Crash_Date	Crash_Street	Intersecting_Street	Crash_Type	Vehicles	Non_Motorists	Fatalities	Injuries	Alcohol_Related	Distraction_Related	Drug_Related	Estimated_Damages	Weather_Condition	Light_Condition	Crash_Severity	Type_of_Shoulder	Road_Surf_Cond
1/22/19 3:05 PM	88854993	2019	HWY 524 HWY	EAST INDUSTRY RD	Rear End	2	0	0	0	N	Y	N	3000	Clear	Daylight	No Injury	Unpaved	Dry
2/1/19 6:00 AM	88855013	2019	HWY 524 HWY	COX RD	Head On	2	0	0	0	N	N	N	18000	Rain	Dark - Lighted	No Injury	Unpaved	Wet
2/11/19 12:20 PM	88080680	2019	SR 520 AT SR 501 (CLEARLAKE RD)	SR 501 (CLEARLAKE RD)	Rear End	2	0	0	1	N	N	N	4000	Clear	Daylight	Possible Injury	Paved	Dry
2/12/19 8:18 AM	88855041	2019	4505 HWY 524	4505	Front to Rear	2	0	0	4	N	Y	N	10000	Cloudy	Daylight	Incapacitating Injury	Unpaved	Dry
4/10/19 9:20 PM	88855170	2019	2324 HWY 524	2324	Rear End	2	0	0	0	N	N	N	12000	Clear	Dark - Lighted	No Injury	Paved	Dry
5/9/19 5:44 AM	88855252	2019	HWY 524	EAST INDUSTRY RD	Rear End	2	0	0	0	N	N	N	500	Clear	Dark - Lighted	No Injury	Paved	Dry
5/11/19 5:43 PM	88855384	2019	SR 524 HWY	2201	Head On	2	0	0	0	N	N	N	0	Other	Unknown	No Injury	Paved	Unknown
5/13/19 12:29 PM	88855255	2019	SR 524 HIGHWAY		Unknown	3	0	0	1	N	N	N	2800	Cloudy	Daylight	Possible Injury	Paved	Dry
5/28/19 3:48 PM	88855291	2019	PINYON BLVD	HIGHWAY 524	Angle	2	0	0	1	N	N	N	8000	Clear	Daylight	Non-Incapacitating Injury	Paved	Dry
6/15/19 9:45 AM	88855331	2019	HWY 524	FRIDAY RD	Right Angle	2	0	0	0	N	N	N	1	Clear	Daylight	No Injury	Paved	Dry
7/2/19 2:06 PM	88855385	2019	STATE ROAD 524	COX RD	Head On	2	0	0	0	N	N	N	0	Other	Unknown	No Injury	Paved	Unknown
7/7/19 1:43 PM	88855387	2019	HWY 524	FRIDAY RD	Other	2	0	0	4	N	Y	N	13000	Cloudy	Daylight	Incapacitating Injury	Unpaved	Dry
7/8/19 9:42 AM	88855392	2019	HWY 524	FRIDAY RD	Sideswipe, Opposite Direction	2	0	0	1	N	Y	N	9000	Clear	Daylight	Possible Injury	Paved	Dry
7/18/19 9:00 AM	88855408	2019	HWY 524	COX RD	Rear End	2	0	0	0	N	N	N	1	Clear	Daylight	No Injury	Paved	Dry
8/1/19 3:37 PM	88855482	2019	HWY 524	FRIDAY RD	Angle	2	0	0	0	N	N	N	7000	Cloudy	Daylight	No Injury	Unpaved	Dry
8/15/19 10:30 PM	88855505	2019	2324 HWY 524	2324	Single Vehicle	1	0	0	0	N	N	N	0	Clear	Dark - Lighted	No Injury	Curb	Wet
8/26/19 8:42 PM	88855545	2019	FRIDAY ROAD	HIGHWAY 524	Other	1	1	0	2	N	N	N	1	Cloudy	Dark - Not Lighted	Possible Injury	Paved	Wet
9/17/19 9:40 AM	88855558	2019	HWY 524	EAST INDUSTRY RD	Same Direction Sideswipe	2	0	0	0	N	N	N	4000	Clear	Daylight	No Injury	Paved	Dry
10/27/19 2:14 PM	88855650	2019	4650 HWY 524	4650	Front to Rear	2	0	0	0	N	N	N	8000	Clear	Daylight	No Injury	Paved	Dry
11/3/19 11:33 AM	88855678	2019	4505 HWY 524	4505	Front to Front	2	0	0	2	N	N	N	16000	Cloudy	Daylight	Non-Incapacitating Injury	Unpaved	Dry
11/22/19 3:01 PM	88855726	2019	2324 HWY 524	2324	Angle	2	0	0	0	N	N	N	3000	Clear	Daylight	No Injury	Unpaved	Dry
11/26/19 3:46 PM	88855743	2019	CLEARLAKE RD	HWY 524	Other	1	0	0	1	N	N	N	1	Clear	Daylight	Possible Injury	Paved	Dry
12/18/19 7:01 AM	88855792	2019	SR 524 HIGHWAY	LONDON BOULEVARD	Sideswipe, Same Direction	2	0	0	0	N	Y	Y	4200	Clear	Daylight	No Injury	Paved	Wet
1/9/20 10:40 AM	88855847	2020	1101 FRIDAY RD	4500	Other	1	0	0	1	N	N	N	5000	Clear	Daylight	Possible Injury	Unpaved	Dry
1/10/20 6:09 PM	89830056	2020	HWY 524	FRIDAY RD	Front to Rear	3	0	0	1	N	N	N	0	Clear	Dark - Lighted	Possible Injury	Unpaved	Dry
1/15/20 7:11 PM	89830061	2020	HWY 524 HIGHWAY	COX ROAD	Rear End	2	0	0	0	N	Y	N	6000	Clear	Dark - Lighted	No Injury	Unpaved	Dry
2/22/20 12:10 PM	89830151	2020	2324 HWY 524	2324	Head On	2	0	0	0	N	N	N	0	Other	Unknown	No Injury	Paved	Unknown
2/25/20 4:30 PM	89830165	2020	HWY 524	EAST INDUSTRY RD	Left Entering	2	0	0	1	N	N	N	1250	Clear	Daylight	Possible Injury	Paved	Dry
4/6/20 12:47 PM	89830233	2020	HWY 524	WESTMINSTER DR	Angle	2	0	0	1	N	N	N	7000	Clear	Daylight	Possible Injury	Paved	Dry
4/21/20 8:00 AM	89830266	2020	HWY 524	COX RD	Rear End	2	0	0	0	N	Y	N	9000	Clear	Daylight	No Injury	Curb	Dry
4/25/20 2:59 AM	89830316	2020	HWY 524	CLEARLAKE RD	Single Vehicle	1	0	0	0	N	N	N	0	Other	Unknown	No Injury	Paved	Unknown
5/2/20 11:02 PM	89830268	2020	HWY 524	COX RD	Rear End	2	0	0	0	Y	N	N	13000	Clear	Dark - Lighted	No Injury	Paved	Dry
5/23/20 9:57 PM	89830318	2020	4505 HWY 524	4505	Rear End	2	0	1	0	N	N	N	5000	Clear	Dark - Lighted	No Injury	Paved	Dry
5/29/20 1:11 PM	89830313	2020	2324 HWY 524	2324	Rear End	2	0	0	0	N	Y	N	3501	Clear	Daylight	No Injury	Unpaved	Dry
6/2/20 4:34 PM	89830328	2020	HWY 524	EAST INDUSTRY RD	Backed Into	2	0	0	0	N	N	N	400	Cloudy	Daylight	No Injury	Paved	Dry
6/15/20 10:45 AM	89830347	2020	HWY 524	COX RD	Rear End	2	0	0	0	N	N	N	8500	Clear	Daylight	No Injury	Paved	Dry
7/14/20 4:55 AM	89830486	2020	524 ROAD E	SE FRIDAY ROAD	Front to Rear	2	0	2	0	N	N	N	20000	Clear	Dark - Lighted	Fatal (within 30 days)	Paved	Dry
7/14/20 4:55 AM	89830423	2020	HWY 524	FRIDAY RD	Front to Rear	2	0	0	0	N	N	N	20000	Clear	Dark - Lighted	Non-Traffic Fatality	Paved	Dry
9/2/20 7:40 AM	89830540	2020	1101 FRIDAY RD	1101	Rear End	3	0	0	0	N	Y	N	1100	Clear	Daylight	No Injury	Paved	Dry
9/14/20 10:55 PM	89830584	2020	E 524 HIGHWAY	CLEARLAKE RD	Rear End	2	0	0	0	N	N	N	500	Clear	Dark - Not Lighted	No Injury	Paved	Dry
9/30/20 8:00 AM	89830632	2020	4505 HWY 524	4505	Single Vehicle	1	0	0	1	N	N	N	0	Rain	Daylight	Possible Injury	Paved	Wet
10/14/20 10:55 PM	89830667	2020	4900 HWY 524	4900	Front to Rear	1	0	0	0	Y	N	N	7000	Clear	Dark - Lighted	No Injury	Paved	Dry
11/24/20 7:07 PM	89830816	2020	HWY 524	EAST INDUSTRY RD	Other	3	0	0	3	N	N	N	3500	Clear	Dark - Lighted	Possible Injury	Unpaved	Dry
11/25/20 8:00 PM	89830786	2020	2324 HWY 524	2324	Head On	2	0	0	0	N	N	N	0	Other	Unknown	No Injury	Paved	Unknown
12/12/20 5:06 PM	89830880	2020	HIGHWAY SR 524	CLEARLAKE ROAD		1	0	0	1	N	N	N	5000	Rain	Dusk	Incapacitating Injury	Unpaved	Wet
12/21/20 12:45 PM	89830850	2020	COX RD	HWY 524	Other	2	0	0	2	N	N	N	10000	Other	Unknown	Non-Incapacitating Injury	Paved	Unknown
12/28/20 5:48 PM	89830875	2020	4505 HWY 524	4505	Rear End	3	0	0	0	N	N	N	6300	Clear	Dusk	No Injury	Unpaved	Dry
12/31/20 2:45 PM	88432150	2020	SR-524	THIEN THAI LANE	Same Direction Sideswipe	2	0	0	1	N	N	N	15500	Clear	Daylight	Possible Injury	Paved	Dry
3/26/21 5:33 PM	24407763	2021	524 HWY	3505	Left Entering	2	0	0	1	N	N	N	20000	Clear	Daylight	Non-Incapacitating Injury	Unpaved	Dry
7/31/21 10:17 PM	24408063	2021	524 HWY	2324	Left Rear	2	0	0	0	N	N	N	5000	Clear	Dark - Lighted	No Injury	Curb	Dry
10/30/21 5:06 PM	24408327	2021	HIGHWAY 524	WESTMINSTER DR	Angle	2	0	0	3	N	N	N	10000	Clear	Daylight	Incapacitating Injury	Paved	Dry
11/4/21 1:21 PM	24408347	2021	CLEARLAKE RD	HIGHWAY 524	Other	1	0	0	0	N	N	N	7000	Clear	Daylight	No Injury	Unpaved	Dry

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REFERENCE DESIGN DOCUMENTS

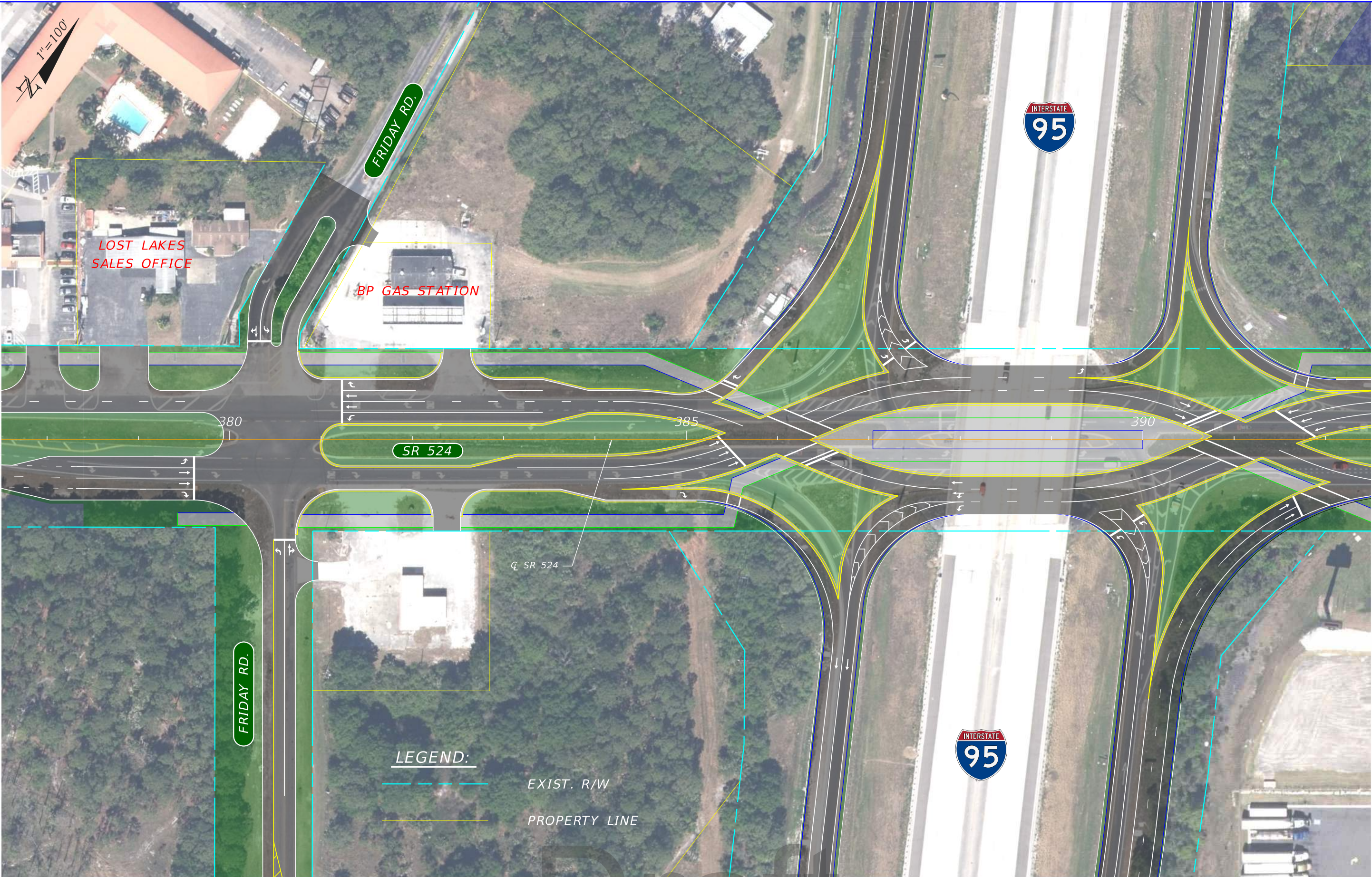
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REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 524 PREFERRED ALTERNATIVE	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION					
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				SR 524	BREVARD	437983-1-22-01		

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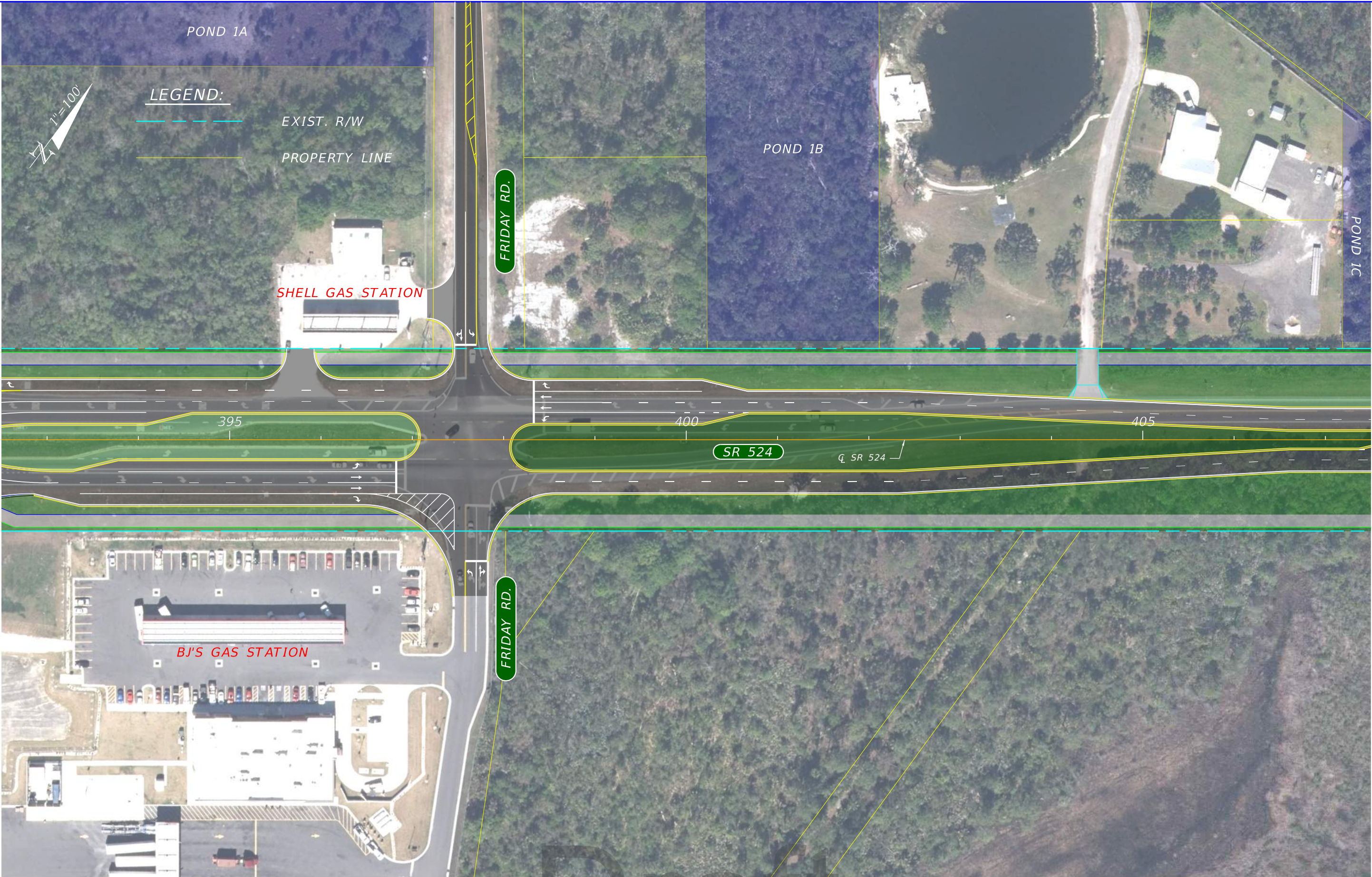
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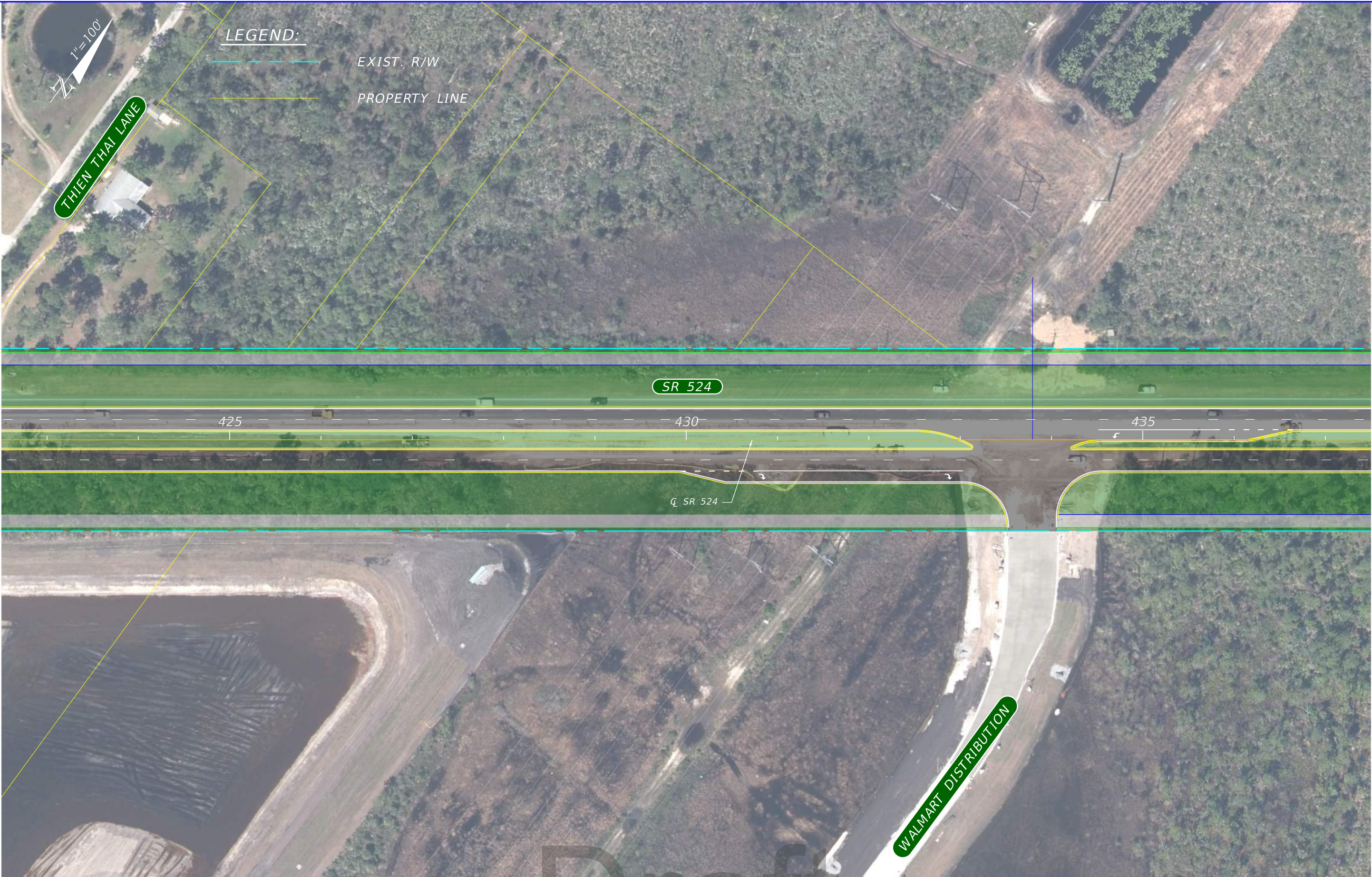
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DATE	DESCRIPTION	DATE	DESCRIPTION				
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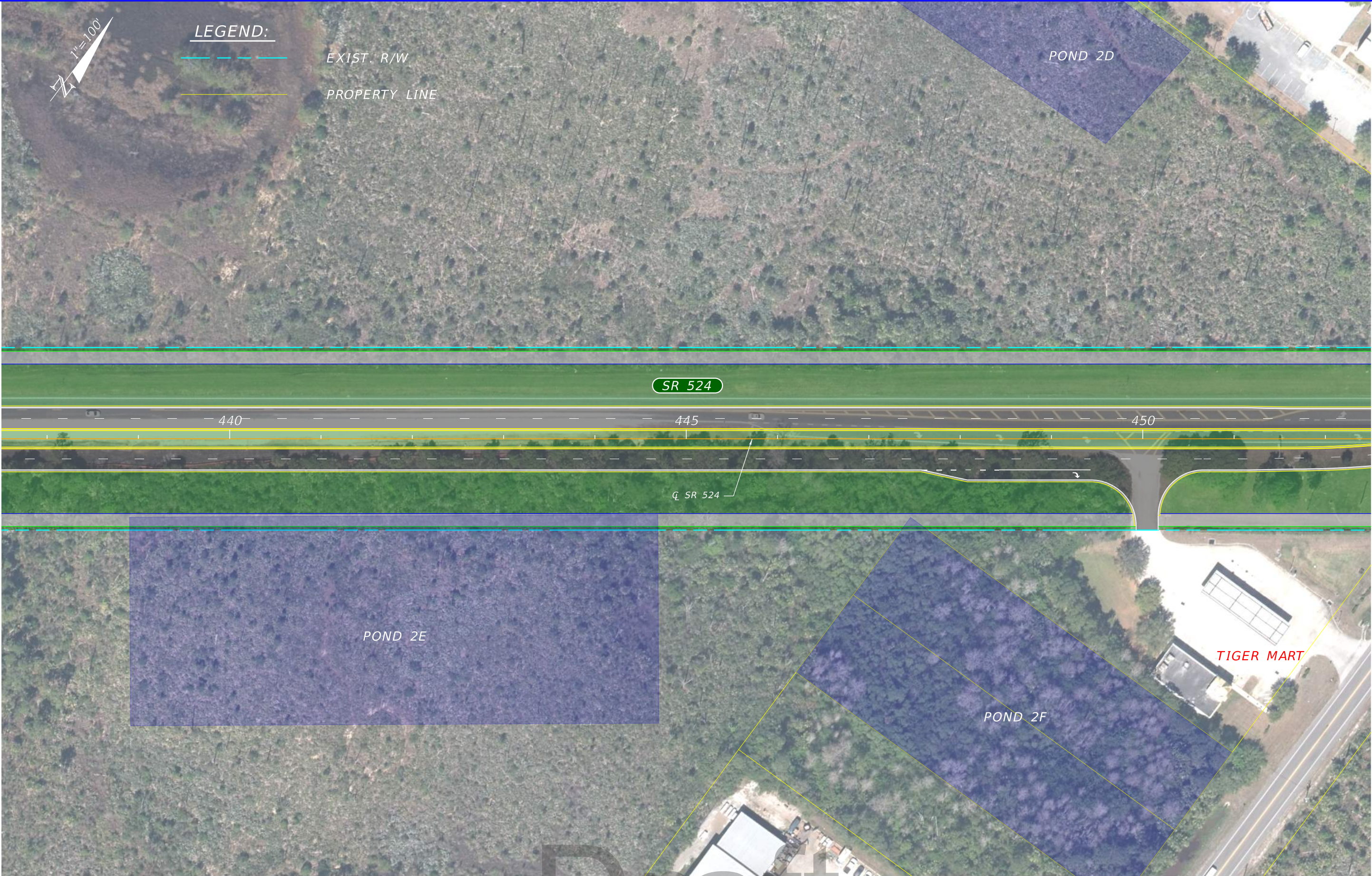
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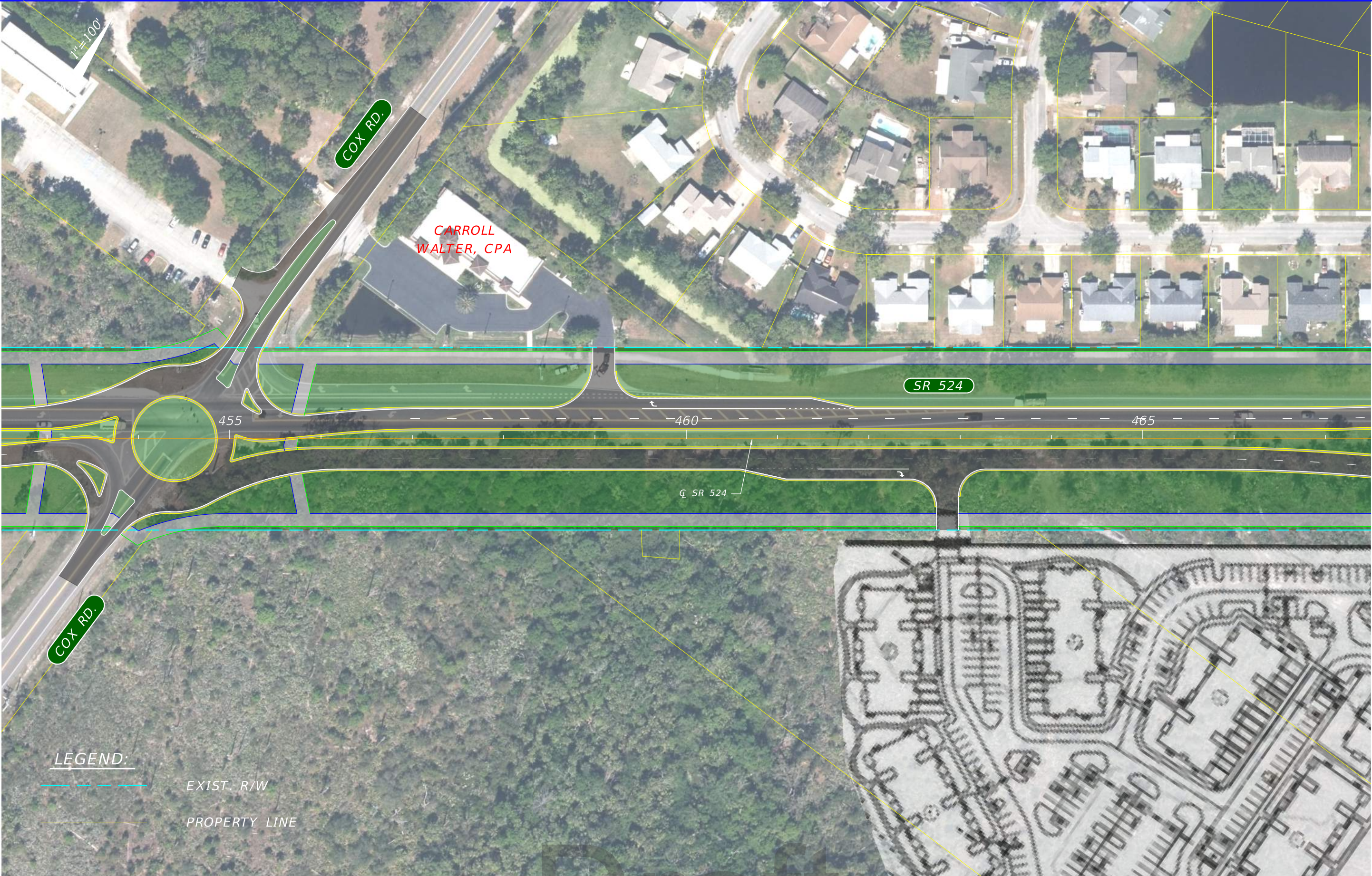
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REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION				
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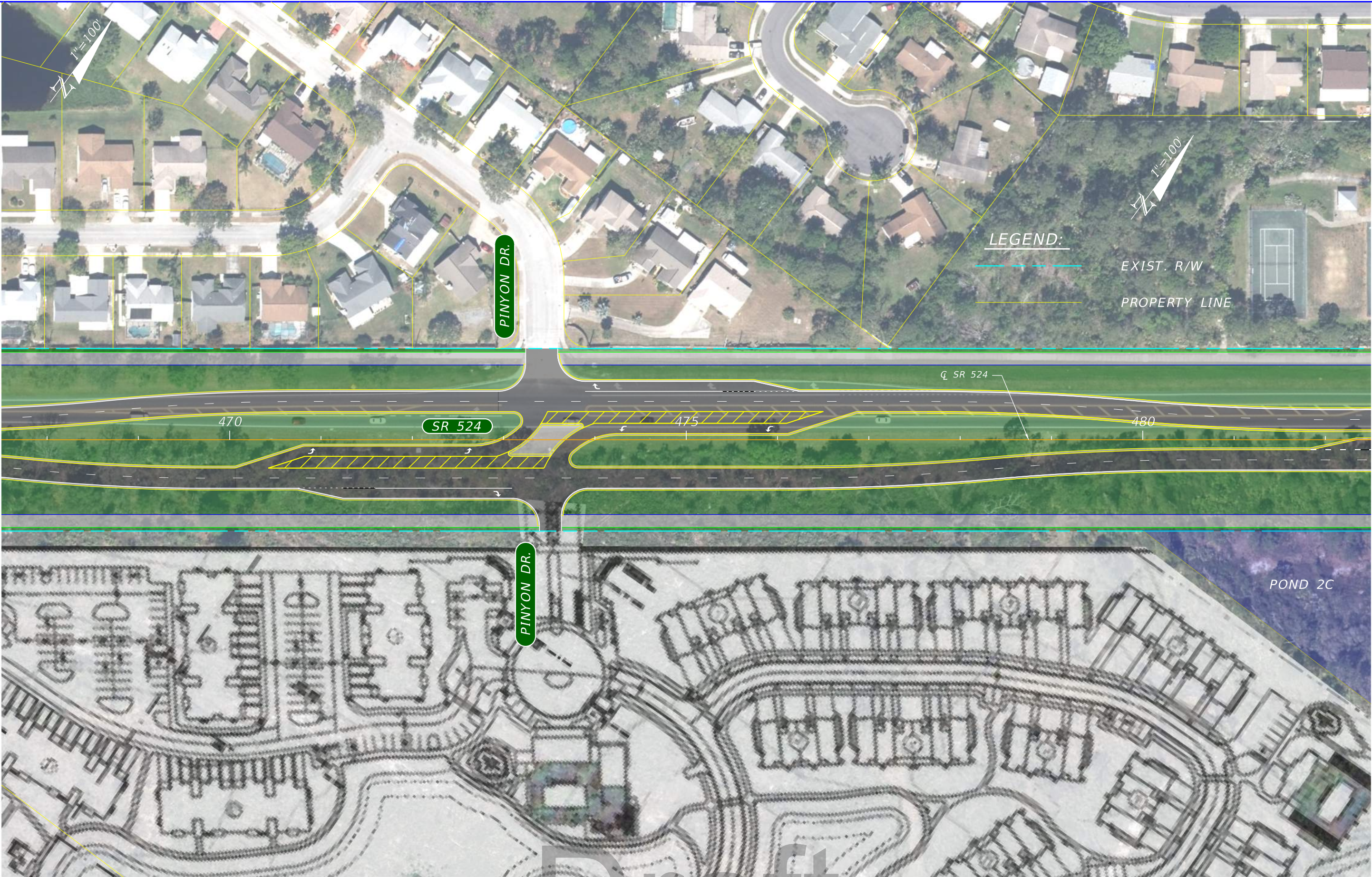
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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID

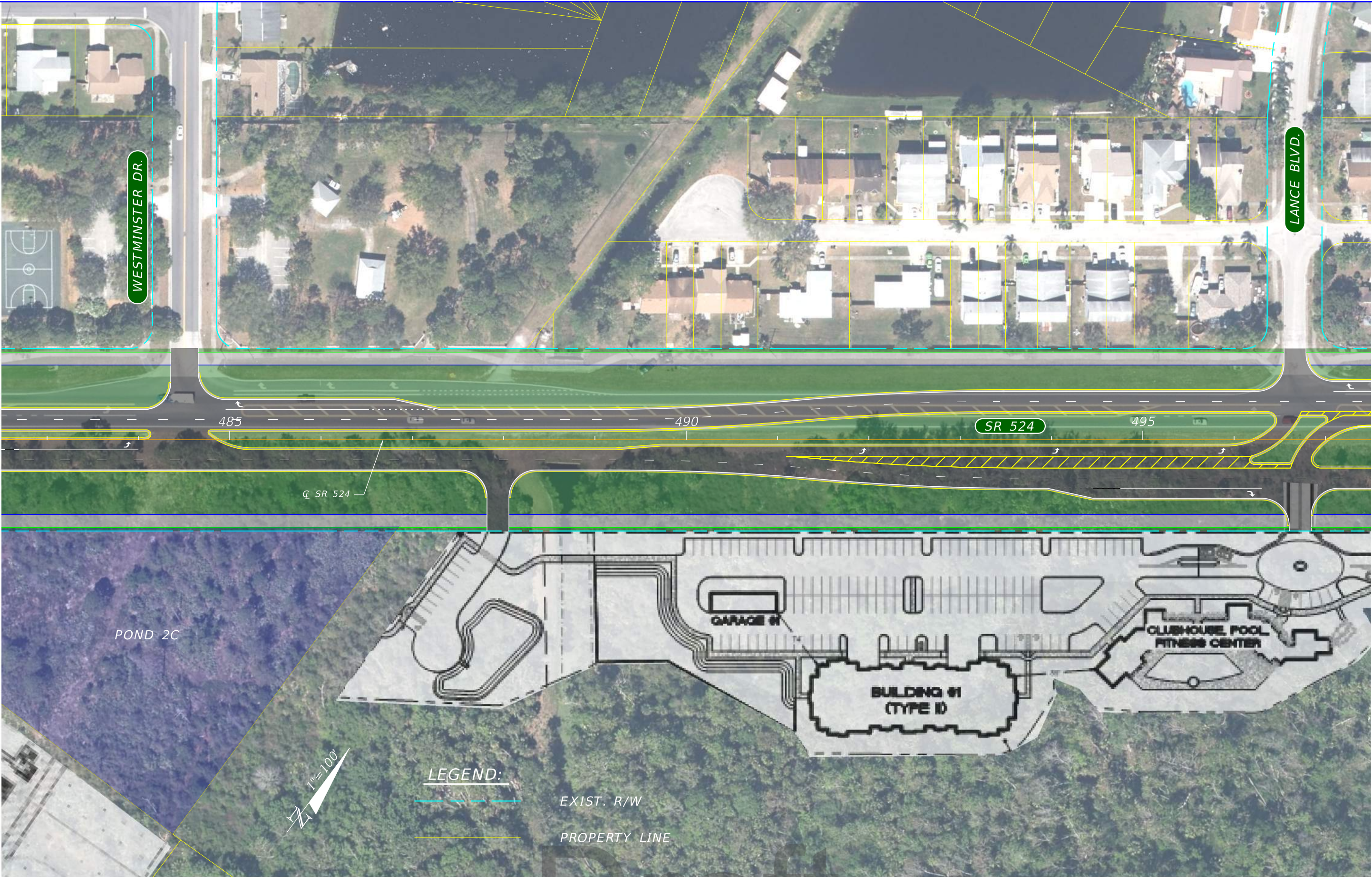
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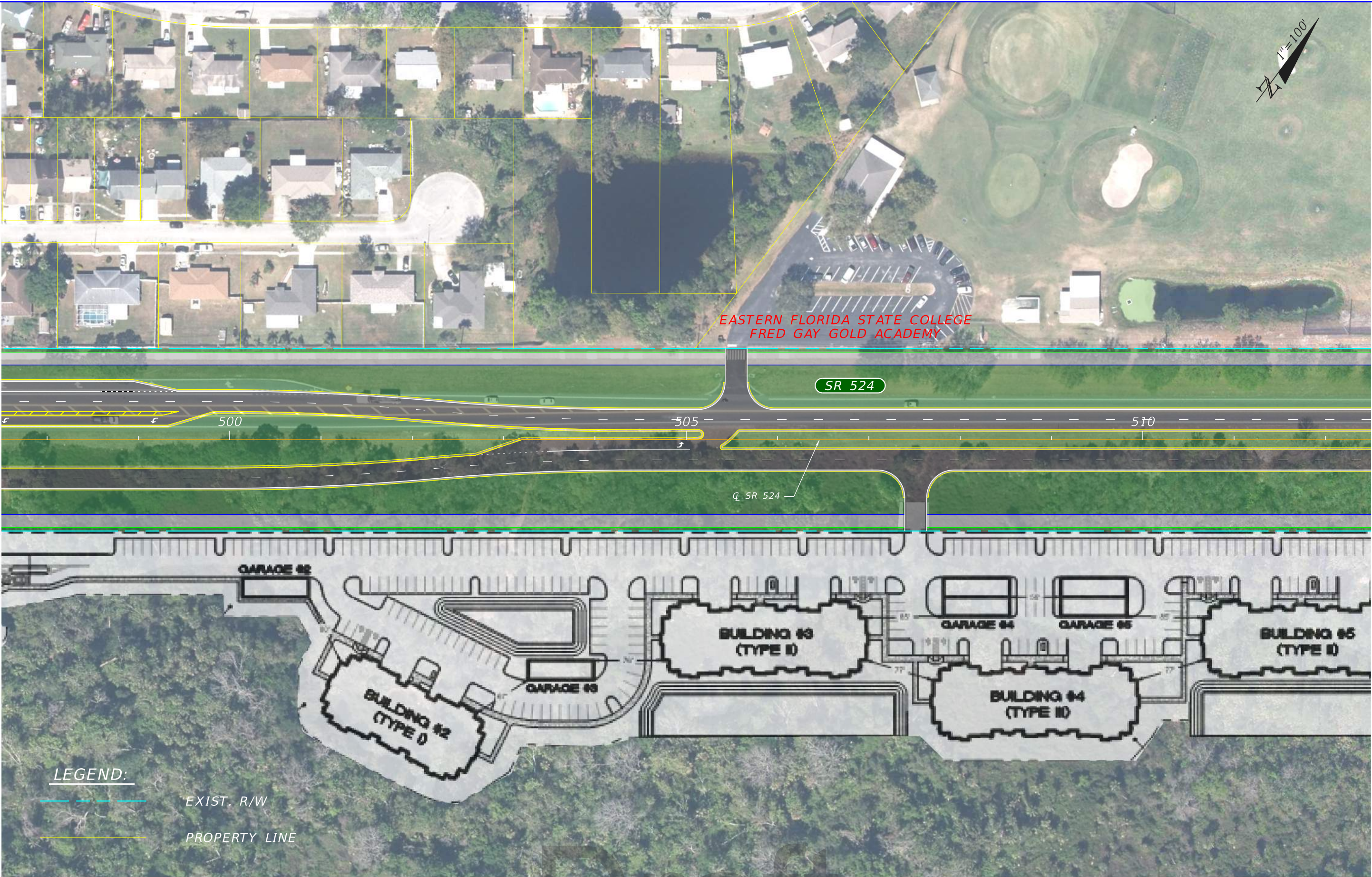
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DATE	DESCRIPTION	DATE	DESCRIPTION				
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID	

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REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION				
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID	

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REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION			
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID
				SR 524	BREVARD	437983-1-22-01

2/25/2022 9:55:16 AM jchestnut F:\CONSR_P\Projects\Worksets\FDOT\437983\2201\Roadway\PLAN\RD03.dgn



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

Draft

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 524	BREVARD	437983-1-22-01

SR 524
PREFERRED ALTERNATIVE

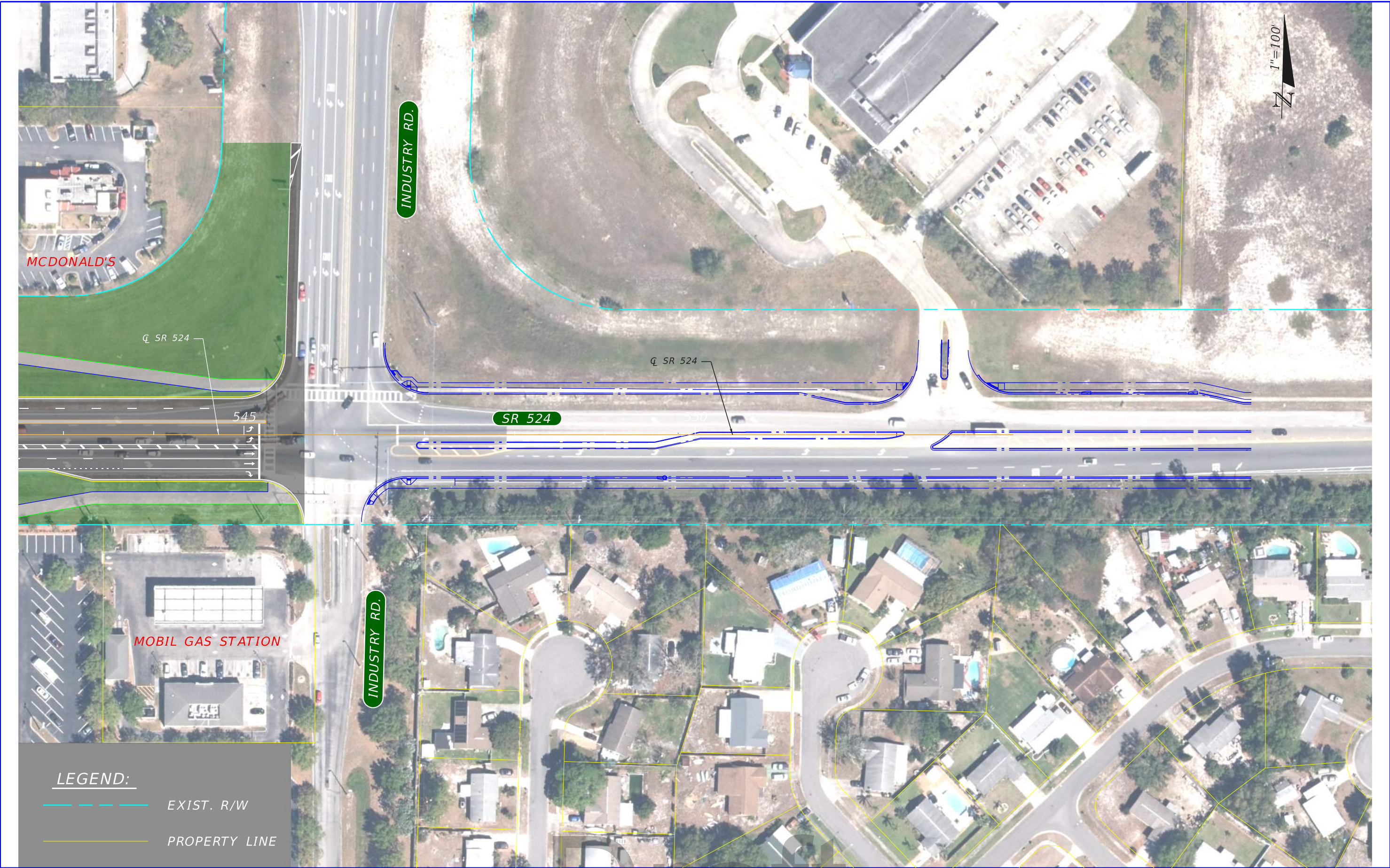
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REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SR 524 PREFERRED ALTERNATIVE	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION					
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

Draft

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 524	BREVARD	437983-1-22-01

SR 524 PREFERRED ALTERNATIVE	
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SHEET NO.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 437983-1-22-01

(FEDERAL FUNDS)
BREVARD COUNTY (70070)

STATE ROAD NO. 524
FROM SOUTH FRIDAY ROAD TO INDUSTRY ROAD

FDOT DISTRICT DESIGN ENGINEER

FDOT DISTRICT STRUCTURES
DESIGN ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS
TARGET SPEED
DESIGN & POSTED SPEEDS

CONCURRING WITH:
TARGET SPEED
DESIGN & POSTED SPEEDS

FDOT DISTRICT INTERMODAL SYSTEMS
DEVELOPMENT MANAGER

FDOT DISTRICT STRUCTURES
DESIGN ENGINEER

CONCURRING WITH:
CONTEXT CLASSIFICATION
TARGET SPEED

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

FHWA TRANSPORTATION ENGINEER

LOCAL TRANSPORTATION ENGINEER

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

CONCURRING WITH:
TYPICAL SECTION ELEMENTS

NOT USED

NOT USED

CONCURRING WITH:

CONCURRING WITH:

PROJECT LOCATION URL: <https://goo.gl/maps/Gn3Vd5dn2LHJtBbFA>

PROJECT DESCRIPTION: RECONSTRUCTION/WIDENING

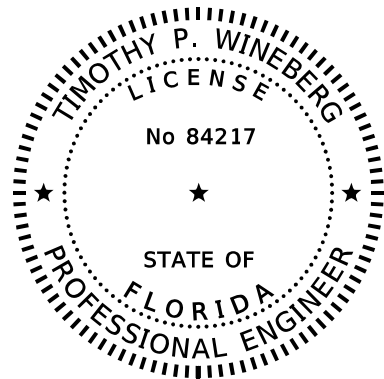
PROJECT LIMITS: BEGIN MP 1.510 - END MP 4.651

EXCEPTIONS: NONE

BRIDGE LIMITS: (700054) MP 1.653 - MP 1.670
(700128) MP 1.670 - MP 1.676

RAILROAD CROSSING: NONE

APPROVED BY:



THIS ITEM HAS BEEN DIGITALLY
SIGNED AND SEALED BY

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.

CONSOR ENGINEERS, LLC
1511 EAST SR 434, SUITE 1001
WINTER SPRINGS, FLORIDA 32708
OSCAR M. CASTANEDA, P.E. NO. 82317

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE
FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

TYPICAL SECTION PACKAGE

SHEET NO	SHEET DESCRIPTION
1	COVER SHEET
2	4-LANE DDI
3 - 5	TYPICAL SECTIONS

Draft

SHEET
NO.

1

<div>PROJECT CONTROLS</div> <div>CONTEXT CLASSIFICATION</div> <div><div><div><div><div></div><div>C1 : NATURAL</div></div><div><div></div><div>C2 : RURAL</div></div><div><div></div><div>C2T : RURAL TOWN</div></div><div><div></div><div>C3R : SUBURBAN RES.</div></div><div><div></div><div>N/A : L.A. FACILITY</div></div></div><div><div><div></div><div>C3C : SUBURBAN COMM.</div></div><div><div></div><div>C4 : URBAN GENERAL</div></div><div><div></div><div>C5 : URBAN CENTER</div></div><div><div></div><div>C6 : URBAN CORE</div></div></div></div></div> <div>FUNCTIONAL CLASSIFICATION</div> <div><div><div><div></div><div>INTERSTATE</div></div><div><div></div><div>FREEWAY/EXPWY.</div></div><div><div></div><div>PRINCIPAL ARTERIAL</div></div><div><div></div><div>MINOR ARTERIAL</div></div></div><div><div><div></div><div>MAJOR COLLECTOR</div></div><div><div></div><div>MINOR COLLECTOR</div></div><div><div></div><div>LOCAL</div></div></div></div>
--

HIGHWAY SYSTEM

NATIONAL HIGHWAY SYSTEM

STRATEGIC INTERMODAL SYSTEM

STATE HIGHWAY SYSTEM

OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

1 - FREEWAY

2 - RESTRICTIVE w/Service Roads

3 - RESTRICTIVE w/660 ft. Connection Spacing

4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing

5 - RESTRICTIVE w/440 ft. Connection Spacing

6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing

7 - BOTH MEDIAN TYPES

CRITERIA

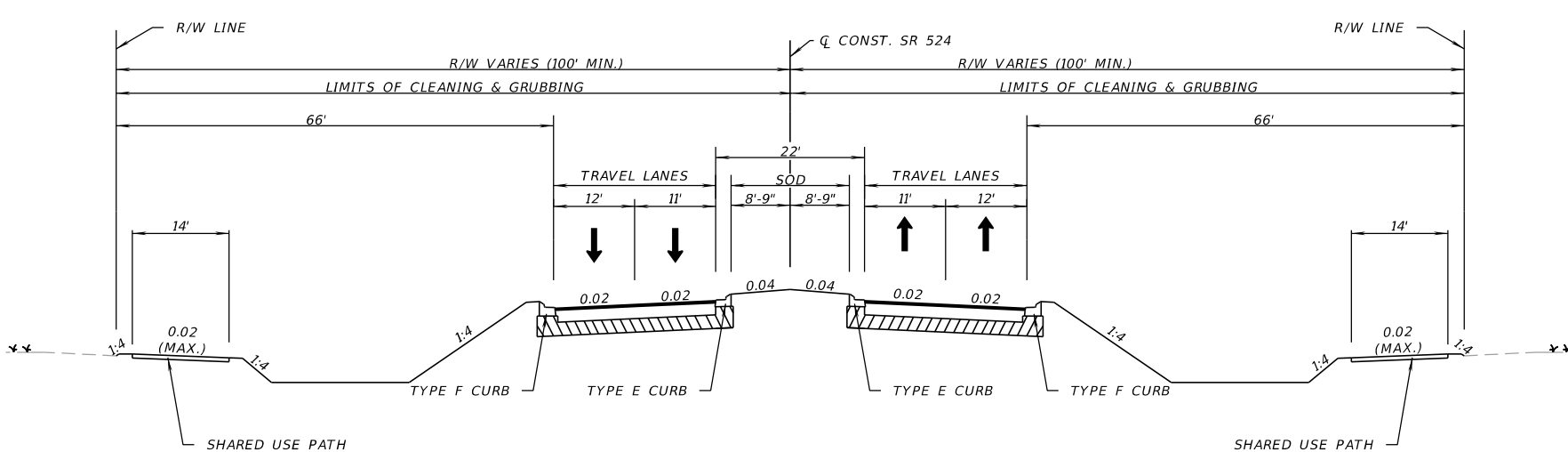
NEW CONSTRUCTION / RECONSTRUCTION

RESURFACING (LA FACILITIES)

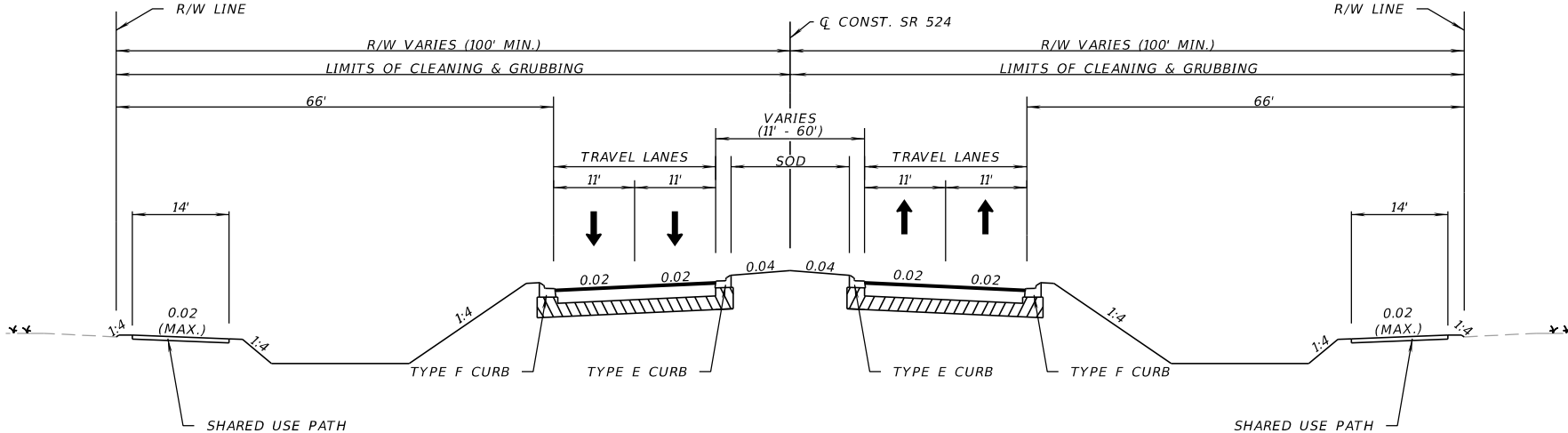
RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS
RELATED TO TYPICAL SECTION:

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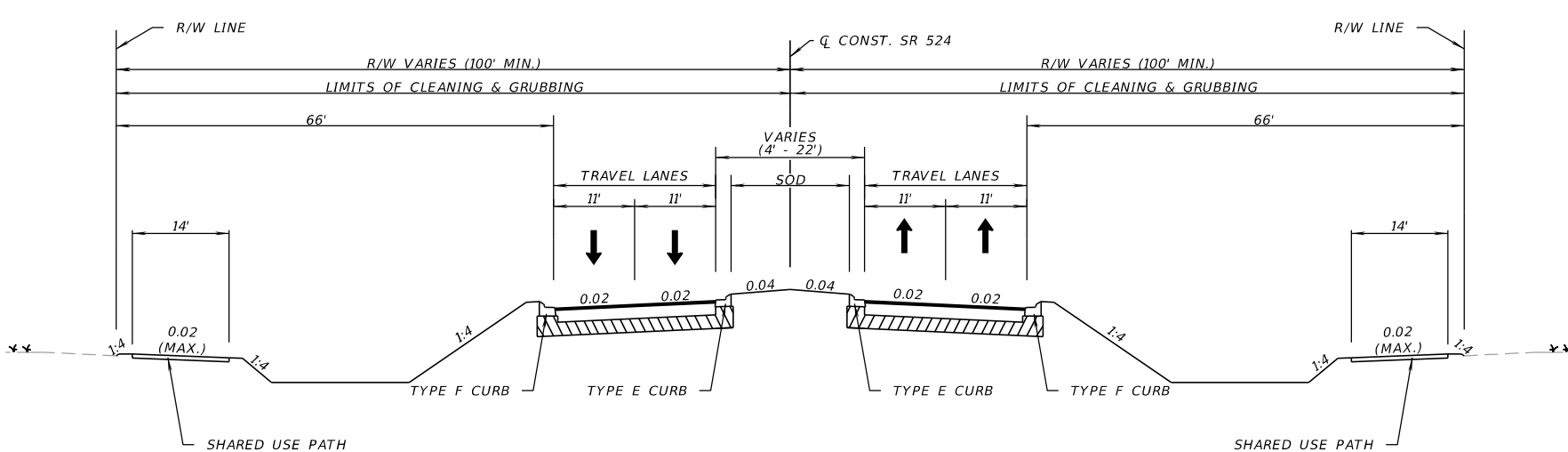
PROJECT CONTROLS		TYPICAL SECTION No. 2	
CONTEXT CLASSIFICATION		<div></div>	
FUNCTIONAL CLASSIFICATION			
HIGHWAY SYSTEM			
ACCESS CLASSIFICATION			
CRITERIA			
POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:		<div><div>TRAFFIC DATA</div><div><div>CURRENT YEAR</div><div>= 2016 AADT = 17,000</div></div><div><div>ESTIMATED OPENING YEAR</div><div>= 2024 AADT = 19,100</div></div><div><div>ESTIMATED DESIGN YEAR</div><div>= 2044 AADT = 24,500</div></div><div><div>K = 9.51%</div><div>D = 56.00%</div><div>T = 3.20% (24 HOUR)</div></div><div><div>DESIGN HOUR T</div><div>= 1.60%</div></div><div><div>POSTED SPEED</div><div>= 45 MPH</div></div><div><div>DESIGN SPEED</div><div>= 45 MPH</div></div><div><div>TARGET SPEED</div><div>= 45 MPH</div></div></div> <div><div>FINANCIAL PROJECT ID</div><div>437983-1-22-01</div></div> <div><div>SHEET NO.</div><div>3</div></div>	

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PROJECT CONTROLS		TYPICAL SECTION No. 3					
CONTEXT CLASSIFICATION							
FUNCTIONAL CLASSIFICATION							
HIGHWAY SYSTEM							
ACCESS CLASSIFICATION							
CRITERIA		<p>TYPICAL SECTION SR 524 SEGMENT 3 COX ROAD TO LONDON BOULEVARD MP 2.916 - MP 4.194</p>					
POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:							
TRAFFIC DATA		<table><tr><td>FINANCIAL PROJECT ID</td><td>SHEET NO.</td></tr><tr><td>437983-1-22-01</td><td>4</td></tr></table>		FINANCIAL PROJECT ID	SHEET NO.	437983-1-22-01	4
FINANCIAL PROJECT ID	SHEET NO.						
437983-1-22-01	4						

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PROJECT CONTROLS		TYPICAL SECTION No. 4	
CONTEXT CLASSIFICATION			
FUNCTIONAL CLASSIFICATION			
HIGHWAY SYSTEM			
ACCESS CLASSIFICATION			
CRITERIA		<p>TYPICAL SECTION SR 524 SEGMENT 4 LONDON BOULEVARD TO INDUSTRY ROAD MP 4.194 - MP 4.651</p>	
POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:			
TRAFFIC DATA			
FINANCIAL PROJECT ID		SHEET NO.	

- ☐ C1 : NATURAL

☒ C3C : SUBURBAN COMM.
- ☐ C2 : RURAL

☐ C4 : URBAN GENERAL
- ☐ C2T : RURAL TOWN

☐ C5 : URBAN CENTER
- ☐ C3R : SUBURBAN RES.

☐ C6 : URBAN CORE
- ☐ N/A : L.A. FACILITY

- ☐ INTERSTATE

☐ MAJOR COLLECTOR
- ☐ FREEWAY/EXPWY.

☐ MINOR COLLECTOR
- ☒ PRINCIPAL ARTERIAL

☐ LOCAL
- ☐ MINOR ARTERIAL

- ☐ NATIONAL HIGHWAY SYSTEM
- ☐ STRATEGIC INTERMODAL SYSTEM
- ☒ STATE HIGHWAY SYSTEM
- ☐ OFF-STATE HIGHWAY SYSTEM

- ☐ 1 - FREEWAY
- ☐ 2 - RESTRICTIVE w/Service Roads
- ☐ 3 - RESTRICTIVE w/660 ft. Connection Spacing
- ☐ 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
- ☒ 5 - RESTRICTIVE w/440 ft. Connection Spacing
- ☐ 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
- ☐ 7 - BOTH MEDIAN TYPES

- ☒ NEW CONSTRUCTION / RECONSTRUCTION
- ☐ RESURFACING (LA FACILITIES)
- ☐ RRR (ARTERIALS & COLLECTORS)

TRAFFIC DATA

CURRENT YEAR = 2016 AADT = 17,000
ESTIMATED OPENING YEAR = 2024 AADT = 19,100
ESTIMATED DESIGN YEAR = 2044 AADT = 24,500
K = 9.51% D = 56.00% T = 3.20% (24 HOUR)
DESIGN HOUR T = 1.60%
POSTED SPEED = 45 MPH
DESIGN SPEED = 45 MPH
TARGET SPEED = 45 MPH