



November 2022

**I-4 (SR 400) from W of SR 570 (Polk Parkway) to
W of US 27 Interchange Master Plan, Phase 2
FPID: 442512-1-12-01
Existing Conditions Element Report**





Existing Conditions Element Report

DRAFT

Volume No. 1 of 1

November 2022

Polk County, Florida

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Prepared by RS&H, Inc. at the
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Existing Conditions Overview

This report documents the existing conditions within the study area of the I-4 Master Plan from west of Polk Parkway (SR 570) to West of US 27 from engineering and environmental standpoints.

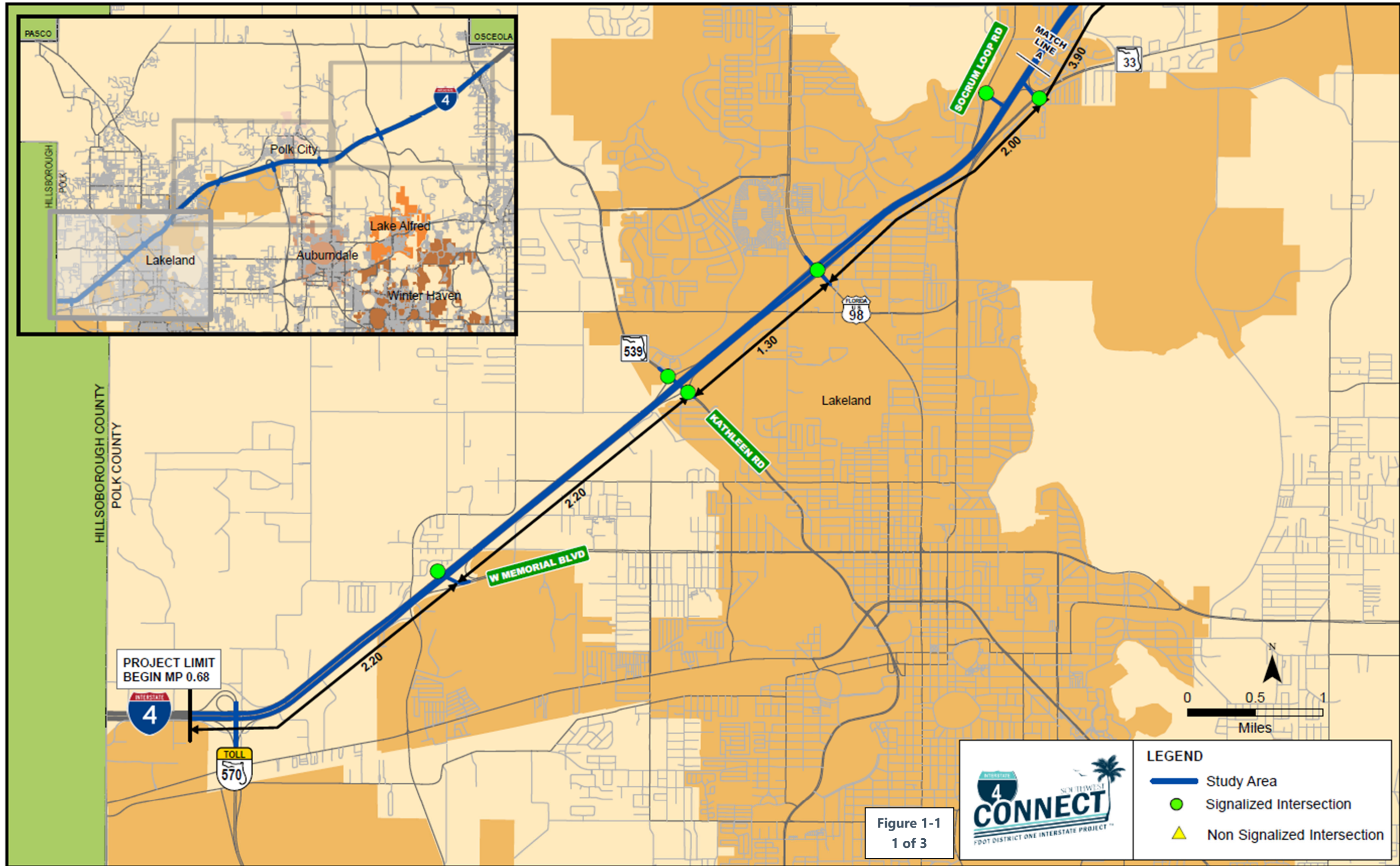
1 Engineering

The primary objective for the I-4 Master Plan from west of Polk Parkway (SR 570) to West of US 27 is to evaluate the impact of operational and capacity improvements including managed lanes along I-4. Impacts on the social, economic, cultural, natural, and physical environment will be analyzed. A safety analysis is also required in accordance with Part 1, Chapter 2 of the PD&E Manual. This technical memorandum documents the analysis of historical crash data collected from the Florida Department of Transportation (FDOT) State Safety Office GIS Query Tool (SSOGis) and Signal 4 Analytics (S4) for the I-4 study corridor, including all nine I-4 study interchanges listed below and in the project location map, Figure 1-1. The data from SSOGis is certified by FDOT (2015-2019); the data from S4 is uncertified (2020-May 2022).

- SR 570/Polk Parkway (West)
- SR 546/W Memorial Boulevard
- SR 539/Kathleen Road
- US 98
- N Socrum Loop Road & SR 33/Lakeland Hills Boulevard
- SR 33/Lakeland Hills Boulevard/Commonwealth Avenue
- SR 570/Polk Parkway (East)
- SR 559
- SR 557

The following mainline segments between interchanges were also analyzed. The segment west of the SR 570/Polk Parkway W interchange was not analyzed as the crash data was already analyzed as part of the interchange study area.

- I-4 from SR 570/Polk Pkwy W to SR 546/W Memorial Blvd
- I-4 from SR 546/W Memorial Blvd to SR 539/Kathleen Rd
- I-4 from SR 539/Kathleen Rd to US 98
- I-4 from US 98 to N Socrum Loop Road & SR 33/Lakeland Hills Boulevard
- I-4 from N Socrum Loop Road & SR 33/Lakeland Hills Boulevard to SR 33/Lakeland Hills Boulevard/Commonwealth Avenue
- I-4 from SR 33/Lakeland Hills Boulevard/Commonwealth Avenue to SR 570/Polk Pkwy E
- I-4 from SR 570/Polk Pkwy E to SR 559
- I-4 from SR 559 to SR 557
- I-4 from SR 557 to West of US 27



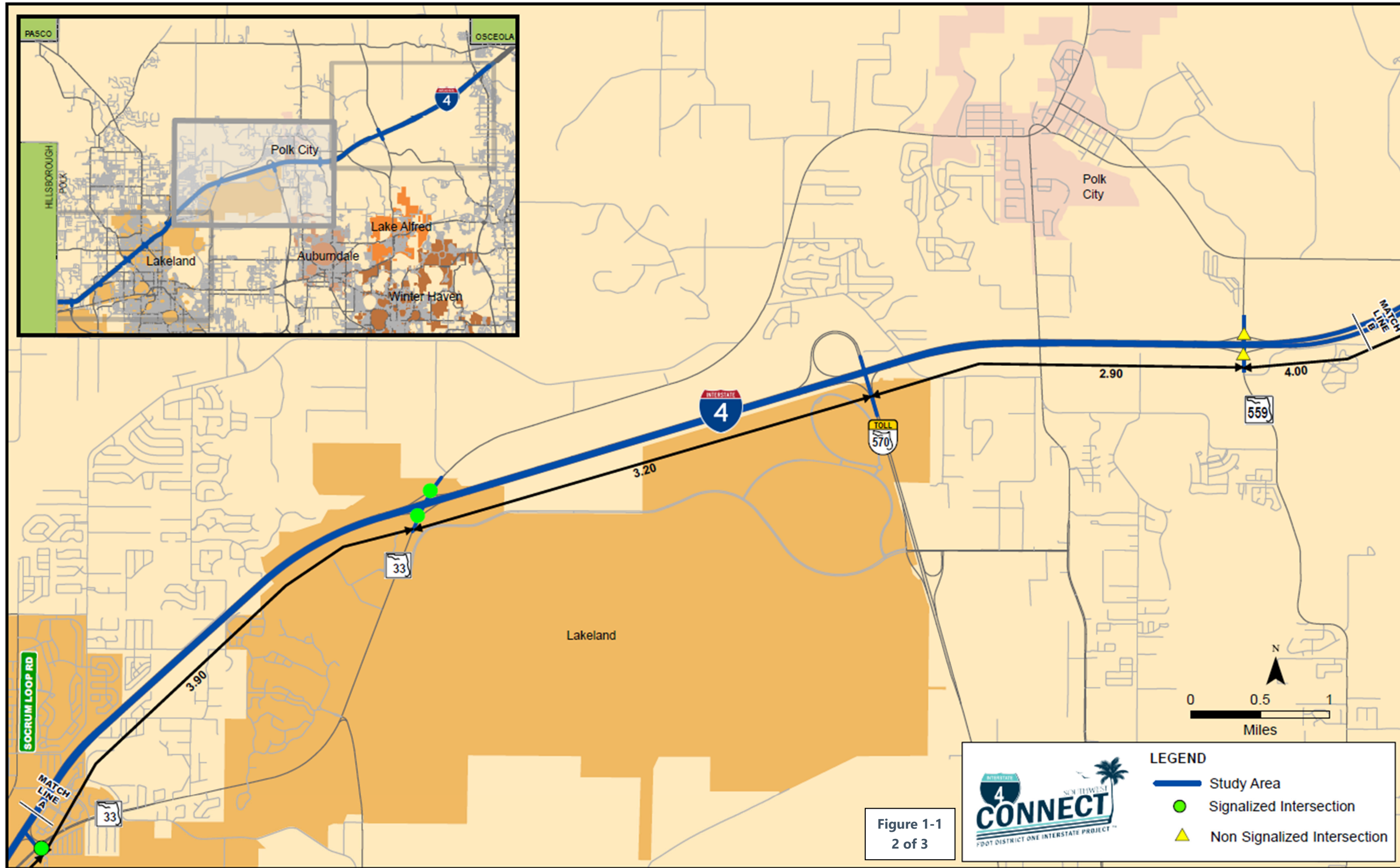


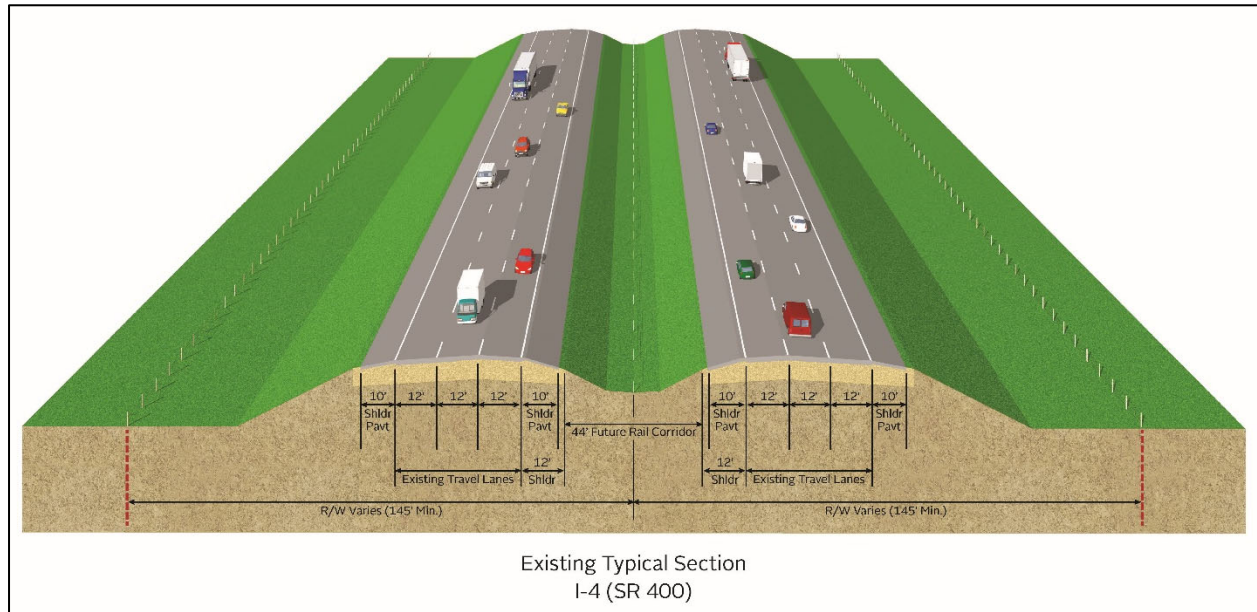
Figure 1-1
2 of 3



1.1 Roadway Typical Sections

The general typical section of I-4 within the study area is depicted below. It includes six (6) 12-foot travel lanes, three (3) in each direction, with 10-foot inside and outside paved shoulders. The roadway is divided and generally includes a grass median that is cable-barrier or guardrail separated. The total right of way is typically just shy of 150 feet in both directions from the centerline of the roadway.

Figure 1-2: I-4 Existing Typical Section



1.2 Right-of-Way

The right-of-way (ROW) widths along the I-4 corridor within the study limits are listed in Table 1-1. The ROW width increases in the vicinity of the interchanges. Right-of-way maps are included in Appendix A.

Table 1-1: Existing Right-of-Way

From	To	Left	Right	Total
County Line Road	Memorial Highway	131 ft. min.	131 ft. min.	262-300 ft.
Memorial Highway	US 98	150-413 ft.	105'-343'	300-350 ft.
US 98	SR 557	150 ft. min.	150 ft. min.	300-450 ft.
SR 557	US 27	Varies	Varies	425-540 ft.

1.3 Roadway Classification

Interstate 4 (I-4) is classified as an Urban Principal Arterial Interstate highway throughout the study limits. It is part of the National Highway System (NHS) and State Highway System (SHS) and is designated as a Strategic Intermodal System (SIS) facility by the Florida Department of Transportation (FDOT).

1.4 Context Classification

I-4 cannot be classified using the FDOT Context Classification Guide as it is an Interstate/Limited Access facility.

1.5 Adjacent Land Use

An analysis of Southwest Florida Water Management District (SWFWMD) Florida Land Use and Classification System (FLUCCS) data (2020) was conducted to determine the existing land use composition of the study corridor within a half mile of I-4. Existing land use adjacent to I-4 consists primarily of wetlands (29.4%), residential (18.7%), and agricultural land (15.0%).

The portion of the corridor extending from the Hillsborough/Polk County line through Lakeland consists primarily of residential land use with some commercial land use at the intersection of I-4 and US 98 and some industrial areas with warehousing and distribution centers. In the Polk City area at the I-4 and SR 570 interchange (east) adjacent to Florida Polytechnic University, a mix of residential and agricultural land is located adjacent to I-4 extending west to SR 559. From west of SR 559 to the US 27 interchange, the corridor is comprised primarily of wetlands associated with the Green Swamp and some agricultural pockets. At the US 27 interchange, commercial and industrial land uses including warehousing and distribution centers are located adjacent to I-4 and extend along US 27. A map of the existing land use is included in Appendix B. The composition of land use types is included in Table 1-2.

Table 1-2: Existing Land Use Composition

Existing Land Use	Acres	Composition
Wetlands	5,122.28	29.3%
Residential	3,254.21	18.7%
Agricultural	2,617.50	15.0%
Industrial	1,326.54	7.6%
Recreation and Open Space	1,233.25	7.1%
Commercial	963.78	5.5%
Water	938.66	5.4%
Uplands	651.99	3.7%
Rangeland	578.55	3.3%
Extractive	289.42	1.7%
Institutional	274.23	1.6%
Transportation/Utilities	137.39	0.8%
Disturbed Land	45.84	0.3%

1.6 Access Management Classifications

As an interstate highway, I-4 is considered Access Classification 1 for access management purposes. Based on the straight-line diagrams for I-4 and measurements taken in Google Earth, the average interchange spacing in the study area is approximately 2.92 miles, as shown in Table 1-3. Based on the FDOT Design Manual (FDM) Section 201.4, I-4 within the study area straddles Area Type 2 (interchange spacing of 2.0 miles) and Area Type 3 (interchange spacing of 3.0 miles). Area Type 2 is defined as existing urbanized areas other than Area Type 1; Area Type 3 is defined as transitioning urbanized areas, and urban areas other than Area Type 1 or 2. The straight-line diagrams are included in Appendix C.

Table 1-3: Interchange Spacing

Start	End	Distance (mi)
County Line Rd	SR 570/Polk Parkway (West)	1.00
SR 570/Polk Parkway (West)	Memorial Parkway	1.90
Memorial Parkway	Kathleen Road	2.24
Kathleen Road	US 98	1.32
US 98	N Socrum Loop Road	2.00
N Socrum Loop Road	SR 33	3.92
SR 33	SR 570/Polk Parkway (East)	3.23
SR 570/Polk Parkway (East)	SR 559	2.86
SR 559	SR 557	3.99
SR 557	US 27	6.74
Average Interchange Spacing		2.92

1.7 Design and Posted Speeds

The posted speed limit on I-4 is 70 miles per hour (mph) throughout the study area. East of the study area, the posted speed limit transitions to 65 mph just west of US 27. West of the study area, the posted speed limit transitions to 65 mph just east of I-75. Based on the most recently available typical sections, the design speed on I-4 within the study limits is also 70 mph throughout. The sole exception is the section of I-4 in the vicinity of US 98 that was designed under the metric system, for which the design speed is 110 kilometers per hour (kph).

1.8 Vertical and Horizontal Geometry

Table 1-4 summarizes the existing vertical alignment of the I-4 mainline. This information was extracted from available as-built plans and existing survey (Appendix D). There are twelve (12) sag vertical curves and thirteen (13) crest vertical curves within the study area.

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Table 1-4: I-4 Existing Vertical Alignment

PVI* Station	Design Speed	Existing Vertical Curve						Curve Length Criteria (ft)	K-Value Criteria		As-Built Plan Source of Data (SPN/FPID No.)
		Type	G1 %	G2 %	A %	Length (ft)	K- Value		FDM	AASHTO	
435+50	70 mph	Sag	-2.769	-0.494	2.275	1,100		1,050	206	181	16320-3423
470+00	70 mph	Sag	-0.300	+0.200	0.500	400	800	1,050	206	181	16320-3423
499+00	70 mph	Crest	+0.200	-0.200	0.400	500	1250	1,050	506	247	16320-3423
515+00	70 mph	Sag	-0.200	+0.200	0.400	400	999	1,050	206	181	16320-3423
529+00	70 mph	Crest	+0.200	-0.200	0.400	500	1249	1,050	506	247	16320-3423
541+00	70 mph	Sag	-0.200	+0.200	0.400	400	1000	1,050	206	181	16320-3423
552+00	70 mph	Crest	+0.200	-0.200	0.400	500	1250	1,050	506	247	16320-3423
567+00	70 mph	Sag	-0.200	+0.200	0.400	400	1000	1,050	206	181	16320-3423
609+00	70 mph	Crest	+0.300	-0.267	0.567	500	882	1,050	506	247	16320-3423
1610+25.00 EB	70 mph	Crest	+0.292	-0.159	0.451	1000	2215	1,050	506	247	201217-2-52-01
1610+25.00 WB	70 mph	Crest	+0.292	-0.159	0.451	1000	2192	1,050	506	247	201217-2-52-01
1630+00	70 mph	Sag	-0.159	0.000	0.159	800	5021	1,050	206	181	201217-2-52-01
1667+20	70 mph	Sag	0.000	+0.200	0.200	800	4000	1,050	206	181	201217-2-52-01
1680+75	70 mph	Crest	+0.200	0.000	0.200	1,000	5003	1,050	506	247	201217-2-52-01
1700+60	70 mph	Sag	0.000	+1.016	1.016	800	788	1,050	206	181	201217-2-52-01
1720+45	70 mph	Sag	+1.016	+2.994	1.978	800	404	1,050	206	181	201217-2-52-01
1744+10	70 mph	Crest	+2.994	+0.120	2.874	1,800	626	1,050	506	247	201217-2-52-01
1763+70	70 mph	Crest	+0.120	-0.950	1.070	1,000	935	1,050	506	247	201217-2-52-01
1793+53.63	70 mph	Sag	-0.769	+1.149	1.918	735	383	1,050	206	181	201217-2-52-01
242+25.00	110 kph	Sag	- 0.7693	1.8000	2.569	300 m		320 m*	206*	181*	201213-1-52-01
246+50	110 kph	Crest	+1.800	-2.500	4.300	550 m		320 m*	506*	247*	201213-1-52-01
252+10	110 kph	Sag	-2.500	-0.412	2.088	250 m		320 m*	206*	181*	201213-1-52-01
255+00	110 kph	Crest	-0.412	-2.631	2.219	300 m		320 m*	506*	247*	201213-1-52-01
884+28.46 WB	70 mph	Crest	+2.880	-2.768	5.648	1,500	266	1,050	506	247	201209-2-52-01
884+28.46 EB	70 mph	Crest	+2.880	-2.8	5.600	1,500	268	1,050	506	247	201209-2-52-01

*For 70 mph design speed

Table 1-5 summarizes the existing horizontal alignment of the I-4 mainline. This information was extracted from available as-built plans and existing survey (Appendix D). There is a total of 25 horizontal curves along I-4 within the study limits.

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Table 1-5: I-4 Existing Horizontal Alignment

PI Station*	PC Station*	PT Station*	Design Speed (MPH)	Existing Horizontal Curve		
				Radius (feet)	Length (feet)	SE
477+50.00	469+99.22	485+00.41	70	27,883.45	1,501.19	NC
492+51.18	485+00.41	500+01.85	70	50,185.57	1,501.44	NC
533+74.35	522+51.35	544+07.57	70	3,125.72	2,156.22	0.065
580+55.29	575+00.29	586+10.09	70	24,247.70	1,109.81	NC
593+66.47	588+11.47	599+21.27	70	24,247.70	1,109.81	NC
1581+75.22	1575+88.72	1587+61.46	70	22,918.31	1,172.73	NC
1593+47.94	1587+61.46	1599+34.16	70	22,918.31	1,172.70	NC
1715+74.73	1708+99.30	1722+50.14	70	114,591.56	1,350.84	NC
258+05.696	256+37.782	259+72.580	110 km/h	1746.379 m	334.798 m	0.036
846+64.20	841+13.30	852+11.72	70	5,729.578	1,098.42	0.037
880+31.31	865+85.61	894+17.89	70	5,729.578	2,832.28	0.037
947+68.54	946+19.41	949+17.64	70	7,611.010	298.24	0.028
953+62.07	949+17.64	958+05.64	70	8,266.712	888.00	0.028
954+44.44	939+38.72	969+33.00	70	11,459.160	2,994.28	RC
960+30.39	958+05.64	962+55.08	70	12,299.781	449.43	RC
1076+12.37	1050+28.69	1101+11.08	70	11,459.160	5,082.39	RC
1332+51.17	1312+61.09	1352+17.05	70	14,654.272	3,955.96	NC
1332+77.78	1316+28.39	1349+04.67	70	3,276.28	11,459.160	RC
1374+64.21	1368+34.36	1380+94.03	70	68,754.960	1,259.67	NC
1428+15.28	1422+52.77	1433+77.77	70	85,943.700	1,125.00	NC
1487+93.43	1446+05.52	1526+38.19	70	11,503.160	8,032.67	NC
1487+93.44	1456+80.53	1516+51.27	70	8,550.370	5,970.74	0.025
1570+39.21	1529+45.96	1610+77.59	70	28,691.900	8,131.63	NC
1763+43.45	1756+48.14	1770+37.99	70	17,188.75	1,389.85	NC
1883+75.60	1872+66.03	1894+78.27	70	11,459.16	2,212.25	RC

*Stations are taken from as-builts and may differ from those shown in the Conceptual Design plan sheets

1.9 Pedestrian Accommodations

As an interstate highway, I-4 lacks pedestrian accommodations. Some intersecting roadway facilities include pedestrian accommodations, as listed in Table 1-6.

Table 1-6: Pedestrian Accommodations

Intersecting Roadway	Pedestrian Accommodations
SR 570/Polk Parkway (West)	None
Memorial Parkway	None
Kathleen Road	Northbound: 6-ft. sidewalk Southbound: none
US 98	Northbound: 8-ft. sidewalk Southbound: 8-ft. sidewalk
N Socrum Loop Road	None
SR 33	None
SR 570/Polk Parkway (East)	None
SR 559	Northbound: 5-6 ft. sidewalk Southbound: 5-6 ft. sidewalk
SR 557	None (as of 2022)

1.10 Bicycle Facilities

As an interstate highway, I-4 lacks bicycle facilities. Some intersecting roadway facilities include bicycle facilities, as listed in Table 1-7.

Table 1-7: Bicycle Facilities

Intersecting Roadway	Bicycle Facilities
SR 570/Polk Parkway (West)	None
Memorial Parkway	None
Kathleen Road	Northbound: 4-ft. adjacent, marked bicycle lane Southbound: 4-ft adjacent, marked bicycle lane
US 98	Northbound: 4-ft. adjacent, marked bicycle lane Southbound: 4-ft adjacent, marked bicycle lane
N Socrum Loop Road*	Northbound: 4-ft. adjacent, marked bicycle lane Southbound: 4-ft adjacent, marked bicycle lane
SR 33	None
SR 570/Polk Parkway (East)	None
SR 559	Northbound: 4-ft. adjacent, marked bicycle lane Southbound: 4-ft adjacent, marked bicycle lane
SR 557	None (as of 2022)

*At the underpass

1.11 Transit Facilities

I-4 does not currently offer transit facilities.

1.12 Pavement Conditions

The condition of the existing pavement was evaluated using data gathered from FDOT's Interstate System Pavement Condition Forecast (Appendix E). The last five (5) years of data and future projection are included in Table 1-8. There are several segments in each direction that have been identified as areas of concern. These segments have, or are expected to have, deficient pavement based on distress ratings (cracking and ride).

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Table 1-8: Pavement Conditions

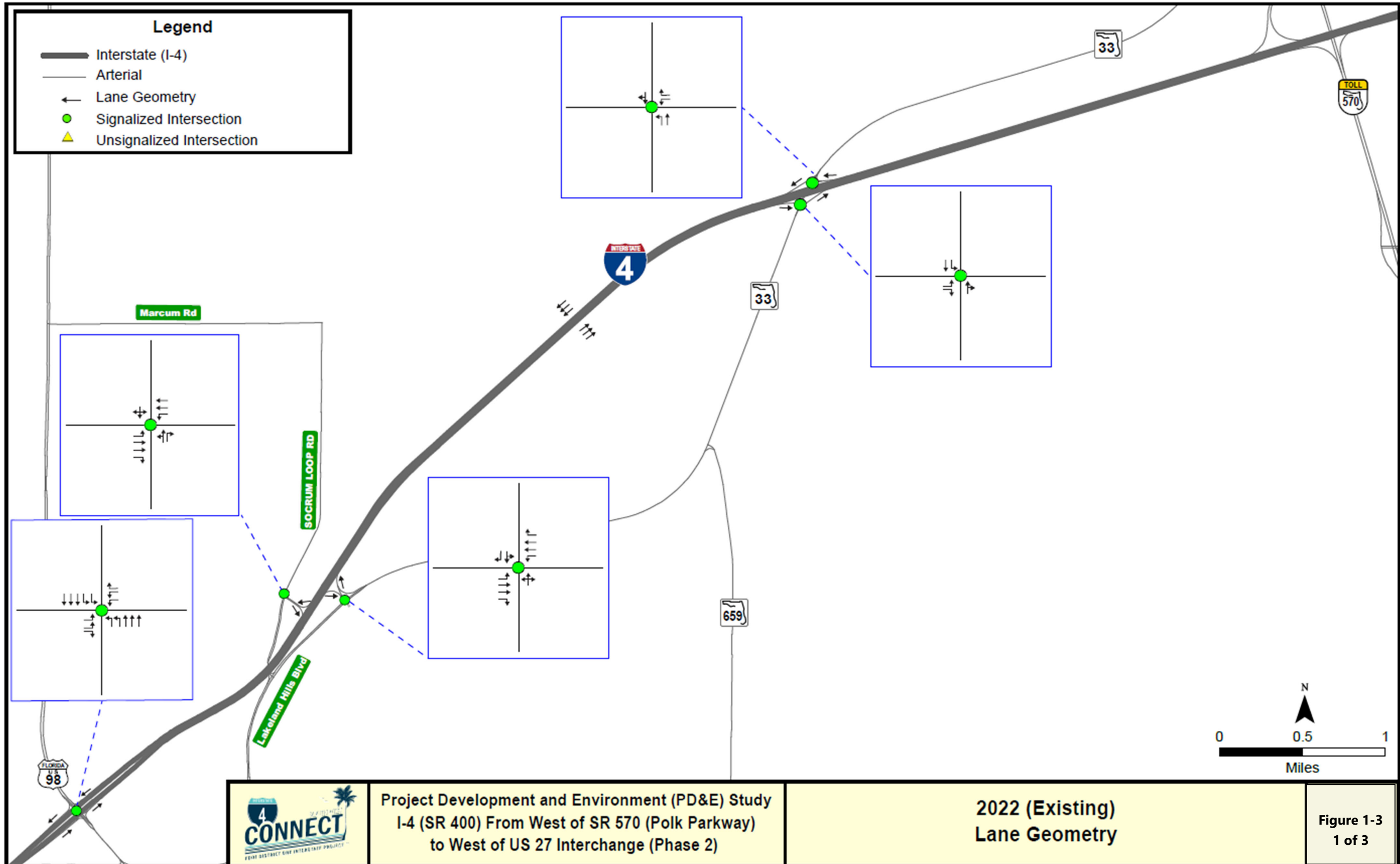
Begin MP	End MP	Side of Roadway	Distress Ratings	2018	2019	2020	2021	2022	2027 (REG)	Area of Concern?
0	0.754	Right	Cracking	9.4	9.4	9.4	9.3	9.1	9.1	✘
			Ride	7.2	7.2	7.2	7.1	7.2	6.8	
0.754	2.197	Right	Cracking	9.2	9.2	9.2	9.2	9.0	9.0	✘
			Ride	7.3	7.3	7.2	7.3	7.3	6.8	
2.197	6.248	Right	Cracking	9.5	9.5	9.0	9.0	9.0	8.9	✘
			Ride	8.1	8.1	8.1	8.1	8.1	8.0	
6.248	6.890	Right	Cracking	8.5	8.6	8.6	8.3	8.4	8.0	✘
			Ride	7.3	7.2	6.9	7.1	7.1	6.9	
6.890	7.130	Right	Cracking	7.0	4.5*	4.5*	4.5*	4.5*	2.2	✓
			Ride	8.4	7.2	6.3*				
7.130	12.100	Right	Cracking	7.0	6.5	6.5	4.5*	4.5*	3.4	✓
			Ride	8.4	8.4	8.4	8.4	8.4	8.4	
12.100	17.751	Right	Cracking	7.0	7.0	7.0	5.5*	5.5*	4.3	✓
			Ride	8.4	8.3	8.3	8.3	8.3	8.2	
17.751	19.033	Right	Cracking	10.0	10.0	10.0	10.0	10.0	10.0	✘
			Ride	8.2	8.1	8.1	8.1	8.0	7.8	
19.033	21.978	Right	Cracking	7.0	7.0	7.0	5.5*	5.5*	4.3	✓
			Ride	8.3	8.3	8.3	8.3	8.3	8.2	
21.978	32.022	Right	Cracking	10.0	10.0	10.0	10.0	8.0	8.0	✘
			Ride	8.6	8.6	8.5	8.6	8.6	8.6	
0	0.938	Left	Cracking	8.4	8.4	8.2	7.8	7.7	7.5	✓
			Ride	6.7	6.5	6.3*	6.4*	6.4*	5.6	
0.938	2.565	Left	Cracking	9.2	9.2	9.1	9.0	9.0	8.9	✓
			Ride	6.9	7.0	6.9	7.0	6.9	6.3	
2.565	6.248	Left	Cracking	10.0	10.0	10.0	9.0	9.0	9.0	✘
			Ride	8.2	8.2	8.2	8.2	8.2	8.2	
6.248	6.890	Left	Cracking	9.1	9.0	9.0	8.7	9.2	8.9	✘
			Ride	7.9	7.8	7.5	7.8	7.8	7.7	
6.890	7.130	Left	Cracking	8.0	1.0*	1.0*	0.0*	0.0*	0.0*	✓
			Ride	8.2	5.8*	6.4*				
7.130	12.100	Left	Cracking	8.0	8.0	8.0	5.5*	5.5*	5.2	✓
			Ride	8.2	8.3	8.2	8.2	8.2	8.2	
12.100	21.978	Left	Cracking	8.0	8.0	8.0	5.5*	5.5*	5.3	✓
			Ride	8.3	8.3	8.3	8.3	8.3	8.3	
21.978	32.022	Left	Cracking	10.0	10.0	10.0	10.0	10.0	10.0	✘
			Ride	8.6	8.6	8.6	8.6	8.6	8.6	

"*" indicates pavement deficient (any rating ≤ 6)

2027 forecasted by simple linear regression (REG)

1.13 Existing Intersection Layout and Traffic Control

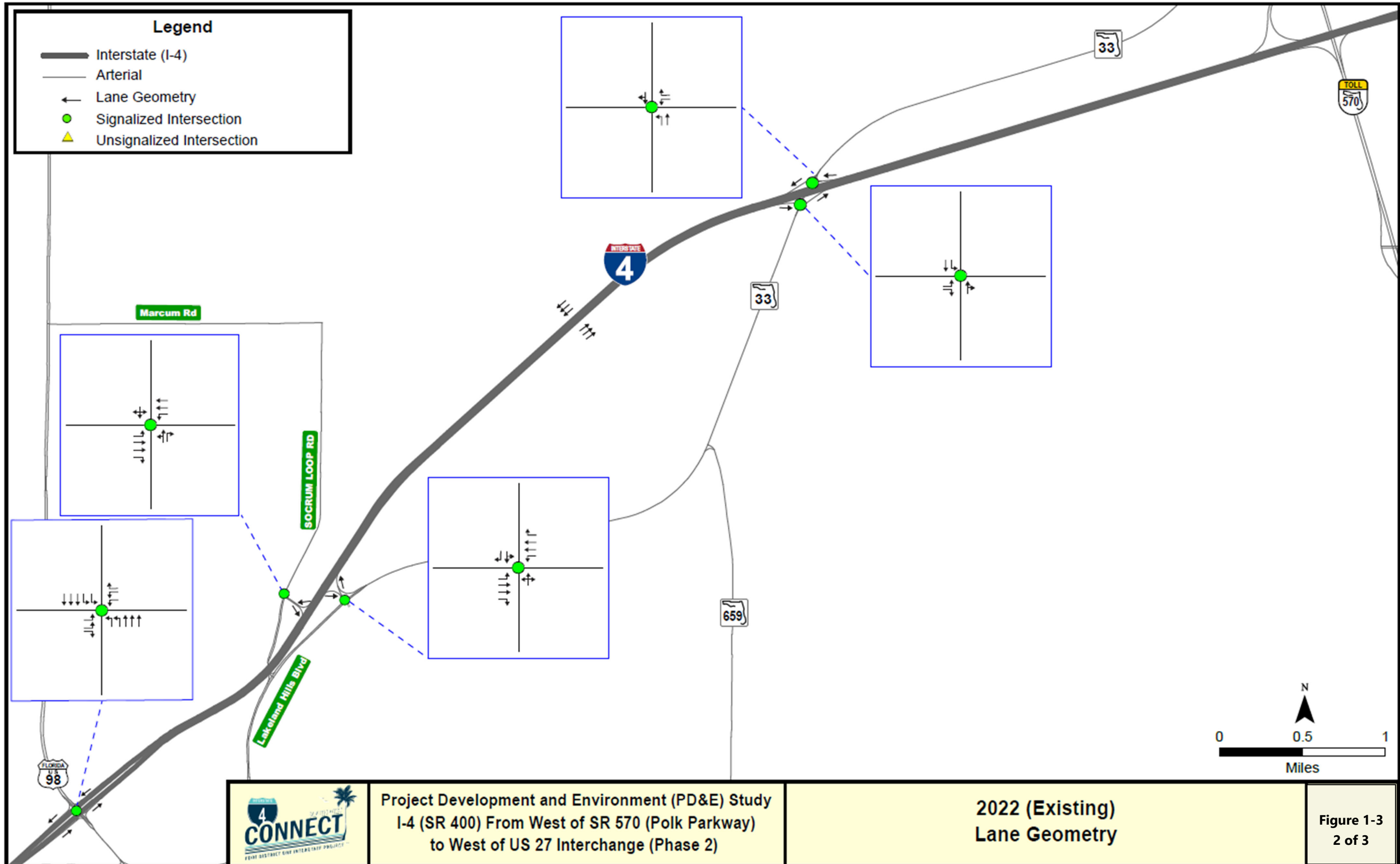
The existing lane configuration along the corridor, the layout of adjacent intersections, and traffic control are depicted in Figure 1-3.

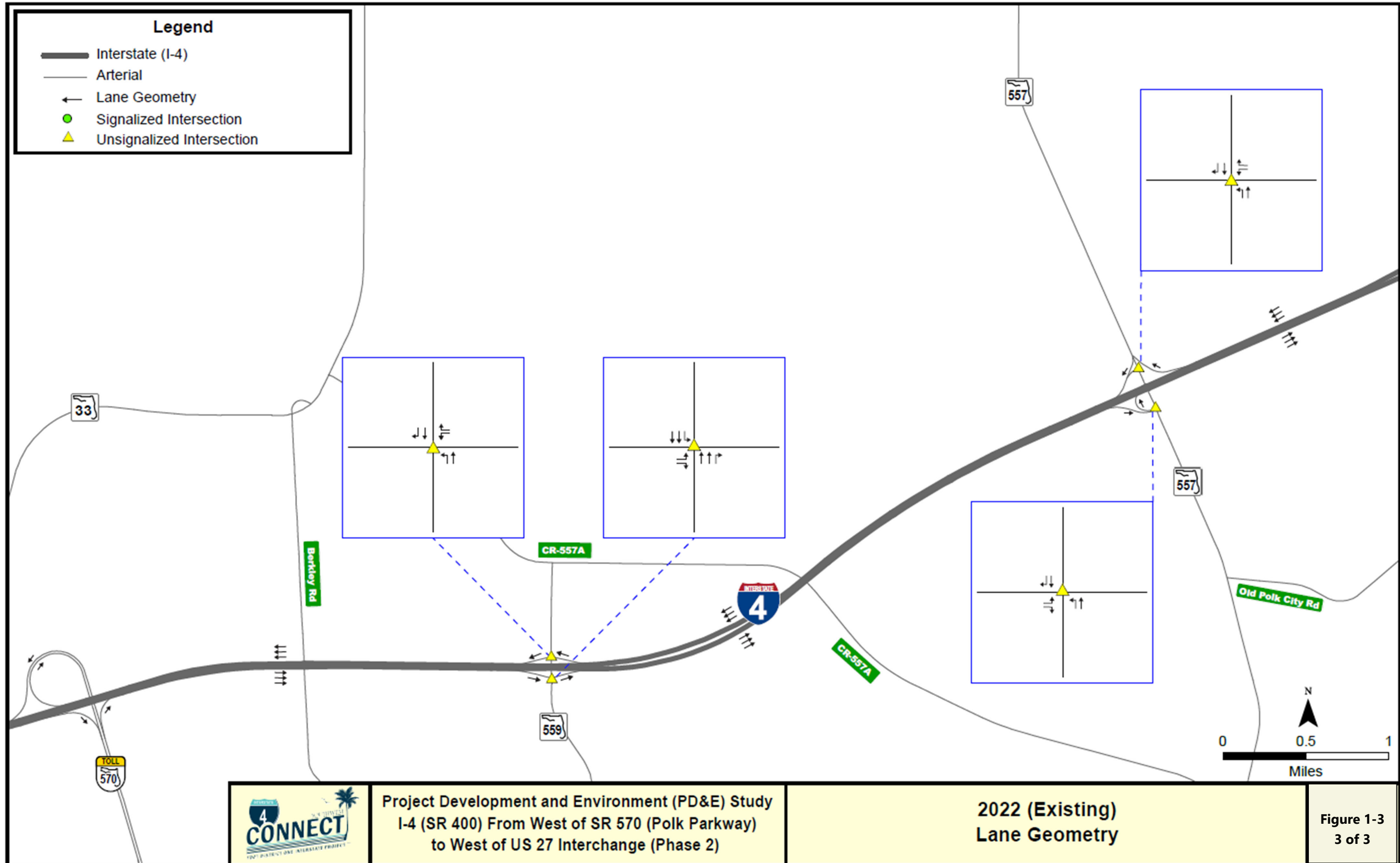


Project Development and Environment (PD&E) Study
 I-4 (SR 400) From West of SR 570 (Polk Parkway)
 to West of US 27 Interchange (Phase 2)

2022 (Existing)
 Lane Geometry

Figure 1-3
 1 of 3





1.14 Existing Traffic Volumes (AADT) and Level of Service (LOS)

The following sections outline the existing volume development and traffic analysis conducted as documented in the Draft Existing Traffic Conditions Memo (Phase 2), which is included in Appendix F.

1.14.1 Existing Volume Development

Existing Year 2022 Annual Average Daily Traffic (AADT) volumes were developed by applying appropriate seasonal adjustment factors (SF) and axle correction factors (AF) to the Average Daily Traffic (ADT) obtained from recent available traffic counts or new counts collected to supplement available counts. An average trend annual growth rate of 5% (before COVID-19 pandemic) was applied to previous year counts to develop year 2022 AADTs where applicable to account for the traffic trends increase in Florida. The overall impact of the traffic on the corridor due to COVID-19 is about two percent less than pre-COVID-19 traffic trends.

Directional Design Hour Volumes (DDHVs) for existing year 2022 were developed by applying the Standard K Factor of 9.0 percent and Directional Factor (D) to the AADT volumes. A historical D factor has been developed by averaging the estimated D factor from permanent count stations along I-4 over a ten-year period based on FDOT Florida Traffic Online data. Peak Hour Factor (PHF) is the ratio of total peak hour volume to the peak rate of flow within the hour. It accounts for the variability of traffic within the hour. Existing PHFs were considered from the latest count data for existing operations analysis. Table 1-9 illustrates the traffic factors for I-4 mainline and ramps.

Table 1-9: Design Traffic Factors for I-4 Corridor

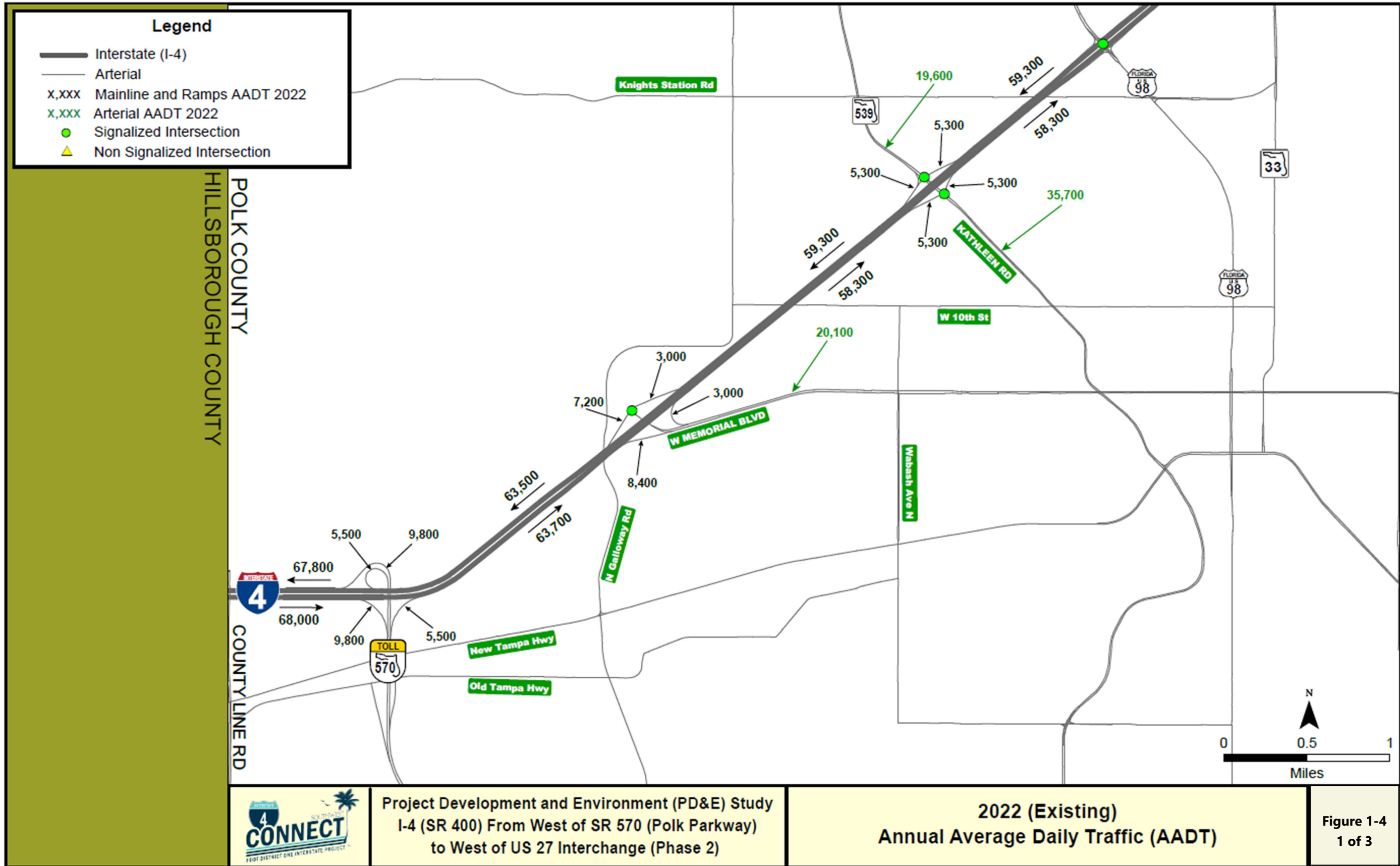
Roadway	K _{STD}	D	T	T _f
I-4 Mainline	9.0	52.0	14.0	7.0
I-4 Ramps	9.0	100.0	14.0	7.0
Arterials	9.0	*	*	*

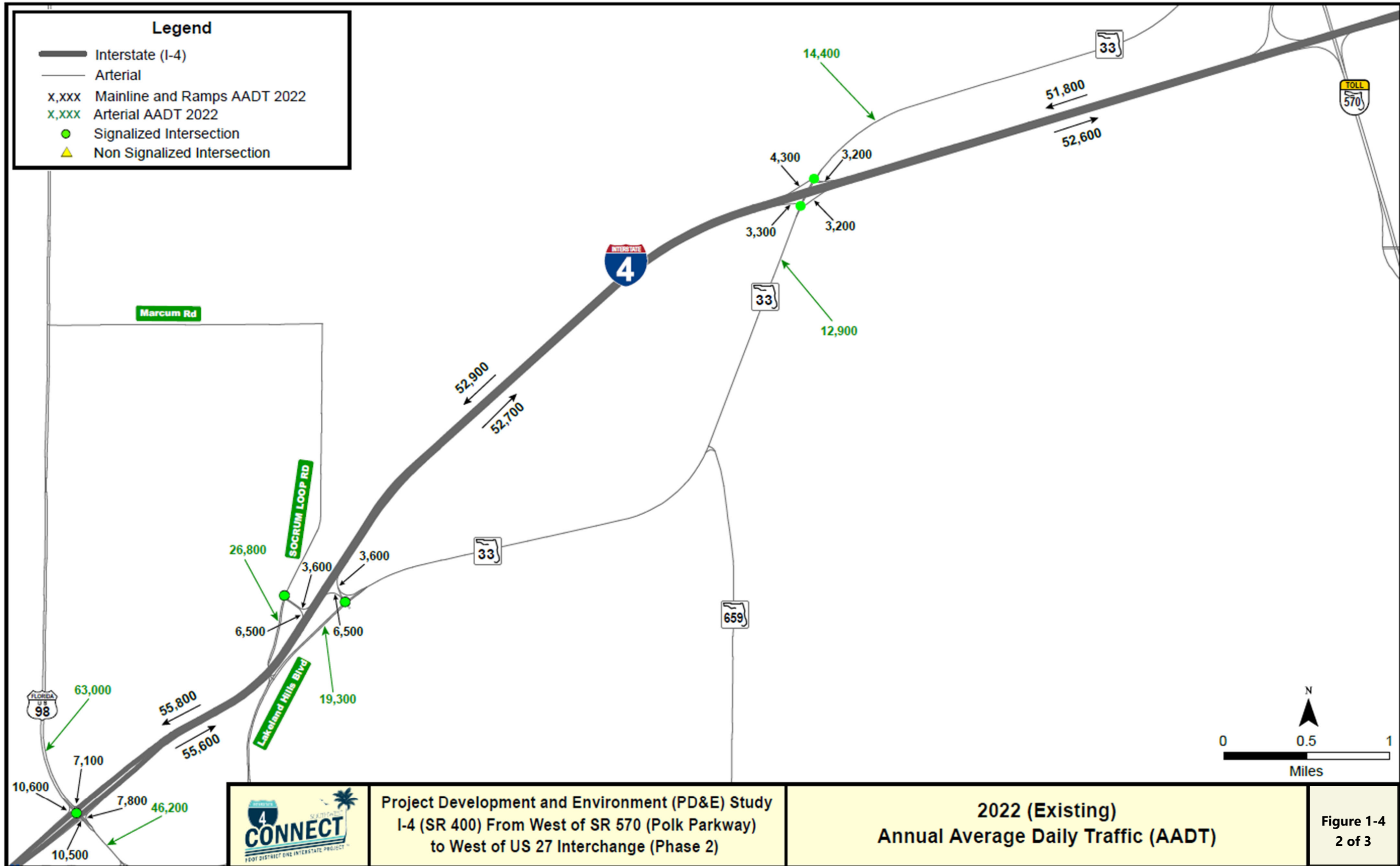
Source: * D and T factors were estimated based on 2021 FTO.

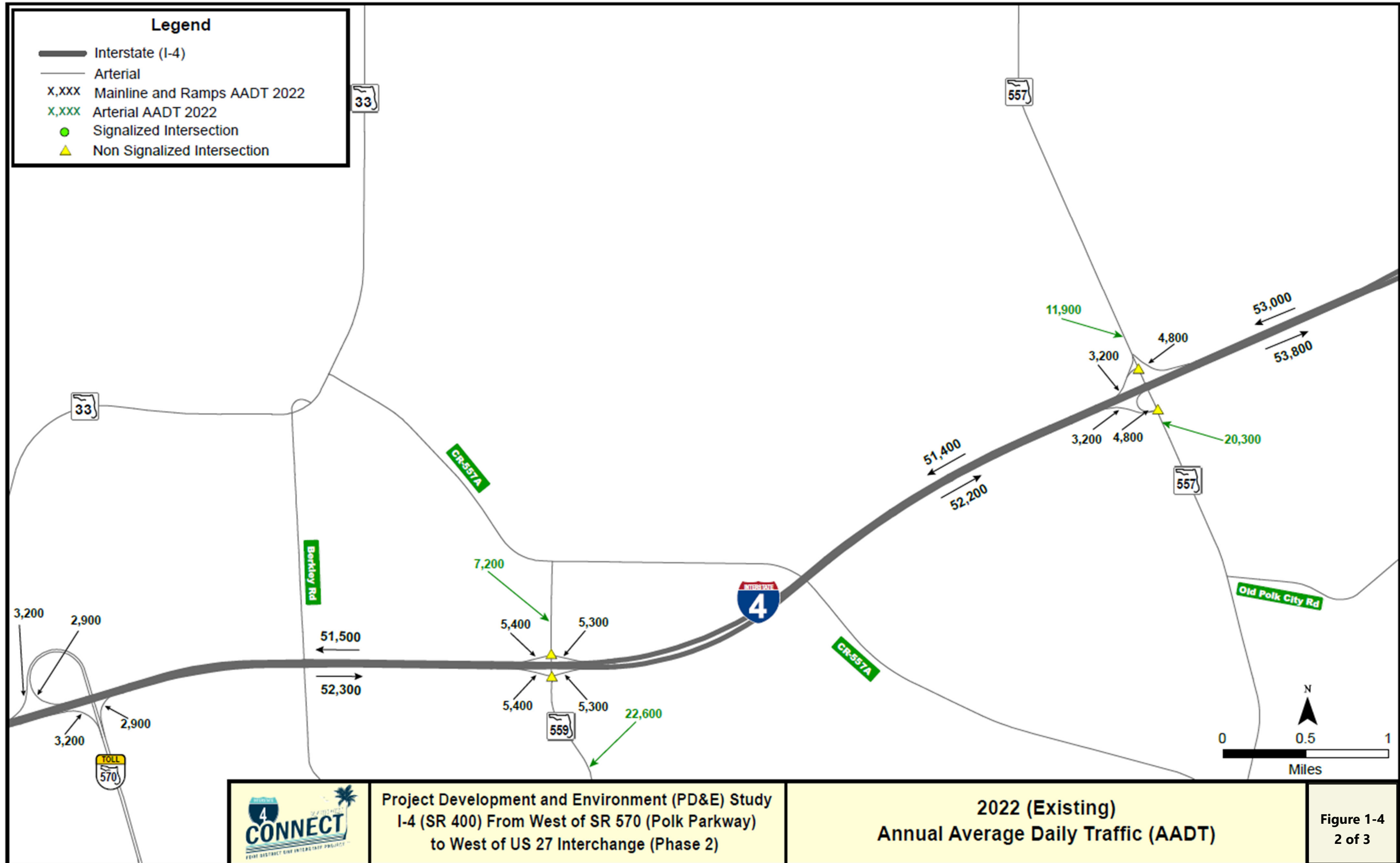
The Standard K is from the FDOT Project Traffic Forecasting Handbook.

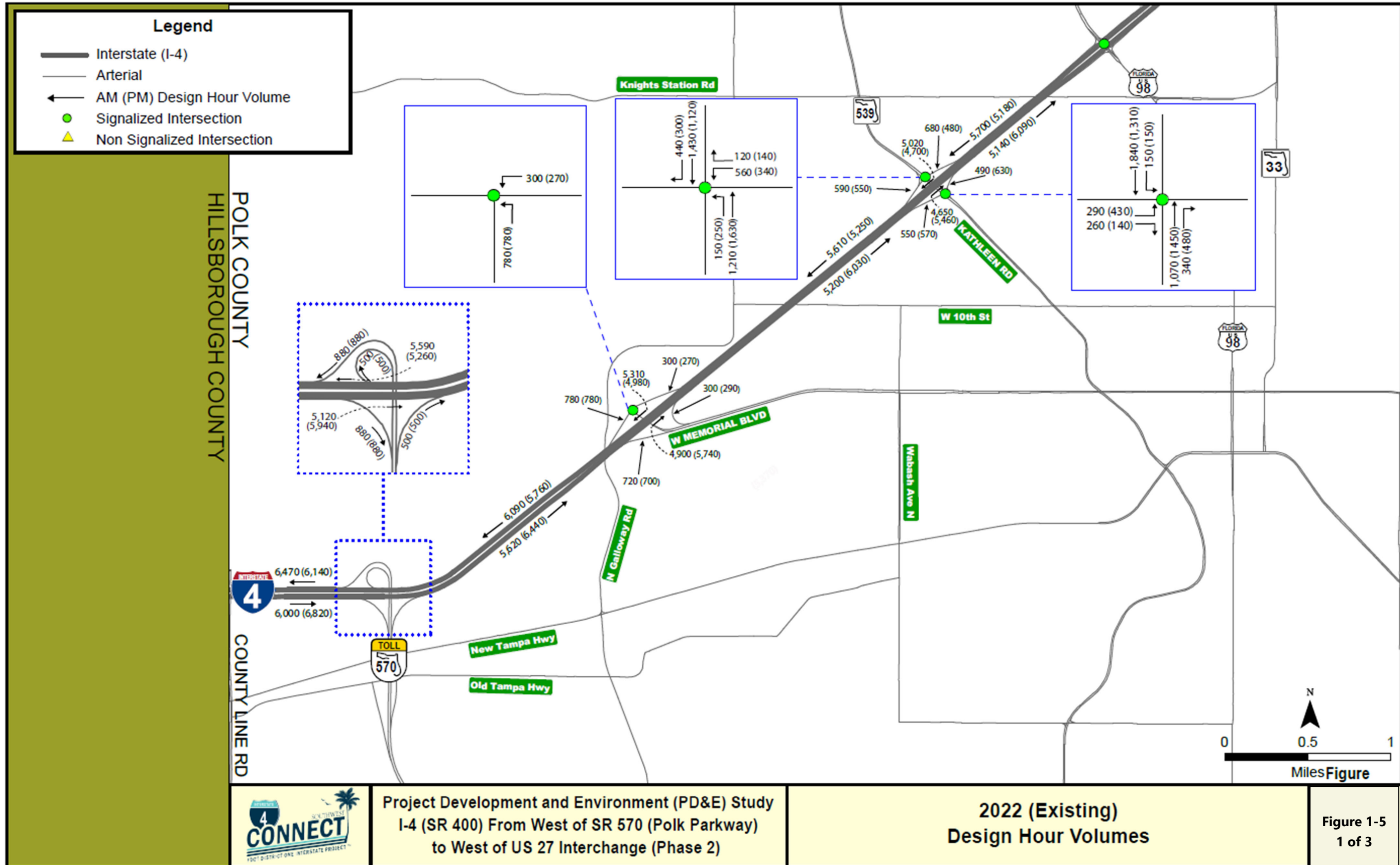
A count location just east of SR 539 (Kathleen Road) (FDOT Count Site ID 160116) was selected as an anchor point (volume fixed and used as a starting point for balancing). The 2021 AADT based on Florida's Traffic Online at this location is 112,000 vehicles per day (vpd). The year 2022 AADT at this segment was developed by multiplying the 2021 volume by a 5% growth rate (117,600 vpd). The 2021 ramp AADTs then were multiplied by a 5% growth rate and adjusted accordingly to develop the mainline balanced volumes in between the interchanges. The 2022 AADTs are presented in Figure 1-4.

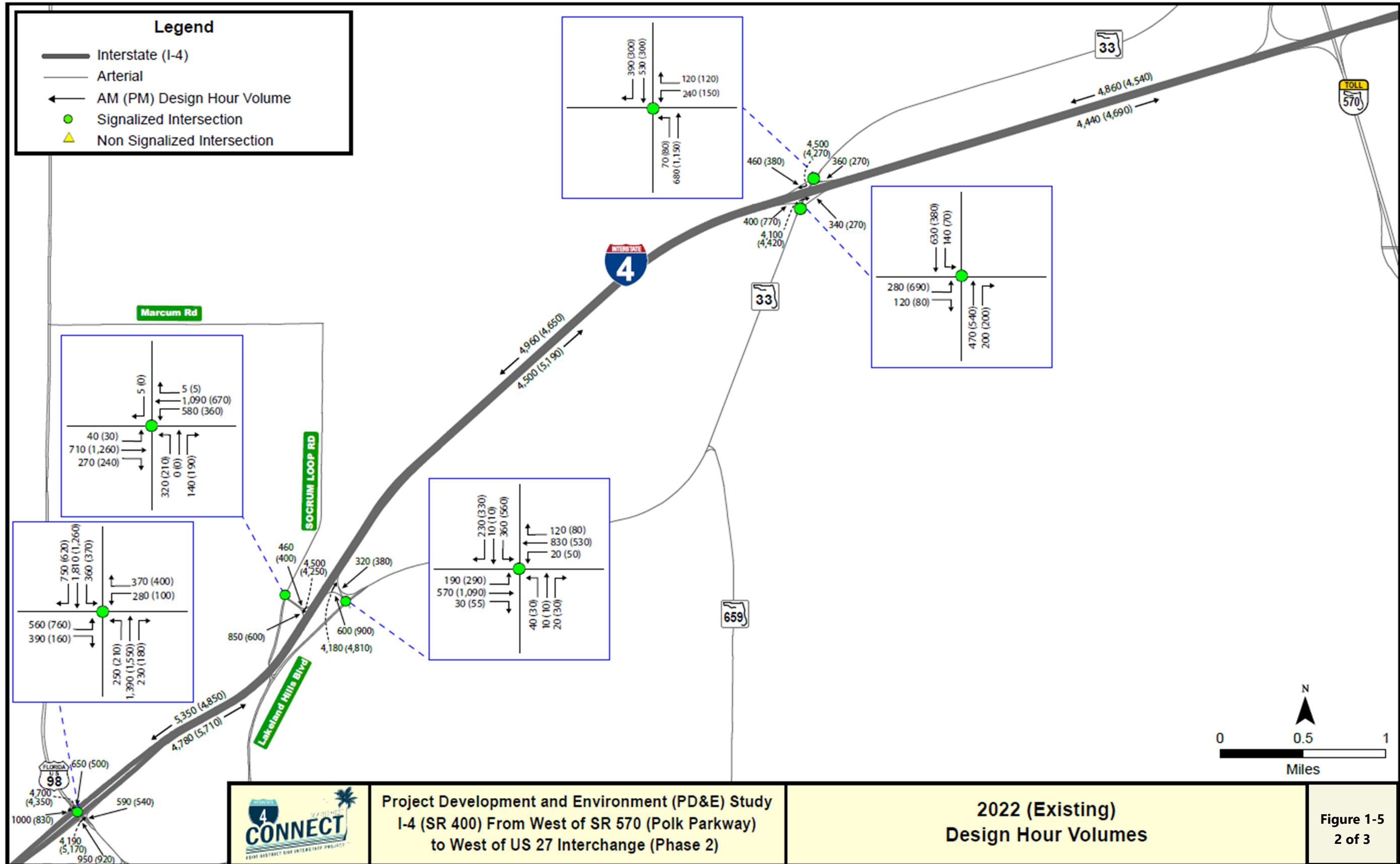
The peak-hour existing traffic was derived by applying the K- and D-factors to the 2022 AADT volumes. The peak direction of travel was assumed to be consistent with the existing counts. At the intersections, the existing turning movement volumes were obtained by applying the existing turning movement percentages to the approach volumes. The Existing Year (2022) AM and PM peak hour traffic is shown in Figure 1-5.

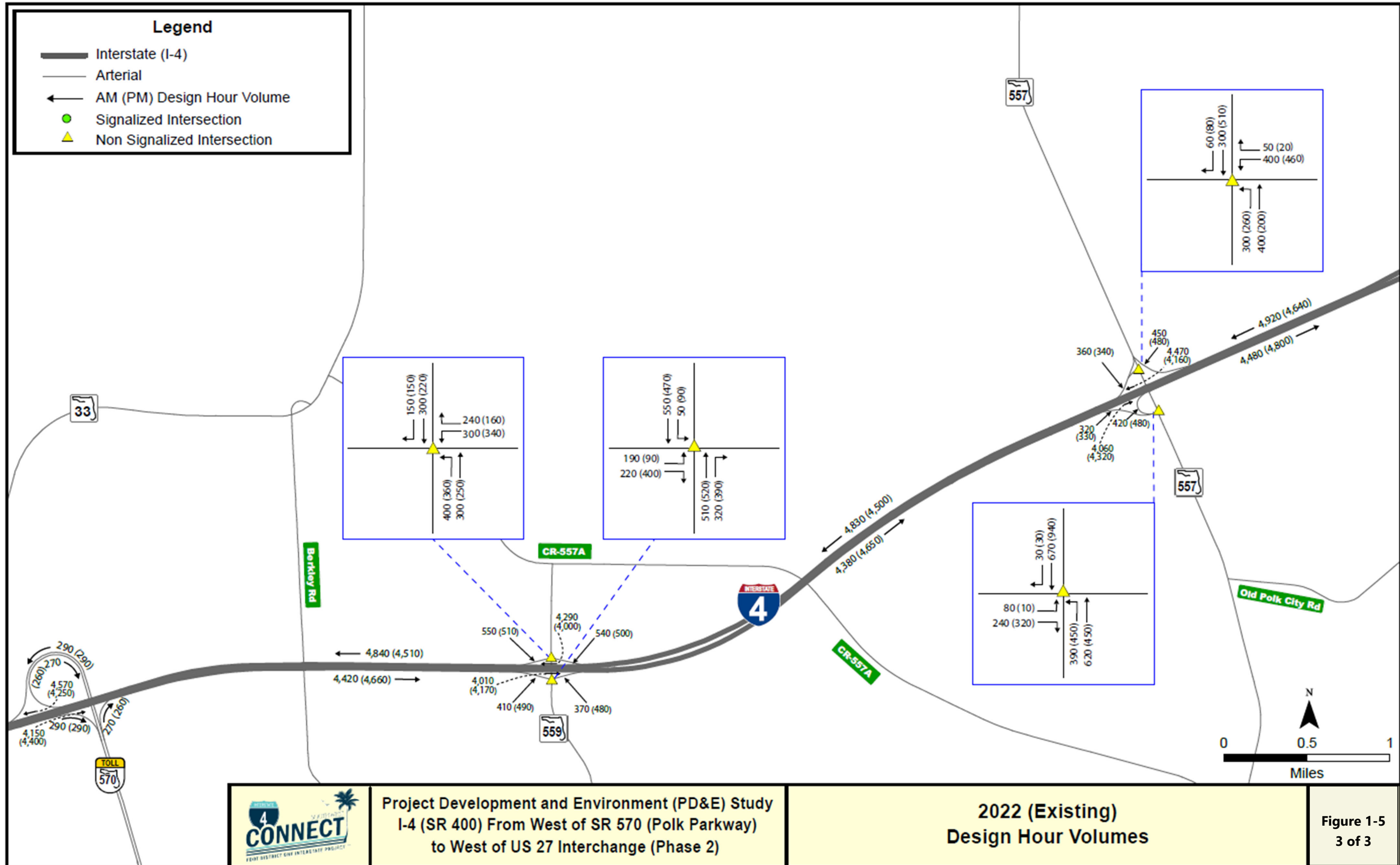












Project Development and Environment (PD&E) Study
I-4 (SR 400) From West of SR 570 (Polk Parkway)
to West of US 27 Interchange (Phase 2)

2022 (Existing)
Design Hour Volumes

Figure 1-5
3 of 3

The 2022 AADT volumes along I-4 and ramps are shown in Table 1-10. The daily traffic for the I-4 mainline ranges from 103,600 vpd to 135,800 vpd.

Table 1-10: 2022 Existing I-4 Corridor AADTs

Location	Profile	Estimated 2022 AADTs
SR 557		106,800
		9,600
		6,400
SR 559		103,600
		10,600
		10,800
SR 570 (Polk Parkway)		103,800
		5,800
		6,400
SR 33 (Lakeland Hills Boulevard/Commonwealth Avenue)		104,400
		6,400
		7,600
SR 33 (Lakeland Hills Boulevard/Commonwealth Avenue)		105,600
		3,600
		3,600
CR 582 (North Socrum Loop Road)		111,400
		6,500
		6,500
US 98/SR 35/SR 700		117,600
		14,900
		21,100
SR 539 (Kathleen Road)		117,600
		10,600
		10,600
West Memorial Boulevard		127,200
		6,000
		15,600
SR 570 (Polk Parkway)		135,800
		11,000
		19,600

2,220 = Mainline volume

2,220 = Combined ramp volume

Note: 2021 FDOT's Florida Traffic Online database multiplied with 5% growth rate and balanced mainline traffic

1.14.2 Existing Conditions Traffic Operations Analysis

Traffic operations analyses for the AM and PM peak hours were conducted to document the LOS within the study area for the Existing Year (2022). Figure 1-3 shows the existing lane configuration of I-4 mainline, ramps and ramp terminals used in the operational analysis.

The 2022 AM and PM peak hour traffic volumes were evaluated in each direction for freeway segments: basic, weave, and merge/diverge influence areas. HCS results are summarized in Table 1-11 and Table 1-12 for the eastbound and westbound directions, respectively.

Most of the segments along I-4 operate at LOS D or better, except for these locations, which operate at an unacceptable LOS E/LOS F in one or both AM and PM peak hours:

- I-4 eastbound at Polk Parkway off-ramp diverge segment
- I-4 eastbound from Polk Parkway off-ramp to on-ramp basic segment
- I-4 eastbound from Polk Parkway on-ramp to West Memorial Boulevard off-ramp basic segment
- I-4 eastbound at West Memorial Boulevard off-ramp diverge segment
- I-4 westbound from US 98 on-ramp to SR 539 (Kathleen Road) off-ramp basic segment
- I-4 westbound at SR 539 (Kathleen Road) off-ramp diverge segment
- I-4 westbound from SR 539 (Kathleen Road) on-ramp to West Memorial Boulevard off-ramp basic segment
- I-4 westbound at West Memorial Boulevard off-ramp diverge segment
- I-4 westbound from Polk Parkway off-ramp to on-ramp basic segment

Signalized intersections were analyzed using Synchro Version 11. Unsignalized intersections were analyzed using the HCS software Version 7.9. Unsignalized LOS/Delay reported for worst movement. The analysis output summary for AM and PM peak hours are presented in Table 1-13. Several intersections within the study area are operating at LOS E or F in one or both AM and PM peak hours. These intersections include:

- I-4 and US 98 interchange
- I-4 and N Socrum Loop (CR 582) westbound ramp terminal
- I-4 and Lakeland Hills Boulevard eastbound ramp terminal
- I-4 and SR 33 eastbound ramp terminal
- I-4 and SR 559 both ramp terminals (unsignalized)
- I-4 and SR 557 both ramp terminals (unsignalized)

Table 1-11: Existing Year 2022 HCS Level of Service and Density for I-4 Eastbound Segments

No.	Segment	Segment Type	Number of Lanes	AM Peak Hour								PM Peak Hour							
				Demand (veh/h)	Density Freeway (pc/mi/ln)	Density Ramp (pc/mi/ln)	LOS	Freeway Density to Capacity Ratio	Ramp Density to Capacity Ratio	Speed Freeway (mph)	Speed Ramp (mph)	Demand (veh/h)	Density Freeway (pc/mi/ln)	Density Ramp (pc/mi/ln)	LOS	Freeway Density to Capacity Ratio	Ramp Density to Capacity Ratio	Speed Freeway (mph)	Speed Ramp (mph)
1	West of Polk Parkway off-ramp	Basic	4	6,000	25.1	-	C	0.73	-	67.3	-	6,820	28.2	-	D	0.81	-	64.8	-
2	Polk Parkway off-ramp*	Diverge	4	6,000	24.1	14	B	0.73	0.24	70.1	62.6	6,820	58.2	16.6	F	0.81	0.24	30.3	62.7
3	Polk Parkway off-ramp to on-ramp	Basic	3	5,120	30.6	-	D	0.83	-	62.8	-	5,940	63.3	-	F	0.94	-	31.3	-
4	Polk Parkway on-ramp	Merge	3	5,120	34.5	32.5	D	0.91	0.28	61.2	58.5	5,940	35.7	33.2	D	0.93	0.27	60.6	57.8
5	Polk Parkway on-ramp to West Memorial Boulevard off-ramp	Basic	3	5,620	36.3	-	E	0.91	-	58.1	-	6,440	38.3	-	F	1.02	-	56.5	-
6	West Memorial Boulevard off-ramp	Diverge	3	5,620	31.5	35.8	E	0.91	0.4	67	63.1	6,440	32.2	36.3	E	0.93	0.38	67.1	63.2
7	West Memorial Boulevard off-ramp to on-ramp	Basic	3	4,900	28.5	-	D	0.79	-	64.5	-	5,740	30.2	-	D	0.91	-	63.1	-
8	West Memorial Boulevard on-ramp	Merge	3	4,900	31.3	30.2	D	0.84	0.17	62.3	59.8	5,740	32.5	31	D	0.87	0.17	61.9	59.3
9	West Memorial Boulevard on-ramp to SR 539 off-ramp	Basic	3	5,200	31.4	-	D	0.84	-	62.1	-	6,030	33.2	-	D	0.95	-	60.6	-
10	SR 539 off-ramp	Diverge	3	5,200	28.9	29.4	D	0.84	0.3	67.6	63.6	6,030	29.8	30.1	D	0.87	0.31	67.5	63.6
11	SR 539 off-ramp to on-ramp	Basic	3	4,650	26.3	-	D	0.75	-	66.4	-	5,460	27.7	-	D	0.86	-	65.2	-
12	SR 539 on-ramp	Merge	3	4,650	30.9	30.9	D	0.83	0.27	62.4	59.9	5,460	33.1	32.7	D	0.88	0.34	61.4	58.6
13	SR 539 on-ramp to US 98 off-ramp	Basic	3	5,140	30.8	-	D	0.83	-	62.6	-	6,090	33.9	-	D	0.96	-	60	-
14	US 98 off-ramp	Diverge	3	5,140	29	33.7	D	0.83	0.53	66.6	62.4	6,090	30.5	34.8	D	0.88	0.5	66.7	62.5
15	US 98 off-ramp to on-ramp	Basic	3	4,190	22.7	-	C	0.68	-	69.2	-	5,170	25.3	-	C	0.82	-	67.2	-
16	US 98 on-ramp	Merge	3	4,190	28.2	28.1	D	0.77	0.33	63.5	61.3	5,170	30.1	29.3	D	0.82	0.29	62.9	60.6
17	US 98 on-ramp to Lakeland Hills Boulevard off-ramp	Basic	3	4,780	27.4	-	D	0.77	-	65.4	-	5,710	29.9	-	D	0.9	-	63.3	-
18	Lakeland Hills Boulevard off-ramp	Diverge	3	4,780	29.1	29.1	D	0.77	0.37	61.6	55.6	5,710	31.2	30.9	D	0.82	0.54	60.8	54.7
19	Lakeland Hills Boulevard off-ramp to on-ramp	Basic	3	4,180	22.7	-	C	0.68	-	69.2	-	4,810	22.6	-	C	0.76	-	69.1	-
20	Lakeland Hills Boulevard on-ramp	Merge	3	4,180	26.5	26.1	C	0.73	0.2	63.7	61.4	4,810	26.8	26.5	C	0.73	0.23	63.7	61.3
21	Lakeland Hills Boulevard on-ramp to SR 33 off-ramp	Basic	3	4,500	25.1	-	C	0.73	-	67.3	-	5,190	25.4	-	C	0.82	-	67.1	-
22	SR 33 off-ramp	Diverge	3	4,500	27.2	30.2	D	0.73	0.24	62.1	56.2	5,190	27.9	31.1	D	0.73	0.46	61	55.1
23	SR 33 off-ramp to on-ramp	Basic	3	4,100	22.1	-	C	0.66	-	69.6	-	4,420	20	-	C	0.7	-	71	-
24	SR 33 on-ramp	Merge	3	4,100	25.8	25.2	C	0.72	0.19	64.6	62.6	4,420	23.3	22.9	C	0.65	0.15	65.2	63.3
25	SR 33 on-ramp to SR 570 off-ramp	Basic	3	4,440	24.6	-	C	0.72	-	67.7	-	4,690	21.8	-	C	0.74	-	69.8	-
26	SR 570 off-ramp	Diverge	3	4,440	23.8	29.9	D	0.72	0.15	69.9	66.4	4,690	21.7	28	C	0.65	0.15	70	66.4
27	SR 570 off-ramp to on-ramp	Basic	3	4,150	22.4	-	C	0.67	-	69.4	-	4,400	19.9	-	C	0.7	-	71.1	-
28	SR 570 on-ramp	Merge	3	4,150	25.4	22.6	C	0.71	0.15	65.2	63.5	4,400	22.9	20.5	C	0.65	0.14	65.8	64.2
29	SR 570 on-ramp to SR 559 off-ramp	Basic	3	4,420	24.5	-	C	0.71	-	67.8	-	4,660	21.6	-	C	0.74	-	70	-
30	SR 559 off-ramp	Diverge	3	4,420	24.3	30	D	0.71	0.23	68.2	64.1	4,660	22.2	28.2	D	0.65	0.27	68	63.9
31	SR 559 off-ramp to on-ramp	Basic	3	4,010	21.5	-	C	0.65	-	70	-	4,170	18.5	-	C	0.66	-	71.8	-
32	SR 559 on-ramp	Merge	3	4,010	25.4	25.2	C	0.71	0.2	64.6	62.5	4,170	23.2	23.6	C	0.65	0.26	65	63
33	SR 559 on-ramp to SR 557 off-ramp	Basic	3	4,380	24.1	-	C	0.71	-	68.1	-	4,650	21.5	-	C	0.74	-	70	-
34	SR 557 off-ramp	Diverge	3	4,380	26.4	29.5	D	0.71	0.2	62.3	56.4	4,650	24.2	27.6	C	0.65	0.2	62.3	56.4
35	SR 557 off-ramp to on-ramp	Basic	3	4,060	21.8	-	C	0.66	-	68.1	-	4,320	19.4	-	C	0.68	-	68.1	-
36	SR 557 on-ramp	Merge	3	4,060	26	24.8	C	0.72	0.23	64.6	62.7	4,320	24	23.4	C	0.67	0.26	65	63.1
37	East of SR 557 on-ramp	Basic	3	4,480	24.9	-	C	0.72	-	67.5	-	4,800	22.5	-	C	0.76	-	69.3	-

Density – passenger cars/mile/lane; Highlighted – LOS E/LOS F;* Lane Add/Drop or Acceleration/Deceleration Lane > 1,500 feet HCM Methodology is limited to 1,500 feet

The results are based on HCS 7.9

Table 1-12: Existing Year 2022 HCS Level of Service and Density for I-4 Westbound Segments

No.	Segment	Segment Type	Number of Lanes	AM Peak Hour								PM Peak Hour							
				Demand (veh/h)	Density Freeway (pc/mi/ln)	Density Ramp (pc/mi/ln)	LOS	Freeway Density to Capacity Ratio	Ramp Density to Capacity Ratio	Speed Freeway (mph)	Speed Ramp (mph)	Demand (veh/h)	Density Freeway (pc/mi/ln)	Density Ramp (pc/mi/ln)	LOS	Freeway Density to Capacity Ratio	Ramp Density to Capacity Ratio	Speed Freeway (mph)	Speed Ramp (mph)
1	East of SR 557 off-ramp	Basic	3	4,920	28.7	-	D	0.79	-	64.4	-	4,640	25.4	-	C	0.73	-	67.1	-
2	SR 557 off-ramp	Diverge	3	4,920	29.8	32.7	D	0.79	0.28	62	56	4,640	27.5	31	D	0.73	0.29	62	56
3	SR 557 off-ramp to on-ramp	Basic	3	4,470	24.8	-	C	0.72	-	66.8	-	4,160	21.9	-	C	0.66	-	66.8	-
4	SR 557 on-ramp	Merge	3	4,470	28.5	27.8	C	0.78	0.2	63.6	61.4	4,160	25.7	25.5	C	0.71	0.18	64.4	62.4
5	SR 557 on-ramp to SR 559 off-ramp	Basic	3	4,830	27.8	-	D	0.78	-	65.1	-	4,500	24.4	-	C	0.71	-	67.9	-
6	SR 559 off-ramp	Diverge	3	4,830	26.7	31.5	D	0.78	0.3	67.8	63.7	4,500	24.4	29.5	D	0.71	0.27	67.9	63.8
7	SR 559 off-ramp to on-ramp	Basic	3	4,290	23.5	-	C	0.69	-	68.6	-	4,000	20.9	-	C	0.63	-	70.5	-
8	SR 559 on-ramp	Merge	3	4,290	28.7	28.9	D	0.78	0.3	63.2	60.9	4,000	25.9	26.5	C	0.71	0.28	64.1	61.9
9	SR 559 on-ramp to SR 570 off-ramp	Basic	3	4,840	27.9	-	D	0.78	-	65	-	4,510	24.4	-	C	0.71	-	67.9	-
10	SR 570 off-ramp	Diverge	3	4,840	26.6	31.6	D	0.78	0.15	68.4	64.5	4,510	24.2	29.5	D	0.71	0.14	68.6	64.6
11	SR 570 off-ramp to on-ramp	Basic	3	4,570	25.6	-	C	0.74	-	66.9	-	4,250	22.5	-	C	0.67	-	69.3	-
12	SR 570 on-ramp	Merge	3	4,570	28.7	27.9	C	0.78	0.16	63.6	61.4	4,250	25.9	25.7	C	0.72	0.16	64.4	62.3
13	SR 570 on-ramp to SR 33 off-ramp	Basic	3	4,860	28.1	-	D	0.78	-	64.8	-	4,540	24.7	-	C	0.72	-	67.7	-
14	SR 33 off-ramp	Diverge	3	4,860	26.7	32.1	D	0.78	0.2	68.2	64.2	4,540	24.4	29.9	D	0.72	0.15	68.5	64.5
15	SR 33 off-ramp to on-ramp	Basic	3	4,500	25.1	-	C	0.73	-	67.3	-	4,270	22.7	-	C	0.68	-	69.2	-
16	SR 33 on-ramp	Merge	3	4,500	29.6	29.6	D	0.8	0.25	62.9	60.5	4,270	26.7	27.2	C	0.74	0.21	63.9	61.7
17	SR 33 on-ramp to CR 582 (North Soorum Loop Road) off-ramp	Basic	3	4,960	29	-	D	0.8	-	64.1	-	4,650	25.5	-	C	0.74	-	67	-
18	CR 582 (North Soorum Loop Road) off-ramp	Diverge	3	4,960	30	21.2	C	0.8	0.28	62	56	4,650	27.5	19.2	B	0.74	0.24	62.2	56.2
19	CR 582 (North Soorum Loop Road) off-ramp to on-ramp	Basic	3	4,500	25.1	-	C	0.73	-	67.3	-	4,250	22.5	-	C	0.67	-	69.3	-
20	CR 582 (North Soorum Loop Road) on-ramp	Merge	3	4,500	32.8	28.7	D	0.86	0.52	61.2	58.4	4,250	28.1	24.7	C	0.77	0.36	63.5	61.3
21	CR 582 (North Soorum Loop Road) on-ramp to US 98 off-ramp	Basic	3	5,350	33.1	-	D	0.86	-	60.7	-	4,850	27.2	-	D	0.77	-	65.6	-
22	US 98 off-ramp	Diverge	3	5,350	29.8	35	D	0.86	0.36	67.3	63.3	4,850	26.3	32	D	0.77	0.27	67.9	63.8
23	US 98 off-ramp to on-ramp	Basic	3	4,700	26.7	-	D	0.76	-	66	-	4,350	23.2	-	C	0.69	-	68.8	-
24	US 98 on-ramp	Merge	3	4,700	35.9	34.6	D	0.92	0.55	59.5	56.3	4,350	30.6	30.7	D	0.82	0.45	62.3	59.7
25	US 98 on-ramp to SR 539 off-ramp	Basic	3	5,700	37.4	-	E	0.92	-	57.2	-	5,180	30.2	-	D	0.82	-	63.1	-
26	SR 539 off-ramp	Diverge	3	5,700	31.9	36.2	E	0.92	0.38	67.1	63.2	5,180	28	33.2	D	0.82	0.26	67.9	63.9
27	SR 539 off-ramp to on-ramp	Basic	3	5,020	29.6	-	D	0.81	-	63.6	-	4,700	25.9	-	C	0.74	-	66.7	-
28	SR 539 on-ramp	Merge	3	5,020	34.4	32.1	D	0.91	0.33	61.2	58.5	4,700	30.7	29.5	D	0.83	0.3	62.8	60.5
29	SR 539 on-ramp to West Memorial Boulevard off-ramp	Basic	3	5,610	36.2	-	E	0.91	-	58.2	-	5,250	30.9	-	D	0.83	-	62.5	-
30	West Memorial Boulevard off-ramp	Diverge	3	5,610	31	35.3	E	0.91	0.17	68	64.6	5,250	28.3	33.2	D	0.83	0.15	68.3	64.5
31	West Memorial Boulevard off-ramp to on-ramp	Basic	3	5,310	32.6	-	D	0.86	-	61.1	-	4,980	28.3	-	D	0.79	-	64.7	-
32	Memorial Boulevard on-ramp to Polk Parkway off-ramp	Weaving	4	5,310	26	-	C	0.75	-	66.6	-	4,980	23.2	-	C	0.69	-	68.8	-
33	Polk Parkway off-ramp to on-ramp	Basic	3	5,590	35.9	-	E	0.9	-	58.4	-	5,260	30.9	-	D	0.83	-	62.5	-
34	Polk Parkway on-ramp*	Merge	4	5,590	28.1	28.1	D	0.78	0.51	64.9	64.9	5,260	25.1	25.1	C	0.73	0.5	67.3	67.3
35	West of Polk Parkway on-ramp	Basic	4	6,470	28.1	-	D	0.78	-	64.9	-	6,140	25.1	-	C	0.73	-	67.3	-

Density – passenger cars/mile/lane; Highlighted – LOS E/LOS F;* Lane Add/Drop or Acceleration/Deceleration Lane > 1,500 feet HCM Methodology is limited to 1,500 feet
The results are based on HCS 7.9

Table 1-13: Existing Year 2020 Intersection Level of Service/Delay (continued)

Interstate	Stop Controlled Intersections	Measure of Effectiveness (MOE)	Location	AM Movement/Approach LOS (Delay)												Intersection AM LOS (Delay)
				Eastbound			Westbound			Northbound			Southbound			
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
I-4	*SR 559 & I-4 Westbound	Volume				300		240	400	300			300	150	F (>999)	
		LOS (Delay)	Movement				F (>999)		B (14.2)	B (10.1)	A (0)			A (0)		A (0)
			Approach				F (888.9)			A (5.8)			A (0)			
	Queue Length 95th (ft)	Movement				950		75	50	0			0	0		
	*SR 559 & I-4 Eastbound	Volume		190			220				510	320	50	550	E (43.6)	
		LOS (Delay)	Movement	E (43.6)			B (13.8)				A (0)	A (0)	A (9.1)	A (0)		
			Approach				D (27.6)			A (0)			A (0.8)			
	Queue Length 95th (ft)	Movement	150			50				0	0	25	0			
	*SR 557 & I-4 Westbound	Volume					400		50	300	400			300	60	F (896.3)
		LOS (Delay)	Movement				F (896.3)		B (11.6)	A (9.5)	A (0)			A (0)	A (0)	
			Approach				F (798.0)			A (4.1)			A (0)			
	Queue Length 95th (ft)	Movement				1025		25	50	0			0	0		
*SR 557 & I-4 Eastbound	Volume		80			240			390	620			670	30	F (198.1)	
	LOS (Delay)	Movement	F (198.1)			D (28.2)			B (14.1)	A (0)			A (0)	A (0)		
		Approach				F (70.7)			A (5.5)			A (0)				
Queue Length 95th (ft)	Movement	150			125				100	0			0	0		
Interstate	Signal Controlled Intersections	Measure of Effectiveness (MOE)	Location	PM Movement/Approach LOS (Delay)												Intersection PM LOS (Delay)
				Eastbound			Westbound			Northbound			Southbound			
				Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
I-4	*SR 559 & I-4 Westbound	Volume				340		160	360	250			220	150	F (732.5)	
		LOS (Delay)	Movement				F (732.5)		B (11.3)	A (9.1)	A (0)			A (0)		A (0)
			Approach				F (501.7)			A (5.3)			A (0)			
	Queue Length 95th (ft)	Movement				825		25	50	0			0	0		
	*SR 559 & I-4 Eastbound	Volume		90			400				520	390	90	470	C (22.4)	
		LOS (Delay)	Movement	C (22.4)			C (17.3)				A (0)	A (0)	A (9.2)	A (0)		
			Approach				C (18.2)			A (0)			A (1.5)			
	Queue Length 95th (ft)	Movement	50			125				0	0	25	0			
	*SR 557 & I-4 Westbound	Volume					460		20	260	200			510	80	F (>999)
		LOS (Delay)	Movement				F (>999)		A (9.7)	B (11.2)	A (0)			A (0)	A (0)	
			Approach				F (>999)			A (6.3)			A (0)			
	Queue Length 95th (ft)	Movement				1450		25	50	0			0	0		
*SR 557 & I-4 Eastbound	Volume		10			320			450	450			940	30	F (185.7)	
	LOS (Delay)	Movement	F (121.5)			F (185.7)			D (28.2)	A (0)			A (0)	A (0)		
		Approach				F (183.8)			B (14.1)			A (0)				
Queue Length 95th (ft)	Movement	25			450				200	0			0	0		

*HCS 7.9 Unsignalized Intersection
 *Unsignalized Level of Service/Delay reported for worst movement
 LOS notes:
 Delay is in sec/veh units
 :Level Of Service (LOS) E reflecting at capacity operations
 :Level Of Service (LOS) F reflecting over capacity operations
 Queue notes:
 ~: Volume exceeds capacity, queue is theoretically infinite
 #: 95th percentile volume exceeds capacity
 m: Upstream metering is in effect

1.15 Crash Data and Safety Analysis

The following sections provide a summary of the most recent available five years of certified crash data (January 2015 – December 2019) obtained from SSOGis and more recent uncertified data obtained from Signal 4 (January 2020 – May 2022). The crash data can be found in Appendix G.

1.15.1 Corridor-Wide Safety Analysis (2015-2019)

Tables summarizing the crash history along the study corridor by type, severity, lighting condition, and type are provided below. The most common crash type was rear end (34%), followed by off road (22%) and sideswipe (16.4%). Most crashes were property damage only (63%); 36% of crashes resulted in some form of injury, and 1% of crashes resulted in a fatality. About 60% of crashes took place during daylight while 40% of crashes occurred under dark, dawn, or dusk conditions. The majority (71%) of crashes occurred while the pavement was dry, and 29% of crashes occurred on wet pavement.

Table 1-14: Crash Types (2015-2019)

Crash Type	Number of Crashes	Percentage of Total
Rear End	1,258	33.6%
Off Road	812	21.7%
Sideswipe	614	16.4%
Other	573	15.3%
Rollover	136	3.6%
Left Turn	134	3.6%
Unknown	96	2.6%
Angle	52	1.4%
Head On	20	0.5%
Pedestrian	17	0.5%
Animal	15	0.4%
Right Turn	9	0.2%
Bicycle	5	0.1%
Total	3,741	100%

Table 1-15: Crash Severity (2015-2019)

Crash Severity	Number of Crashes	Percentage of Total
No Injury	2,353	62.9%
Possible Injury	765	20.4%
Non-Incapacitating Injury	472	12.6%
Incapacitating Injury	112	3.0%
Fatal (within 30 days)	37	1.0%
Non-Traffic Fatality	2	0.1%
Total	3,741	100.0%

Table 1-16: Lighting Conditions (2015-2019)

Lighting Conditions	Number of Crashes	Percentage of Total
Daylight	2,258	60.4%
Dark - Not Lighted	606	16.2%
Dark - Lighted	595	15.9%
Dusk	143	3.8%
Dawn	128	3.4%
Unknown	7	0.2%
Dark – Unknown Lighting	3	0.1%
Total	3,741	100.0%

Table 1-17: Pavement Conditions (2015-2019)

Pavement Conditions	Number of Crashes	Percentage of Total
Dry	2662	71.2%
Wet	1067	28.5%
Unknown	7	0.2%
Other	2	0.1%
Ice/Frost	1	0.0%
Oil	1	0.0%
Water (standing/moving)	1	0.0%
Total	3,741	100.0%

1.15.2 Crash Rate Evaluation

Included in this crash study is a breakdown of crashes by location, comparing calculated crash rates with that of the most recent five-year statewide average crash rates. Crash rates, expressed in the number of crashes per million vehicle miles (MVM) traveled, were computed based on the following equation:

$$\text{Crash Rate (MVM)} = \frac{\text{Total Number of Crashes} * 1,000,000}{\text{AADT} * 365 * \text{Number of Years} * \text{Length of Roadway Segment}}$$

The most recent districtwide average crash rates (2015-2019) that were used in this study are provided in Table 1-18 below.

Table 1-18: Districtwide Average Crash Rates (2015-2019)

Crash Rate Category	Average Crash Rate (MVM)
Interstate Urban	0.582
Interstate Rural	0.435
Urban 4-5 Lane, 2-way, Divided/Raised	2.606
Urban 6+ Lane, 2-way, Divided/Raised	2.731
Suburban 2-3 Lane, 2-way, Divided/Raised	4.774
Suburban 4-5 Lane, 2-way, Divided/Raised	1.509
Rural 2-3 Lane, 2-way, Undivided	0.757

The calculated crash rates for I-4, segmented between and within the interchanges, are listed in Table 1-19; the calculated crash rates for the intersecting roadways are listed in Table 1-20. Several segments and intersecting roadways have crash rates that exceed the districtwide average.

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Table 1-19: I-4 Segment Crash Rates

I-4 Segment Extents	Segment Crash Rate (per MVM)	Districtwide Average Crash Rate (per MVM)
Within Polk Parkway W (SR 570) Interchange	0.308	0.582
Polk Parkway W (SR 570) to Memorial Boulevard (SR 546)	0.176	0.582
Within Memorial Boulevard (SR 546) Interchange	0.416	0.582
Memorial Boulevard (SR 546) to Kathleen Road (SR 539)	0.272	0.582
Within Kathleen Road (SR 539) Interchange	0.739	0.582
Kathleen Road (SR 539) to US 98	0.524	0.582
Within US 98 Interchange	0.638	0.582
US 98 to Socrum Loop Road	0.587	0.582
Within Socrum Loop Road Interchange	0.342	0.582
Socrum Loop Road to SR 33	0.394	0.582
Within SR 33 Interchange	0.913	0.582
SR 33 to Polk Parkway E (SR 570)	0.433	0.435
Within Polk Parkway E (SR 570) Interchange	0.730	0.582
Polk Parkway E (SR 570) to SR 559	0.489	0.582
Within SR 559 Interchange	0.543	0.582
SR 559 to SR 557	0.365	0.435
Within SR 557 Interchange	0.705	0.482
SR 557 to west of US 27	0.561	0.435

Table 1-20: Intersecting Roadway Crash Rates

Segment Extents	Segment Crash Rate (per MVM)	Districtwide Average Crash Rate (per MVM)
Polk Parkway W (SR 570) from New Tampa Highway to I-4	0.406	0.582 ¹
Memorial Boulevard (SR 546) from I-4 to Nature's Own Facility	0.529	2.606 ¹
Kathleen Road (SR 539) from Mall Hill Drive to Interstate Drive	1.010	2.606 ¹
US 98 from Griffin Road to Mall Access 2	4.482	2.731 ¹
N Socrum Loop Road from Lakeland Hills Boulevard to Old Combee Road	1.463	2.606 ¹
Lakeland Hills Boulevard from Socrum Loop Road to Old Combee Road	2.192	2.606 ¹
SR 33 from University Boulevard to Tomkow Road	3.045	4.774 ¹
Polk Parkway E (SR 570) from I-4 to 0.5 miles from I-4	0.350	0.582 ¹
SR 559 from C Fred Jones Boulevard to Le Lynn RV Resort	3.558	1.509 ¹
SR 557 from 0.35 miles south of I-4 to 0.35 miles north of I-4	1.418	0.757 ¹

¹Using best comparable system: Districtwide Urban Interstate Average Crash Rate

A map depicting all crashes that occurred in the most recent available five years along the I-4 corridor as well as the study interchange cross streets and ramps can be found in Appendix H. Crashes are symbolized by the most common crash types including rear end, off road, sideswipe, rollover, and left turn. All pedestrian and bicycle related crashes are also displayed with different symbology. While it

appears as if all mainline I-4 crashes occurred in the eastbound direction, this is a result of the coordinates coded into the SSOGis database. About 54.8% of all I-4 mainline crashes occurred in the eastbound direction while about 45.2% of all I-4 mainline crashes occurred in the westbound direction.

A map depicting the hot spots along the I-4 mainline and identifies fatal crash locations can also be found in Appendix H. Most hot spots are located at the interchange ramp junctions, but there are a few spots not associated with an interchange ramp. Between the US 98 and N Socrum Loop Road & SR 33/Lakeland Hills Boulevard interchange, near the Carpenters Way bridge, there is a dense cluster of crashes. There are a few clusters of crashes just west of the SR 33 interchange. There are also hot spots between the SR 557 interchange and the US 27 interchange.

1.15.3 Recent Data Review (January 2020 – May 2020)

The most recent available (uncertified) crash data was collected from SSOGis and S4 to compare crash trends and hot spots with the certified data from 2015-2019. No major changes in crash frequency or hotspot locations were observed when comparing the two datasets.

1.16 Railroad Crossings

There is a rail bridge that crosses over I-4 just west of Kathleen Road. The existing bridge is currently being replaced; the new bridge number and bridge plans are not yet available.

1.17 Drainage

The corridor lies within the jurisdiction of the Southwest Florida Water Management District (SWFWMD). The main stormwater outfall feature is the Green Swamp which is intersected by the I-4 corridor starting just west of US 98 and extending all the way to US 27. Most of the surrounding area adjacent to the I-4 corridor and within the Green Swamp is undeveloped except between US 98 and SR 33 which is the highly urbanized area of Lakeland. Lakeland and associated suburbs extend all the way to the beginning of the corridor which is just west of SR 570 (West Polk Parkway).

The soil conditions vary significantly throughout the corridor with no specific soil or soils that characterize most of the length based on percentage. Between the Beginning of the Project and US 98, Pomona Fine Sand and Kendrick Fine Sand make up the largest percentages of any soil type. Pomona Fine Sand is considered poorly drained and classified as an A/D soil with a relatively shallow seasonal high-water table. However, Kendrick Sand is a type A soil that is considered well drained with a much deeper water table. These two soils are followed closely by Apopka Fine Sand, Sparr Sand, Tavares Fine Sand, Urban Land and Felda Fine Sand which are the other soils that, while not dominant, represent a mentionable percentage of the soil within this section of the corridor. These secondary soils vary widely between type and their representative drainage classification.

Between US 98 and CR 557A, which represents the more developed section of the Green Swamp, the largest percentage of soil is classified as Candler Sand and Tavares Fine Sand. Each of these soil types are considered well drained and classified as Type A soils. East of CR 557A to the end of the project, represents the most undeveloped section of the Green Swamp crossed by the I-4 corridor. Within this

section, Samsula muck along with Pomona Find Sand are the most significant soil types. Each is considered a poorly drainage A/D soil with a shallow seasonal high-water table.

Offsite stormwater is conveyed from north to south across the I-4 corridor through more than 60 cross drains which vary in size from 18" diameter pipe to multi-cell box culverts. Stormwater management is accomplished via permitted ponds and treatment wetlands which appear to have been designed and located using mostly remnant parcels along the corridor.

The corridor crosses or touches the following watersheds.

- Hillsborough River/TBC/East Lake Watershed – From beginning of the project to just west of the SR 570 interchange (West Polk Parkway).
- Polk City Watershed – From just east of the SR 570 interchange (East Polk Parkway) to CR 557 interchange.

These watersheds have been delineated by SWFWMD and the limits of the floodplain within the watersheds are typically determined using a hydrologic and hydraulic model developed using some version of the Interconnected Pond Routing (ICPR) platform or the EPA Stormwater Management Model (SWMM).

Throughout the entire corridor, there are many locations where the limits of the existing FEMA floodplain encroach into the I-4 R/W. Between the beginning of the project and CR 557A, most of the locations would be considered discrete and generally isolated from other locations. The only exception to this is the Itchepackasassa Creek. The main crossing is just west of the SR 570 Interchange (West Polk Parkway) and there is also a tributary that crosses just to the west of the SR 539 interchange. FEMA has designated each of these locations as regulated floodways. West of CR 557A, the FEMA floodplain is almost continuous and generally encroaches into the I-4 R/W throughout the entire length of this section.

Drainage maps included in Appendix I illustrate the FEMA base flood elevations as well as the regulated floodway locations. The maps also illustrate approximate stormwater infrastructure location including cross drains as well as permitted stormwater management facilities. It is worth noting that future corridor improvements should consider available space within the interchange areas as few of the existing infield areas appear to have already been utilized by permitted stormwater management facilities.

1.18 Utilities

An inventory of the existing utilities within the study area was conducted via Sunshine 811. The utility owners and respective contact information are listed in Table 1-21. There are 26 utility owners within the study area.

Table 1-21: Utilities and Utility Contacts

#	Utility Owner	Contact Name	Contact Number
1	FiberLight, LLC	Neil Cleveland	813-877-7185

#	Utility Owner	Contact Name	Contact Number
2	Alternative Choice Wireless, LLC	Justin Visconti	863-258-8496
3	City of Auburndale	Manny Silva	863-956-7743
4	Florida Public Utilities	Gary Hardy	863-224-3786
5	Kinder Morgan/Central Florida Pipeline	Mark Clark	727-271-0024
6	City of Plant City	Nick Towles	N/A
7	FDOT	Doug Vasser	813-494-5758
8	Florida Gas Transmission Company	Joseph Sanchez	407-838-7171
9	Zayo Group (Formerly Lightwave, LLC)	Henry Klobucar	406-496-6510
10	Duke Energy	Customer Service	407-629-1010
		Mark Hurst	727-820-5208
11	Williams	James Villarreal	941-723-7100
12	Frontier Communications	Toni Cannon	813-875-1014
13	Centurylink	Tech on Duty	877-366-8344 ext. 3
		Network Relations	877-366-8344 ext. 2
14	City of Lakeland	Rex Harris	863-834-6825
		Darryl Goolsby (Traffic Operations)	863-834-3499
		Kris Hayes (Electric)	863-834-6486
		Gas Energy	863-834-6600
		Water Utilities	863-834-6560
15	MCI	ASG Investigations Team	800-624-9675 ext. 2
16	Summit Broadband	Michelle Daniel	407-996-1183
17	City of Polk City	Keith McVeigh	863-984-1375 ext. 301
18	Polk County Natural Resources	Conner Updike	863-370-6634
19	Polk County Utilities	Tom Hollington	863-298-4100
20	Teco People's Gas Lakeland	Joan Domning	813-275-3783
21	Uniti Fiber, LLC	Charlie Croft	251-214-7059
22	TransCore FDOT	Kevin McCaffery	813-620-3983 ext. 320
23	Traffic Engineering and Maintenance FTE		
24	Tampa Electric Company	Engineering Group	N/A
25	Spectrum Sunshine State, LLC	Gene Gregory	863-333-4763
26	City of Winter Haven	Amin Hanhan	863-291-5850

1.19 Lighting

Table 1-22 lists the location and type of lighting along the study corridor, which includes conventional and high mast.

Table 1-22: Existing Lighting

Location	Lighting Type
I-4 at SR 570 (West) Interchange	High Mast
I-4 & Frontage Road between SR 570 (West) and N Galloway Road	Conventional
I-4 at West Memorial Highway Interchange	High Mast
I-4 at Kathleen Road Interchange	High Mast
I-4 at US 98 Interchange	High Mast
I-4 at SR 33 (West) Interchange	High Mast
I-4 at SR 33 (East) Interchange	High Mast
I-4 at SR 570 (East)	High Mast
I-4 at SR 559 Interchange	Conventional LED
Rest Area Ramps (Westbound and Eastbound)	Conventional
Rest Areas (Westbound and Eastbound)	High Mast
I-4 at SR 557*	Currently Under Design*

*The I-4 at SR 557 interchange is currently under design. Lighting will be provided at the interchange.

1.20 Bridges

There are twenty-seven (27) bridge structures along the study corridor. A listing of these structures is provided in Table 1-23, outlining general data for these structures including span length, typical section data, bridge condition (Sufficiency Rating and Health Index), etc. In addition to the data shown, the substructures for all these structures include multicolumn piers, standard abutments, and all are founded on square prestressed precast piles. In addition, the condition of the bridges – Sufficiency Rating and Health Index – have been included in the table.

The bridges all appear to be in good condition: the Sufficiency Ratings vary from a low of 80.2 to a high of 99.4, and the Health Indices vary from 85.34 to 99.74; these ratings are based on a scale of 0 to 100, where 100 is excellent and 0 is very poor. Two of the bridges (CSX over I-4 and CR 557 over I-4) are currently being replaced and therefore their data is not included. It is also noted that three of the bridges (one of the western Polk Parkway interchange bridges, and both eastern Polk Parkway interchange bridges) are designated as Functionally Obsolete. All the collected data files have been included as Appendix J to this report.

Table 1-23: Existing Bridges Summary

#	Bridge Identification	Bridge Number	Mainline or Overpass	Year Built	Overall Bridge Length (ft)	No. of spans	Overall Bridge Width (ft)	Roadway Clear Width		Superstructure Type	Sufficiency Rating	Health Index	Comments
								(ft)	Description				
1	Eastbound 570 over I-4 (Western Polk Pkwy Interchange)	160234	Overpass	1998	317.00	3	30.08	27.00	15' lane, two 6' shoulders	Prestressed Concrete Beams	92.4	97.87	Bridge has been designated as Functionally Obsolete
2	Westbound 570 over I-4 (Western Polk Pkwy Interchange)	160235	Overpass	1998	317.00	3	43.08	40.00	two 12' lanes, 10' shoulder & 6' shoulder	Prestressed Concrete Beams	96.9	97.85	
3	Clark Road over I-4	160236	Overpass	1998	317.00	3	47.08	44.00	two 12' lanes, two 10' shoulders	Prestressed Concrete Beams	98.2	96.91	
4	North Galloway Road over I-4	160298	Overpass	1998	445.56	3	49.54	40.50	two 12' lanes, 6.5' & 10' shoulders*	Steel Plate Girders	96.7	85.34	*Bridge includes a 5' sidewalk
5	Memorial Blvd Ramp over I-4	160330	Overpass	2005	322.92	2	101.08	98.00	EB: two 15' lanes, 10' shoulder WB: two 12' lanes, 30' shoulder*	Steel Plate Girders	95.8	99.67	*Roadway clear width includes a 4' raised median
6	Swindell Road over I-4	160325	Overpass	2005	505.00	2	65.00	44.00	two 12' lanes, two 10' shoulders*	Steel Plate Girders	98.8	99.44	*Bridge includes two 8.21' sidewalks
7	West 10th St over I-4	160326	Overpass	2005	505.00	2	65.00	44.00	two 12' lanes, two 10' shoulders*	Steel Plate Girders	98.8	99.7	*Bridge includes two 8.21' sidewalks
8	Bella Vista Drive over I-4	160327	Overpass	2005	503.00	2	59.00	44.00	two 12' lanes, two 10' shoulders*	Steel Plate Girders	99.4	99.74	*Bridge includes two 5.21' sidewalks
9	CSX over I-4	160173 (Current)	Overpass	Bridge is in process of being replaced; the new Bridge Number & bridge plans have not been provided									
10	Kathleen Road over I-4	160328	Overpass	2005	325.58	2	123.00*	108.00*	EB: two 12' lanes, 11.5' lane, 11' lane, 5.5' bike lane WB: two 12' lanes, 11.5' lane, 11' lane, 5.5' bike lane*	Prestressed Concrete Beams	80.2	98.48	*Roadway clear width includes a 4' raised median. Bridge typical includes two 5.21' sidewalks
11	Griffin Road over I-4	160329	Overpass	2005	508.33	2	84.17*	66.00*	5.5' bike lane, two WB 11' lanes, 14' median, two EB 11' lanes, 5.5' bike lane*	Steel Plate Girders	94.2	97.85	*14' median includes a 11' raised concrete median. Bridge typical includes two 6.5' raised concrete sidewalks
12	Westbound I-4 over US 98	160310	Mainline	2004	237.86	1	58.23	55.12	Three 11.81' lanes, two 9.84' shoulders*	Steel Plate Girders	95.4	99.66	*Bridge was designed/constructed using the metric system
13	Eastbound I-4 over US 98	160311	Mainline	2004	237.86	1	58.23	55.12	Three 11.81' lanes, two 9.84' shoulders*	Steel Plate Girders	95.4	99.49	*Bridge was designed/constructed using the metric system
14	Carpenters Way over I-4	160322	Overpass	2004	320.00	2	50.17	35.00	two 12' lanes, two 4' bike lanes, two 1.5' shoulders*	Prestressed Concrete Beams	85.8	94.98	*Bridge includes two 6.5' raised sidewalks
15	Westbound I-4 over CR 582	160177	Mainline	1961; 2004 widening	161.85	3	58.92	56.00	three 12' lanes, two 10' shoulders	Prestressed Concrete Beams	94	92.81	
16	Eastbound I-4 over CR 582	160178	Mainline	1961; 2004 widening	159.46	3	58.92	56.00	three 12' lanes, two 10' shoulders	Prestressed Concrete Beams	94	96.07	
17	Old Combee Rd over I-4	160323	Overpass	2004	355.00	2	50.17	35.00	two 12' lanes, two 4' bike lanes, two 1.5' shoulders*	Steel Plate Girders	96.5	99.53	*Bridge includes two 6.5' raised sidewalks
18	Westbound I-4 over SR 33	160181	Mainline	1961; 2004 widening	222.94	4	60.58	56.00	three 12' lanes, two 10' shoulders	Prestressed Concrete Beams	84.2	96.67	
19	Eastbound I-4 over SR 33	160182	Mainline	1961; 2004 widening	222.94	4	60.58	56.00	three 12' lanes, two 10' shoulders	Prestressed Concrete Beams	95.5	93.29	

#	Bridge Identification	Bridge Number	Mainline or Overpass	Year Built	Overall Bridge Length (ft)	No. of spans	Overall Bridge Width (ft)	Roadway Clear Width		Superstructure Type	Sufficiency Rating	Health Index	Comments
								(ft)	Description				
20	Westbound 570 over I-4 (Eastern Polk Pkwy Interchange)	160281	Overpass	1999	320.00	3	30.08	27.00	15' lane, two 6' shoulders	Prestressed Concrete Beams	91.6	98.85	Bridge has been designated as Functionally Obsolete
21	Eastbound 570 over I-4 (Eastern Polk Pkwy Interchange)	160282	Overpass	1999	320.00	3	43.08	40.00	two 12' lanes, 10' shoulder & 6' shoulder	Prestressed Concrete Beams	94.6	99.41	Bridge has been designated as Functionally Obsolete
22	Mt Olive Church Rd over I-4	160324	Overpass	2004	334.00	2	47.08	44.00	two 12' lanes, two 10' shoulders	Prestressed Concrete Beams	99.7	99.66	
23	Westbound I-4 over Berkley Road	160184	Mainline	1961; 2004 widening	247.31	5	60.58	56.00	three 12' lanes, two 10' shoulders	Prestressed Concrete Beams	95.2	95.2	
24	Eastbound I-4 over Berkley Road	160185	Mainline	1961; 2004 widening	247.31	5	60.58	56.00	three 12' lanes, two 10' shoulders	Prestressed Concrete Beams	95.2	95.18	
25	SR 559 over I-4	160348	Overpass	2016	377.50	3	109.63*	94.00*	SB: three 12' lanes, 4' bike lane, 4' shoulder NB: two 12' lanes, 4' bike lane, two variable width shoulders**	Prestressed Concrete Beams	94.8	99.5	*Roadway clear width includes 6' raised median. Bridge typical includes two 5.31' sidewalks; span 3 widens from 109.63' to 113.96' **left shoulder varies from 11.17' to 4.58'; right shoulder varies from 4.83' to 15.75'
26	CR 557A over I-4	160307	Overpass	2004	327.50	2	47.08	44.00	two 12' lanes, two 10' shoulders	Prestressed Concrete Beams	85	99.13	
27	CR 557 over I-4	160114 (Current)	Overpass	Bridge is in process of being replaced; the new Bridge Number & bridge plans have not been provided									

2 Environmental

The study area for this review is defined as I-4 (SR 400) from W of SR 570 (Polk Parkway) to W of US 27. The following information and datasets were reviewed to determine land use, future land use, wetland presence, and the likelihood of state and federally listed species occurring within the study area:

- True color aerial photography (Environmental Science Research Institute's (ESRI) Online Database)
- USGS Topographic (ESRI Online Database)
- U.S. Department of Agriculture NRCS Soils GIS data for Osceola and Polk Counties (2022)
- SWFWMD FLUCFCS (2020)
- SWFWMD Permitting Portal (2022)
- SFWMD FLUCFCS (2016)
- SFWMD Permitting Portal (2022)
- USFWS NWI data (2013)
- "Federal Listed Species in Osceola and Polk Counties, Florida" USFWS (2022)
- Endangered & Threatened Wildlife and Plants, 50 CFR 17.11 and 17.12
- "Notes on Florida's Endangered and Threatened Plants," Florida Department of Agriculture and Consumer Services (2010), and 5B-40 FAC
- Florida Natural Areas Inventory (FNAI) database of listed species known to occur in Osceola and Polk Counties (2022)
- FNAI Biodiversity Matrix (2022)
- FNAI Florida Conservation Lands and Florida Forever Board of Trustees Projects database (2022)
- USFWS Wood Stork Florida Nesting Colonies and Core Foraging Areas (CFA) Active 2008-2019 (2022)
- "Florida's Endangered and Threatened Species," FWC (2021)
- FWC listed species occurrence data (2017)
- FWC Gopher Tortoise Permitting Guidelines (revised 2020)
- FWC Strategic Habitat Conservation Areas GIS Database (2009)
- Osceola County - North Ranch Sector Plan Long-Term Master Plan, Peer Review of the Environmental Plan (2015)
- Osceola County Comprehensive Plan (2022)
- Polk County Comprehensive Plan (2022)
- USFWS Consultation Areas and Critical Habitat Maps (2022)

2.1 Future Land Use

Future Land Use (FLU) was determined based on a review of Osceola and Polk County FLU Maps (Appendix K). The FLU designations can be found at the Polk County map viewer and are listed below in Table 2-1.

Table 2-1: Polk County Future Land Use

Land Use Code	Land Use
A/RR	Agriculture/Residential-Rural
BPC	Business-Park Centers
EC	Employment Centers
IND	Industrial
INST	Institutional
LR	Leisure/Recreation
OC	Office Center
PRESV	Preservation Areas
RAC	Regional Activity Centers
RL	Residential – Low
RM	Residential – Medium
RH	Residential – High
RS	Residential – Suburban
TCC	Tourism-Commercial Centers

2.2 Section 4(f)

Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 which provided for consideration of park and recreation lands, wildlife and waterfowl refuges, and historic sites during transportation project development. The law, now codified in 49 U.S.C. §303 and 23 U.S.C. §138, applies only to the U.S. Department of Transportation (U.S. DOT) and is implemented by the Federal Highway Administration (FHWA) and the Federal Transit Administration through the regulation 23 Code of Federal Regulations (CFR) 774. Section 4(f) properties include significant publicly owned public parks, recreation areas, and wildlife or waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing on the National Register of Historic Places. There are 203 potential Section 4(f) resources located within the study area, which are depicted in a figure included in Appendix L.

Of these sites, several were identified as potentially sensitive sites which could require some involvement during project design. These sites include but are not limited to the Hilochee Wildlife Management Area owned by the Trustees of the Internal Improvement Trust Fund (TIITF) and managed by FWC or the FDEP Green Swamp Land Authority Lands. These areas are also part of the Florida Forever Hilochee and Peace River projects. Special consideration should be given to these locations during project design.

2.3 Cultural Resources

According to the Florida Master Site File (FMSF) database, approximately 99% of the study area has been evaluated for historic resources and approximately 3% of the study area has been evaluated for archaeological resources. Most of the archeologic studies performed within the study area are concentrated in proximity to the City of Lakeland, as depicted in a figure included in Appendix L.

2.3.1 Historical

The FMSF database indicates that 20 historic structures are located within the study area (Table 2-2; figure in Appendix L). Of these structures, 18 have been determined ineligible for the National Register of Historic Places (NRHP) by the State Historic Preservation Officer (SHPO). The remaining two (2) structures have not been evaluated by SHPO. One (1) historic bridge, the CSX Bridge at I-4 (PO08242) is also located within the study area. This bridge was determined ineligible for the NRHP by the SHPO. Two (2) linear resources also have been recorded within the study area. The CSX/Pemberton Ferry Branch site (PO08241) was determined eligible for NRHP by the SHPO; however, the Seaboard Airline Wahneta site (PO07117) was determined to be ineligible for listing. Three of the sites listed below were identified within the I-4 ROW; however, none were considered sensitive.

Table 2-2: Previously Recorded Historic Resources

Historic Structures			
FMSF No.	Address	Year Built	SHPO Evaluation
PO01549	CARPENTERS HOME SOUTH ENTRANCE GATEWAY	C1925	INELIGIBLE FOR NRHP
PO04036	3390 SWINDELL ROAD	1927	NOT EVALUATED BY SHPO
PO04056	4000 NORTH FLORIDA AVENUE	1925	INELIGIBLE FOR NRHP
PO04057	3408 DALE DRIVE	1940	INELIGIBLE FOR NRHP
PO04058	NORTHSIDE FRONTAGE ROAD	1930	NOT EVALUATED BY SHPO
PO04059	623 UNION DRIVE	1930	INELIGIBLE FOR NRHP
PO04060	505 UNION DRIVE	1920	INELIGIBLE FOR NRHP
PO04062	AUBURNDALE ROAD	C1920	INELIGIBLE FOR NRHP
PO04612	743 CREVASSE STREET	1940	INELIGIBLE FOR NRHP
PO06704	1310 SUTTON RD	1948	INELIGIBLE FOR NRHP
PO06705	1221 N GALLOWAY RD	1946	INELIGIBLE FOR NRHP
PO06706	2735 W 10TH ST		INELIGIBLE FOR NRHP
PO06707	22046 W ELLIOT ST	1945	INELIGIBLE FOR NRHP
PO06711	810 HULL ST	1953	INELIGIBLE FOR NRHP
PO06712	518 UNION DR	1948	INELIGIBLE FOR NRHP
PO06713	4023 N FLORIDA AVE	1953	INELIGIBLE FOR NRHP
PO06714	4105 N FLORIDA AVE	1949	INELIGIBLE FOR NRHP
PO06715	1520 WALT WILLIAMS RD	1940	INELIGIBLE FOR NRHP
PO06716	8355 N SR33	1940	INELIGIBLE FOR NRHP
PO07962	43804 US HIGHWAY 27	C1967	INELIGIBLE FOR NRHP
Historic Bridges			
FMSF No.	Name	Year Built	SHPO Evaluation
PO08242	CSX BRIDGE AT I-4	C1961	INELIGIBLE FOR NRHP
Linear Resources			
FMSF No.	Name	Time Period of Significance	SHPO Evaluation
PO07117	SEABOARD AIRLINE WAHNETA	BOOM TIMES, 1921-1929	INELIGIBLE FOR NRHP

Historic Structures			
PO08241	CSX/PEMBERTON FERRY BRANCH	POST-RECONSTRUCTION, 1880-1897	ELIGIBLE FOR NRHP

2.3.2 Archaeological

The FMSF database also indicates that 49 archaeological sites have been recorded within the study area (see Table 2-3, figure in Appendix L). Of these sites, 41 have been determined not eligible for NRHP by the SHPO. Six (6) sites have not been evaluated by the SHPO and the remaining two (2) sites were recorded as having insufficient information for evaluation. The locations of archaeological sites, historic structures, unmarked human burials, cemeteries, and other cultural features contained in Site File data layers are for resource management, law enforcement, and research purposes only. State law protects archaeological remains on state owned and controlled lands (section 267.13, Florida Statutes). State law protects human burial sites on all lands (sections 872.02 and 872.05, Florida Statutes). Of all the sites listed within the project study area, non were identified within the I-4 ROW.

Table 2-3: Previously Recorded Archaeological Sites

FMSF No.	Name	Description	SHPO Evaluation
PO00111	OLIVE	NINETEENTH CENTURY AMERICAN, 1821-1899	INELIGIBLE FOR NRHP
PO02254	STATE ROAD 559 INTERCHANGE	TWENTIETH CENTURY AMERICAN, 1900- PRESENT	INELIGIBLE FOR NRHP
PO02255	LITTLE LAKE AGNES	"ST. JOHNS, 700 B.C.- A.D. 1500"	INELIGIBLE FOR NRHP
PO02256	PRETTY POTSHERD	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO02257	DUCK POND	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO02714	I 4 REST AREA A	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO02715	I 4 REST AREA B	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO03605	GALLOWAY ROAD	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO03991	BRADLEY BABICZ	LATE ARCHAIC	INSUFFICIENT INFORMATION
PO04034	SWINDELL ROAD	PREHISTORIC LACKING POTTERY	NOT EVALUATED BY SHPO
PO04038	AMEBIC POND SITE	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO04039	FROZEN GROVE	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO04040	WET SITE	PREHISTORIC LACKING POTTERY	NOT EVALUATED BY SHPO
PO04041	SCRUB OAK	PREHISTORIC LACKING POTTERY	NOT EVALUATED BY SHPO
PO04042	ORANGE KNOLL	OTHER	INELIGIBLE FOR NRHP
PO04099	POST AVENUE SITE	PREHISTORIC WITH POTTERY	INELIGIBLE FOR NRHP
PO04100	BASIN 2 SITE	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO04101	WAFFLE HOUSE	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO04102	LAKE CRAGO SITE	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO04103	BASIN 3 SITE	PREHISTORIC	INELIGIBLE FOR NRHP
PO04104	BUTTERCUP	PREHISTORIC WITH POTTERY	INELIGIBLE FOR NRHP

FMSF No.	Name	Description	SHPO Evaluation
PO04105	WESTBOUND RAMP	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO04106	CRESCENT DRIVE	PREHISTORIC WITH POTTERY	INELIGIBLE FOR NRHP
PO04107	GREGG'S RV SALES	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO04108	GALLOWAY ROAD	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO04109	OSPREY	"ARCHAIC, 8500 B.C.-	INELIGIBLE FOR NRHP
PO04113	DOUG GILMOUR	1000 B.C."	INELIGIBLE FOR NRHP
PO04115	DOE	PREHISTORIC WITH POTTERY	INELIGIBLE FOR NRHP
PO04116	LUNCH	PREHISTORIC WITH POTTERY	INELIGIBLE FOR NRHP
PO04117	LOTHAGAM	PREHISTORIC WITH POTTERY	INELIGIBLE FOR NRHP
PO04118	WILDFLOWER	PREHISTORIC WITH POTTERY	INELIGIBLE FOR NRHP
PO04606	BROKEN TOOL SITE	PREHISTORIC WITH POTTERY	NOT EVALUATED BY SHPO
PO04607	GOAT MILK FUDGE	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO04608	POND M	PREHISTORIC LACKING POTTERY	NOT EVALUATED BY SHPO
PO04626	HOLIDAY INN SITE	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO05354	DIXIE BOY	PREHISTORIC LACKING POTTERY	INSUFFICIENT INFORMATION
PO05355	LAKE AGNES SOUTH	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO05431	CHIP'S CHIP	AMERICAN, 1821- PRESENT	INELIGIBLE FOR NRHP
PO05432	GROVE EDGE	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO05433	LONELY FLAKE	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO06069	RAYMOND'S KNOLL	PREHISTORIC LACKING POTTERY	NOT EVALUATED BY SHPO
PO06114	JR12	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO06118	JR16	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO06119	JR17	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO06122	JR20	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO06123	JR21	PREHISTORIC WITH POTTERY	INELIGIBLE FOR NRHP
PO06180	ISTHMUS ISLANDS	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO06207	JR 101	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP
PO06209	JR-104	PREHISTORIC LACKING POTTERY	INELIGIBLE FOR NRHP

2.4 Wetlands

Activities in, on or over Waters of the United States (WOTUS), including wetlands, are regulated at the state and federal level. Executive Order 11990, Protection of Wetlands, 1977 (the Order), is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands". To meet these objectives, the Order requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. In Florida, the U.S. Environmental Protection Agency (EPA) had previously delegated the jurisdictional authority over activities in WOTUS under the Clean Water Act (CWA) of 1972, as amended, to the U.S. Army Corps of Engineers (USACE). On January 23, 2020, the EPA Administration and Assistant Secretary of the Army for Public Works signed a final rule defining the scope of waters

federally regulated under the CWA. The Navigable Waters Protection Rule is the second step of a two-step process intended to review and revise the definition of WOTUS. It is intended to increase the predictability and consistency of the CWA programs by clarifying the scope of WOTUS federally regulated under the CWA. The final rule was posted on April 21, 2020 and became effective June 22, 2020. On December 17, 2020, the State of Florida applied for and received approval to formally transfer permitting authority under the CWA Section 404 from the USACE to the State of Florida Department of Environmental Protection (FDEP) for any project proposing dredge or fill activities within State assumed waters. Florida's Section 404 program became effective on December 22, 2020, upon publication of EPA's approval in the Federal Register.

In addition, Florida Statue 373.016 states that waters in the state are among its basic resources. If activities in, on or over wetlands or surface waters cannot be avoided by an activity, it is subject to the conditions set forth in Florida Administrative Code (FAC) 62-330. The FDEP, SWFWMD, SFWMD, as well as other local governments, have jurisdictional authority over wetlands and surface waters within the study area.

A preliminary assessment of wetlands and surface waters was conducted within the study area utilizing the 2020 SWFWMD FLUCFCS, the 2016 SFWMD FLUCFCS and National Wetland Inventory (NWI) GIS datasets for Osceola and Polk Counties (figure in Appendix M). Additionally, a preliminary review of wetlands or surface waters within the I-4 ROW was also conducted. Based on the review, approximately 86.1 acres of wetlands or surface waters are located within the I-4 ROW. These wetlands and surface waters should be reviewed for impact during project design.

The study area contains large expanses of freshwater emergent wetlands. These areas are primarily associated with the Green Swamp and Reedy Creek watersheds. Numerous areas of smaller freshwater forested/shrub wetlands are found throughout the study area. Based on a review of recent and historical aerial photography, the majority of the forested, shrub and herbaceous systems are potentially hydrologically connected during the wet season and would therefore, fall under the jurisdiction of the SWFWMD, SFWMD, and FDEP. Qualitative field reviews were not conducted within the study area; however, based on aerial interpretation, it is anticipated that these wetlands range from low to high quality. Typically, higher quality wetlands are located some distance away from large amounts of development. Wetlands near Lakeland or Celebration would likely be considered lower quality whereas wetlands near the Hilochee Wildlife Management Area would likely be considered higher quality. Golf courses, roadways, and citrus groves may have altered the overall characteristics of the individual wetlands due to the introduction of nutrient rich chemicals or fertilizers, nuisance vegetation, and ditching associated with agriculture.

While NWI data was collected in 1999, the main wetland systems throughout the study area appear to be accurately depicted. Most wetlands within the study area are identified as palustrine emergent or forested wetlands.

2.5 Protected Species and Habitat

The U.S. Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) have authority under the U.S. Endangered Species Act of 1973 (ESA) and the State of Florida's Endangered and Threatened Species Act (s. 379.2291, Florida Statutes) to provide comments and recommendations concerning protected species. Section 7 of the ESA requires federal agencies to ensure that activities do not have a detrimental effect on the continued existence of listed species or their habitats. For some species, USFWS has designated consultation areas or critical habitat. If actions may affect state or federally listed species or critical habitats, then coordination with USFWS and FWC will be required.

The study area lies within the USFWS consultation area for the Audubon's crested caracara (*Polyborus plancus audubonii*), bluetail mole skink (*Eumeces egregius lividus*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Florida scrub-jay (*Aphelocoma coerulescens*), sand skink (*Neoseps reynoldsi*), and Lake Wales Ridge plants. Based on a review of the USFWS Critical Habitat Mapper, the study area is outside of any USFWS designated critical habitats.

Areas identified by FWC as strategic habitat conservation areas (SHCA) are located within the study area. SHCAs are undeveloped natural areas identified by FWC as areas that could provide potential habitat to native plant and wildlife species and therefore may be considered for acquisition as conservation lands. However, these areas have no regulatory implications and have not been and may never be acquired for conservation.

Based on the review of available information from USFWS, FNAI, and FWC, an assessment of habitat availability, a list of the state and federally listed species with the potential to occur within the study area has been compiled. Table 2-4 includes state and federally listed species that may occur in the study area, along with other relevant species information. A likelihood of occurrence was developed based on known occurrences documented in existing databases and the presence of suitable habitat. A low ranking indicates limited habitat no documented occurrences within the study area. A moderate ranking indicates suitable habitat, but no documented occurrences within the study area. A high ranking indicates both suitable habitat and documented occurrences within the study area.

Table 2-4: Potential Listed Species and Likelihood of Occurrence

Common Name	Scientific Name	Federal Status	State Status	Comments	Likelihood of Occurrence
Mammals					
Florida panther	<i>Puma concolor coryi</i>	E	E	The study area is outside of the USFWS Consultation Area for Florida panther; however, panther telemetry and roadkill have been reported within the study area according to FWC.	High
Florida black bear	<i>Ursus americanus floridanus</i>	N*	N*	Florida black bear roadkill has been reported within the study area according to FWC.	High

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Common Name	Scientific Name	Federal Status	State Status	Comments	Likelihood of Occurrence
Birds					
Audubon's crested caracara	<i>Polyborus plancus audubonii</i>	T	T	The study area is within the USFWS Consultation Area for Audubon's crested caracara. Nesting and foraging habitat within the study area is limited.	Low
Eastern black rail	<i>Laterallus jamaicensis</i>	T	T	Nesting and foraging habitat within the study area is limited.	Low
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E	E	The study area is within the USFWS Consultation Area for Everglade snail kite. Nesting and foraging habitat within the study area is limited.	Low
Florida grasshopper sparrow	<i>Ammodramus savannarum floridanus</i>	E	E	The study area is within the USFWS Consultation Area for Florida grasshopper sparrow but not within NRCS consultation area. Nesting and foraging habitat within the study area is limited.	Low
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	T	T	The study area is within the USFWS Consultation Area for Florida scrub-jay. Nesting and foraging habitat within the study area is limited.	Low
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	E	The study area is within the USFWS Consultation Area for red-cockaded woodpecker. Nesting and foraging habitat within the study area is limited.	Low
Wood stork	<i>Mycteria americana</i>	T	T	The study area falls within wood stork CFA's. Nesting and foraging habitat is available within the study area.	Moderate
Bald eagle	<i>Haliaeetus leucocephalus</i>	N**	N**	Nesting and foraging habitat is available within the study area. Approximately eight (8) active bald eagle nests exist within the study area or immediately adjacent to the study area.	High
Florida sandhill crane	<i>Grus canadensis pratensis</i>	N	T	Nesting and foraging habitat is available within the study area.	Moderate
Florida burrowing owl	<i>Athene cunicularia floridana</i>	N	T	Burrowing owls have been documented within the study area according to FWC. Burrowing and foraging habitat is available within the study area.	High
Little blue heron	<i>Egretta caerulea</i>	N	T	Nesting and foraging habitat is available within the study area.	Moderate
Reddish egret	<i>Egretta rufescens</i>	N	T	Foraging habitat within the study area is limited. Inhabits mainly coastal areas.	Low
Roseate spoonbill	<i>Platalea ajaja</i>	N	T	Nesting and foraging habitat is available within the study area.	Moderate

Common Name	Scientific Name	Federal Status	State Status	Comments	Likelihood of Occurrence
Southeastern American kestrel	<i>Falco sparverius paulus</i>	N	T	Nesting and foraging habitat is available within the study area.	Moderate
Tricolored heron	<i>Egretta tricolor</i>	N	T	Nesting and foraging habitat is available within the study area.	Moderate
Reptiles					
American alligator	<i>Alligator mississippiensis</i>	T (S/A)	T (S/A)	Nesting and foraging habitat is available within the study area.	Moderate
Blue-tailed mole skink	<i>Eumeces egregius lividus</i>	T	T	Habitat within the study area is limited.	Low
Eastern indigo snake	<i>Drymarchon couperi</i>	T	T	Nesting and foraging habitat is available within the study area.	Moderate
Sand skink	<i>Neoseps reynoldsi</i>	T	T	Habitat within the study area is limited.	Low
Gopher tortoise	<i>Gopherus polyphemus</i>	C	T	Gopher tortoises have been documented within the study area according to FWC. Burrowing and foraging habitat is available within the study area.	High
<p>E = Endangered T = Threatened SSC = Species of Special Concern N = Not Listed C=candidate species T (S/A) = Threatened due to Similarity of Appearance</p> <p>*The Florida Black Bear is still protected under Florida Black Bear Conservation Rule 68A-4.009 (F.A.C.) and the FWC Florida Black Bear Management Plan.</p> <p>**The Bald eagle is still protected under the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act and FWC Management Plan regulations.</p>					

Listed Plant Species

The Florida Department of Agriculture and Consumer Service's *Notes on Florida's Threatened and Endangered Plants*, and Richard Wunderlin's *Guide to Vascular Plants of Florida*, were consulted to assess habitat requirements for listed species. Based on the available habitats, state and federally listed plant species have the potential to occur within the study area.

2.6 Essential Fish Habitat

A review of the National Marine Fisheries Service (NMFS) essential fish habitat (EFH) GIS data and literature was conducted, and it was determined that the study area does not contain EFH. Should revised EFH GIS data and literature become available, a further analysis will be conducted during the PD&E study.

2.7 Contamination

Contamination concerns in the study area include historical agricultural operations such as cattle grazing and citrus groves. Such operations may have incorporated cattle dip vats and cattle pens or barns (arsenic), as well as regular application of agrichemicals (i.e., pesticides, herbicides) which may accumulate over time in soil and/or groundwater. Additional contamination concerns are concentrated along the more heavily developed portions of the I-4 corridor study area. These areas are characterized by light

industrial and commercial development comprised of numerous auto repair and gas station operations that can generate contamination impacts to soil and/or groundwater. Based on a limited desktop review of database information generated by the Efficient Transportation Decision Making (ETDM) Environmental Screening Tool (EST), potential contamination concerns were identified in the study area that will be considered in the evaluation of alignment alternatives (figure in Appendix N).

The following potential contamination sites were documented within the project study area:

- Historical agricultural operations such as cattle grazing and citrus groves
- 17 Storage Tank Contamination Monitoring Sites
- 10 Petroleum Contamination Monitoring Sites
 - Two (2) sites have documented contamination impacts
- 18 hazardous waste facilities
- One (1) Florida Department of Environmental Protection (FDEP) Environmental Restoration Integrated Cleanup (ERIC) Site
- One (1) FDEP Institutional Controls Registry Site
- 24 US Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) Regulated Facilities
- One (1) Toxic Release Inventory Site
- One (1) historical railroad

Of the above listed sites, 20 sites were identified within the I-4 ROW. No Comprehensive Environmental Resource, Compensation, and Liability Act (CERCLA) or Superfund sites were found within the study area.

A predominant indicator of potential contamination in the study area is the presence of 17 Storage Tank Contamination Monitoring Sites and 10 Petroleum Contamination Monitoring Sites. Petroleum storage tanks are prone to leakage and spills, causing contaminated soil and/or groundwater. The presence of petroleum contamination can impact highway construction activities including soil excavation and dewatering. Construction in petroleum-impacted areas typically must be performed by a Contamination and Remediation (CAR) contractor and project costs increase due to the requirement for special handling and treatment of contaminated material.

The presence of non-petroleum contaminated environmental media (soil, groundwater, surface water, and sediment) can also have a significant negative impact on the cost and schedule to complete a roadway development project. The purpose of the preliminary contamination site evaluation will be the early identification of potential contamination sites that could impact alignment selection.

The sites and land uses listed above will be further evaluated during the contamination screening process to assess their impact on alignment alternatives.