INTERCHANGE MODIFICATION REPORT

Wekiva Parkway (SR 429) from Orange Boulevard to west of I-4 (SR 400)

Seminole County, Florida

Financial Project ID Number: 240200-4

July 2020

Prepared for:
Florida Department of Transportation – District 5
719 S. Woodland Boulevard, Deland, FL 32720

Florida Department of Transportation - District 5
District Five Headquarters
719 S. Woodland Blvd
De Land, FL 32720

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Florida Department of Transportation

Determination of Engineering and Operational Acceptability

Acceptance of this document indicates successful completion of the review and determination of engineering and operational acceptability of the Interchange Access Request. Approval of the access request is contingent upon compliance with applicable Federal requirements, specifically the National Environmental Policy Act (NEPA) or Department's Project Development and Environment (PD&E) procedures. Completion of the NEPA/PD&E process is considered approval of the project location design concept described in the environmental document.

Requestor

DocuSigned by: Hatem Aguib EAD1C8A14E9A408...

7/16/2020 | 8:17 AM EDT

Hatem Aguib, P.E.

Date

Project Manager, District Five

Interchange Review Coordinator

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7/16/2020 | 8:24 AM EDT

Suraj Pamulapati, P.E., PTOE

Date

District Five Interchange Coordinator

Interchange Review Coordinator

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7/16/2020 | 8:31 AM EDT

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Date

Planning Manager, Florida's Turnpike Enterprise

System Management Administrator

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7/16/2020 | 3:58 PM EDT

Chris Edmonston

Date

Systems Implementation Office, Central Office

Acting Associate Division Administrator

DocuSigned by: Chad Thompson 4203ECE57D2A4A3...

7/21/2020 | 1:24 PM EDT

Chad Thompson

Date

Federal Highway Administration

PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Osiris 9 Consulting, a Florida Limited Liability Company authorized under the provisions of Section 471.023, Florida Statutes, to offer engineering services to the public through a Professional Engineer, duly licensed under Chapter 471, Florida Statutes, (CA No. 29670) by the State of Florida Board of Professional Engineers and I have prepared or approved the evaluation, findings, opinions, conclusions or technical advice hereby reported for:

PROJECT: Wekiva Parkway (SR 429) from Orange Boulevard to west of I-4 (SR 400)

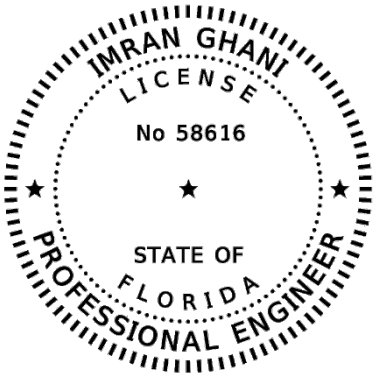
LOCATION: Seminole County, FL

FINANCIAL PROJECT ID: 240200-4

This report includes a summary of data collection effort, traffic analysis, discussion of preferred alternative and summary of conclusions. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering and planning as applied through professional judgement and experience.

Name: Imran Ghani, PE

P.E. Number: 58616



Imran Ghani

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Date: 2020.07.15 18:50:15 -04'00'

This item has been digitally signed and sealed by **Imran Ghani, P.E**. on the date adjacent to the seal.

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

SYSTEMS IMPLEMENTATION OFFICE

QUALITY CONTROL CERTIFICATION FOR INTERCHANGE ACCESS REQUEST SUBMITTAL

Submittal Date: July 15, 2020

FM Number: 240200-4

Project Title: Wekiva Parkway (SR 429) from Orange Boulevard to west of I-4 (SR 400)

District: Five

Requestor: Hatem Aguib, PE Phone: (386) 943-5559

District IRC: Suraj Pamulapati, PE, PTOE Phone: (386) 943-5378

Document Type: ☐ MLOU ☐ IJR ☒ IMR ☐ IOAR ☐ OTHER_____(Specify)

Status of Document (Only complete documents will be submitted for review; however, depending on the complexity of the project, interim reviews may be submitted as agreed upon in the MLOU)

Quality Control (QC) Statement

This document has been prepared following FDOT Procedure Topic No. 525-030-160 (New or Modified Interchanges) and complies with the FHWA two policy requirements. Appropriate District level quality control reviews have been conducted and all comments and issues have been resolved to their satisfaction. A record of all comments and responses provided during QC review is available in the project file or Electronic Review Comments (ERC) system.

Requestor: DocuSigned by: Hatem Aguib EAD1C8A14E9A408... 7/16/2020 | 8:17 AM EDT

Hatem Aguib, PE

Consultant Project Management Supervisor

IRC: DocuSigned by: Suraj Pamulapati FE89B6447E1043B... 7/16/2020 | 8:24 AM EDT

Suraj Pamulapati, PE, PTOE

Interchange and Traffic Engineering Supervisor

EXECUTIVE SUMMARY

Located in northwest Seminole County, Florida, Wekiva Parkway (SR 429)/Interstate 4 (I-4) interchange lies within unincorporated Seminole County and the City of Sanford. The Wekiva Parkway (SR 429) is a proposed 4-lane divided limited access toll facility that will connect to SR 417 at I-4, completing the Western Beltway (SR 429) around the Orlando metropolitan area.

The purpose of this Interchange Modification Report (IMR) is to demonstrate that the Alternative Technical Concept #32 (ATC #32) is performing equal to or better than the RFP concept and has satisfied the FHWA policy points. This IMR is consistent with the Environmental Impact Statement (EIS) for the I-4 Beyond the Ultimate (BtU) Segment 3 in the design year.

A Methodology Letter of Understanding (MLOU) was prepared to document the methodology for the analysis and evaluation of this IMR. The MLOU was approved by the Florida Department of Transportation (FDOT) District 5 Interchange Review Coordinator (IRC), Florida's Turnpike Enterprise IRC, FDOT Central Office System Management Administrator, and Federal Highway Administration (FHWA) in August 2019. The primary basis for traffic projections in this IMR is the Central Florida Regional Planning Model (CFRPM) Version 6.2.

The study area was analyzed for an Opening Year 2023 and Design Year 2043. The operational analysis for this study was performed using the Highway Capacity Software (HCS 7), Synchro 10, and VISSIM 7.0. All operational analysis followed the guidelines of the Highway Capacity Manual (HCM) 6th Edition. The safety analysis was performed using the Enhanced Interchange Safety Analysis Tool (ISATe).

Consistent with FDOT Interchange Access Request User Guide (IARUG), two alternatives were analyzed for this IMR:

- RFP Concept – The interchange concept represented in the RFP.
- ATC #32 – The modified "Wekiva Parkway" alternative proposed by Lane Construction/DRMP during the Design-Build process will serve as the Proposed Design-Build Alternative.

This IMR has been developed in accordance with the FDOT Policy No. 000-525-015: Approval of New or Modified Access to Limited Access Highways on the State Highway System (SHS), FDOT Procedure No. 525-030-160: New or Modified Interchanges, Interchange Access Request User's Guide (IARUG), and the FDOT Project Traffic Forecasting Handbook (Procedure No. 525-030-120).

A detailed operations analysis for the ATC #32 and the RFP Concept was performed. The results can be summarized in the following categories:

Freeway Analysis (HCS): The number of segments with acceptable Level of Service (LOS) (A through D) are higher for the ATC #32 than the RFP Concept for all analysis years. The ATC #32 showed a major improvement in weaving segments. 5 out of 30 weaving segments improved from

an unacceptable LOS (E and F) in the RFP Concept to an acceptable LOS (A through D) in the ATC #32, the rest being equal.

Intersection Analysis (Synchro): The changes proposed by ATC #32 were primarily limited to I-4, system-to-system ramps, location of merge/diverge segments, and weaving segments. The location of where the ramp terminals intersected crossroads remained unchanged except for one intersection. Therefore, 14 intersections out of the 15 intersections show equal delay values in all analysis periods. The delay at the 15th intersection, International Parkway and Wekiva Parkway (SR 429), cannot be compared directly as it accommodates different movements for the RFP Concept and ATC #32.

Microsimulation Analysis (VISSIM)

The network-wide statistics produced by the VISSIM models provide additional insight into operational conditions. For the AM period, the 2043 ATC VISSIM model is performing 1% to 2% better than the 2043 RFP VISSIM model. For the PM period, the 2043 ATC VISSIM model is performing at the same level as the 2043 RFP VISSIM model.

A safety analysis for the RFP Concept and ATC #32 was performed using ISATe. The results are summarized below:

> The analysis showed a reduction of 7% in the total number of expected crashes when comparing the ATC #32 to the RFP Concept. This results in 19-million-dollar economic saving. The ATC #32 showed a reduction in crashes in each severity distribution (fatal, severity injury, moderate injury, minor injury, and property damage) when compared with the RFP Concept.

The comparison of the RFP Concept and the ATC #32 shows that the ATC #32 provides better operational conditions and enhances safety. Therefore, the IMR demonstrates that ATC #32 is performing equal or better than the RFP Concept.

Compliance with FHWA Policy Points

FHWA Policy Point #1

An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations (CFR), paragraphs 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, should be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts

that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access should include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute, and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request should also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

An in-depth operational and safety analysis was conducted to document the impacts of the proposed project. Several performance measures were used to compare the operations of the RFP Concept and ATC #32. Key measures included freeway densities, v/c ratios, intersection delays, level of service and 95th percentile queue lengths.

Operational Analysis

Freeway Analysis using Highway Capacity Software (HCS)

A comparison of the level of service (LOS) by segments was performed and shows the ATC #32 has a higher percentage of segments within LOS range A-D and a smaller percentage of segments at LOS E and F.

Concept (Year Time Period)	% of segments within LOS A-D	% of segments at LOS E	% of segments at LOS F
RFP Concept (2023 AM)	80	9	11
ATC #32 (2023 AM)	85	9	6
RFP Concept (2023 PM)	85	4	11
ATC #32 (2023 PM)	87	4	9
RFP Concept (2043 AM)	76	7	17
ATC #32 (2043 AM)	77	8	15
RFP Concept (2043 PM)	80	2	19
ATC #32 (2043 PM)	82	2	17

HCS analysis showed that:

- The number of segments with acceptable LOS (A through D) are higher for the ATC #32 than the RFP Concept for all analysis years.
- There is a major improvement in weaving segments. 5 out of 30 segments improved from an unacceptable LOS (E and F) in the RFP Concept to an acceptable LOS (A through D) in the ATC #32.
- Overall, there are 15 segments with a better LOS in ATC #32 while there are only two segments with a better LOS in the RFP concept. The two segments in which the RFP Concept performs better are located on the C-D system and not on I-4, SR 429, or SR 417. And both segments are operating at an acceptable LOS (LOS C) in ATC #32.

Therefore, the analysis of freeway segments using HCS7 shows the ATC #32 design performs significantly better than the RFP Concept design.

Intersection Analysis using Synchro

Fifteen intersections were identified within the Area of Influence (AOI). Fourteen out of the fifteen intersections showed equal delay values in all analysis periods. The intersection at International Parkway and Wekiva Parkway (SR 429) for the RFP Concept and ATC #32 cannot be compared directly as it accommodates different movements.

Microsimulation Analysis using VISSIM

The network-wide output produced by the VISSIM models provide additional insight into operational conditions. For the AM period, the 2043 ATC VISSIM model is performing 1% to 2% better than the 2043 RFP VISSIM model. For the PM period, the 2043 ATC VISSIM model is performing equally as the 2043 RFP VISSIM model.

2043 AM Network Wide Summary

Parameter	RFP AM Peak Hour	ATC AM Peak Hour	% Change
Total Travel Time (hr)	4,100	4,067	-1%
Total Delay Time (hr)	1,184	1,158	-2%
Average Delay Time (sec/veh)	90	88	-2%
Latent Delay Time (hr)	1	1	0%
Number of Arrived Vehicles	43,070	43,070	0%
Percentage of Latent Vehicles	0%	0%	0%
Total Delay + Latent Delay (hr)	1,185	1,159	-2%
Average Speed (miles/hr)	43	43	0%

2043 PM Network Wide Summary

Parameter	RFP PM Peak Hour	ATC PM Peak Hour	% Change
Total Travel Time (hr)	4,672	4,675	0%
Total Delay Time (hr)	1,619	1,624	0%
Average Delay Time (sec/veh)	115	115	0%
Latent Delay Time (hr)	654	657	0%
Number of Arrived Vehicles	46,015	46,017	0%
Percentage of Latent Vehicles	3%	3%	0%
Total Delay + Latent Delay (hr)	2,272	2,282	0%
Average Speed (miles/hr)	39	39	0%

Safety Analysis

A detailed safety analysis was conducted using ISATe. The analysis showed a reduction of 7% in the total number of expected crashes when comparing the ATC #32 to the RFP Concept. This results in a 19-million-dollar economic saving. The ATC #32 showed a reduction in crashes in each severity distribution (fatal, severity injury, moderate injury, minor injury, and property damage) when compared with the RFP Concept.

Type of Crash	Cost Associated	Crashes		Cost of Crashes ($)	
		RFP	ATC	RFP	ATC
Fatal (K)	10,670,000	12.5	11.7	133,789,294	125,090,633
Severe Injury (A)	872,612	41.0	39.2	35,790,647	34,159,246
Moderate Injury (B)	174,018	249.1	237.7	43,350,373	41,371,351
Minor Injury (C)	106,215	724.2	667.9	76,918,285	70,942,012
Property Damage Only (O)	7,700	1381.1	1293.3	10,634,360	9,958,076
	Total	**2407.9**	**2249.8**	**300,482,958**	**281,521,318**

Overall, the ATC #32 provides significantly better traffic operations and enhanced safety when compared to the RFP Concept.

A conceptual signing plan has been developed for the ATC #32 showing signage requirements for the proposed improvements and the interchange.

In conclusion, the comparison of the ATC #32 and the RFP Concept show that the ATC #32 will provide better LOS and safer operating conditions. The proposed ATC #32 modifications are not anticipated to have a negative impact on operations or safety on the I-4 mainline or adjacent interchange when compared with the RFP Concept.

FHWA Policy Point 2

The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial-interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.

The proposed Wekiva Parkway (SR 429)/I-4 interchange will provide full access to Wekiva Parkway (SR 429), SR 417 and I-4. There will be no missing movements.

The proposed Wekiva Parkway (SR 429)/I-4 interchange is designed to meet current standards for federal-aid projects on the interstate system and conforms to FDOT design standards and American Association of State and Transportation Officials (AASHTO) standards.

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1 INTRODUCTION

1.1 Project Description

The Wekiva Parkway (SR 429) is a proposed 4-lane divided limited access toll facility that will connect to SR 417 at Interstate 4 (I-4), completing the Western Beltway (SR 429) around the Orlando metropolitan area. The Wekiva Parkway (SR 429) begins at the existing Western Beltway (SR 429) terminus at US 441 and ends at I-4, a total distance of 20.9 miles (**Figure 1-1**).

Wekiva Parkway (SR 429) is being constructed in sections by the Central Florida Expressway Authority (CFX) and the Florida Department of Transportation (FDOT). Sections 1A, 1B, 2A, 2B and 2C (**Figure 1-1**) were completed by CFX and are currently open to traffic. Sections 4A and 4B were completed by FDOT and are also open to traffic. Sections 3A, 3B, 5, 6, 7A and 8 are under construction.

Wekiva Parkway (Section 8) will be 2.63 miles of limited access toll road from Orange Boulevard to east of Rinehart Road and includes the new Wekiva Parkway Interchange at I-4 that will connect to SR 417, providing the final link for the beltway around Central Florida (**Figure 1-2**).

The planning for Wekiva Parkway (SR 429) has spanned over 30 years and the important milestones are listed below:

- ✓ **1986:** CFX and FDOT conducted a study for the Western Beltway (SR 429) Parts A and B. Part A from Florida's Turnpike to U.S. 441 has since been built. Part B was proposed from US 441 to I-4, within portions of northwest Orange County, east Lake County, and Seminole County.
- ✓ **September 26, 2002:** Governor Jeb Bush issued Executive Order No. 2002-259 creating the Wekiva Basin Area Task Force to recommend alignment and design features for the route connecting Western Beltway (SR 429) in Apopka to I-4 in Seminole County, and to address potential impacts of roadway expansion and growth pressures on the Wekiva River Basin ecosystem.
- ✓ **January 15, 2003:** The Wekiva Basin Area Task Force issues its final report, *Wekiva Basin Area Task Force Final Report: Recommendations for Planning and Locating the Wekiva Parkway while Preserving the Wekiva River Basin Ecosystem*. Among the 17 recommendations were five addressing the need for the Wekiva Parkway, specific elements to be included in the Parkway design, and four parcels identified to be acquired as conservation land.
- ✓ **July 1, 2003:** Governor Bush signed Executive Order No. 2003-112 creating the Wekiva River Basin Coordinating Committee to address specific issues related to the definition of the study area. The Coordinating Committee's SR 429 Working Group received input from the Mount Plymouth - Sorrento communities that they wanted to maintain existing SR 46 as a two-lane facility (minimizing land use impacts) and a new southern bypass for through traffic.

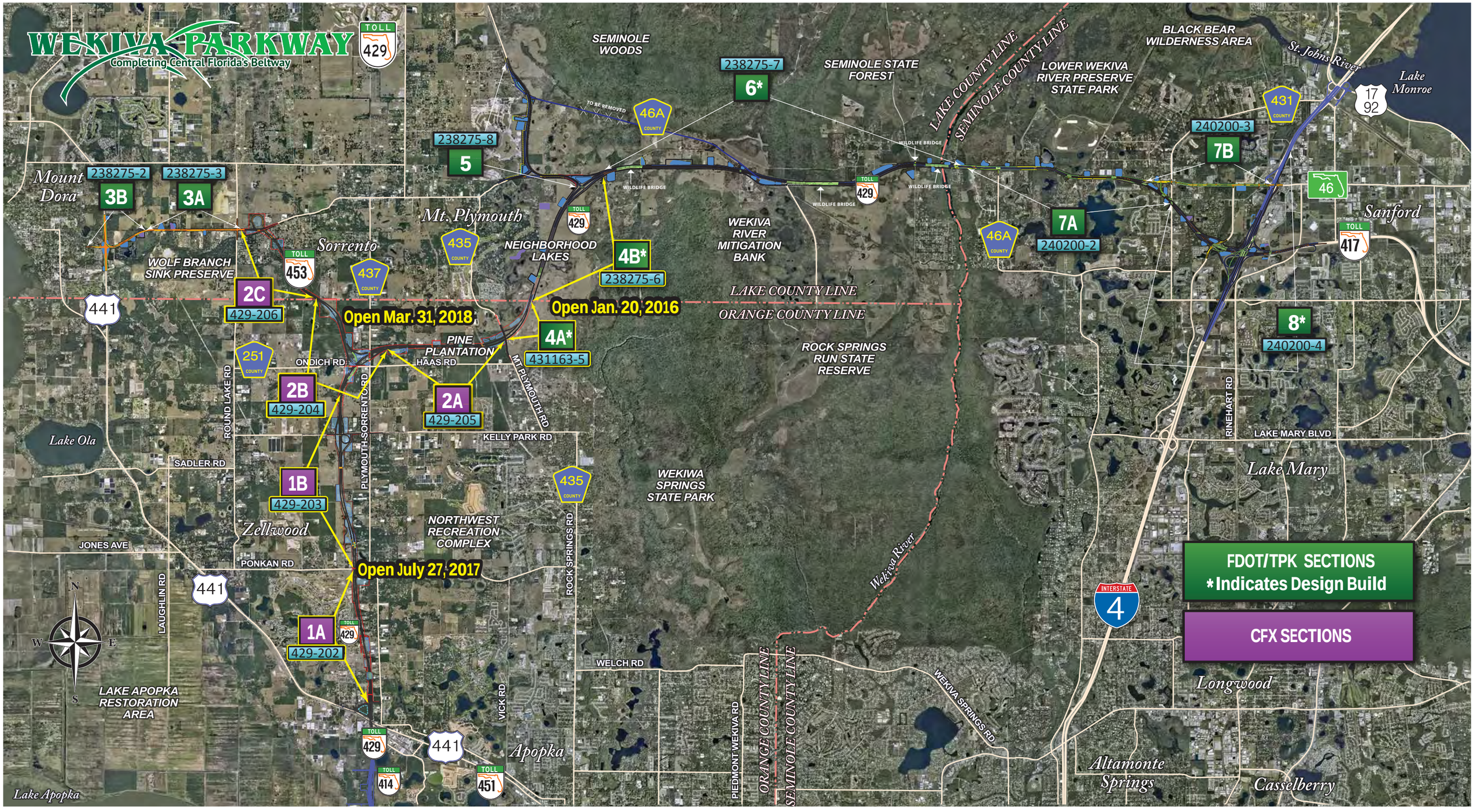
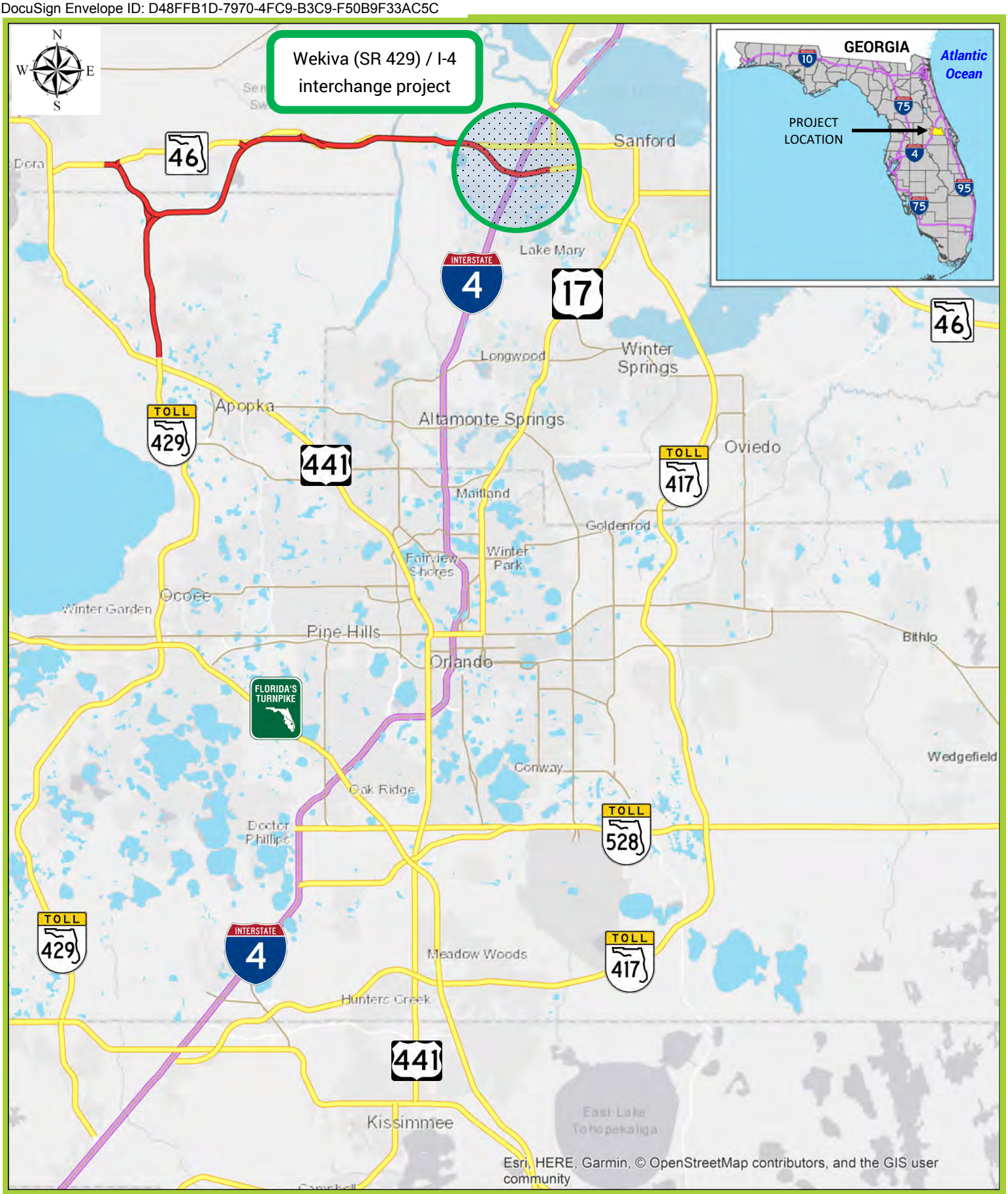


FIGURE 1-1. WEKIVA PARKWAY SECTIONS



Wekiva Parkway
Section 8

Legend

- Interstate
- Major Roads
- Wekiva Parkway

Figure 1-2
Project Location Map

- ✓ **June 29, 2004:** Governor Jeb Bush signed into law Chapter 369, Part III, F.S., "Wekiva Parkway and Protection Act."
- ✓ **November 10, 2004:** First meeting held of the Wekiva River Basin Commission. FDOT and the CFX drafted and submitted a preliminary Wekiva Parkway (SR 429) funding plan prior to this meeting, as required by statute.
- ✓ **December 2004**: CFX began the required acquisition process for buffer/ conservation areas along the Wekiva Parkway (SR 429) corridor.
- ✓ **July 20, 2011**: *Wekiva Parkway (SR 429)/SR 417/I-4 Interchange Modification Report (IMR) FM#240200-1* was approved by Federal Highway Administration (FHWA).
- ✓ **May 11, 2012**: The Environmental Assessment (EA) resulting in a Finding of No Significant Impact (FONSI) FM#238275-1 was signed by FHWA.
- ✓ **October 10, 2012**: The Preliminary Engineering Report (PER) for the Wekiva Parkway (SR 429)/SR 46 Realignment PD&E Study FM#238275-1 and FM#240200-1 was completed.
- ✓ **February 18, 2013**: FDOT started construction of Section 4A & 4B of the Wekiva Parkway (SR 429) Project.
- ✓ **May 9, 2017**: FHWA approved *the I-4 Beyond the Ultimate (BtU) North Section System Access Modification Report (SAMR) Re-evaluation FM#432100-1*. This document integrated a revision to the configuration of the interchange at I-4 and Wekiva Parkway (SR 429).
  The integrated revision of the interchange configuration depicted in the 2017 I-14 BtU SAMR Re-evaluation FM#432100-1 is incorporated as the concept interchange for the Wekiva Parkway - Section 8 from Orange Boulevard to east of Rinehart Road FM#240200-4 project Request for Proposal (RFP).
- ✓ **July 27, 2017**: The EA document for the interchange (2012 FONSI FM#238275-1) was re-evaluated and approved to allow for the construction advertisement of the Wekiva Parkway - Section 8 from Orange Boulevard to east of Rinehart Road FM#240200-4 Design Build project.
- ✓ **June 11, 2018**: During the Design-Build selection process, the Lane Construction/DRMP team submitted their Technical Proposal which outlined an Alternative Technical Concept (ATC) for the Wekiva Parkway - Section 8 from Orange Boulevard to east of Rinehart Road FM#240200-4 project. The changes proposed in the ATC modified the RFP concept interchange. FDOT reviewed the ATC submitted by the team that showed the proposed alternative was equal to, if not an improvement to the concept provided in the RFP.
- ✓ **June 28, 2018**: *The I-4 at Wekiva Parkway Interim Interchange Analysis Addendum* and Appendix to the *2017 I-4 BtU North Section SAMR Re-evaluation FM#432100-1* was approved by FHWA.
- ✓ **August 23, 2019**: The MLOU was approved by the FDOT District 5, Florida's Turnpike Enterprise, FDOT Central Office, and Federal Highway Administration (FHWA)

1.2 Project Location

Located in northwest Seminole County, Florida, Wekiva Parkway (SR 429)/I-4 interchange lies within unincorporated Seminole County and the City of Sanford. The project is located to the west of the Orlando Sanford International Airport and north of the City of Lake Mary. See **Figure 1-2** for the project location map.

1.3 Purpose and Need Statement

The purpose and need for the Wekiva Parkway/I-4 Interchange is consistent with the *2012 Wekiva Parkway (SR 429) / SR 46 Realignment FONSI FM#238275-1 and FM#240200-1*. This EA document was re-evaluated and used to approve the advertisement for the project with no changes to the purpose and need statement.

The purpose of the proposed Wekiva Parkway (SR 429)/I-4 interchange is to complete the Western Beltway around Orlando metropolitan area.

The need for the project (as listed in the Wekiva Parkway FONSI) is based on the following factors:

Regional System Linkage – The major highways within the Orlando Metropolitan region currently consist of I-4 (SR 400), Florida's Turnpike, SR 408 (East-West Expressway), SR 528 (Beachline), SR 417 (Eastern Beltway) and completed portions of SR 429 (Western Beltway), all of which are heavily traveled SIS facilities. The Wekiva Parkway (SR 429)/I-4 interchange is the missing link in the completion of the Western Beltway from I-4 in Osceola County to I-4 in Seminole County. Once completed, the Western Beltway (SR 429) will provide another north-south facility and help to alleviate traffic the existing regional transportation network.

Capacity – SR 46 is currently a two-lane, undivided roadway from Mount Dora in Lake County to Orange Boulevard in Seminole County. The section from Orange Boulevard to I-4 (SR 400) is a four-lane, divided roadway. The most recent LOS data from FDOT shows that SR 46 is over capacity from CR 437 in Lake County to Orange Boulevard/CR 431 in Seminole County. Several new subdivisions within and adjacent to the study area are currently in various stages of planning and construction, and will add to the demand on the area roadways. The Wekiva Parkway (SR 429) is expected to address the increased travel demands, both locally and regionally.

Safety – Many of the study area roadways are two-lane local and arterial roads that do not meet the current design standards for safety and capacity. In 2004, 20 people died on SR 46 through Lake and Seminole Counties. Eleven of the 20 fatalities on SR 46 occurred within the Wekiva Parkway study area, with seven in Lake County and four in Seminole County. On a per mile basis, the section of SR 46 through Lake County is the most dangerous roadway in Central Florida, according to an Orlando Sentinel analysis of 2004 state and federal crash data. The section of SR 46 through Seminole County is the region's second most dangerous segment of roadway.

Wekiva Parkway (SR 429) and the widened and realigned sections of SR 46 would be designed and constructed in accordance with all current standards and would be available to those regional motorists desiring to bypass local traffic. A modern facility, coupled with the opportunity for segregation of trip types, would help to minimize the potential for traffic incidents and fatalities.

1.4 Alternatives

As part of this IMR and per Table 4-1 of the FDOT Interchange Analysis Request User Guide (IARUG), the RFP Concept shall be used as the basis for comparison when evaluating the new concept developed as ATC #32 during the Technical Proposal Phase. As required per the RFP and FDOT IARUG, the new concept shall perform equal to or better than the RFP Concept and satisfy the FHWA policy points (**Section 8.0**). The RFP concept for Wekiva Parkway (Section 8) is based on the RFP Reference Document 02 Concept Plans. The following alternatives were analyzed for this IMR:

- RFP Concept – The interchange concept represented in the RFP is shown in **Figure 1-3**.
- ATC #32 – The modified "Wekiva Parkway" alternative proposed by Lane Construction/DRMP during the Design-Build process will serve as the Proposed Design-Build Alternative and is shown in **Figure 1-4**.

  The differences between the RFP Concept and the ATC #32 are shown in **Appendix A**.

Per the FDOT IARUG Table 3-2 Considered Alternatives, the Transportation Systems Management & Operations (TSM&O) alternative does not apply when determined by the Interchange Review Coordinator (IRC). This was discussed at the February 14, 2019 District IRC meeting and it was decided it is not necessary for this project.

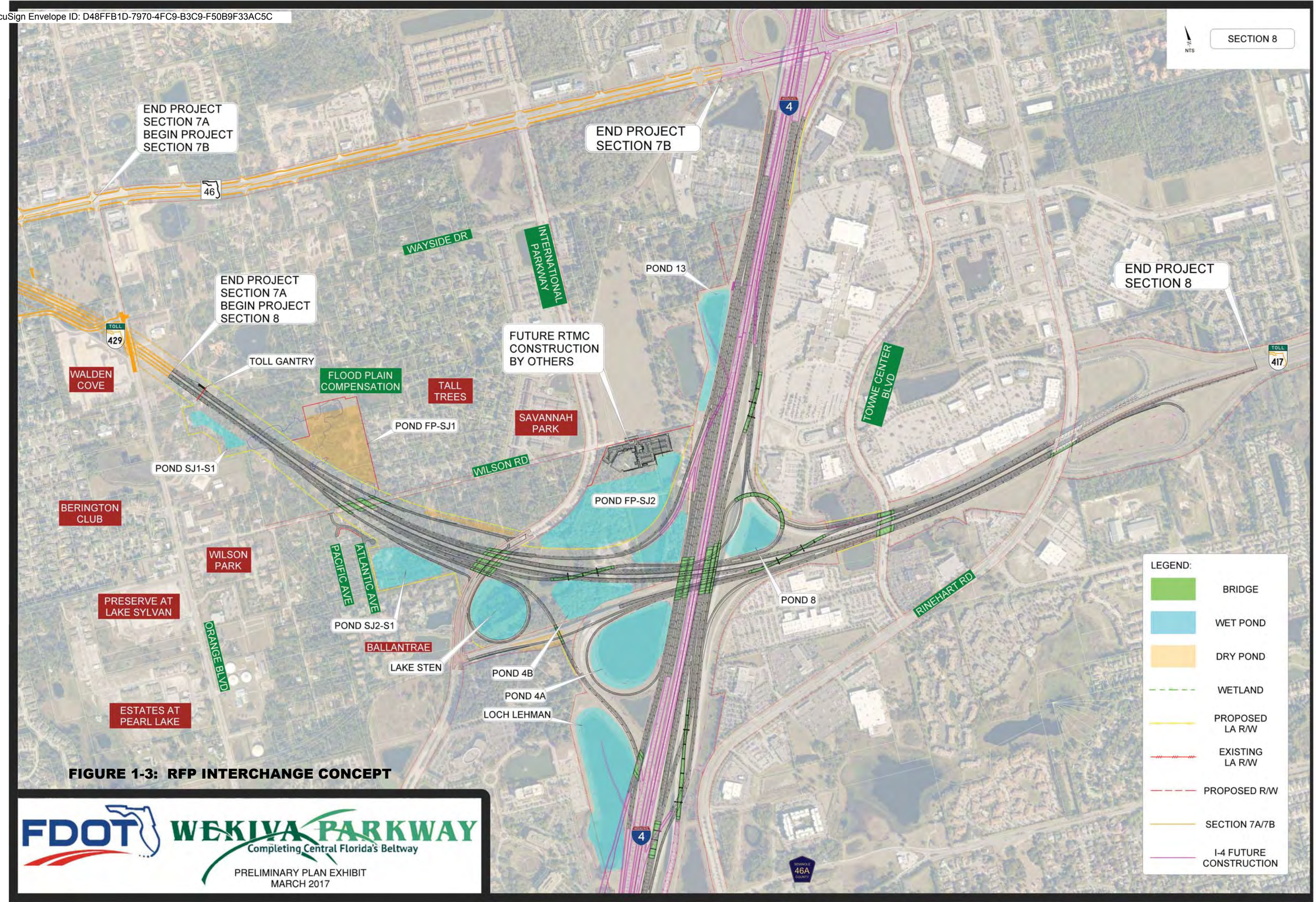


FIGURE 1-3: RFP INTERCHANGE CONCEPT

FDOT WEKIVA PARKWAY
Completing Central Florida's Beltway
PRELIMINARY PLAN EXHIBIT
MARCH 2017

FIGURE 1-4. APPROVED ATC #32 ALTERNATIVE INTERCHANGE CONCEPT

END PROJECT SECTION 7A
FPID 240200-2-52-01 (BY OTHERS)
BEGIN PROJECT SECTION 8
BEGIN CONSTRUCTION SR 429

END PROJECT SECTION 8
END CONSTRUCTION SR 429
BEGIN CONSTRUCTION SR 417

END CONSTRUCTION SR 417

LEGEND

- BRIDGE
- WET POND
- DRY POND
- PROPOSED LA R/W
- EXISTING LA R/W
- PROPOSED R/W
- EXISTING R/W
- FUTURE CONSTRUCTION
- OTHER PROJECTS

LANE DRMP | FDOT | WEKIVA PARKWAY

1.5 Project Schedule

The Wekiva Parkway (SR 429) IMR is being prepared as part of the Wekiva Parkway (Section 8) from Orange Boulevard to east of Rinehart Road FM#240200-4 Design-Build project. Construction started in the fourth quarter of 2018 and is expected to be completed by the fourth quarter of 2022.

1.6 Consistency with Other Plans/Projects

The proposed project is consistent with the Florida Department of Transportation Strategic Intermodal System FY 2018/2019 through FY 2022/2023 Multi-Modal Plan.

The proposed project is consistent with the MetroPlan 2040 Long Range Transportation Plan (Source: *2040 Long Range Transportation Plan, Technical Report 3: Plan Development & Cost Feasible Projects*. Table 7, Page 28).

2 METHODOLOGY

The methodology for the IMR reevaluation was developed in accordance with the procedures and methods outlined in the FDOT IARUG. The Methodology Letter of Understanding (MLOU) was approved for this project in August 2019 and is included in **Appendix B**.

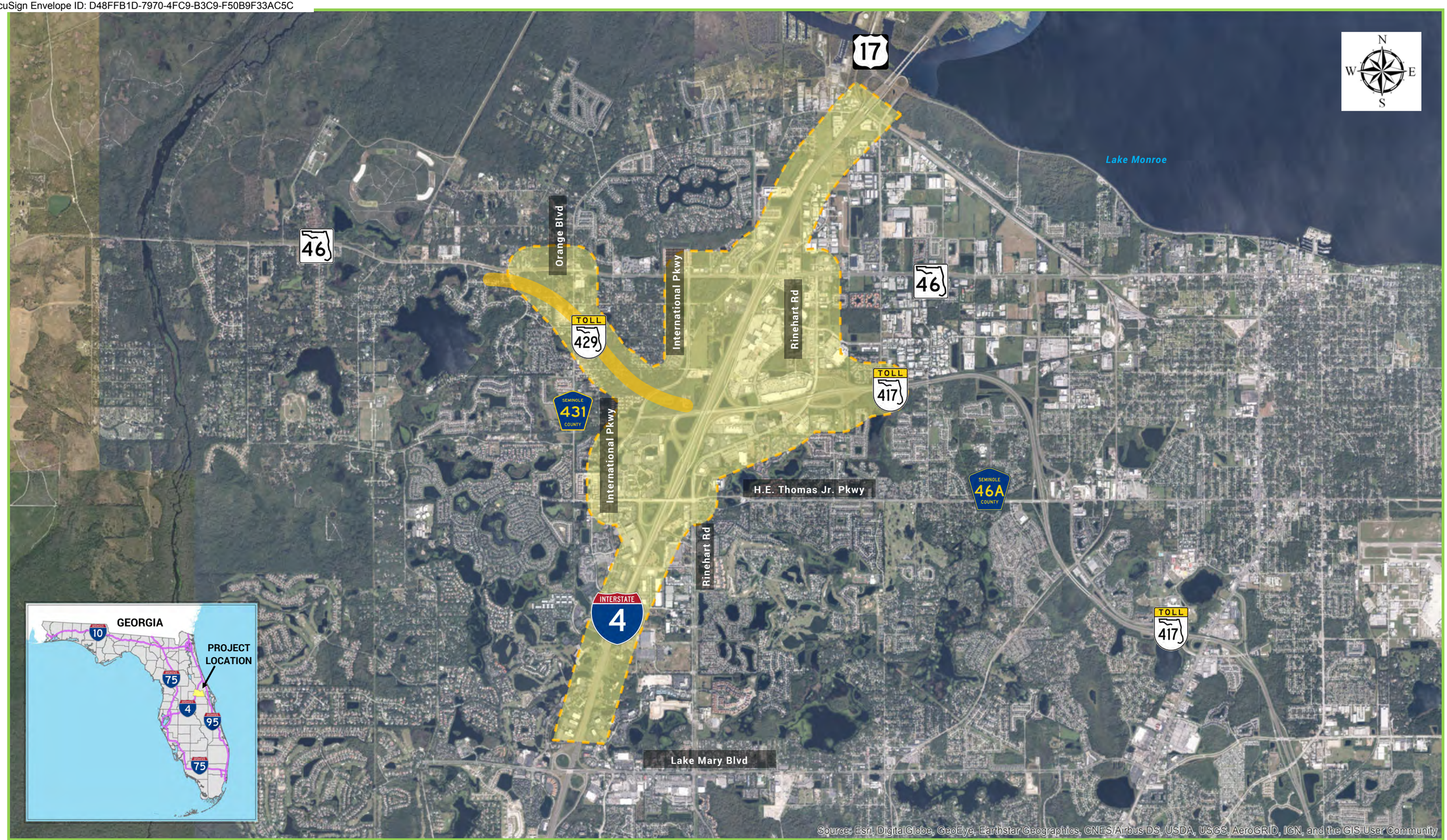
2.1 Area of Influence

As defined by the FDOT IARUG, the Area of Influence (AOI) is the area that is anticipated to experience significant changes in traffic operating characteristics as a result of the access proposal. The AOI in urban areas includes at the least the first adjacent interchange on either side of the proposed access change. Factors such as interchange spacing, cross-street signal locations, the extent of congestion, the presence of systems interchanges, planned transportation systems, and anticipated traffic impacts were considered during the identification of the AOI.

The AOI commitment was established in *the I-4 at Wekiva Parkway Interchange Operational Analysis Report* that was included with the May 2018 Addendum to the 2017 *I-4 BtU SAMR North Section Re-evaluation* and that commitment shall be maintained for this IMR.

The AOI includes adjacent interchanges along I-4 and Wekiva Parkway (SR 429)/SR 417 (**Figure 2-1**). These include:

- Eastbound on-ramp and westbound off-ramp at the I-4 at Lake Mary Boulevard Interchange where the analysis includes merge and diverge areas with I-4 but not ramp terminal analysis with the crossroad
- I-4 at CR 46A (H.E. Thomas Jr. Parkway) Interchange
- I-4 at SR 46 Interchange
- Eastbound off-ramp and westbound on-ramp at the I-4 at US 17/92 Interchange where the analysis includes merge and diverge areas with I-4 but not ramp terminal analysis with crossroad
- Wekiva Parkway (SR 429) at International Parkway Interchange
- SR 417 at Rinehart Road Interchange
- Wekiva Parkway (SR 429) at SR 46 Interchange



FDOT

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Area of Influence

Figure 2-1

2.1.1 AOI Along Crossroads

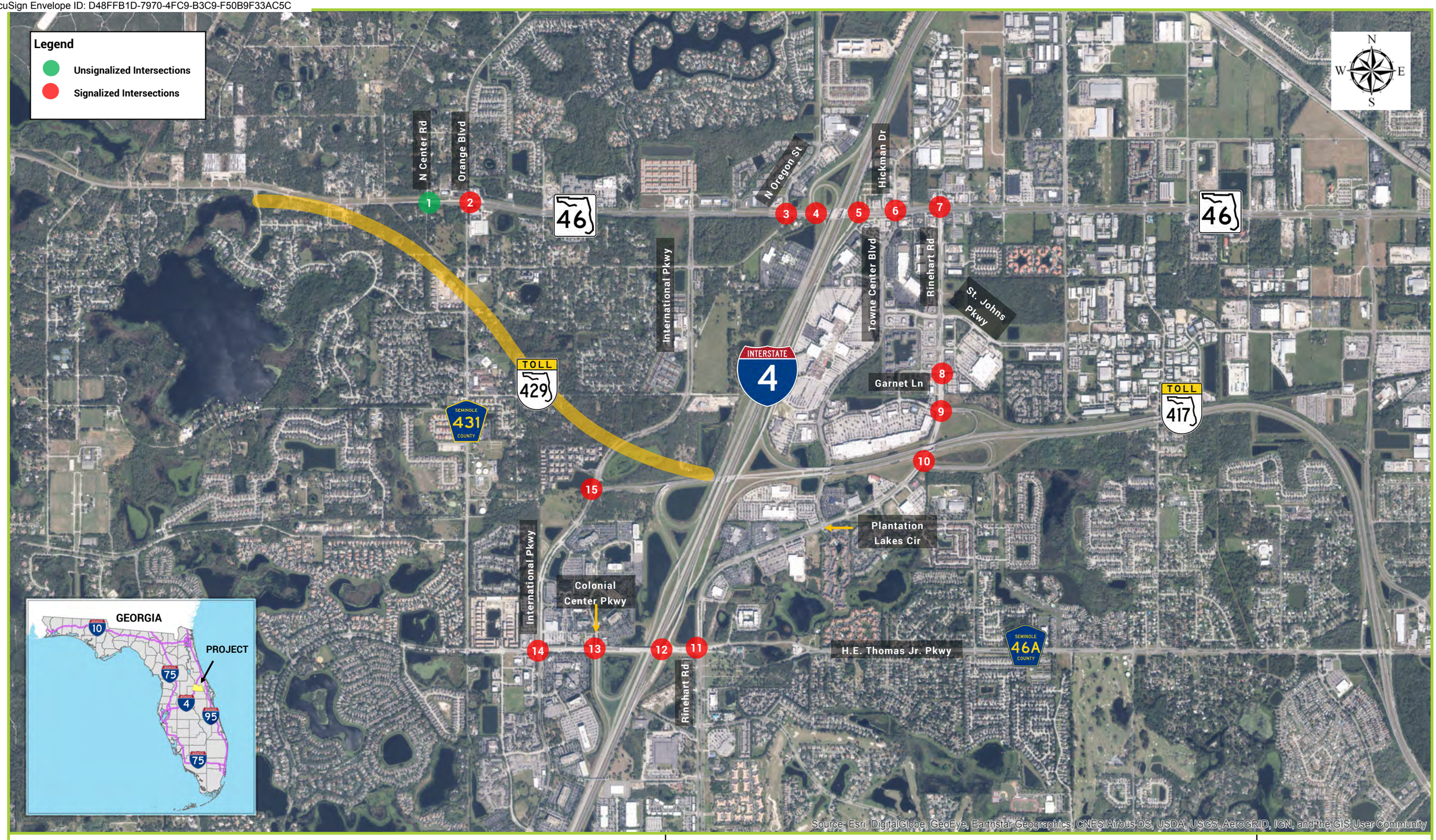
Following the FDOT IARUG, the AOI along the crossroads needs to extend to up to one-half mile in either direction of the proposed access change, at a minimum. If there were signalized intersections along the crossroad, the AOI would extend beyond the half-mile to include at least one signalized intersection in either direction. Additionally, no Developments of Regional Impact (DRI) have been approved in the vicinity of the access change since 1989; therefore, the AOI does not need to be extended to cover DRI areas.

Four crossroads were identified:

1. CR 46A (H.E. Thomas Jr. Parkway)
2. International Parkway
3. Rinehart Road
4. SR 46

Fifteen (15) intersections were identified in the AOI. **Figure 2-2** illustrates each crossroad and the number in parenthesis references the location of the intersection.

- SR 46 at N Center Road (1)
- SR 46 at CR 431 (Orange Boulevard) (2)
- SR 46 at North Oregon Street (3)
- SR 46 at I-4 WB Ramps (4)
- SR 46 at I-4 EB Ramps (5)
- SR 46 at Towne Center Boulevard/Hickman Drive (6)
- SR 46 at Rinehart Road (7)
- Rinehart Road at Garnet Lane (8)
- Rinehart Road at SR 417 NB Ramps (9)
- Rinehart Road at SR 417 SB Ramps (10)
- CR 46A (H.E. Thomas Jr. Parkway) at Rinehart Road (11)
- CR 46A (H.E. Thomas Jr. Parkway) at I-4 EB Ramps (12)
- CR 46A (H.E. Thomas Jr. Parkway) at I-4 WB Ramps/Colonial Center Parkway (13)
- CR 46A (H.E. Thomas Jr. Parkway) at International Parkway (14)
- International Parkway at SR 417 Ramps (15)



SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Area of Influence along Crossroads

Figure 2-2

2.2 Analysis Years

Consistent with the MLOU, analysis years for the project were as follows:

2.2.1 Traffic Forecasting

The travel demand forecasting years used were:

- Base year – 2015
- Planning horizon year – 2045

2.2.2 Traffic Operations

The proposed schedule for Wekiva Parkway (Section 8) anticipates that construction would be completed by late 2022. Therefore, 2023 is the first year in which the proposed project would be open to traffic.

The analysis years were decided as follows:

- Opening year – 2023
- Design year – 2043

No analysis was included for existing conditions. During their February 14, 2019 meeting, the District IRC decided that since the project is already under construction, there is no need for an existing conditions analysis.

There are two major changes in the transportation network between the opening year (2023) and design Year (2043) that impact operations results. These changes occur as a result of I-4 Beyond the Ultimate improvements.

1. Express Lanes are not included in 2023 analysis but are included in 2043 analysis
2. By 2043, the CR 46A interchange with I-4 is assumed to be a diverging diamond interchange.

2.3 Operational Analysis

2.3.1 Calibration Methodology

During the ATC #32 process, FDOT provided VISSIM files representing the RFP Concept.

All of the RFP Concept scenario link variables, parameters, and driver behavior settings will remain the same as the BtU RFP VISSIM model. To develop the analysis for a 2043 design year, new origin-destination (OD) inputs were needed for the future year. The AOI was extracted from the I-4 BtU model, since it covers a much larger area. The VISUM ODME (Origin-Destination Matrix Estimation) procedure was used to develop the future year OD paths for the 2043 RFP Concept and ATC #32 VISSIM simulations. The VISSIM simulated volume based on the OD matrix was calibrated against the 2043 Design Directional Hourly Volumes (DDHV) to yield the acceptable GEH (Geoffrey E. Havers) formula value as specified by the 2014 FDOT Traffic Analysis Handbook. The GEH statistics are provided in Appendix E along with VISSIM model inputs and outputs.

2.3.2 Selection of Measures of Effectiveness (MOEs)

Per the FDOT IARUG, the RFP Concept was compared against the ATC #32 to demonstrate that the safety and operations of the ATC #32 is equal or better than the RFP Concept. The following MOEs were selected to compare the RFP Concept against the ATC #32:

Highway Capacity Software and Synchro Analysis:

- Freeway – Level of Service (LOS), Density, Speed, Volume/Capacity for Weaving Segments
- Intersection Analysis – LOS, Total Delay, 95th percentile Queue Length

VISSIM Analysis:

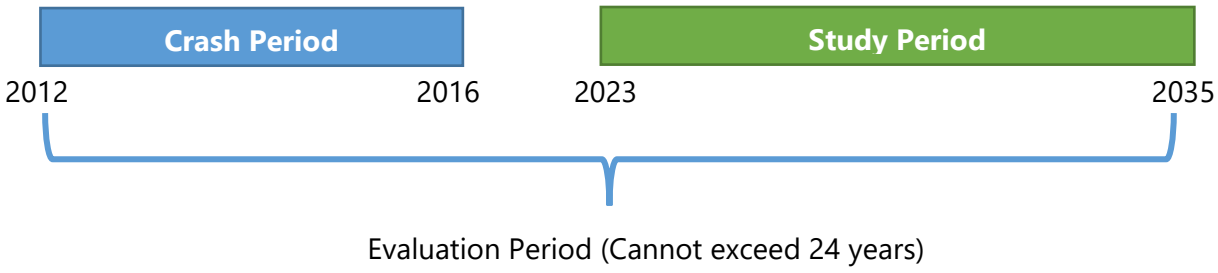
- Link Segments – Volume, Speed, Density
- Network Wide Performance – Total Delay, Average Speed, Latent Demand, Latent Delay, Demand vs Simulated Volumes

2.4 Safety Analysis

Safety analysis was performed for the RFP Concept and the ATC #32 utilizing the Enhanced Interchange Safety Analysis Tool (ISATe). The ISATe is a predictive safety analysis tool applying part C of the Highway Safety Manual (HSM) which provides design and safety engineers with an automated tool to assess the safety effects of geometric design and traffic control features. The ISATe can also be used to predict the safety performance of design alternatives for new interchanges before reconstruction of existing interchanges.

During the analysis of the RFP Concept and the ATC #32, geometric and traffic data were supplemented with 2012-2016 crash data (from Signal 4 Analytics) to enhance the safety tool. The availability of crash data allowed the Empirical Bayes (EB) Method to be used by combining the predictive average crash frequency with five years of observed crash data to obtain a more reliable estimate of the expected crash frequency.

While ISATe is the best available tool for predictive safety analysis, it is limited to a maximum evaluation period of 24 years. The crash data covered the first five years of analysis leaving 19 years of analysis for the study period. As a result of this constraint, the safety predictions obtained are limited to the year 2035.



3 Project Traffic Forecast Development

The project traffic forecasting development included several steps and began with the Central Florida Regional Planning Model (CFRPM) Version 6.2. Several adjustments were made to the CFRPM forecast and the methodology blended traffic forecasts from CFRPM on I-4, SR 417, and Wekiva Parkway (SR 429) with historical traffic trends analysis on interchange ramps.

3.1 Selected Travel Demand Model

CFRPM Version 6.2 was used for travel demand forecasting. Key characteristics of the model are:

- Base year: 2015
- Forecast year: 2045
- Updated theme park data
- Inclusion of all of Polk County
- Time of day model with the following periods:
  - AM Period from 6:30 a.m. to 9:00 a.m.
  - Mid-day Period from 9:00 a.m. to 3:30 p.m.
  - PM Period from 3:30 p.m. to 6:30 p.m.
  - Night Period from 6:30 p.m. to 6:30 a.m.
- Expanded validation metrics

The CFRPM Version 6.2 utilized the currently approved CFRPM Version 6.1 as a base and made several improvements. Created for the I-4 BtU Study, the CFRPM Version 6.2 is an update of Version 6.1 and uses the adopted socio-economic data from Metropolitan Planning Organizations (MPO) and Transportation Planning Organizations (TPO), such as MetroPlan Orlando, Polk, River-To-Sea, Space Coast, Lake-Sumter, and Ocala-Marion, and covers the entire study area. This update satisfied the commitment made by FDOT to FHWA during the completion of the previous SAMR study.

The CFRPM model outputs are shown in Appendix H.

3.2 Evaluation of CFRPM

CFRPM Version 6.2 includes a forecast year of 2045, a base year of 2015, and interim years of 2025 and 2035. Traffic forecasts for 2025 and 2045 were obtained from the CFRPM and evaluated for reasonableness. An initial review of the CFRPM 2045 traffic forecast focused on two corridors: I-4 and SR 417. For both corridors, the 2045 CFRPM forecasts were compared to forecasts based on historical traffic trends. The mainline traffic projections were found to be very reasonable. **Table 3-1** shows the 2045 traffic forecasts by CFRPM and historical traffic trends on mainline corridors.

Table 3-1: Comparison of CFRPM and Historical Traffic Trends Analysis

Location	CFRPM 2045 Unadjusted Forecast	2045 Forecast based on Historical Trends (using 10 years of data)	2045 Forecast based on Historical Trends (using 15 years of data)
I-4 (South of US 17/92)	224,327	235,400	181,000
I-4 (South of CR 46A)	191,513	228,800	187,100
SR 417 (West of Rinehart Rd)	85,105	93,000	72,700

Historical trend forecasts were developed using 10 and 15 years of historical traffic data. The 15-year historical traffic included the 2007 recession and the associated decrease in traffic on major roads due to high unemployment. Therefore, the 15-year historical traffic trends analysis represented the low end of traffic projections.

The 10-year analysis used traffic data from 2009 (9.9% national unemployment rates) through 2018 (4.0% national unemployment) and covered a period from recession (2009) to robust economic growth (2018). As a result, this period showed rapid traffic growth and the 10-year historical traffic trend analysis represented the high end of traffic projections.

These high and low projections of traffic helped validate the traffic on mainline corridors from the model. The 2045 CFRPM projections for I-4 and SR 417 were in between these low and high projections of the traffic trends analysis.

3.3 Adjustments to CFRPM Forecast

No adjustments were made to the socio-economic data.

Although the model forecasts were validated for the mainline corridors, there were some inconsistencies within the model. In order to achieve consistency, two major adjustments were made to the 2045 traffic forecasts generated by CFRPM.

Adjustment #1

The Western Beltway (SR 429) and the Eastern Beltway (SR 417) were both coded as toll facilities in the CFRPM. Analysis of 2045 projections showed 40,548 vehicles traveling to/from I-4 to the Eastern Beltway (SR 417) and 11,220 vehicles traveling to/from I-4 to the Western Beltway (SR 429) This results in 78% of the traffic using the Eastern Beltway (SR 417) and 22% of the traffic using the Western Beltway (SR 429).

The Wekiva Parkway (SR 429), once constructed, will complete the beltway around Central Florida. Motorists traveling through the City of Orlando will have the option of using the Western Beltway (SR 429), I-4 or the Eastern Beltway (SR 417). The length of the Western Beltway (SR 429) is

approximately 52 miles (from I-4/SR 429 North interchange to I-4/SR 429 South interchange) while the length of the Eastern Beltway (SR 417) is approximately 57 miles. Since tolls are calculated on a cost per mile basis, trips on the shorter Beltway will require less travel time and cost to complete. It is, therefore, reasonable to assume that the majority of the through traffic wishing to pay tolls to avoid downtown Orlando congestion will take the shorter Western Beltway (SR 429) as opposed to the longer Eastern Beltway (SR 417).

The purpose of adjustment #1 was to correct the over assigning of traffic on the Eastern Beltway (SR 417). However, the value of the over assignment was not clear.

In order to gain a better understanding of the amount of traffic using Western Beltway (SR 429) and Eastern Beltway (SR 417), a detailed socio-economic data analysis was performed. This analysis identified all Traffic Analysis Zones (TAZs) within a 5-mile buffer of SR 429 and SR 417. **Table 3-2** shows the population and total employment.

Table 3-2: 2045 Socio-Economic Data Comparison

	Eastern Beltway (SR 417)	Western Beltway (SR 429)	Ratio of SR 417: SR 429
Total Population	1,527,790	856,595	64:36
Employment	1,004,489	530,800	65:35

The analysis showed that 64% of the population lived adjacent to the Eastern Beltway (SR 417) and 36% lived adjacent to the Western Beltway (SR 429). Therefore, strictly based on local traffic patterns, the Eastern vs Western Beltway split should be 64% vs. 36% respectively.

The total traffic on a roadway is the sum of through traffic and local traffic. As previously stated, the local trips favor the Eastern Beltway (SR 417) while the through trips favor the Western Beltway (SR 417). The local traffic patterns were based on socio-economic data (64% on Eastern Beltway and 36% on Western Beltway). For the through trips, it was assumed that 70% of the traffic would use Western Beltway (SR 429) and 30% would use Eastern Beltway (SR 417).

As a result, the traffic projections were adjusted to show a traffic projection of 25,000 vehicles to/from I-4 to the Western Beltway (SR 429) and 26,000 vehicles to/from I-4 to the Eastern Beltway (SR 417).

Adjustment #2

While the CFRPM 2045 forecasts for I-4 and SR 417 mainlines compared very favorably with historical traffic trends, the interchange ramps traffic forecasts did not.

Table 3-3 shows the comparison of 2045 CFRPM forecasts and 2018 traffic counts on I-4. **Table 3-4** shows the comparison of 2045 CFRPM forecasts and 2018 traffic counts on SR 429 and SR 417.

Table 3-3: 2045 CFRPM Volumes and 2018 FDOT Traffic Counts for I-4 (SR 400)

Interchange with I-4 (SR 400)		2045 CFRPM Volume				2018 FDOT Traffic Count			
		I-4 WB		I-4 EB		I-4 WB		I-4 EB	
US 17/92									
		4,600		9,000		9,200		9,500	
SR 46		5,200		6,900		11,500		10,500	
		10,000		1,600		11,300		10,000	
SR 429/SR 417		11,000	5,300	620	21,000	NA	5,600	NA	15,000
		930	19,000	50	6,500	NA	12,500	NA	4,900
CR 46A		3,900		6,300		5,100		5,100	
		7,400		8,900		12,500		15,500	
Lake Mary Blvd		7,200		4,300		13,500		11,500	

Table 3-4: 2045 CFRPM Volumes and 2018 FDOT Traffic Counts for SR 417/SR 429

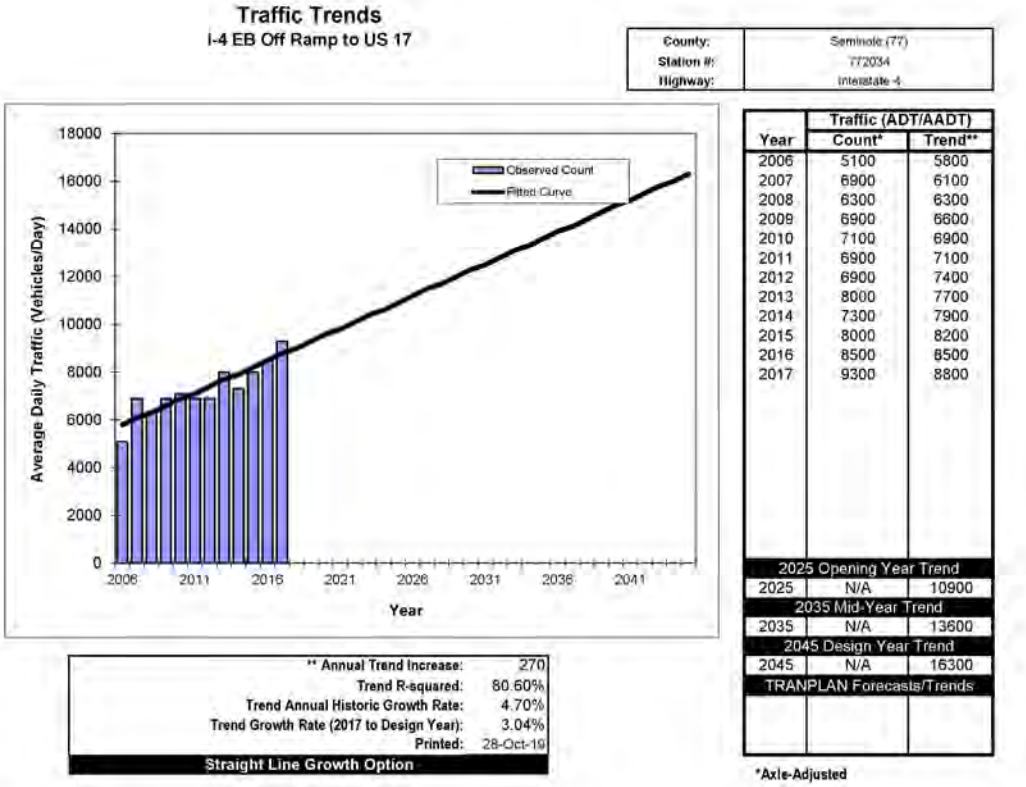
Interchange with SR 417/SR 429		2045 CFRPM Volume				2018 FDOT Traffic Count			
		SR 429 NB/SR 417 SB		SR 429 SB/SR 417 NB		SR 429 NB/SR 417 SB		SR 429 SB/SR 417 NB	
SR 46		NA		NA		NA		NA	
International Parkway		8,500		5,700		NA		NA	
		8,700		8,500		6,900		7,200	
I-4		930	19,000	5,300	11,000	NA	12,500	5,600	NA
		6,500	50	620	21,000	4,900	NA	NA	15,000
Rinehart Rd		1,900		510		3,000		3,000	
		360		380		4,200		4,200	

Based on the model, the 2045 projected traffic on ramps was less than the 2018 counts. After comparing the 2045 CFRPM traffic forecasts and the 2018 traffic counts, it was decided that the 2045 traffic forecast for the ramps would be developed using historical growth rate. The growth rate was calculated using historical trend analysis at existing FDOT count sites within the study area.

3.4 Historical Traffic Trend Analysis

Trend analysis was performed for the following traffic count sites to determine a growth rate.

3.4.1 I-4 at US 17/92 Interchange



Year	Traffic (ADT/AADT) Count*	Trend**
2006	5100	5800
2007	6900	6100
2008	6300	6300
2009	6900	6600
2010	7100	6900
2011	6900	7100
2012	6900	7400
2013	8000	7700
2014	7300	7900
2015	8000	8200
2016	8500	8500
2017	9300	8800
2025 Opening Year Trend		
2025	N/A	10900
2035 Mid-Year Trend		
2035	N/A	13600
2045 Design Year Trend		
2045	N/A	16300
TRANPLAN Forecasts/Trends		

Figure 3-1: Site 772034 - I-4 EB off-ramp to US 17

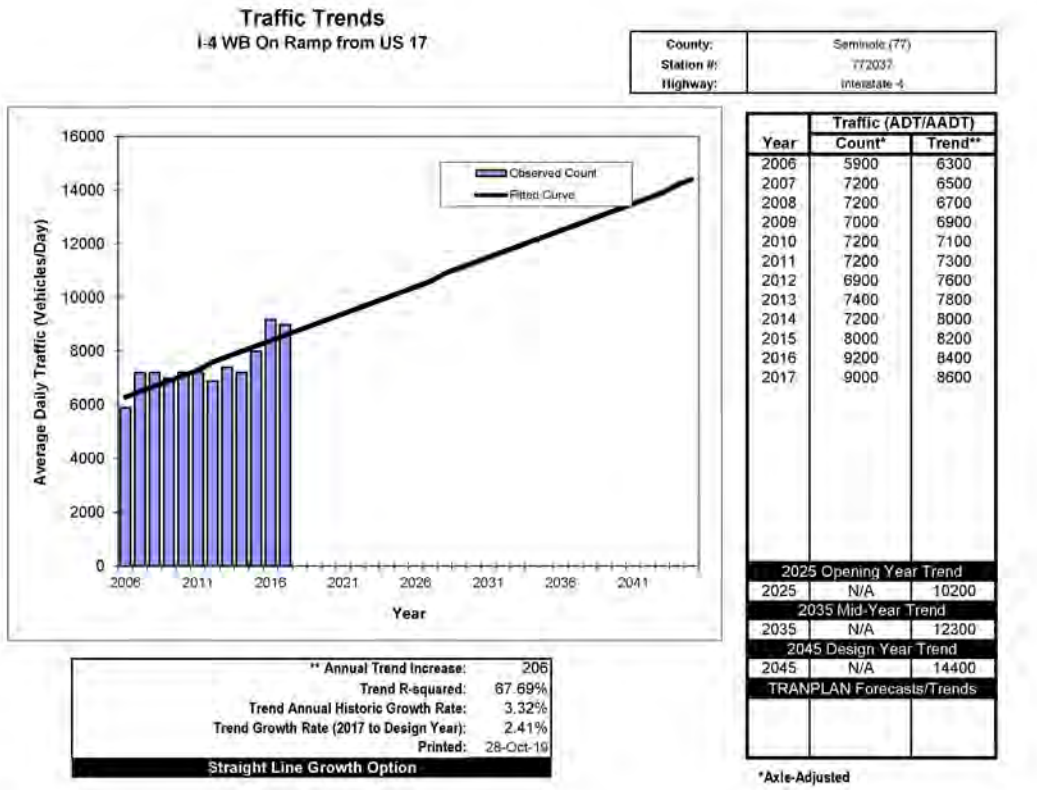
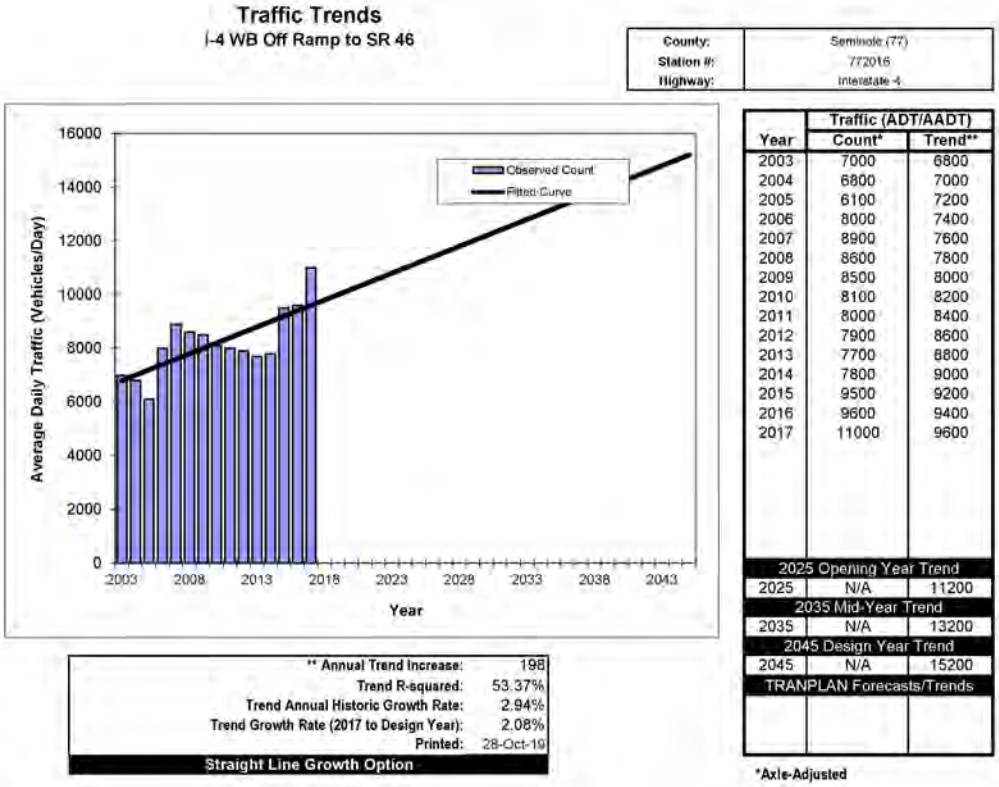


Figure 3-2: Site 772037 - I-4 WB on-ramp to US 17

Summary:

The average trend growth rate for the two ramps was 2.73% and this growth rate was used to forecast traffic on I-4 (SR 400) at US 17/92 interchange ramps.

3.4.2 I-4 at SR 46 Interchange



Year	Traffic (ADT/AADT) Count*	Trend**
2003	7000	6800
2004	6800	7000
2005	6100	7200
2006	8000	7400
2007	8900	7600
2008	8600	7800
2009	8500	8000
2010	8100	8200
2011	8000	8400
2012	7900	8600
2013	7700	8800
2014	7800	9000
2015	9500	9200
2016	9600	9400
2017	11000	9600
2025 Opening Year Trend		
2025	N/A	11200
2035 Mid-Year Trend		
2035	N/A	13200
2045 Design Year Trend		
2045	N/A	15200
TRANPLAN Forecasts/Trends		

Figure 3-3: Site 772016 - I-4 WB off-ramp to SR 46

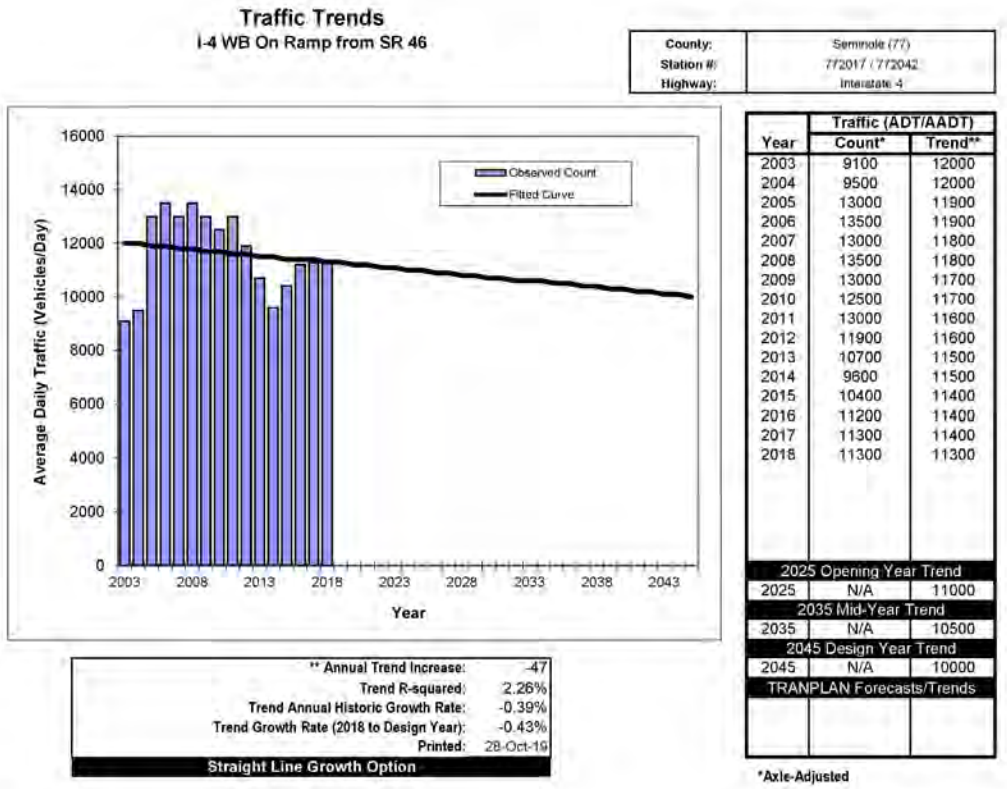
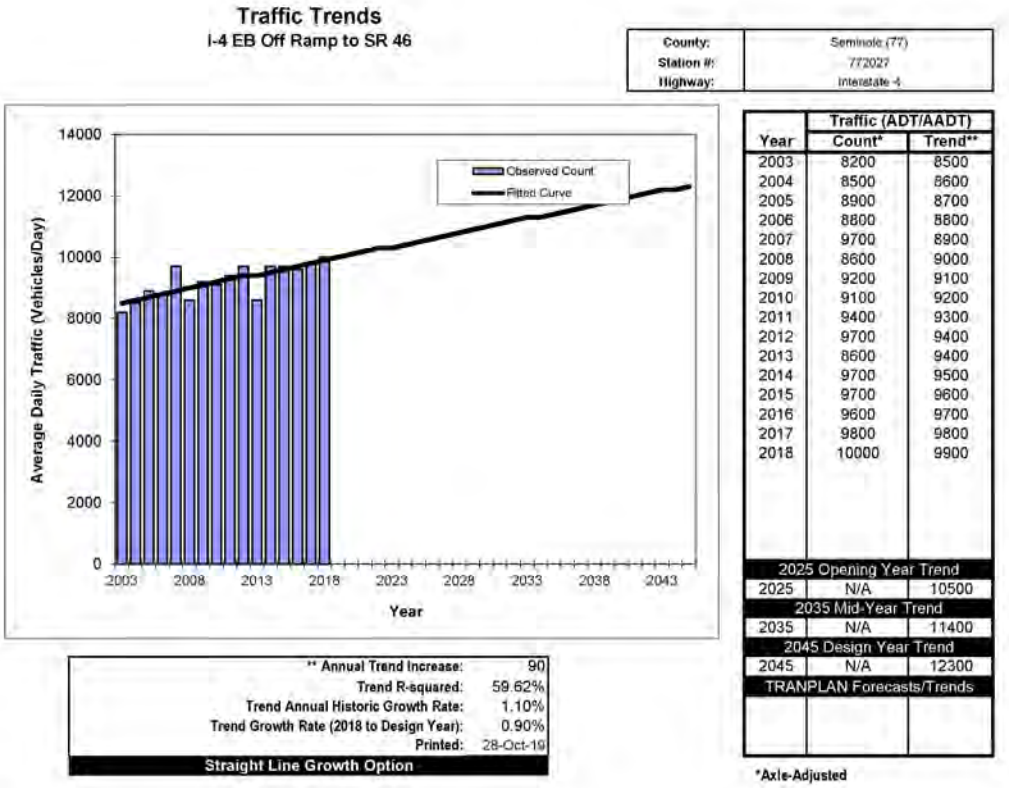


Figure 3-4: Site 772017/772042 - I-4 WB on-ramp from SR 46

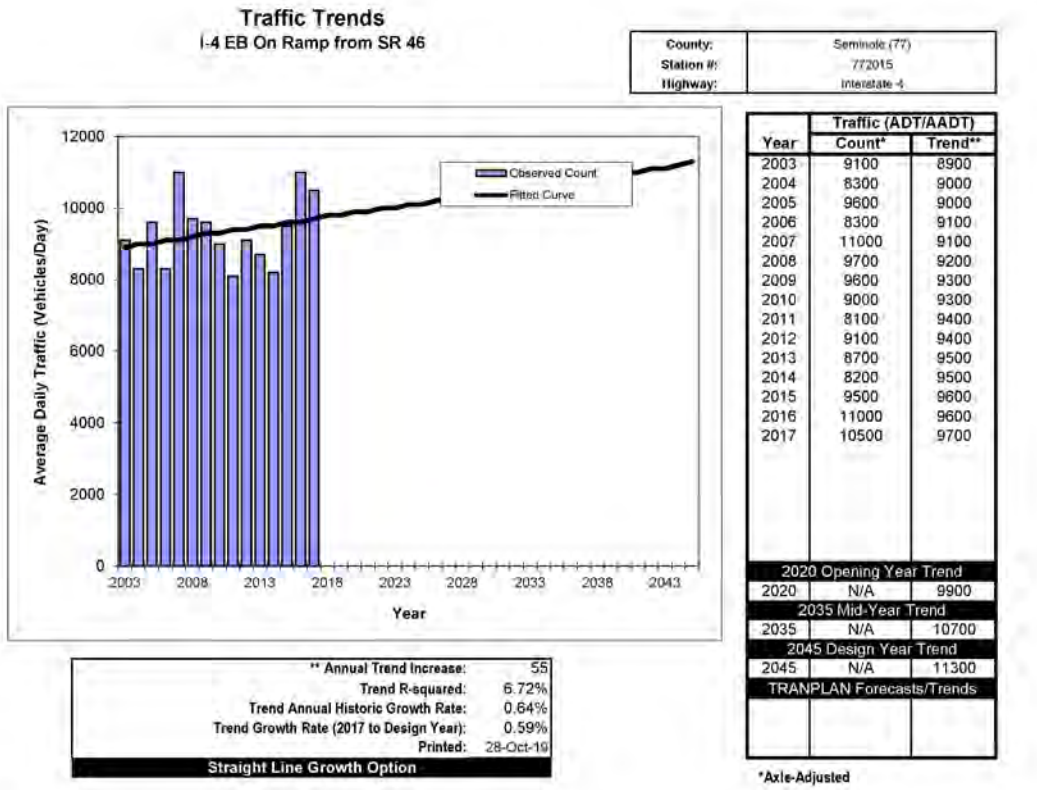


County:	Seminole (77)
Station #:	772027
Highway:	Interstate 4

Year	Traffic (ADT/AADT) Count*	Trend**
2003	8200	8500
2004	8500	8600
2005	8900	8700
2006	8800	8800
2007	9700	8900
2008	8600	9000
2009	9200	9100
2010	9100	9200
2011	9400	9300
2012	9700	9400
2013	8600	9400
2014	9700	9500
2015	9700	9600
2016	9600	9700
2017	9800	9800
2018	10000	9900
2025 Opening Year Trend		
2025	N/A	10500
2035 Mid-Year Trend		
2035	N/A	11400
2045 Design Year Trend		
2045	N/A	12300
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

Figure 3-5: Site 772027 - I-4 EB off-ramp to SR 46



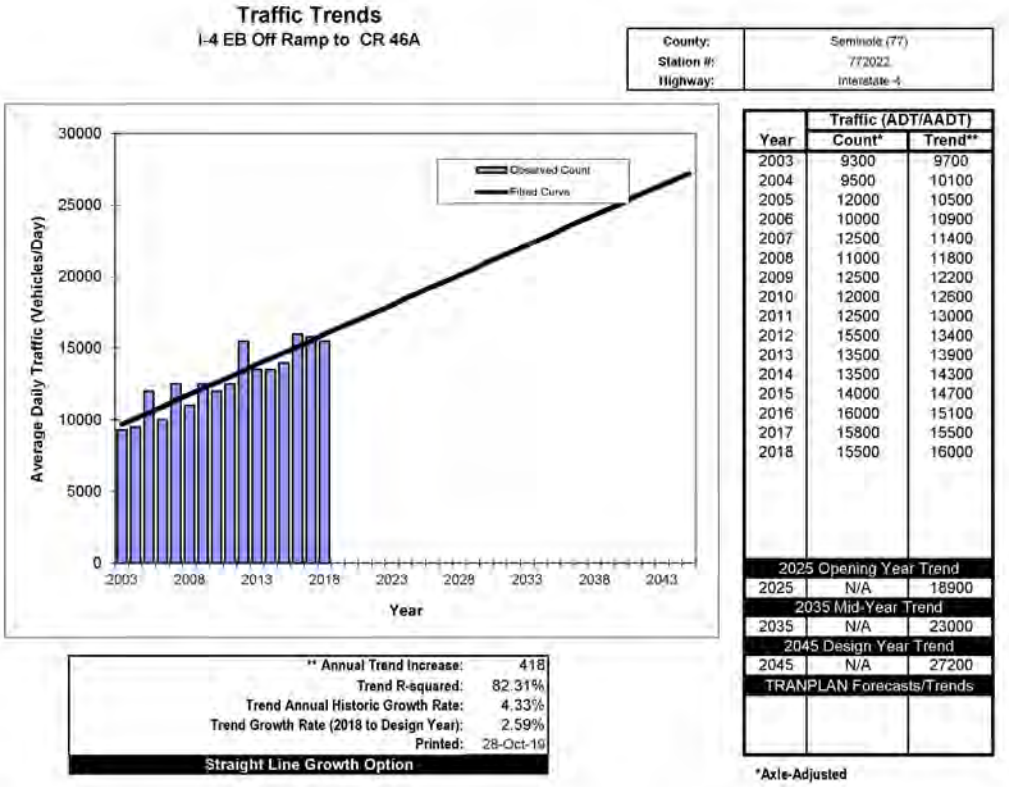
Year	Traffic (ADT/AADT) Count*	Trend**
2003	9100	8900
2004	8300	9000
2005	9600	9000
2006	8300	9100
2007	11000	9100
2008	9700	9200
2009	9600	9300
2010	9000	9300
2011	8100	9400
2012	9100	9400
2013	8700	9500
2014	8200	9500
2015	9500	9600
2016	11000	9600
2017	10500	9700
2020 Opening Year Trend		
2020	N/A	9900
2035 Mid-Year Trend		
2035	N/A	10700
2045 Design Year Trend		
2045	N/A	11300
TRANPLAN Forecasts/Trends		

Figure 3-6: Site 772015 - I-4 EB on-ramp from SR 46

Summary:

The average trend growth rate for the four ramps was 0.79% and this growth rate was used to forecast traffic on I-4 (SR 400) at SR 46 interchange ramps.

3.4.3 I-4 at CR 46A Interchange



Year	Traffic (ADT/AADT) Count*	Trend**
2003	9300	9700
2004	9500	10100
2005	12000	10500
2006	10000	10900
2007	12500	11400
2008	11000	11800
2009	12500	12200
2010	12000	12600
2011	12500	13000
2012	15500	13400
2013	13500	13900
2014	13500	14300
2015	14000	14700
2016	16000	15100
2017	15800	15500
2018	15500	16000
2025 Opening Year Trend		
2025	N/A	18900
2035 Mid-Year Trend		
2035	N/A	23000
2045 Design Year Trend		
2045	N/A	27200
TRANPLAN Forecasts/Trends		

Figure 3-7: Site 772022 - I-4 EB off-ramp to CR 46A

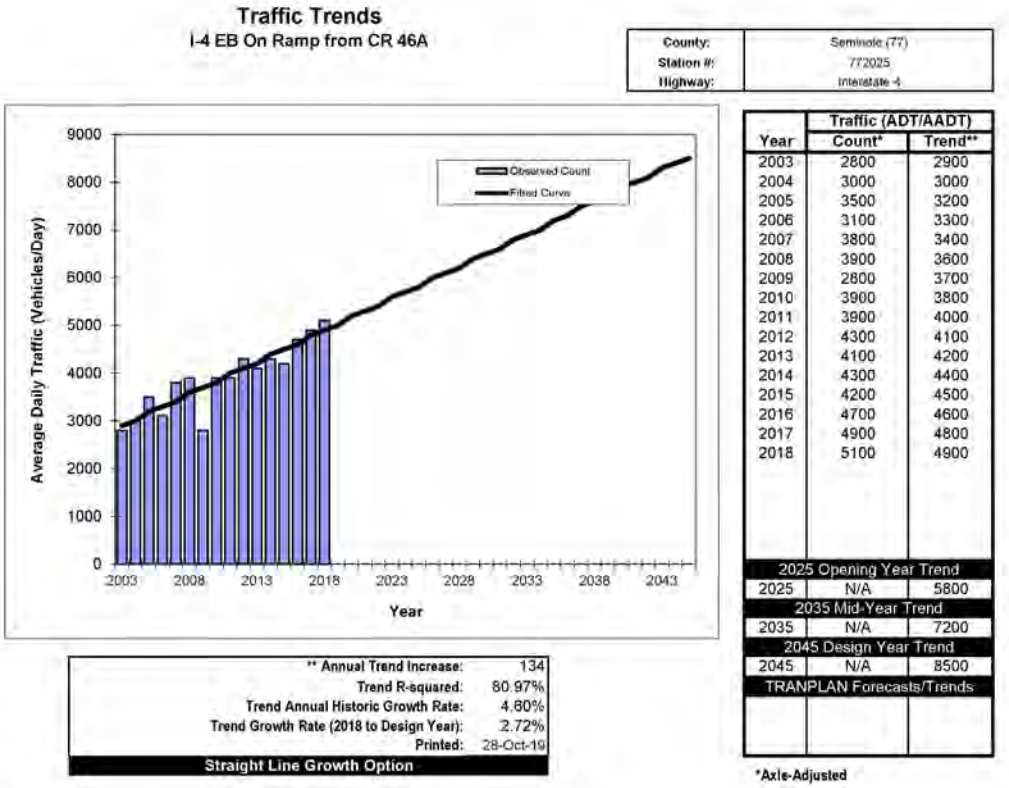


Figure 3-8: Site 772025 - I-4 EB on-ramp from CR 46A

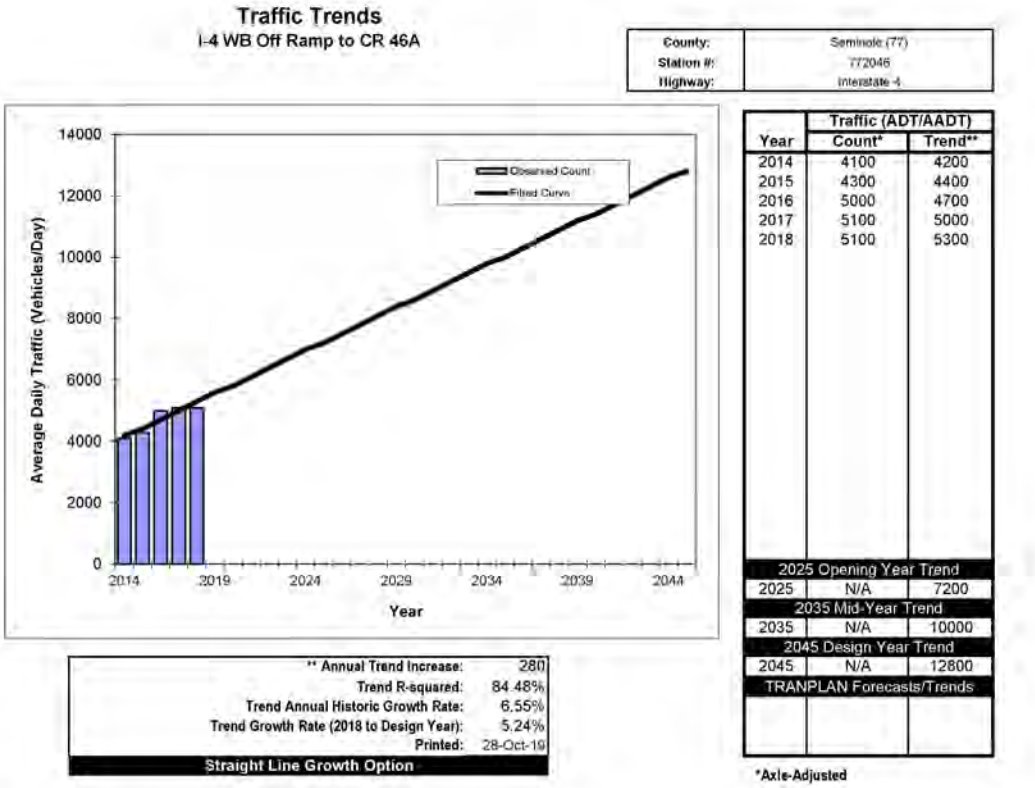


Figure 3-9: Site 772046 - I-4 WB off-ramp to CR 46A

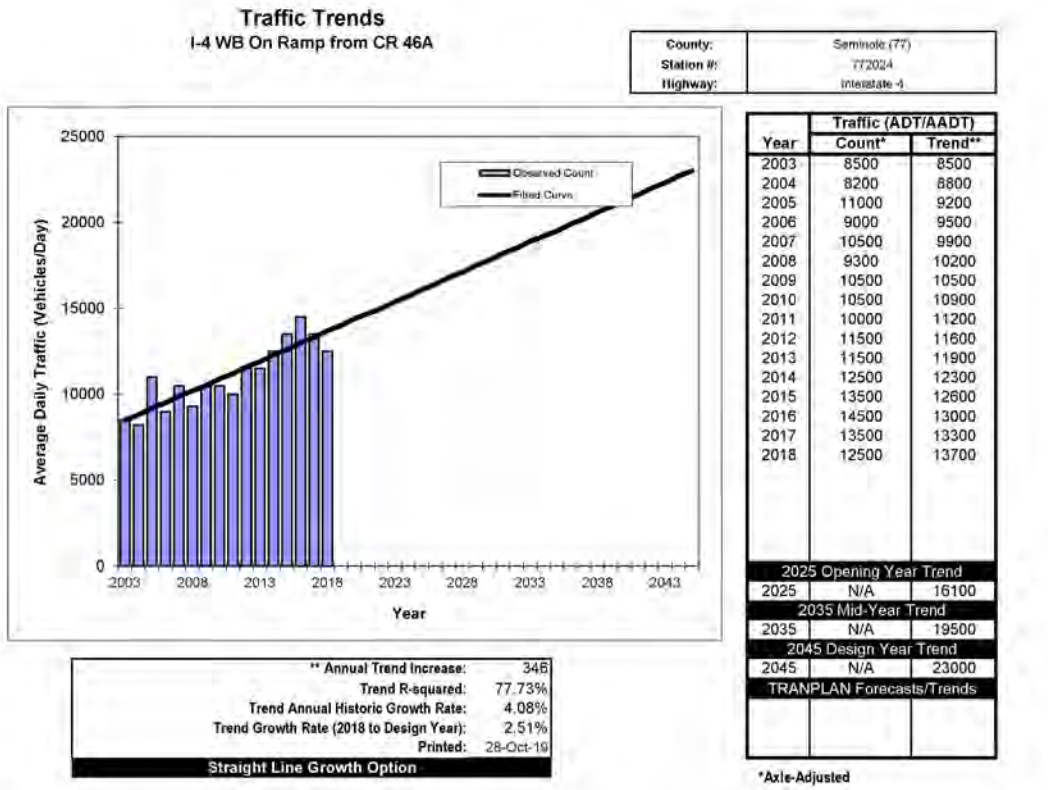


Figure 3-10: Site 772024 - I-4 WB on-ramp from CR 46A

Summary:

The average trend growth rate for the four ramps was 3.28% and this growth rate was used to forecast traffic on I-4 (SR 400) at CR 46A interchange ramps.

3.4.4 I-4 at Lake Mary Blvd Interchange

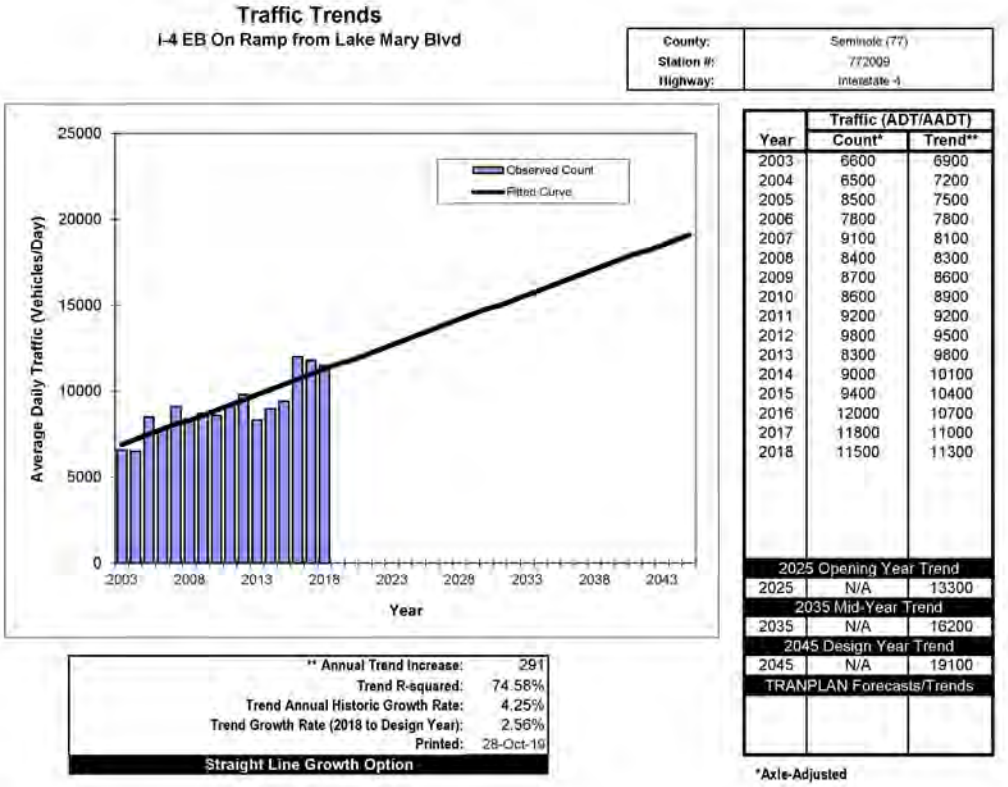


Figure 3-11: Site 772009 - I-4 EB on-ramp from Lake Mary Blvd

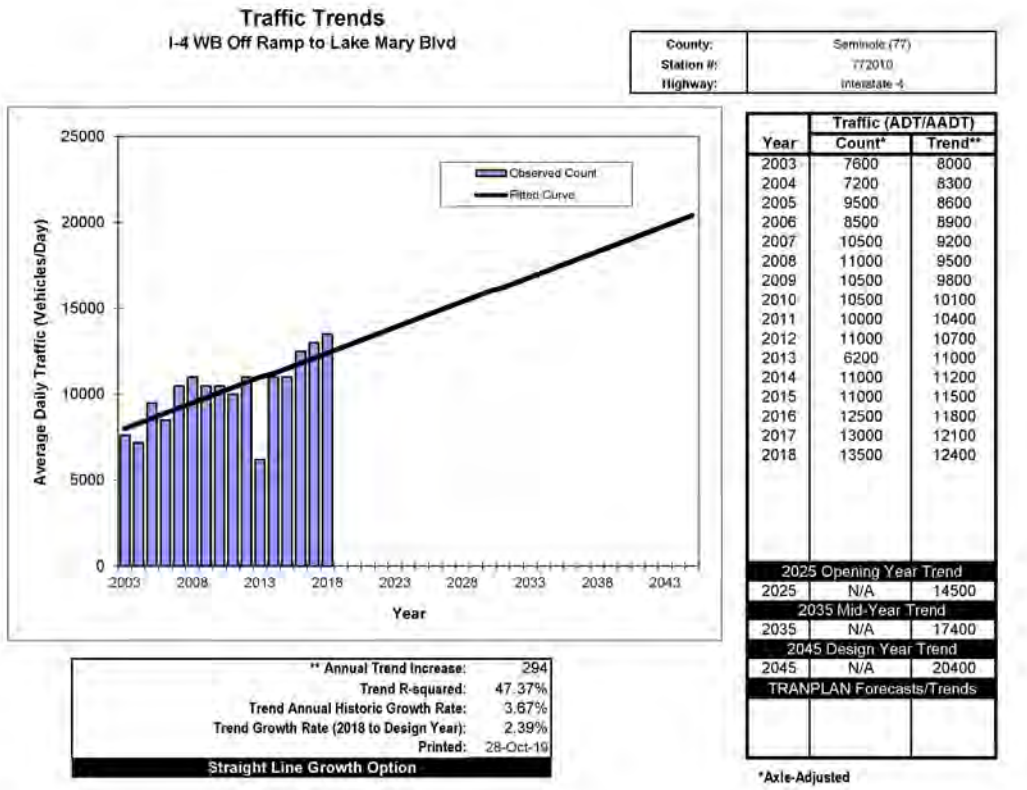


Figure 3-12: Site 772010 - I-4 WB off-ramp to Lake Mary Blvd

Summary:

The average trend growth rate for the two ramps was 2.47% and this growth rate was used to forecast traffic on I-4(SR 400) at Lake Mary Blvd ramps.

3.4.5 SR 417 at Rinehart Road Interchange

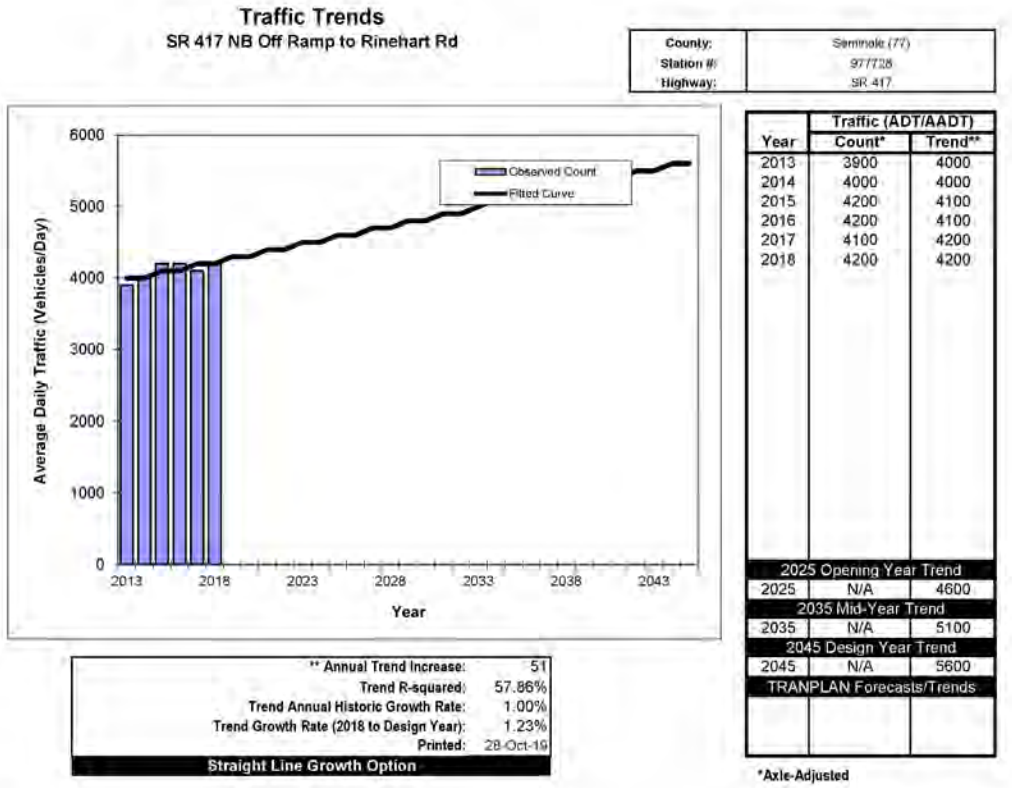


Figure 3-13: Site 977728 – SR 417 NB off-ramp to Rinehart Rd

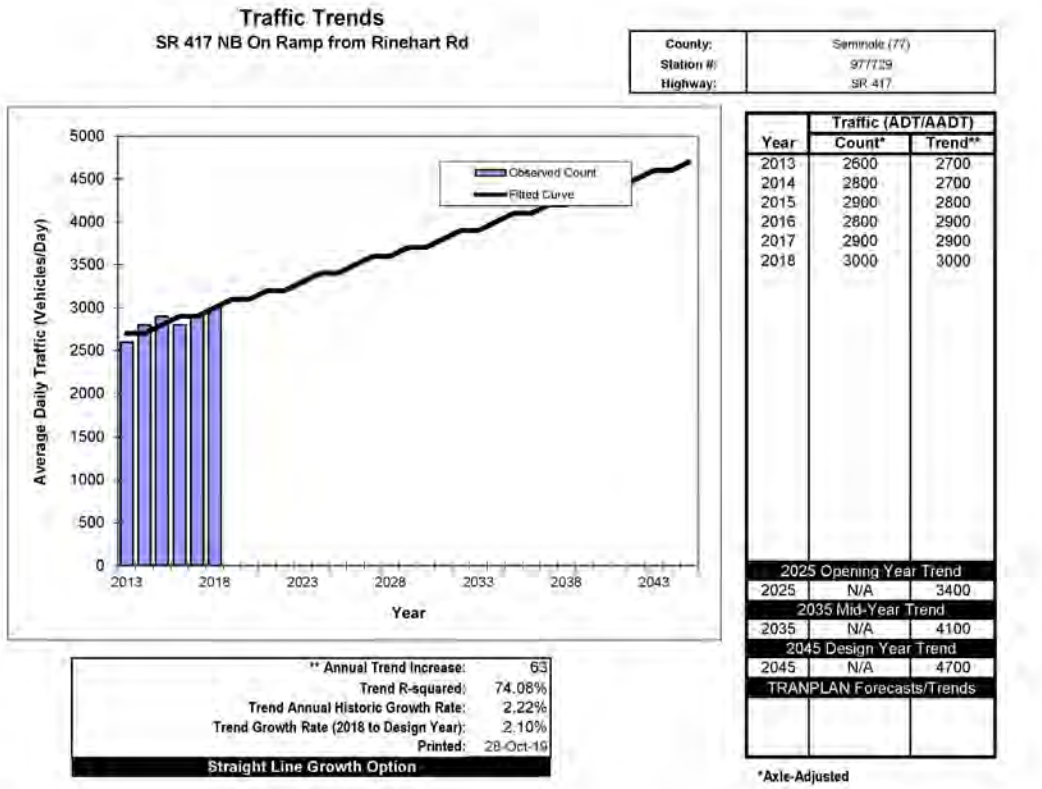


Figure 3-14: Site 977729 – SR 417 NB on-ramp from Rinehart Rd

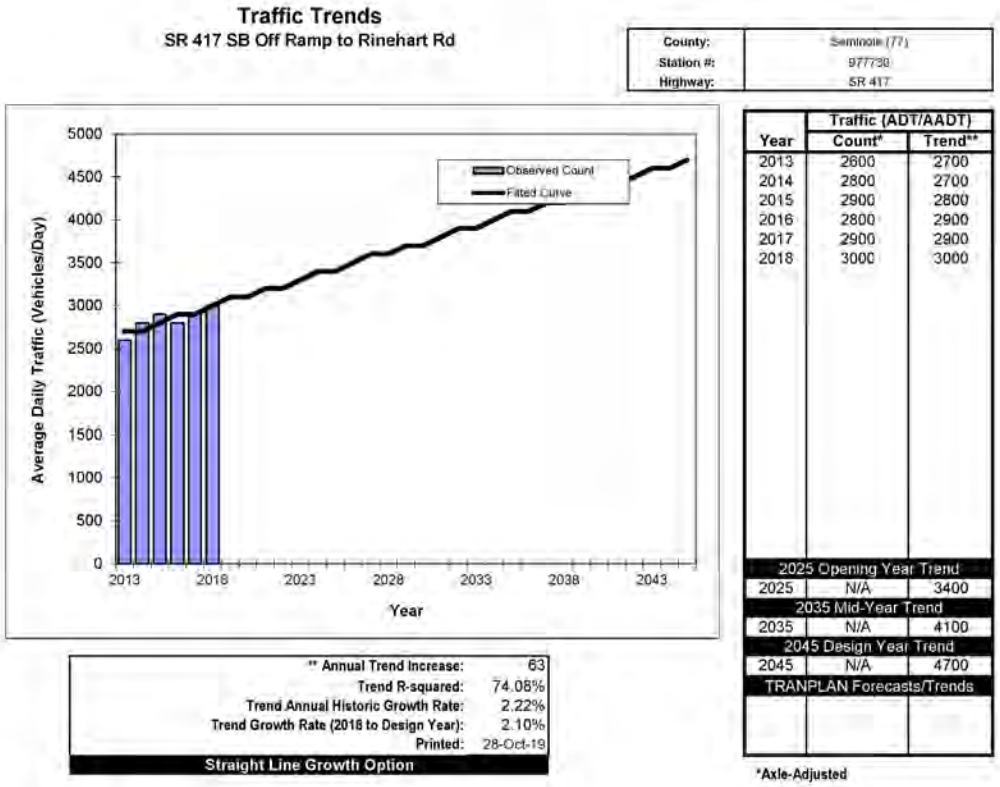


Figure 3-15: Site 977730 – SR 417 SB off-ramp to Rinehart Rd

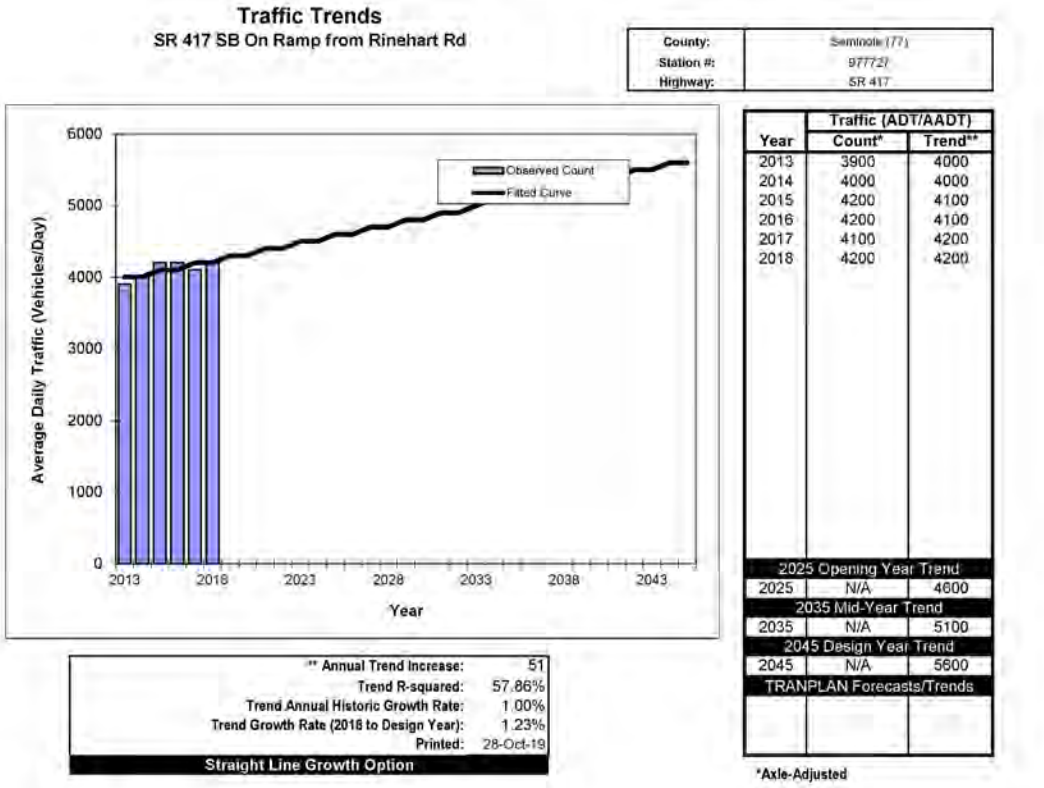


Figure 3-16: Site 977727 – SR 417 SB on-ramp from Rinehart Rd

Summary:

The average trend growth rate for the four ramps was 1.67% and this growth rate was used to forecast traffic on SR 417 at Rinehart interchange ramps.

3.4.6 SR 417/SR 429 at International Parkway Interchange

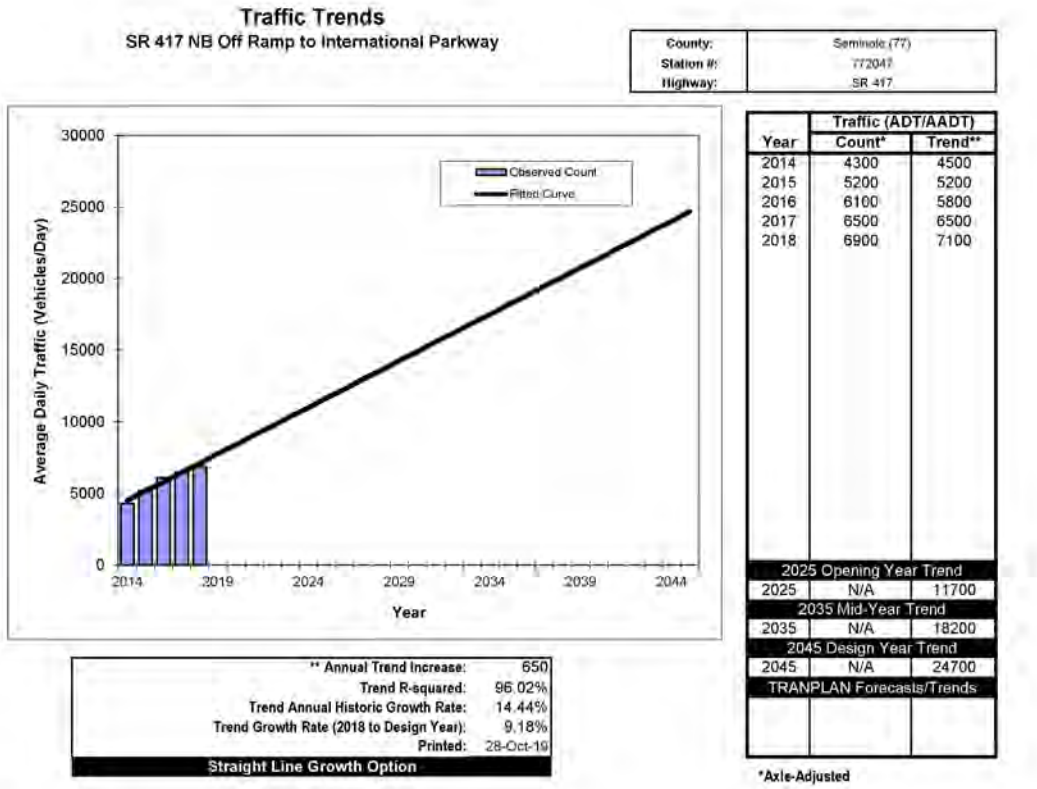


Figure 3-17: Site 772047 – SR 417/SR 429 off-ramp to International Parkway

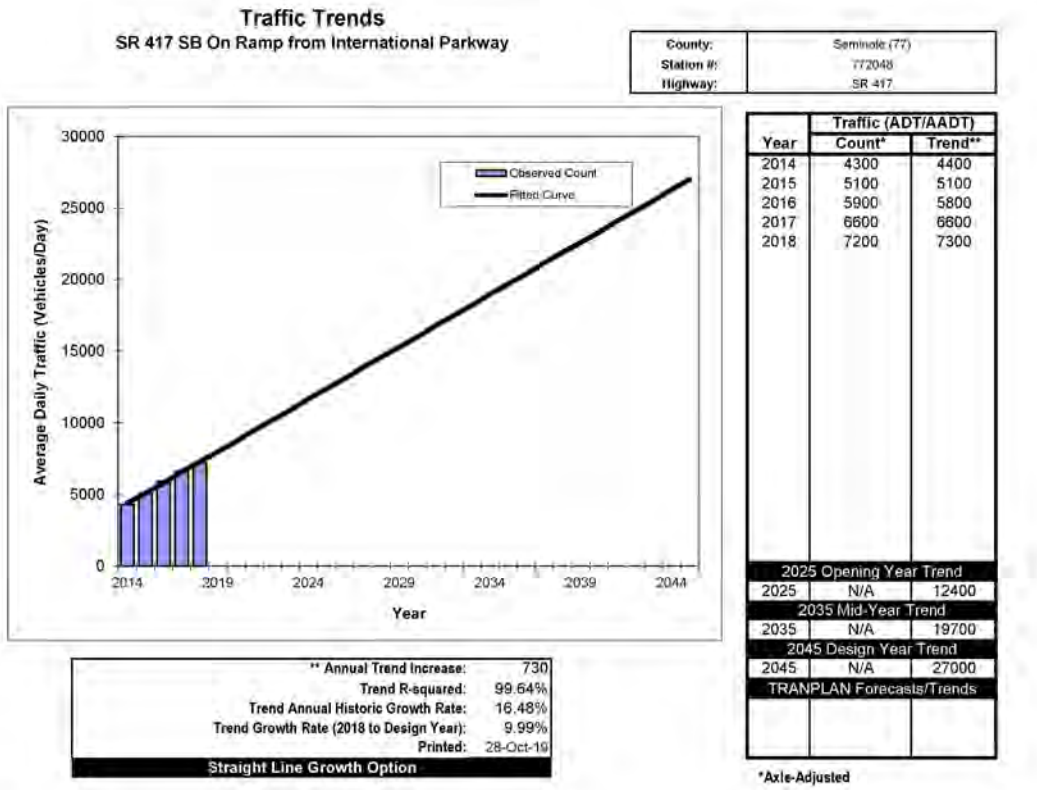


Figure 3-18: Site 772048 – SR 417/SR 429 on-ramp from International Parkway

Summary:

The average trend growth rate for the two ramps was 9.59%. This analysis was based on only 5 years of historical traffic data and is extremely high for a developed area. At 9.59% growth rate, the traffic on these ramps would quadruple by 2045 and exceed projections for system-to-system interchange ramps.

For comparison purposes, the population of Seminole County is projected to grow from 422,718 (in 2010) to 589,200 (in 2045), a growth rate of 1% per year. Therefore, a conservative 2.5% trend growth rate was used to forecast traffic on SR 417 at the International Parkway interchange ramps. This rate is much higher than population projections for Seminole County but lower than the calculated growth rate.

Table 3-5 and **Table 3-6** show the 2043 ramp projections for I-4, SR 417 and SR 429 based on growth rates. These traffic projections were adjusted to balance origin-destination trips (the number of trips arriving equals the number of trips leaving the interchange in each direction).

Once the 2043 CFRPM ramp volumes were replaced with 2043 growth rate volumes, the traffic volumes on I-4, SR 417, and SR 429 on either side of the interchange were no longer in balance.

The traffic balancing approach gave the highest priority to the I-4, SR 417, and SR 429 corridors, followed by interchange ramps and finally intersection turning movements. Therefore, interchange ramp volumes were adjusted to minimize changes for the I-4, SR 417, and SR 429 corridor and intersection volumes were adjusted to minimize changes to ramp traffic projections.

The 2043 Adjusted Traffic Volume column in **Table 3-5** and **Table 3-6** shows the final ramp traffic projections once the entire study area traffic was balanced.

Table 3-5: 2043 Historical Traffic and Adjusted Traffic Volumes for I-4 (SR 400)

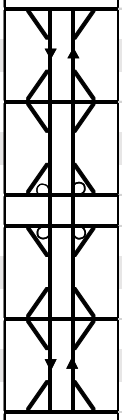
Interchange with I-4 (SR 400)		2043 Historical Traffic Volume				2043 Adjusted Traffic Volume			
		I-4 WB		I-4 EB		I-4 WB		I-4 EB	
US 17/92		18,000		19,000		18,000		18,000	
SR 46		14,000		13,000		16,000		16,000	
		14,000		12,000		12,000		12,000	
SR 429/SR 417		NA	11,000	NA	29,000	13,000	8,000	3,300	13,000
		NA	24,000	NA	9,500	3,300	13,000	13,000	8,000
CR 46A		11,000		11,000		17,000		17,000	
		28,000		35,000		34,000		34,000	
Lake Mary Blvd		25,000		21,000		20,000		20,000	

Table 3-6: 2043 Historical Traffic and Adjusted Traffic Volumes for SR 417/SR 429

Interchange with SR 417/SR 429		2043 Historical Traffic Volume				2043 Adjusted Traffic Volume			
		SR 429 NB/SR 417 SB		SR 429 SB/SR 417 NB		SR 429 NB/SR 417 SB		SR 429 SB/SR 417 NB	
SR 46		NA		NA		9,200		9,200	
International Parkway		NA		NA		11,000		11,000	
		13,000		7,200		11,000		11,000	
I-4		NA	24,000	11,000	NA	3,300	13,000	8,000	13,000
		9,500	NA	NA	29,000	8,000	13,000	3,300	13,000
Rinehart Rd		4,500		3,000		5,500		5,500	
		6,400		4,200		5,400		5,400	

3.5 Final Adjusted Traffic Forecasts

The final traffic forecasts are shown in **Table 3-7** and **Table 3-8.** At this point, the initial traffic forecasts produced by CFRPM for the interchange ramps had been replaced by growth method-based forecasts, and the traffic forecast for the I-4, SR 429 and SR 417 corridor had been modified to balance the traffic across the interchanges.

The final traffic forecasts no longer represented Peak Season Weekday Average Daily Traffic and therefore, were not multiplied by a Model Output Conversion Factor (MOCF) to calculate AADT. Applying a MOCF factor to the I-4, SR 417 and SR 429 corridor would have resulted in unbalanced traffic.

Table 3-7: 2023 and 2043 Adjusted Traffic Volumes for I-4 (SR 400)

Interchange with I-4 (SR 400)		2023 Adjusted Traffic Volume		2043 Adjusted Traffic Volume		2023-2043 Growth
		I-4 WB	I-4 EB	I-4 WB	I-4 EB	
US 17/92						
		9,900	9,900	18,000	18,000	
		76,000	**76,000**	**107,000**	**107,000**	**41%**
SR 46		13,000	13,000	16,000	16,000	
		12,000	12,000	12,000	12,000	
		74,000	**74,000**	**103,000**	**103,000**	**39%**
		9,400 6,800	3,100 10,000	13,000 8,000	3,300 13,000	
SR 429/SR 417						
		3,100 10,000	9,400 6,800	3,300 13,000	13,000 8,000	
		65,000	**65,000**	**89,000**	**89,000**	**37%**
		6,000	6,000	17,000	17,000	
CR 46A		20,000	20,000	34,000	34,000	
		79,000	**79,000**	**106,000**	**106,000**	**34%**
		15,000	15,000	20,000	20,000	
Lake Mary Blvd						

Table 3-8: 2023 and 2043 Adjusted Traffic Volumes for SR 417/SR 429

Interchange with SR 417/SR 429		2023 Adjusted Traffic Volume		2043 Adjusted Traffic Volume		2023-2043 Growth
		SR 429 NB/ SR 417 SB	SR 429 SB/ SR 417 NB	SR 429 NB/ SR 417 SB	SR 429 SB/ SR 417 NB	
		28,000	**28,000**	**43,000**	**43,000**	**54%**
SR 46		7,500	7,500	9,200	9,200	
		21,000	**21,000**	**34,000**	**34,000**	**62%**
International Parkway		5,500	5,500	11,000	11,000	
		6,800	6,800	11,000	11,000	
		22,000	**22,000**	**35,000**	**34,000**	**57%**
		3,100 10,000	6,800 9,400	3,300 13,000	8,000 13,000	
I-4						
		6,800 9,400	3,100 10,000	8,000 13,000	3,300 13,000	
		26,000	**26,000**	**40,000**	**39,000**	**52%**
Rinehart Rd		4,100	4,100	5,500	5,500	
		3,700	3,700	5,400	5,400	
		26,000	**26,000**	**39,000**	**39,000**	**50%**

3.6 Traffic Factors

Traffic factors were collected from the FDOT Florida Traffic Online Website and are listed below in **Table 3-9**. The ranges of the factors have been checked against the recommended ranges identified in the Project Traffic Forecasting Handbook (2014) and Procedure (525-030-120).

Table 3-9: Traffic Factors by Roadway

Roadway	K	D	T	T_f	FDOT Count Sites
I-4	9%	51.7%	10.4%	5.2%	770266, 770286, 770268
SR 417	9%	54.8%	15.5%	7.8%	972350, 972360
SR 46	9%	52.6%	8.7%	4.4%	770073, 770287, 770288
CR 46A	9%	52.6%	5.0%	2.5%	778091
Rinehart Road	9%	52.6%	5.0%	2.5%	778070
International Parkway	9%	52.6%	5.0%	2.5%	778001

Source: 2017 Florida Traffic Online

3.7 Directional Design Hour Volumes

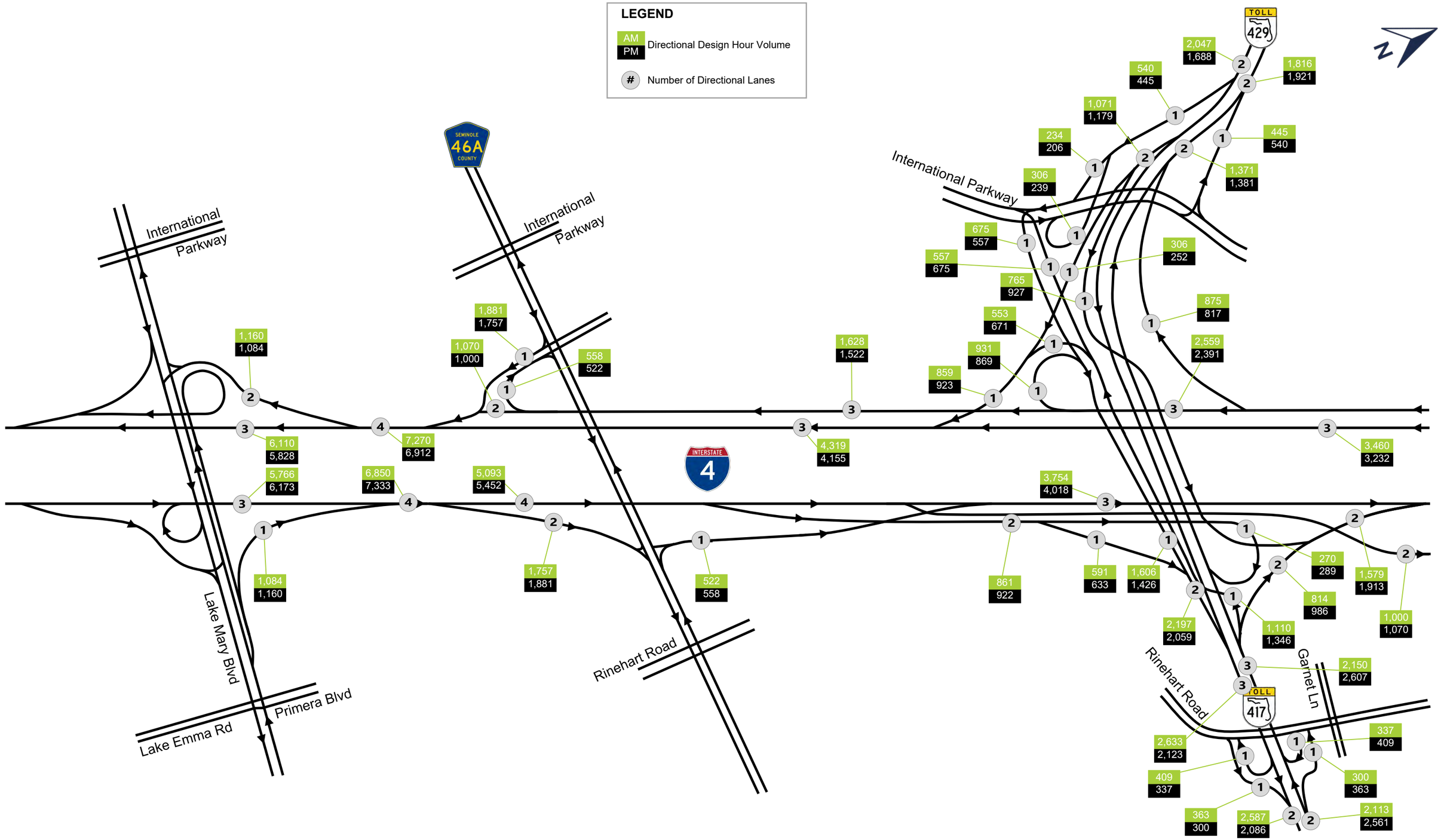
Per the FDOT Project Traffic Forecasting Handbook (2014), the DDHVs were calculated using the following formula:

$DDHV = AADT * K * D_{30}$

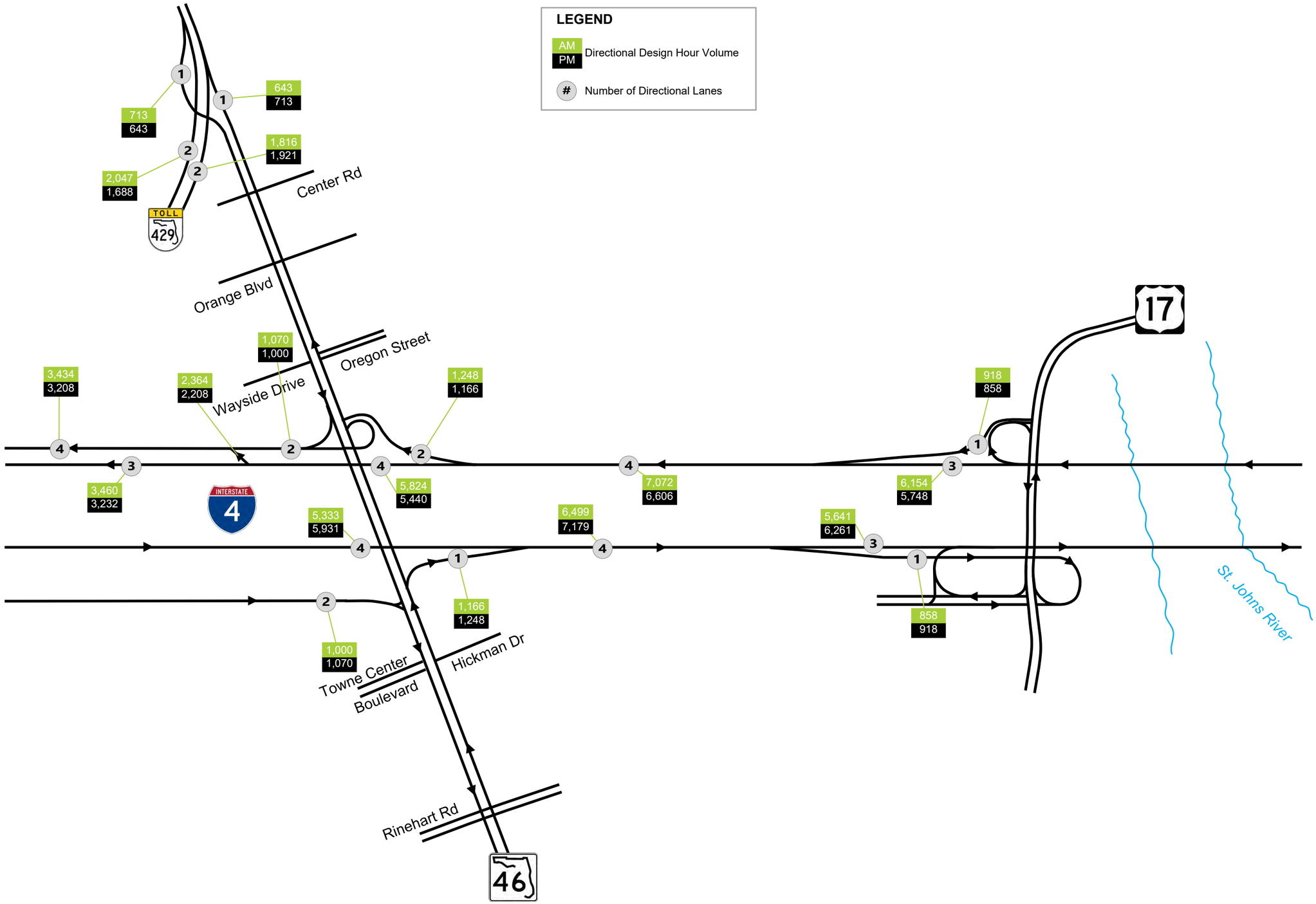
where K = Standard K Factor and D_{30} = Directional Factor

The project area includes two existing limited access facilities: I-4 and SR 417. As shown in **Table 3-9**, I-4 and SR 417 have different D factors. As a result, traffic projections can either be balanced at the AADT level or the DDHV level, but not both. Since the traffic operations analysis was performed using DDHV, the final traffic balancing was performed at the DDHV level. Consequently, there will be some minor discrepancies when calculating DDHV volumes from projected AADT.

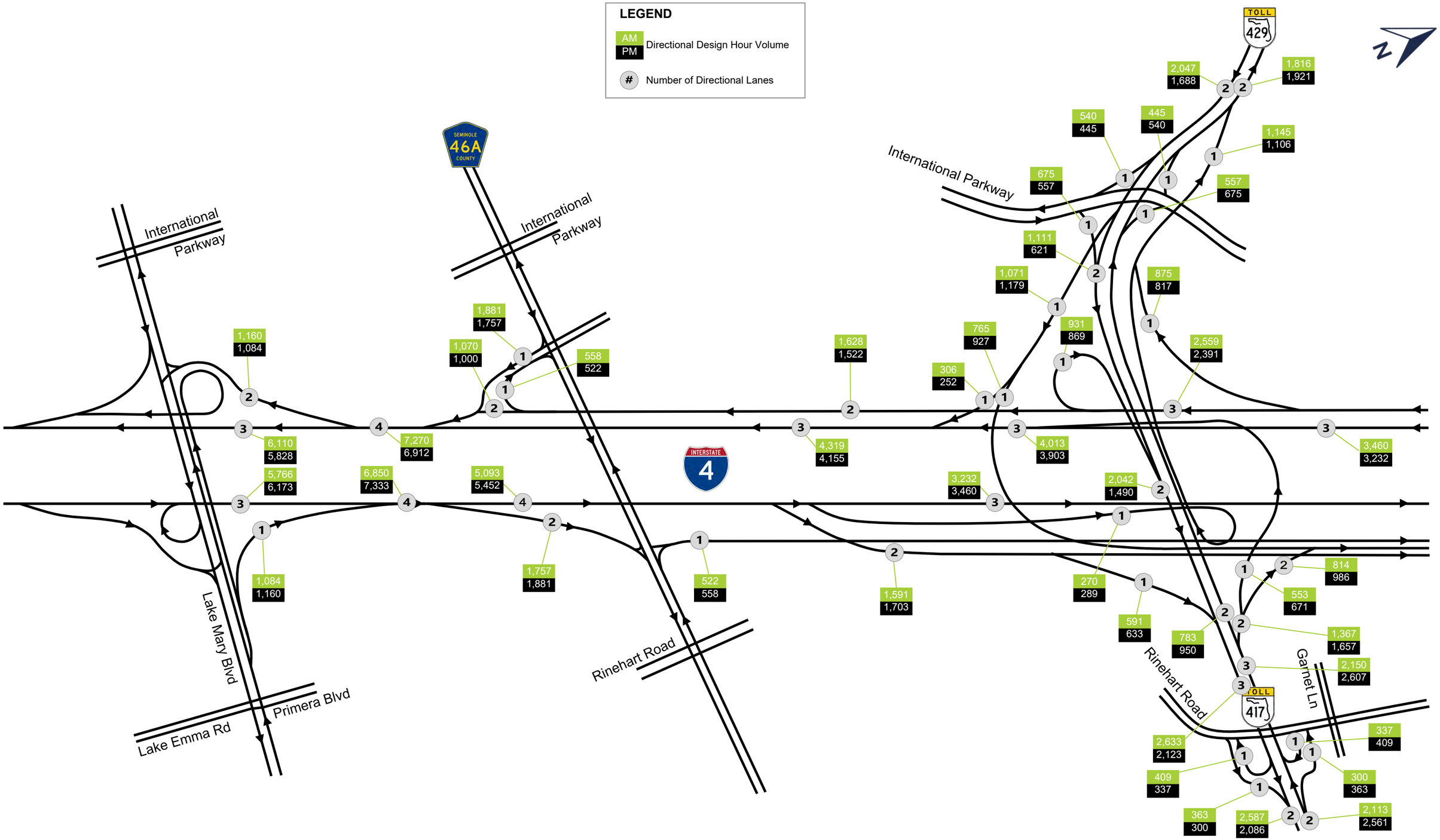
Figure 3-19 through **Figure 3-26** show the forecasted DDHV for years 2023 and 2043 on segments within the area of influence.



SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal** **2023 Directional Design Hour Volume**	Figure 3-19 Page 3-27

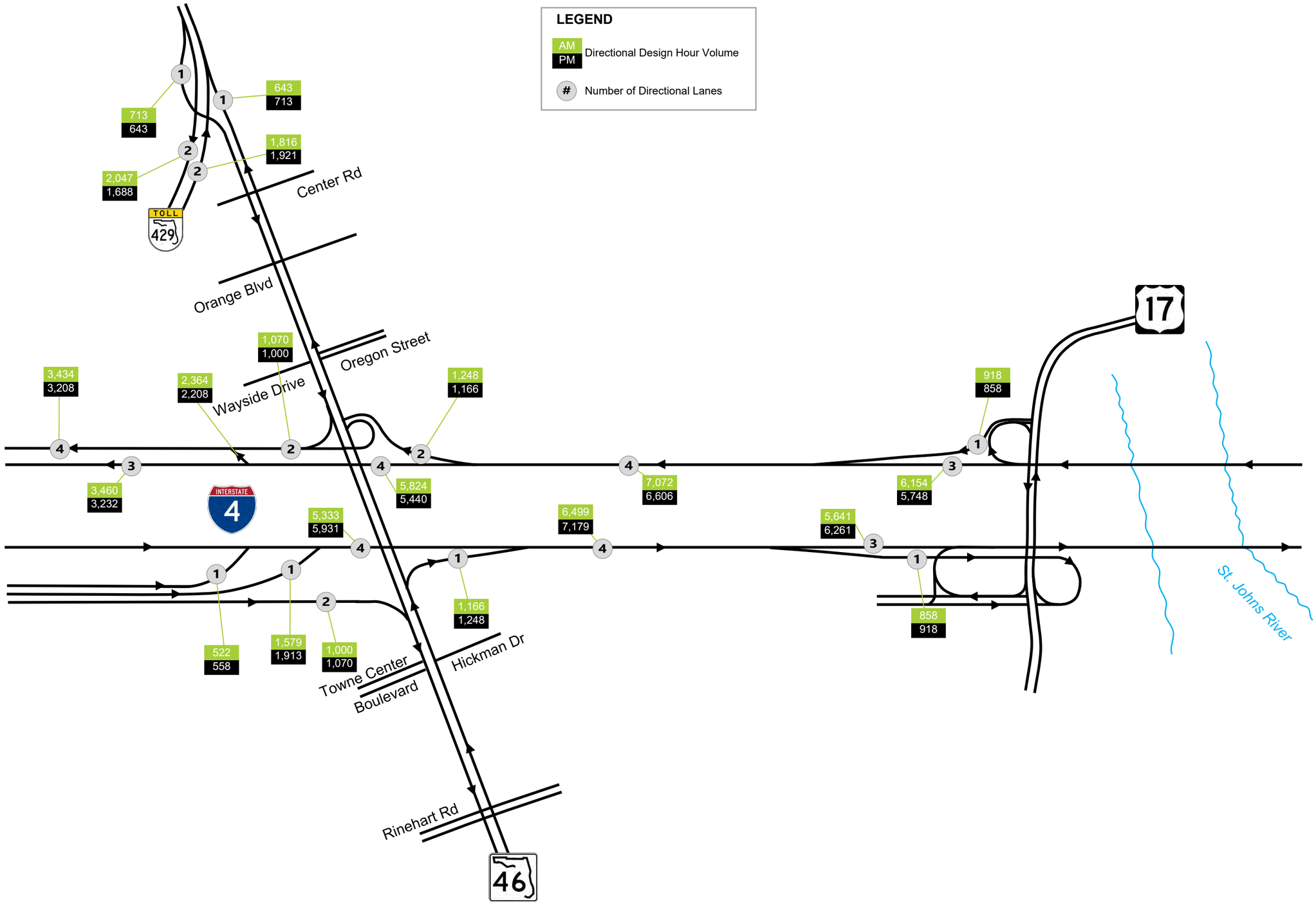


SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal** **2023 Directional Design Hour Volume**	Figure 3-20 Page 3-28

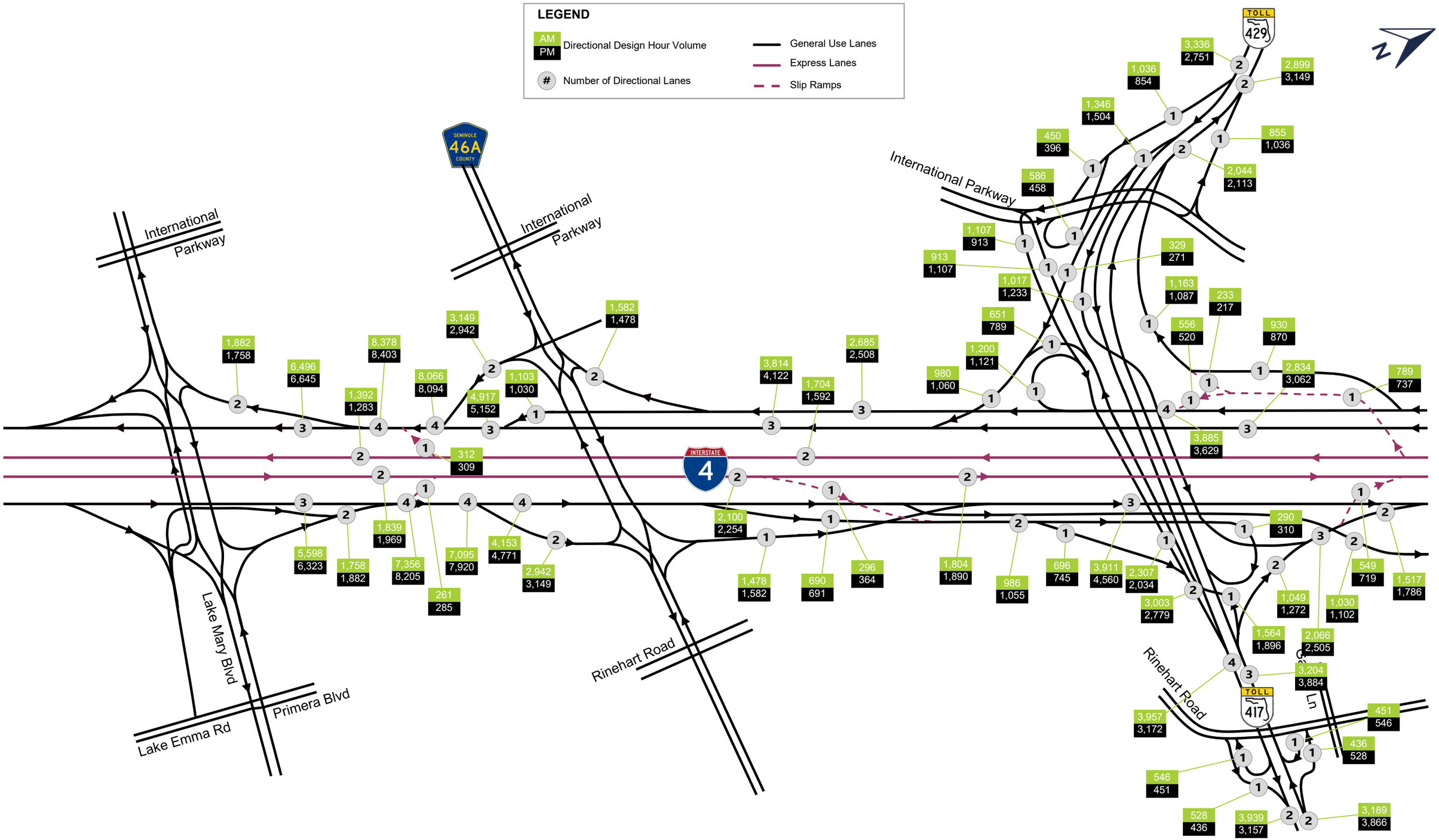


FDOT	SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32** **2023 Directional Design Hour Volume**

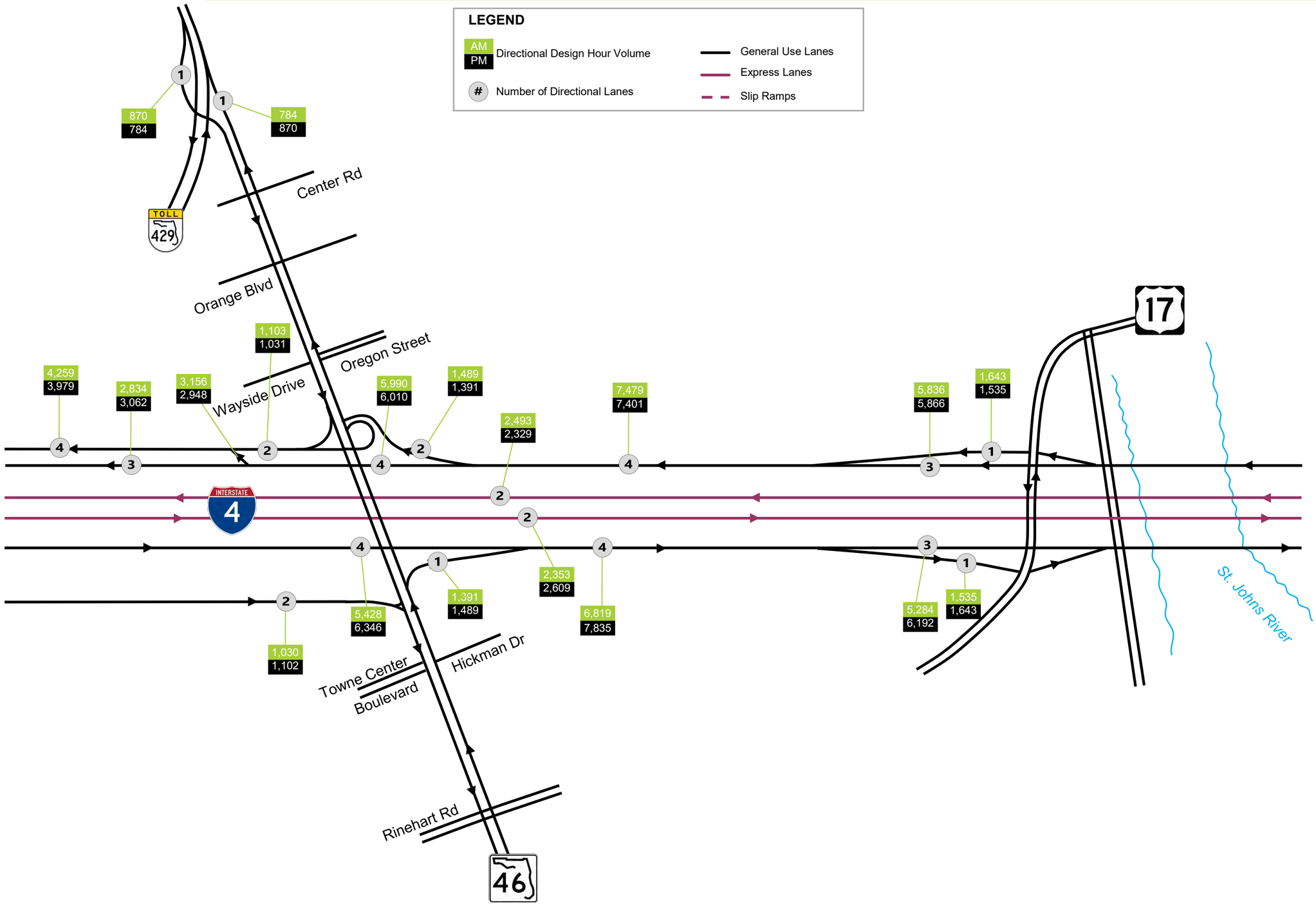
Figure 3-21

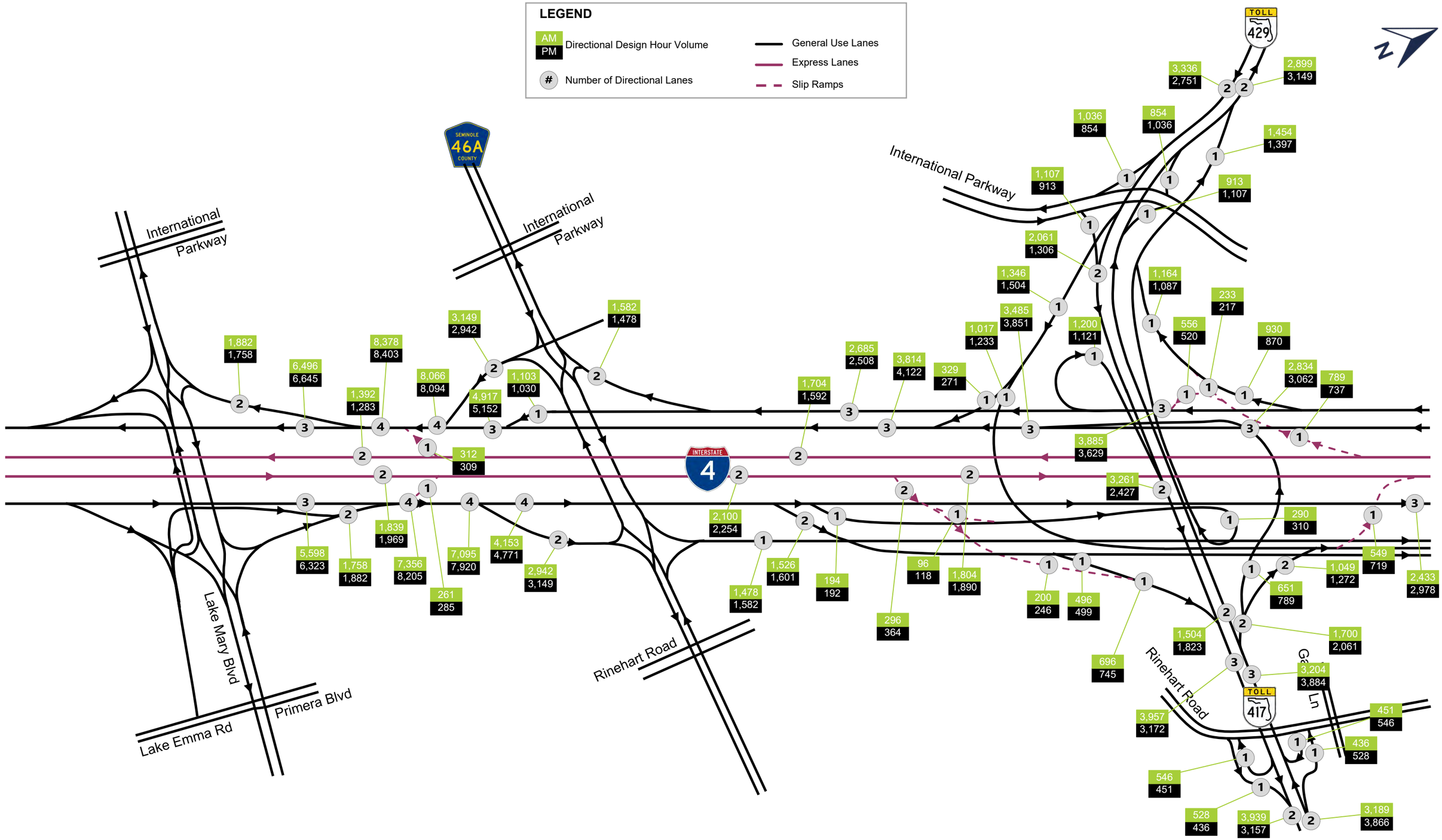


SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32** **2023 Directional Design Hour Volume**	Figure 3-22 Page 3-30

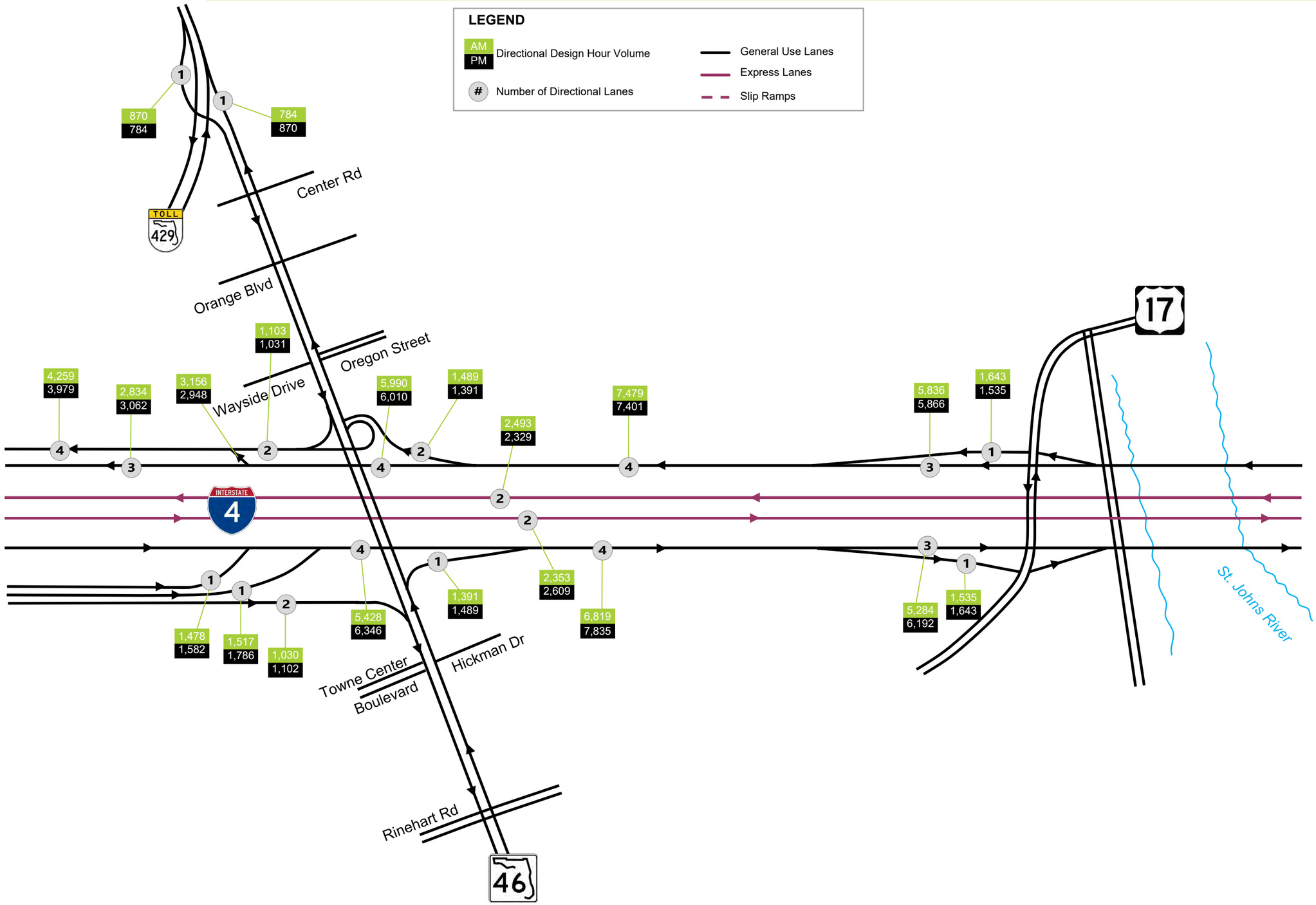


SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal** **2043 Directional Design Hour Volume**	Figure 3-23 Page 3-31





SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32** **2043 Directional Design Hour Volume**	Figure 3-25 Page 3-33



3.8 Future Turning Movements

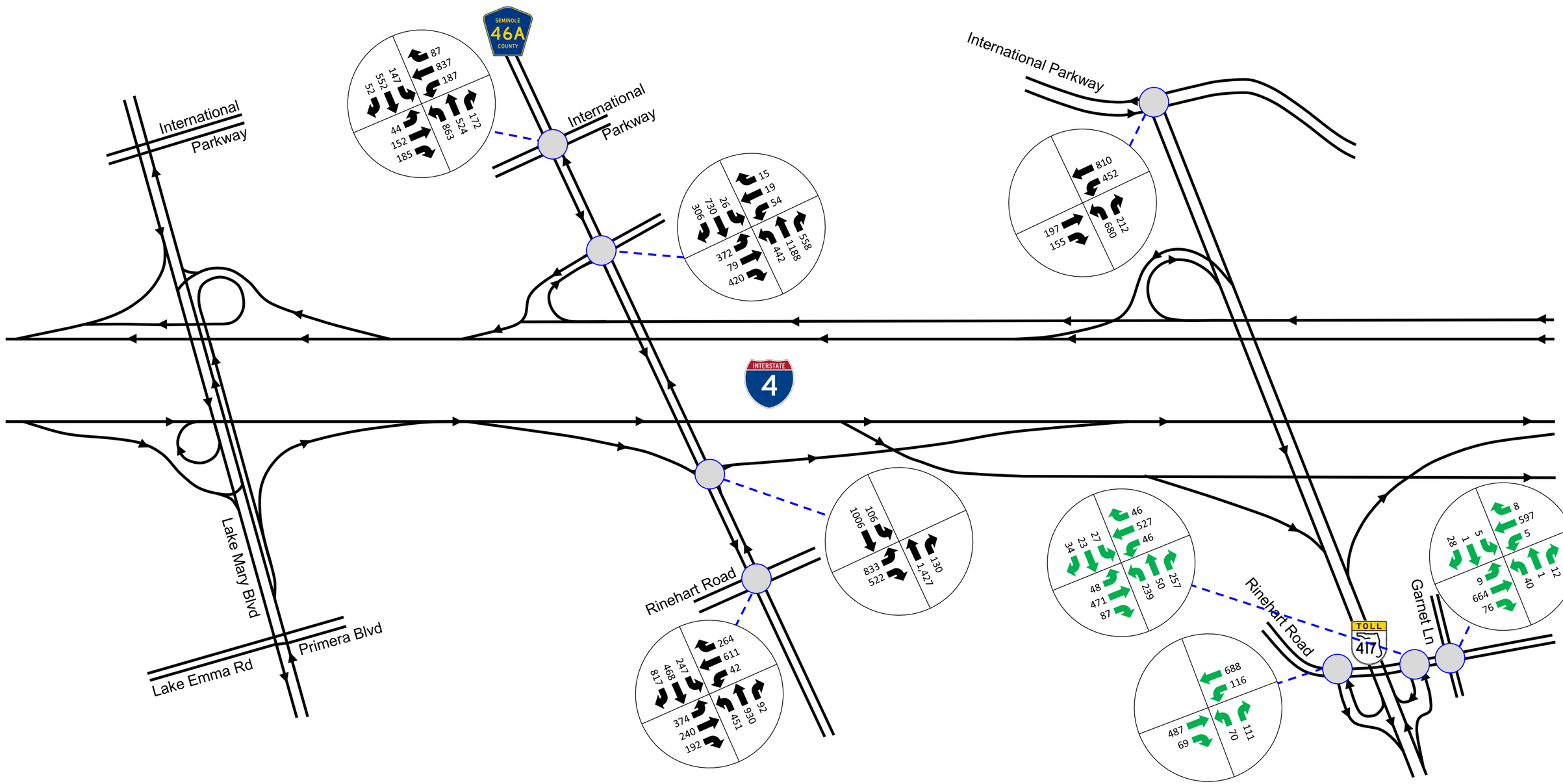
The AOI for the Wekiva Parkway (SR 429)/I-4 interchange project included 15 intersections. As part of the I-4 BtU data collection effort, existing turning movements were collected at the SR 46 and CR 46A ramp terminals on August 24, 2017 from 7:30 a.m. to 8:30 a.m. and 4:45 p.m. to 5:45 p.m.

The I-4 BtU data collection focused on I-4 and did not include any intersections with SR 417 and SR 46 near the proposed SR 429 interchange. Therefore, a second data collection effort was initiated on January 23, 2019 from 6:00 a.m. to 10:00 a.m. and from 4:00 p.m. to 7:00 p.m. to collect existing turning movements on Rinehart Road, International Parkway and SR 46 intersections near the proposed SR 429 interchange.

Figure 3-27 through **Figure 3-30** show the existing turning movement counts collected.

Collected in 2017

Collected in 2019



SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange

Seminole County, Florida

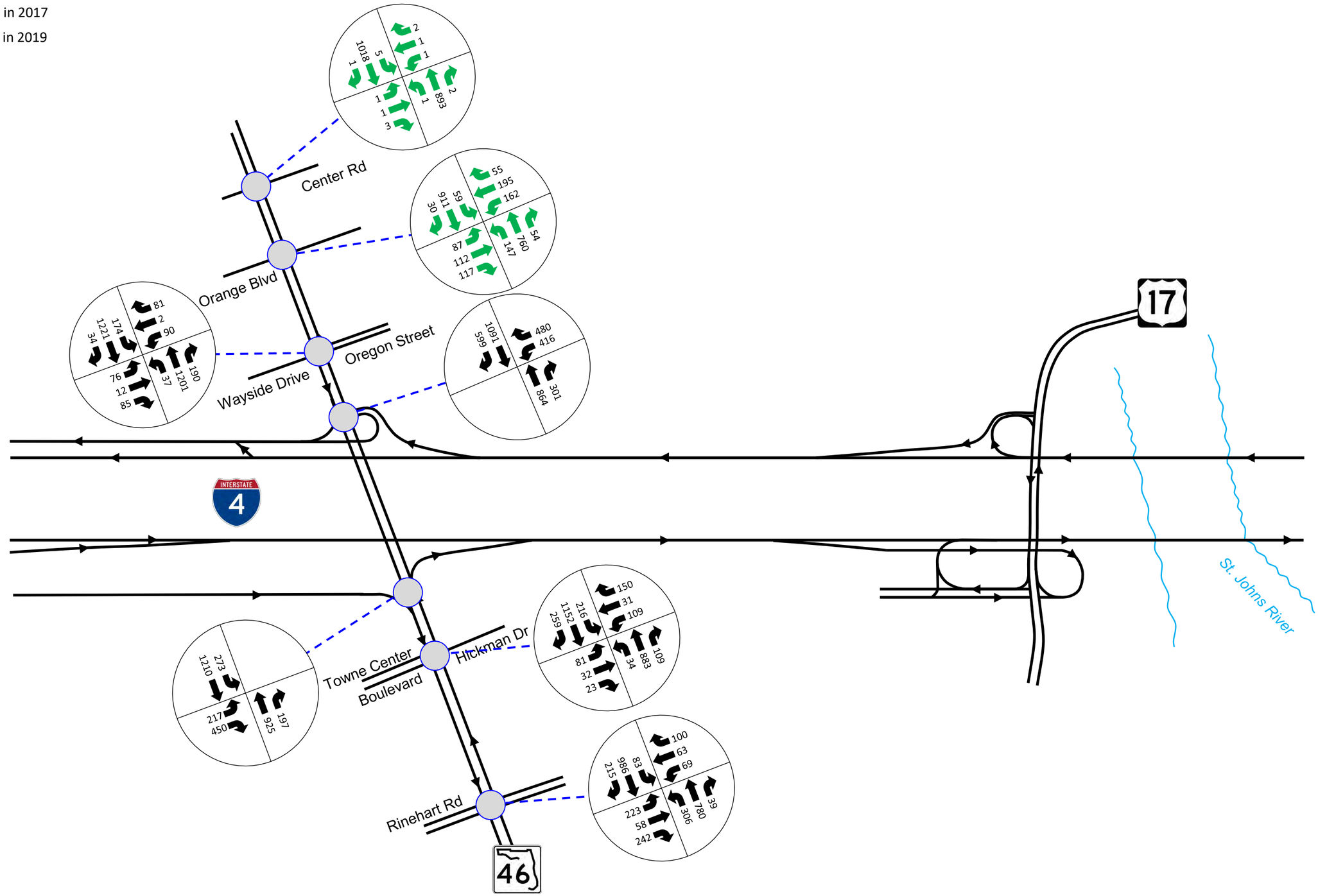
FM Number: 240200-4

Turning Movement Counts - AM Peak

Figure 3-27

Collected in 2017

Collected in 2019



SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange

Seminole County, Florida

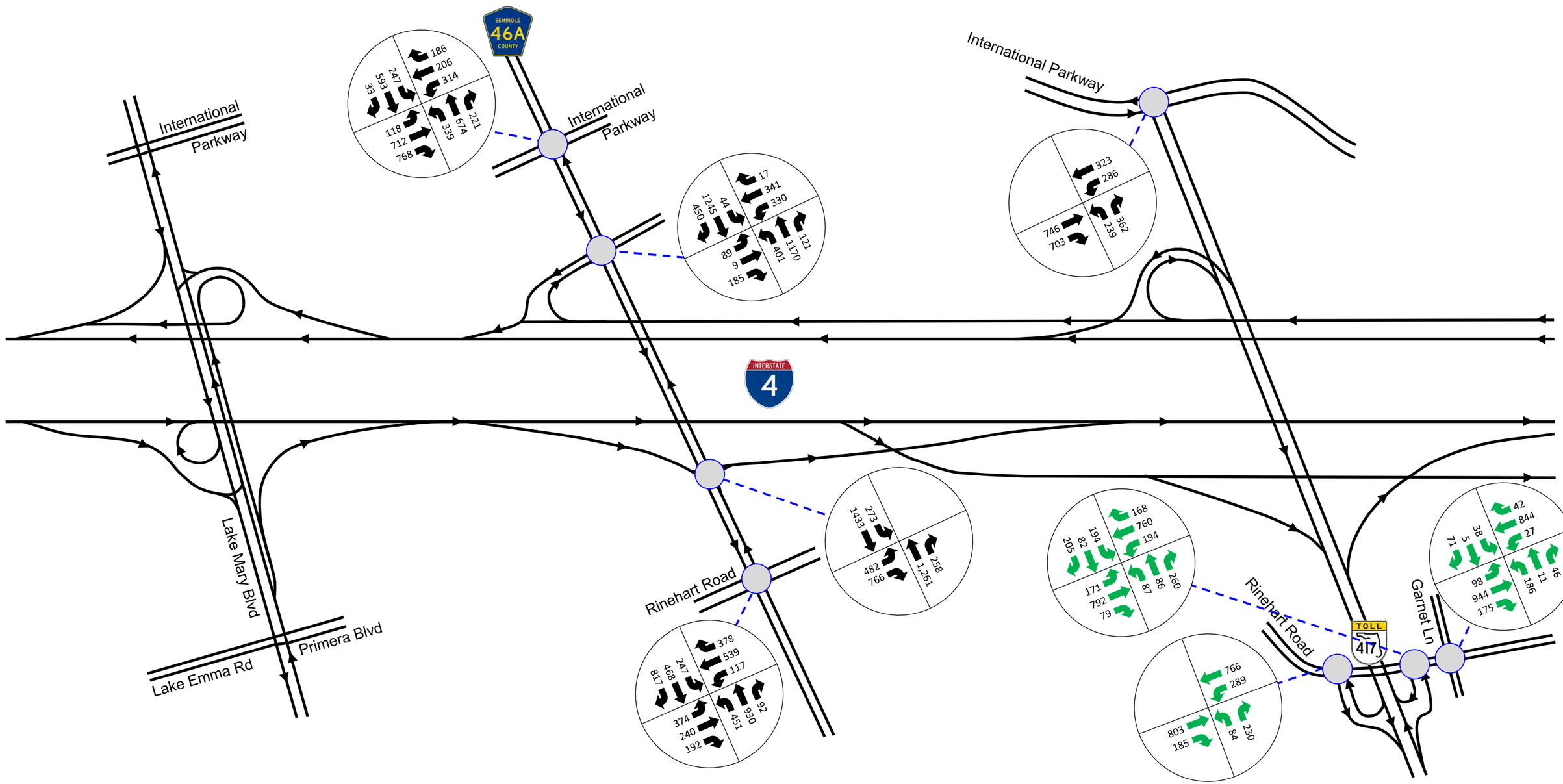
FM Number: 240200-4

Turning Movement Counts - AM Peak

Figure 3-28

Collected in 2017

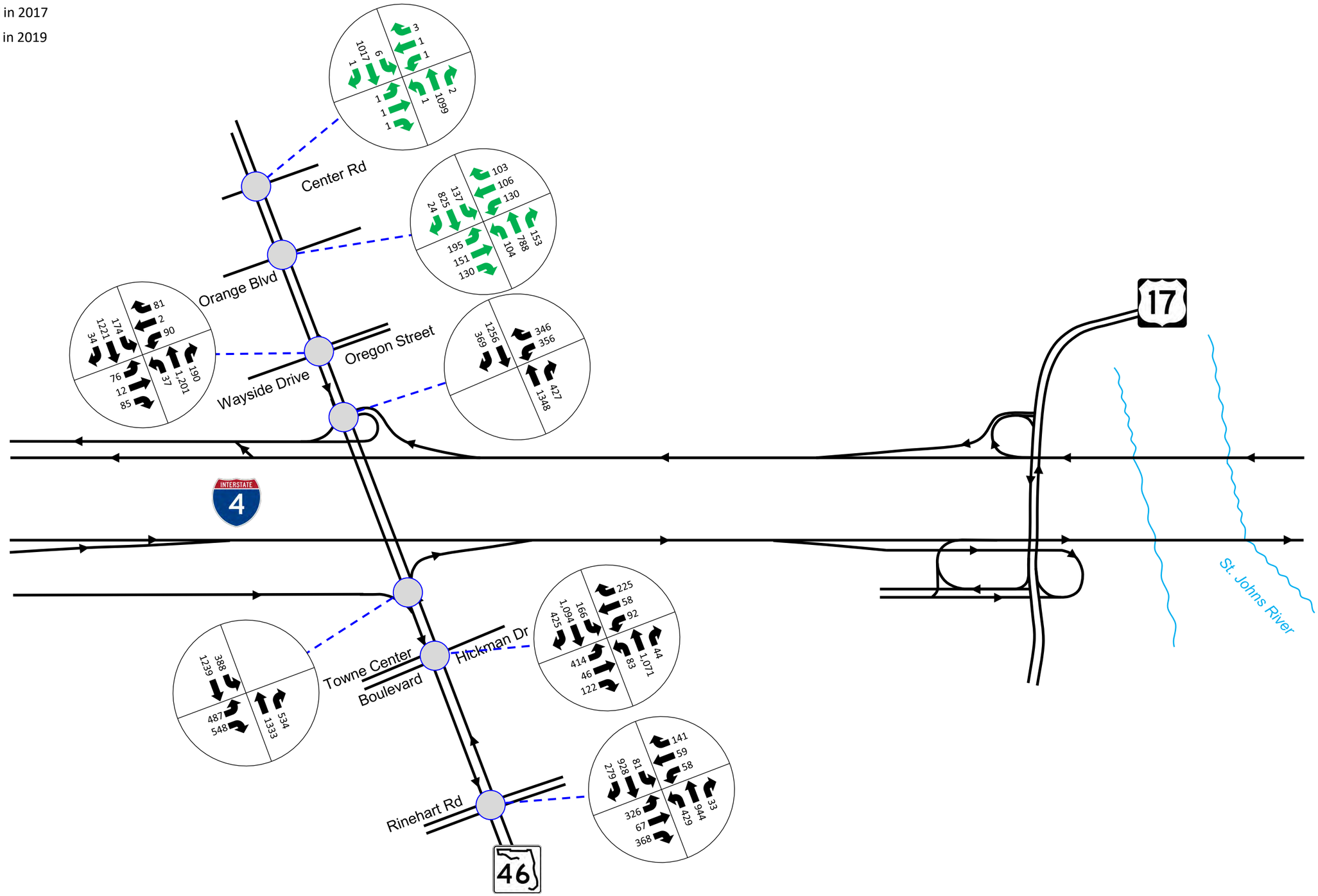
Collected in 2019



SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Turning Movement Counts - PM Peak**	Figure 3-29 Page 3-38

Collected in 2017

Collected in 2019



At the time of the MLOU approval, the plan for developing future turning movements was to use TURNS 5 software. TURNS 5 software uses AADT projections, K and D factors, and existing peak hour turning movements to forecast design hour turning movements. As previously discussed, the 2045 CFRPM forecasts on ramps were lower than the 2018 traffic counts. Therefore, a different approach was required to forecast turning movements.

The challenge in developing turning movements was to ensure consistency between the ramp traffic projections and turning movements at the intersections. Therefore, a three-step process was used to forecast future turning movements:

Step 1: Initial 2023/2043 projections were obtained by applying a growth rate to the existing turning movements.

Step 2: For interchange ramp terminals, the projections were compared and adjusted to match the DDHV calculated in **Section 3.7**.

Step 3: The volumes on the crossroads and the ramps terminals were again balanced so that volumes approaching the intersection equaled the volumes exiting the intersection.

Figure 3-31 through **Figure 3-46** show the turning movement forecasts for years 2023 and 2043 on segments within the area of influence.

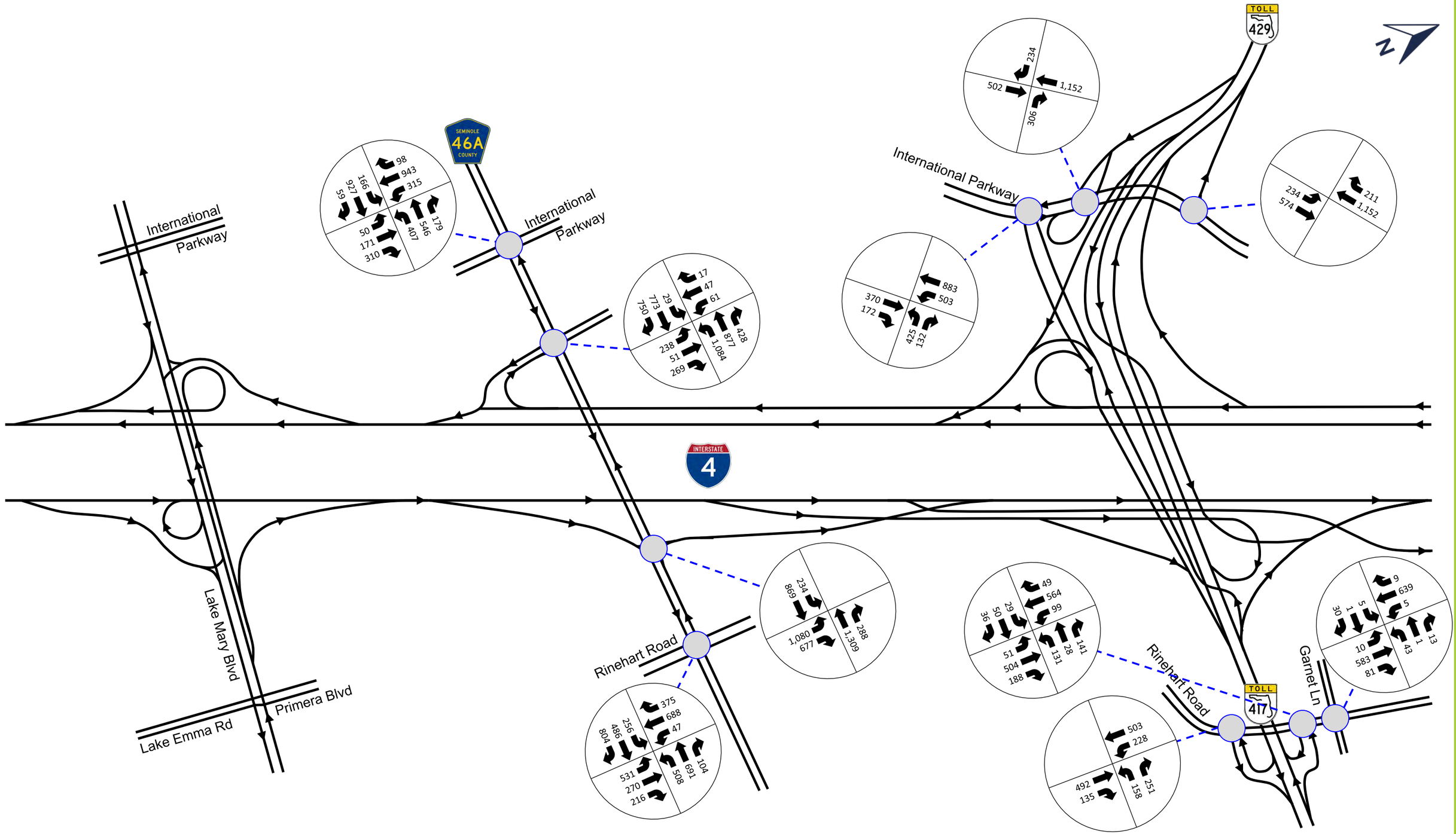
The growth rate for each intersection was based on trend analysis discussed in **Section 3.4** with some modifications.

Table 3-10: Turning Movement Growth Rate

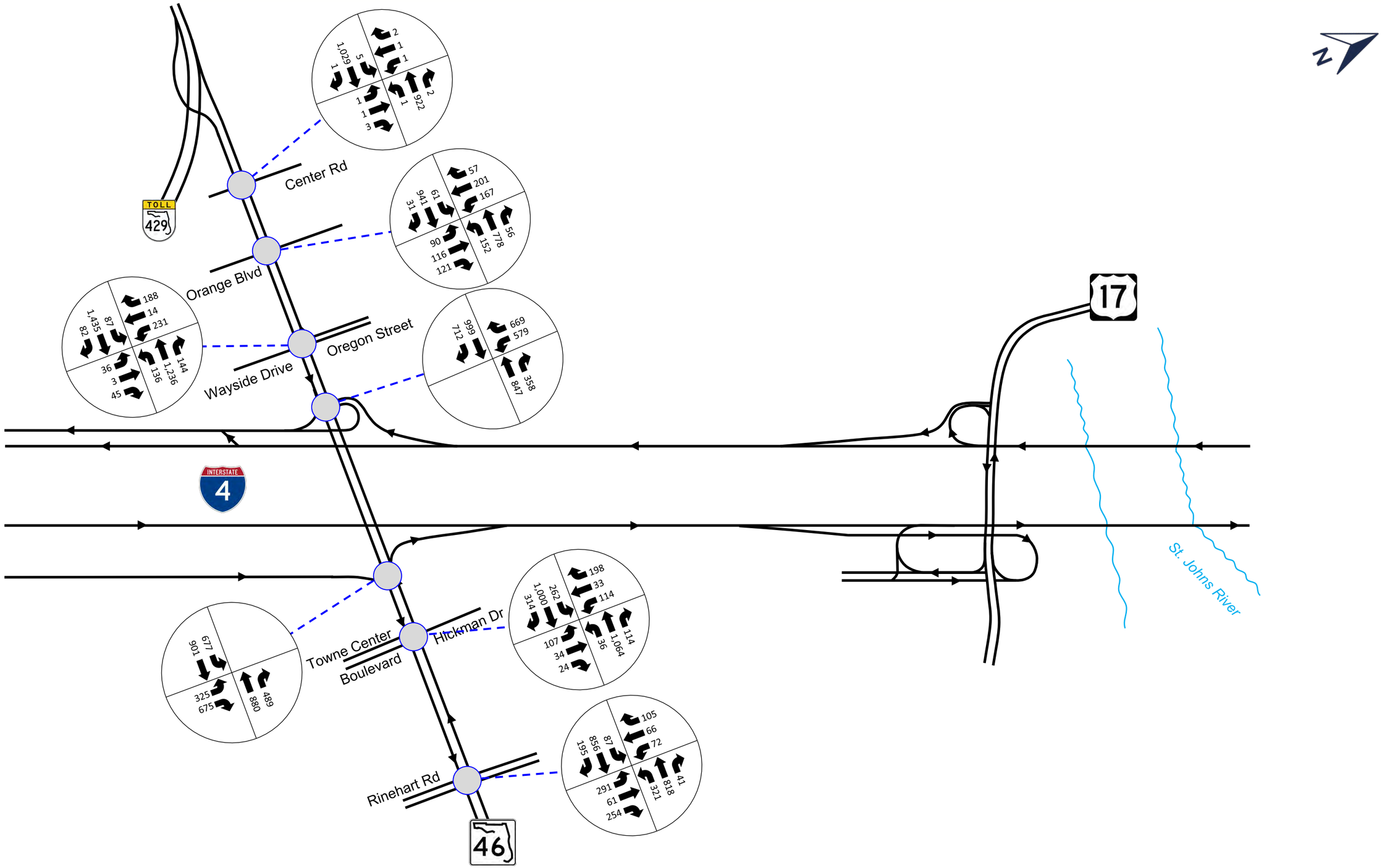
Roadway	Trend Analysis Growth Rate	Turning Movement Growth Rate
SR 46	0.8%	0.8%
CR 46A	3.2%	2.0%
Rinehart Road	1.7%	1.7%
International Parkway	9.6%	2.0%

The trend analysis growth rate for CR 46A and International Parkway was 3.2% and 9.6%. While this growth is reasonable for AADT, it is not reasonable for peak hour turning movements. The morning and afternoon peak hour of an intersection are generally the most congested times of the day and the traffic volumes are reaching the capacity of the intersection.

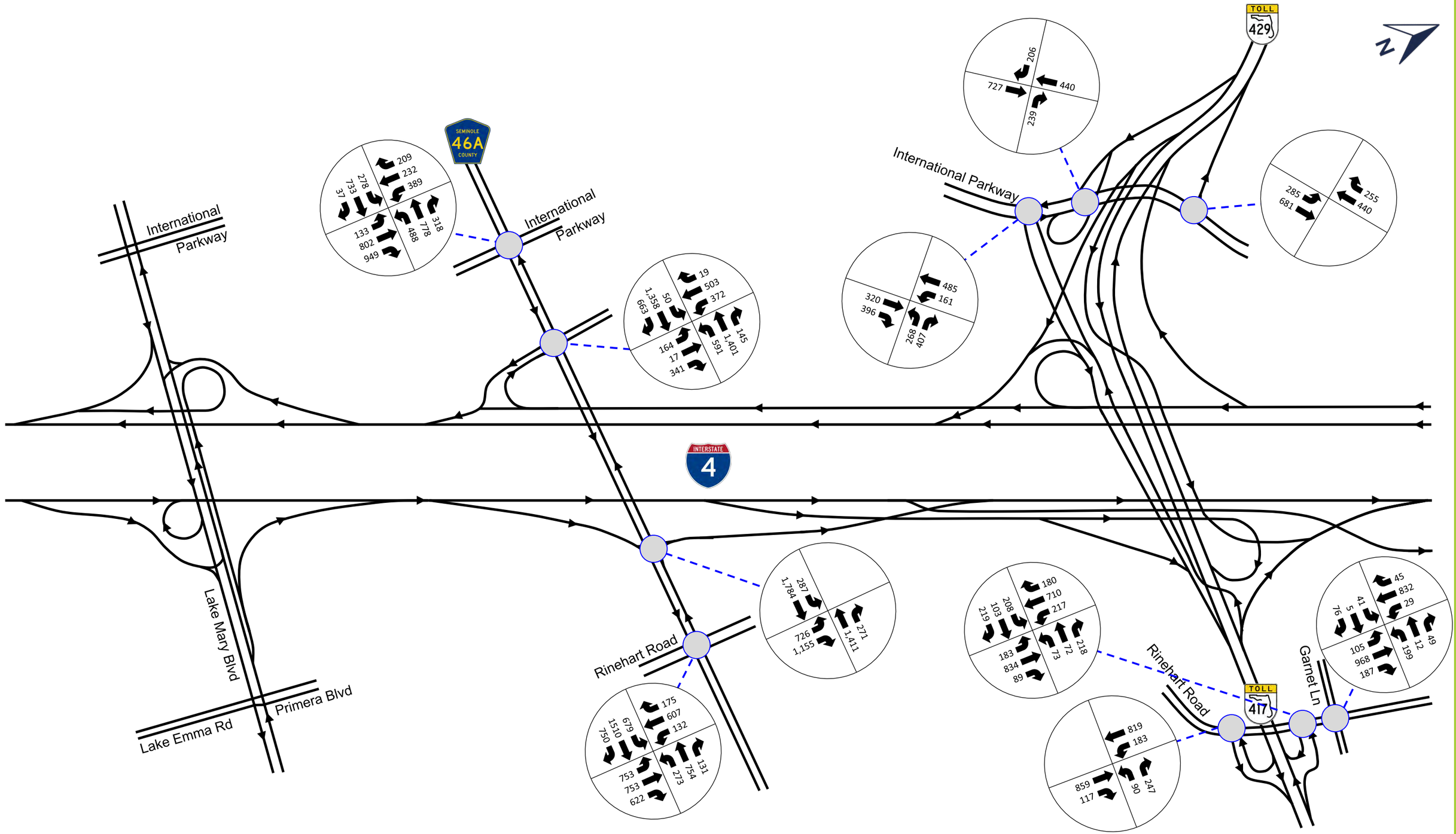
For comparison purposes, the population of Seminole County is projected to grow from 422,718 (in 2010) to 589,200 (in 2045), a growth of 1% per year. Therefore, a conservative 2.0% growth rate was used to forecast turning movements for the CR 46A and International Parkway intersections.



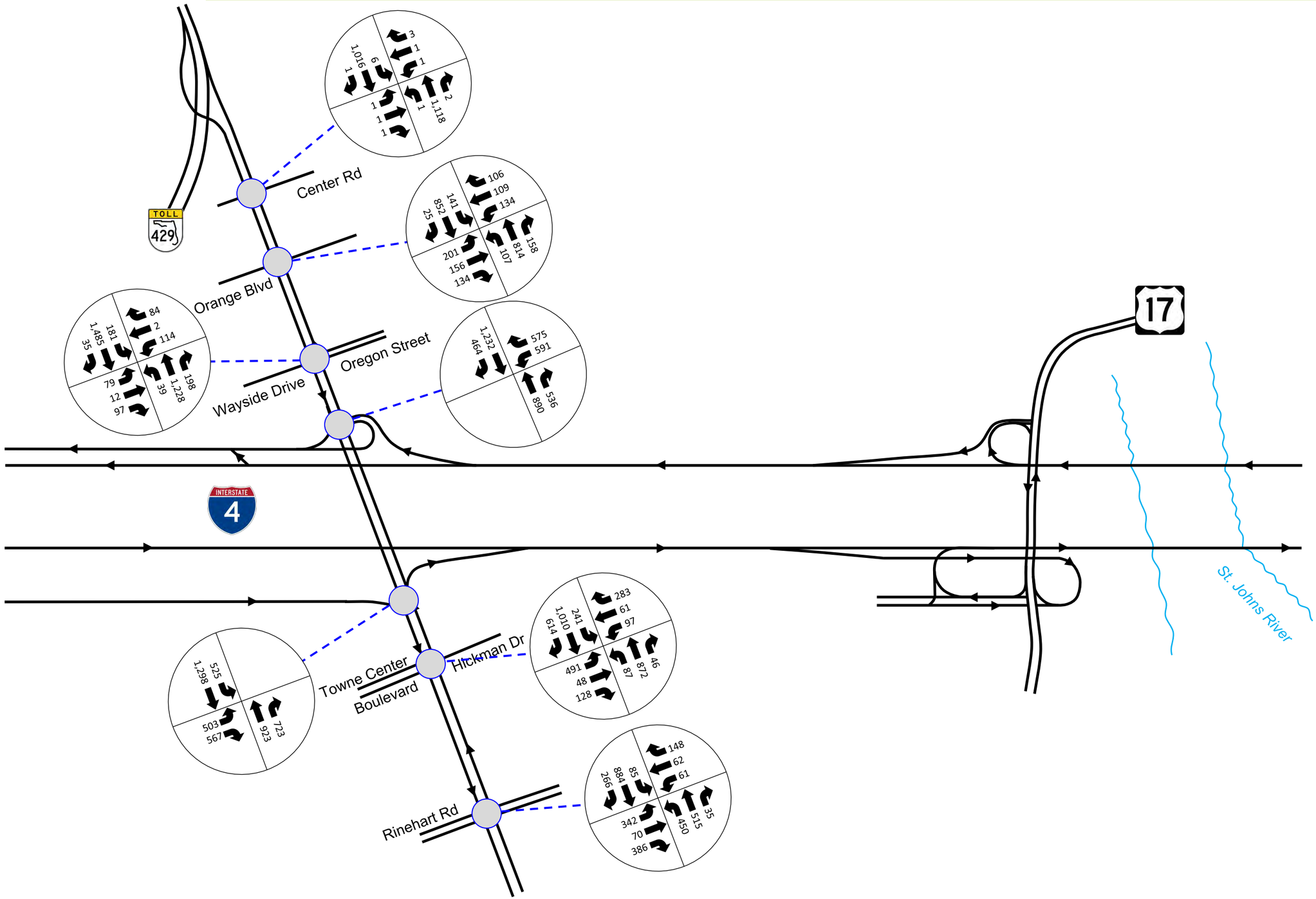
SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal 2023 AM** **Turning Movements**	Figure 3-31 Page 3-41

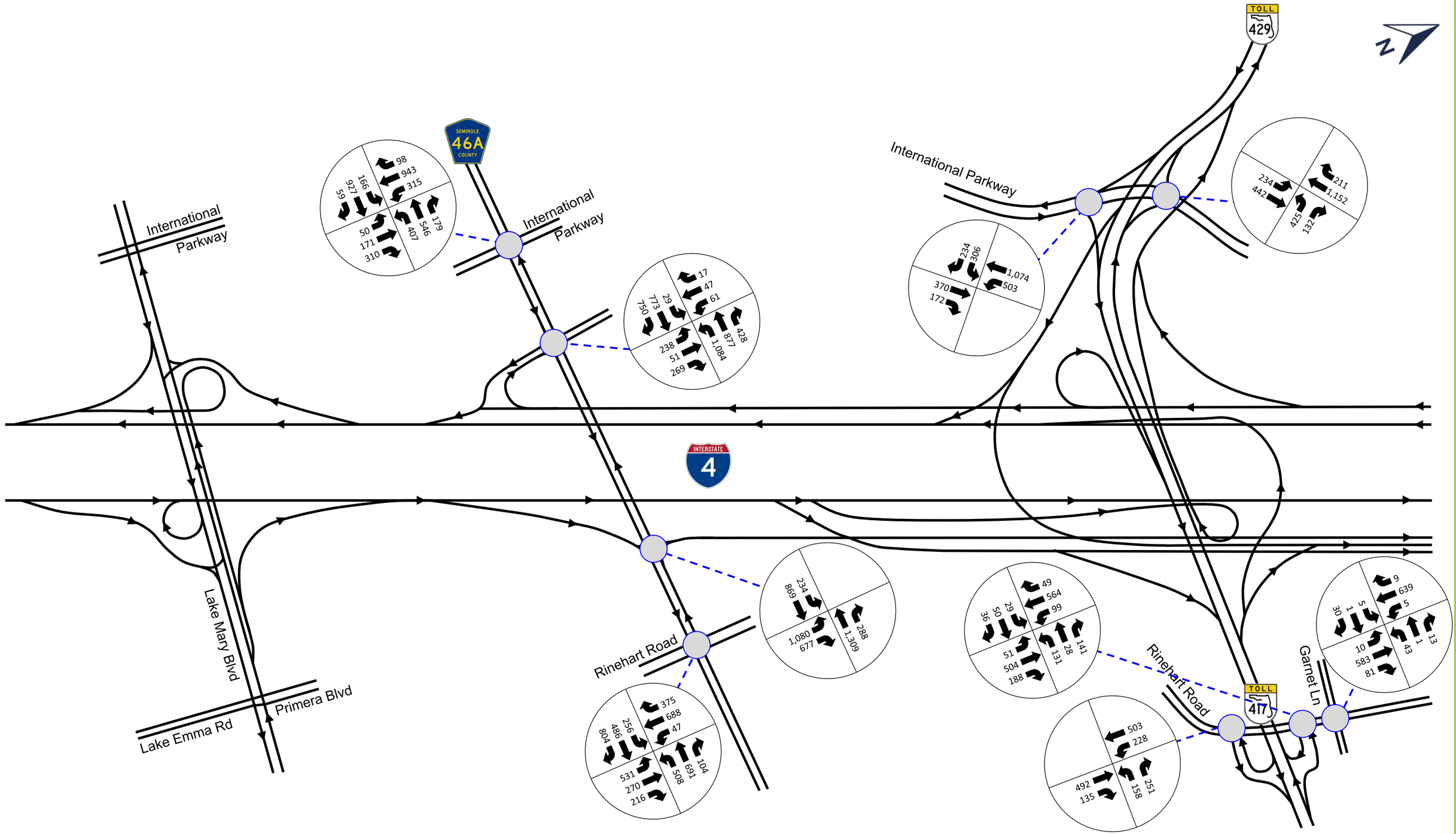


SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal 2023 AM** **Turning Movements**	Figure 3-32 Page 3-42

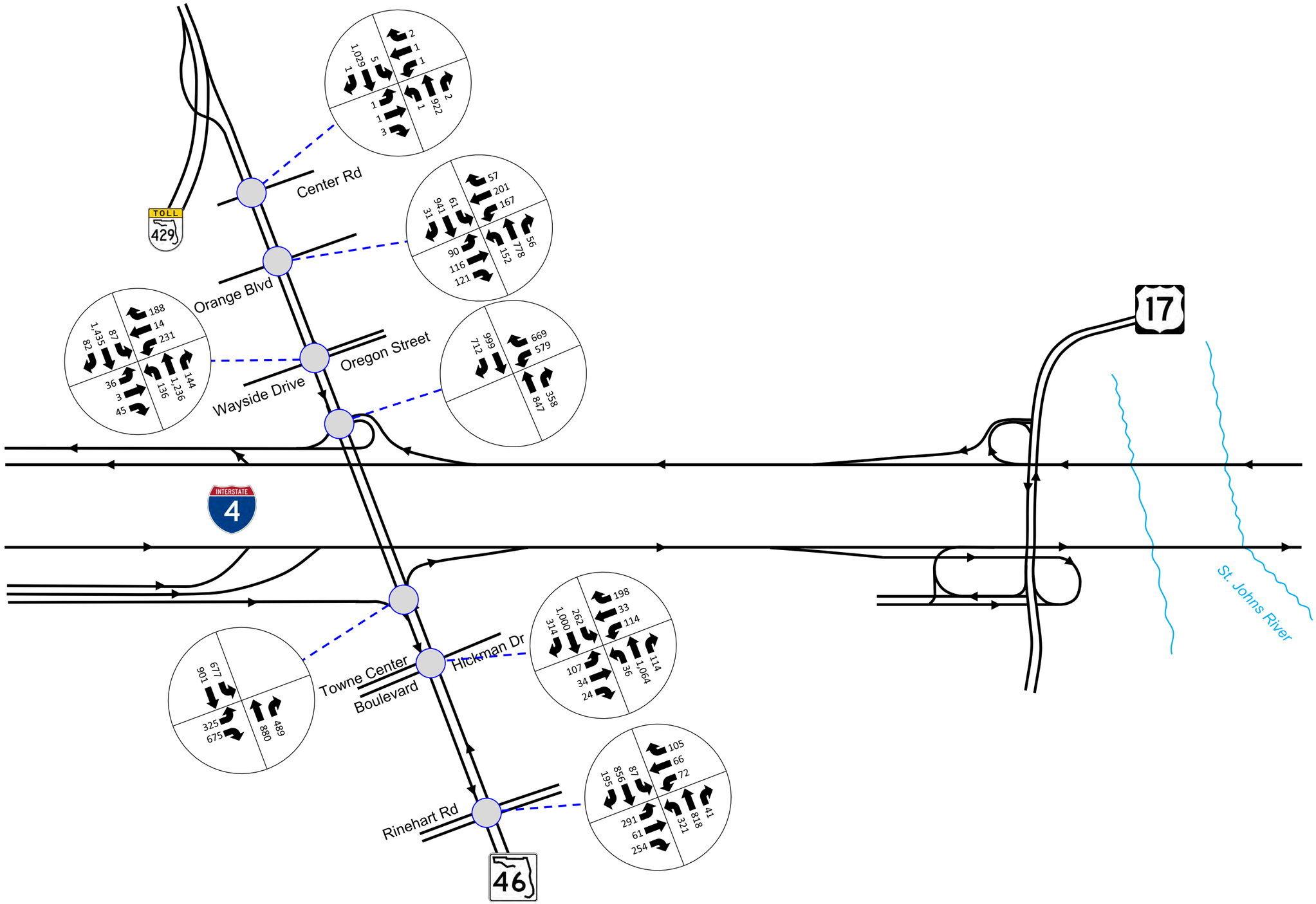


SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal 2023 PM** **Turning Movements**	Figure 3-33 Page 3-43

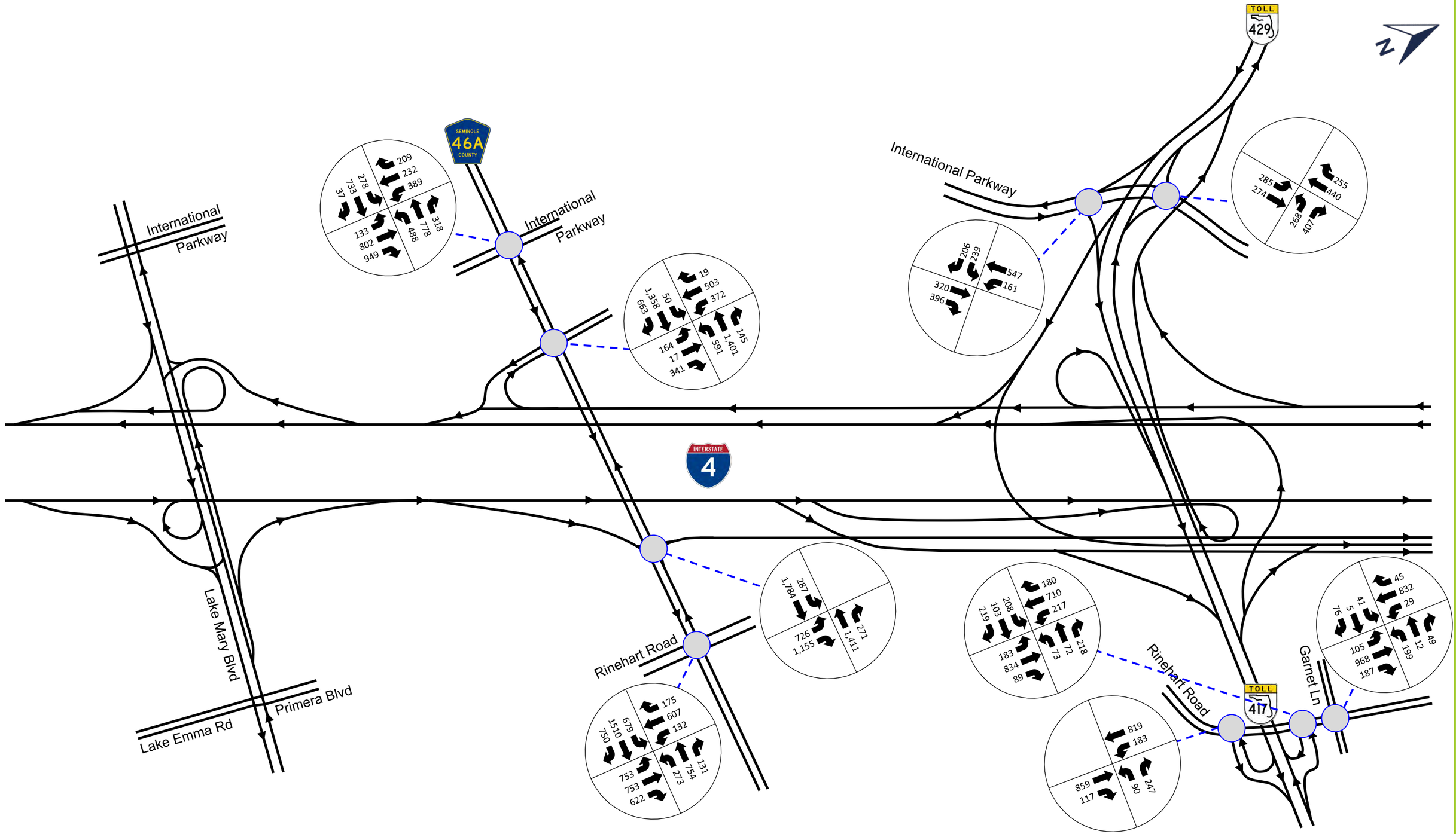




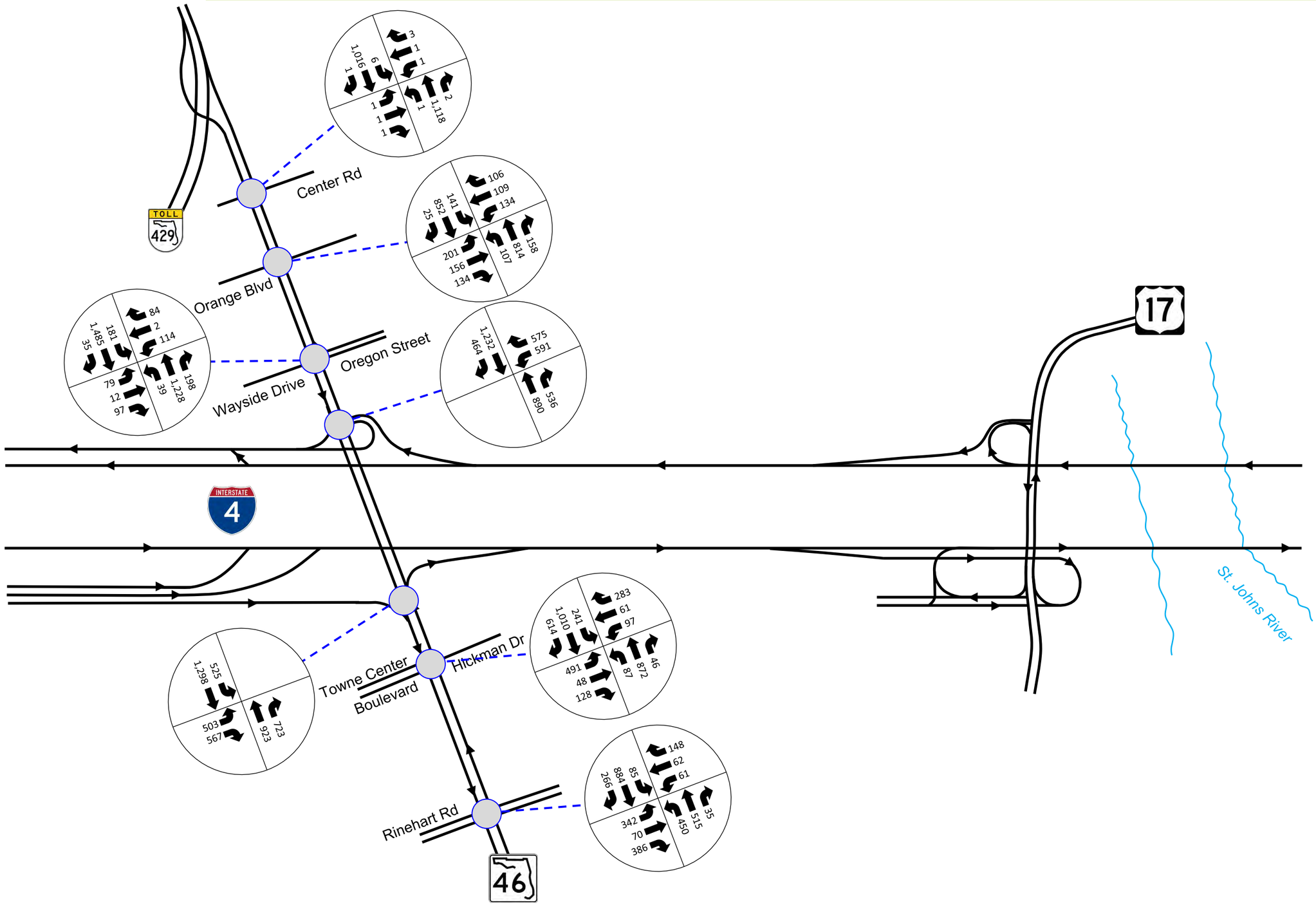
FDOT SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2023 AM** **Turning Movements**	Figure 3-35 Page 3-45



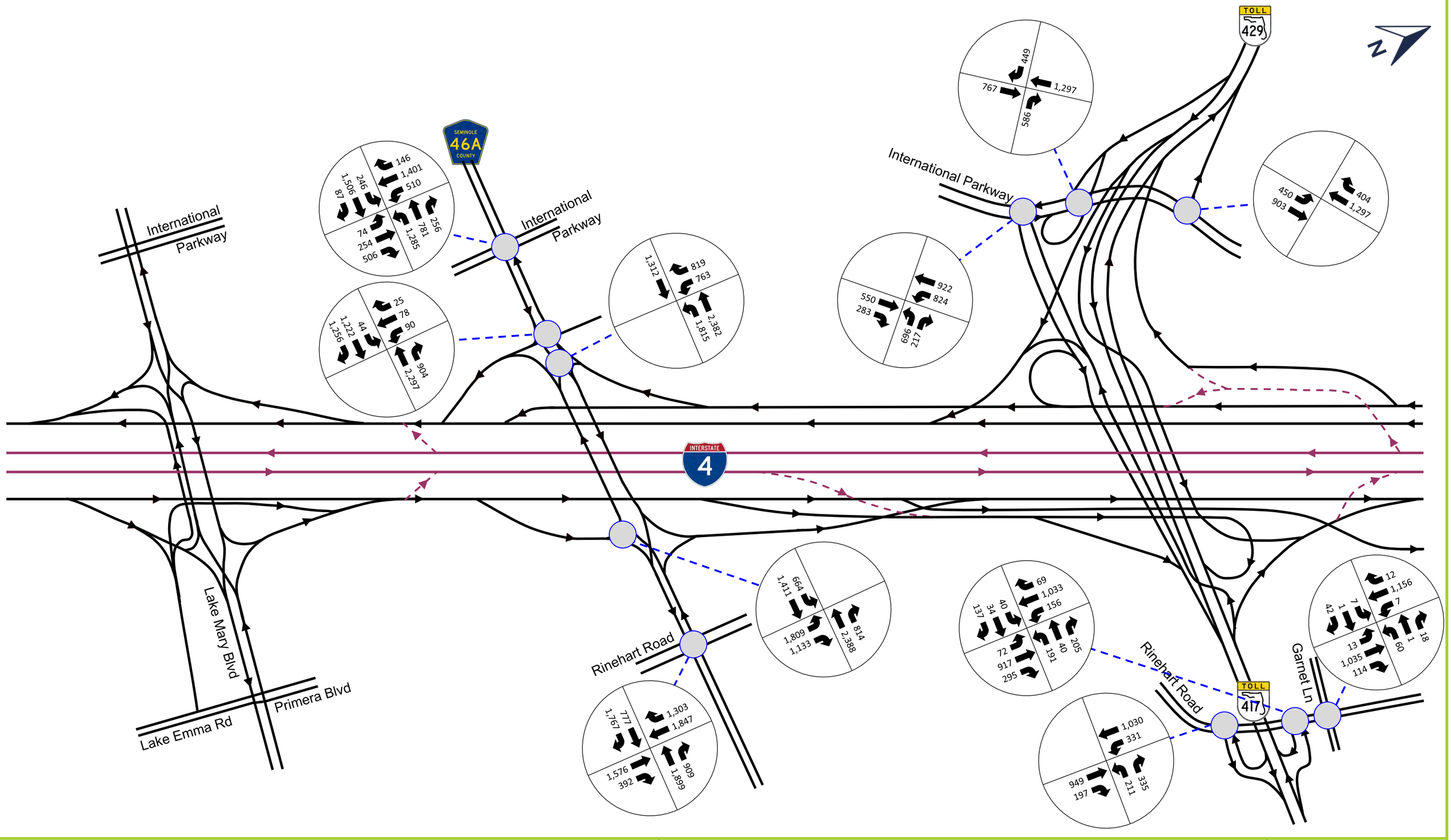
SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2023 AM** **Turning Movements**	Figure 3-36 Page 3-46



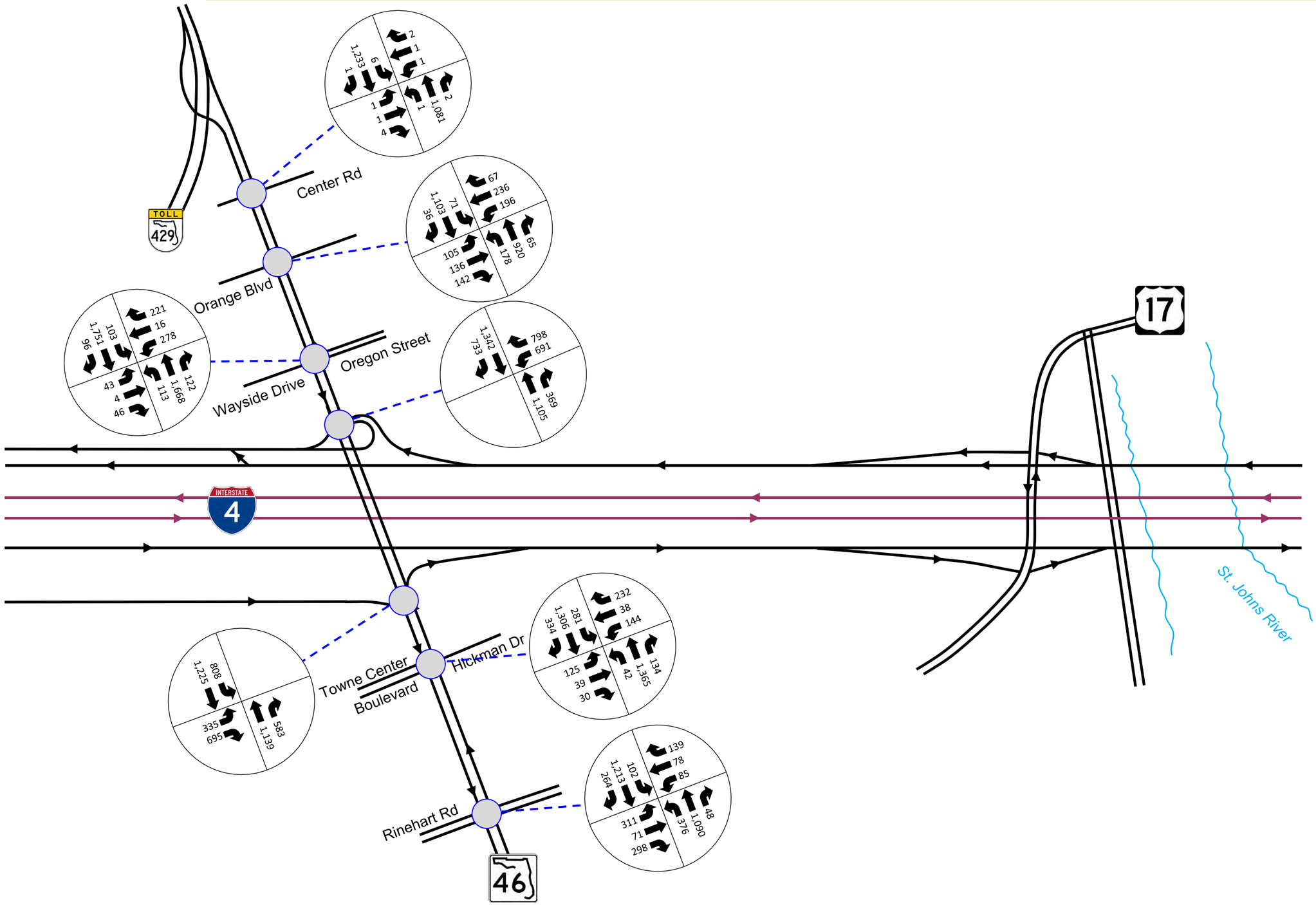
SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2023 PM** **Turning Movements**	Figure 3-37 Page 3-47

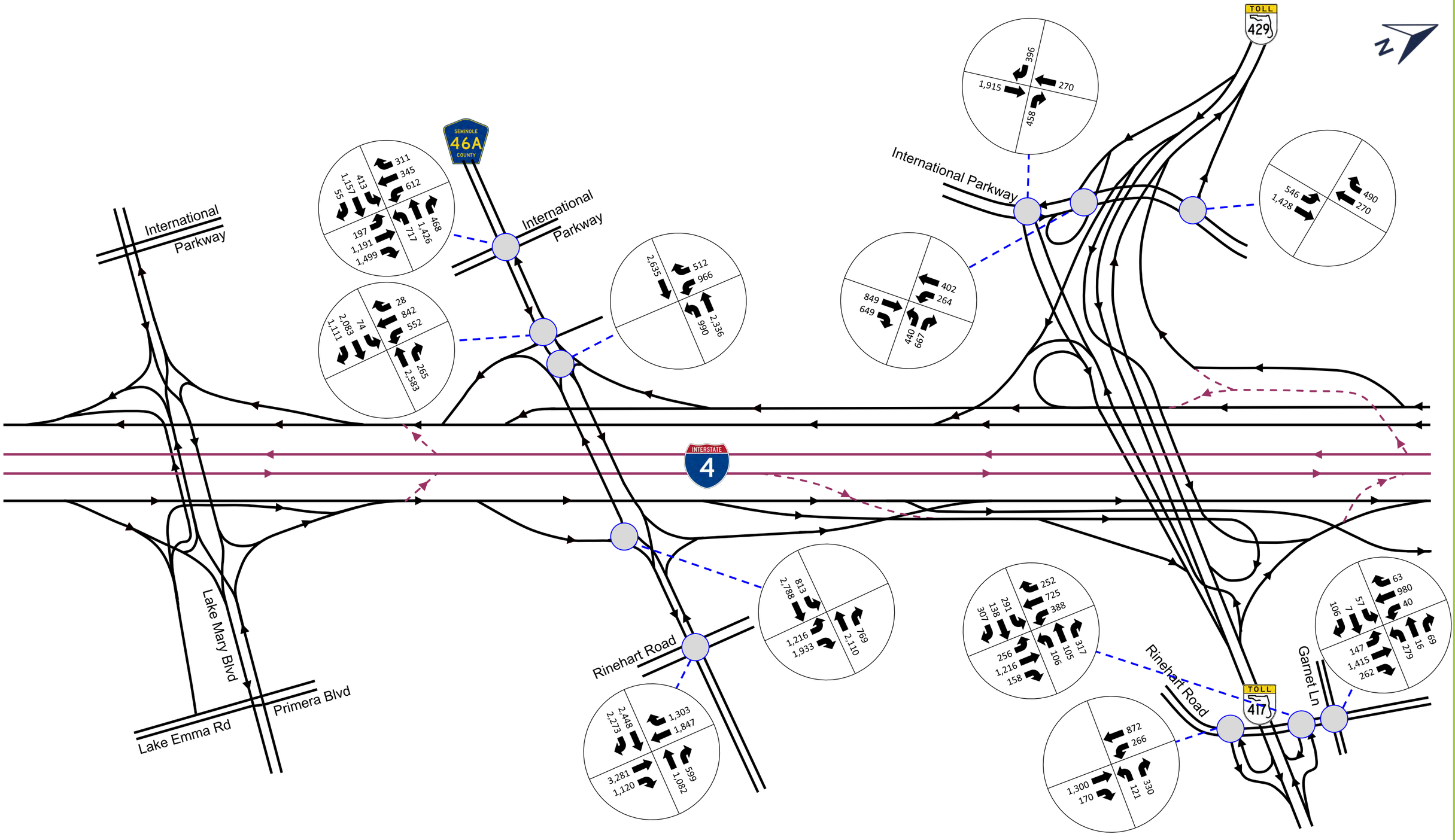


SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2023 PM** **Turning Movements**	Figure 3-38 Page 3-48

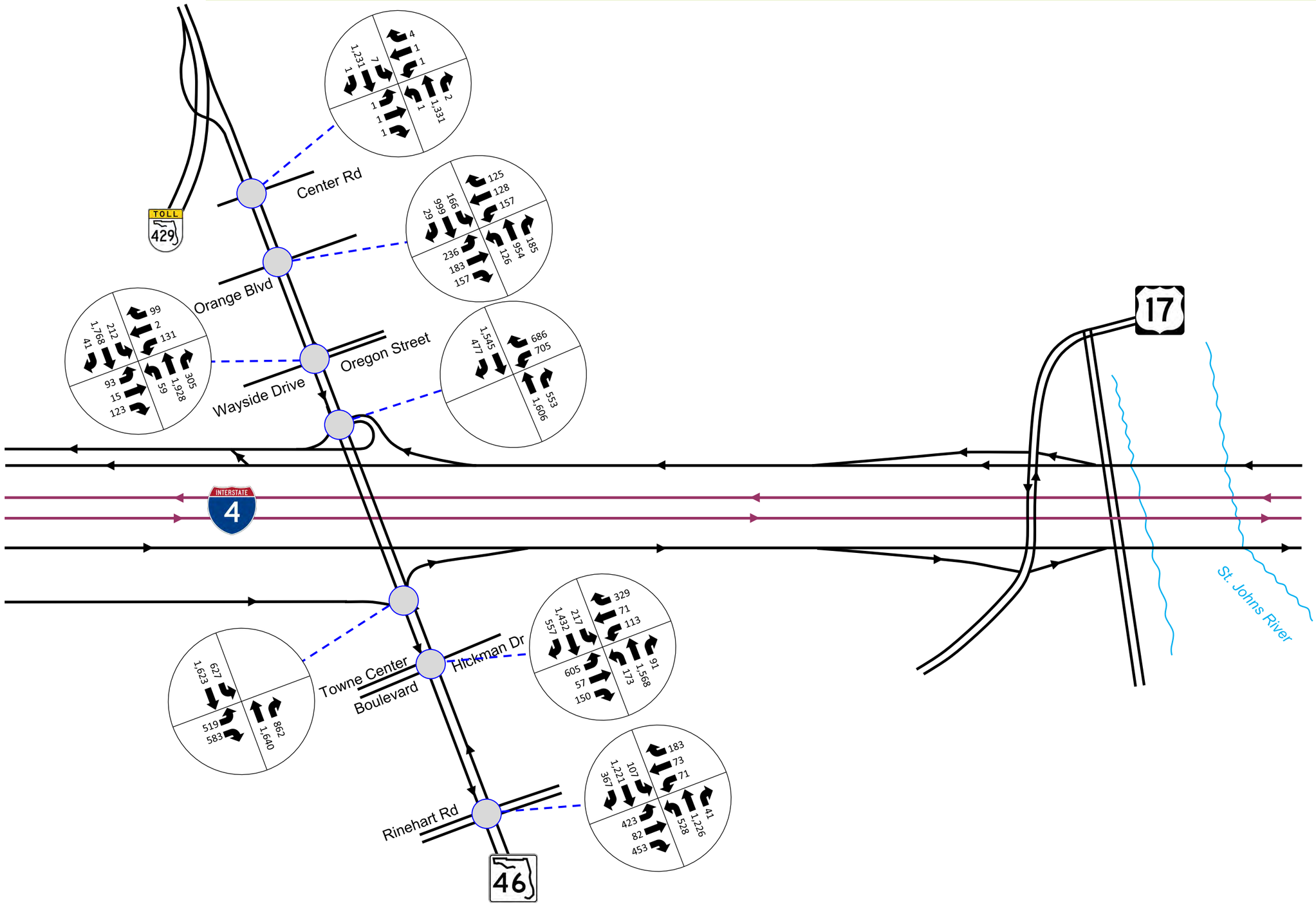


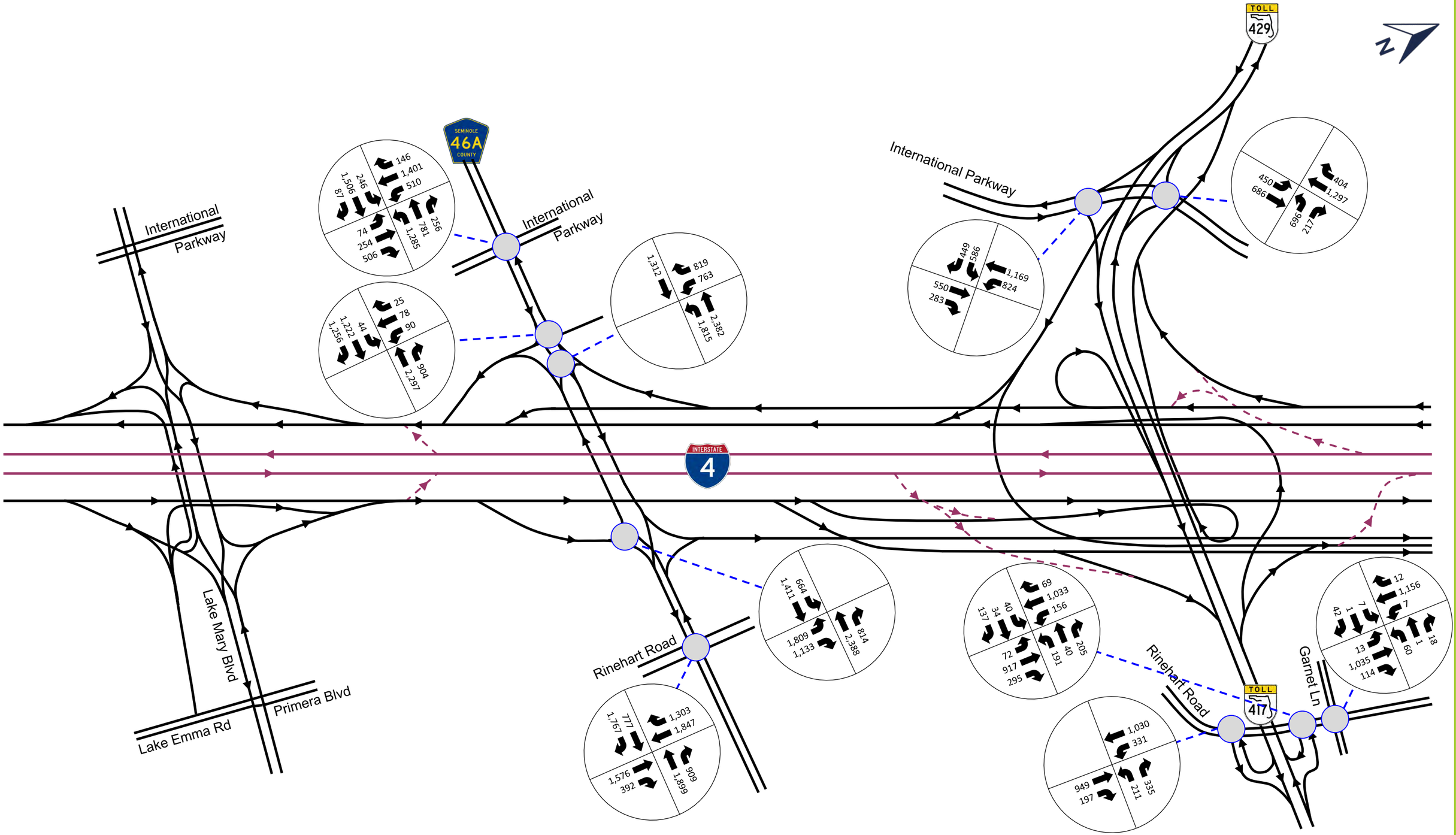
SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal 2043 AM** **Turning Movements**	Figure 3-39 Page 3-49



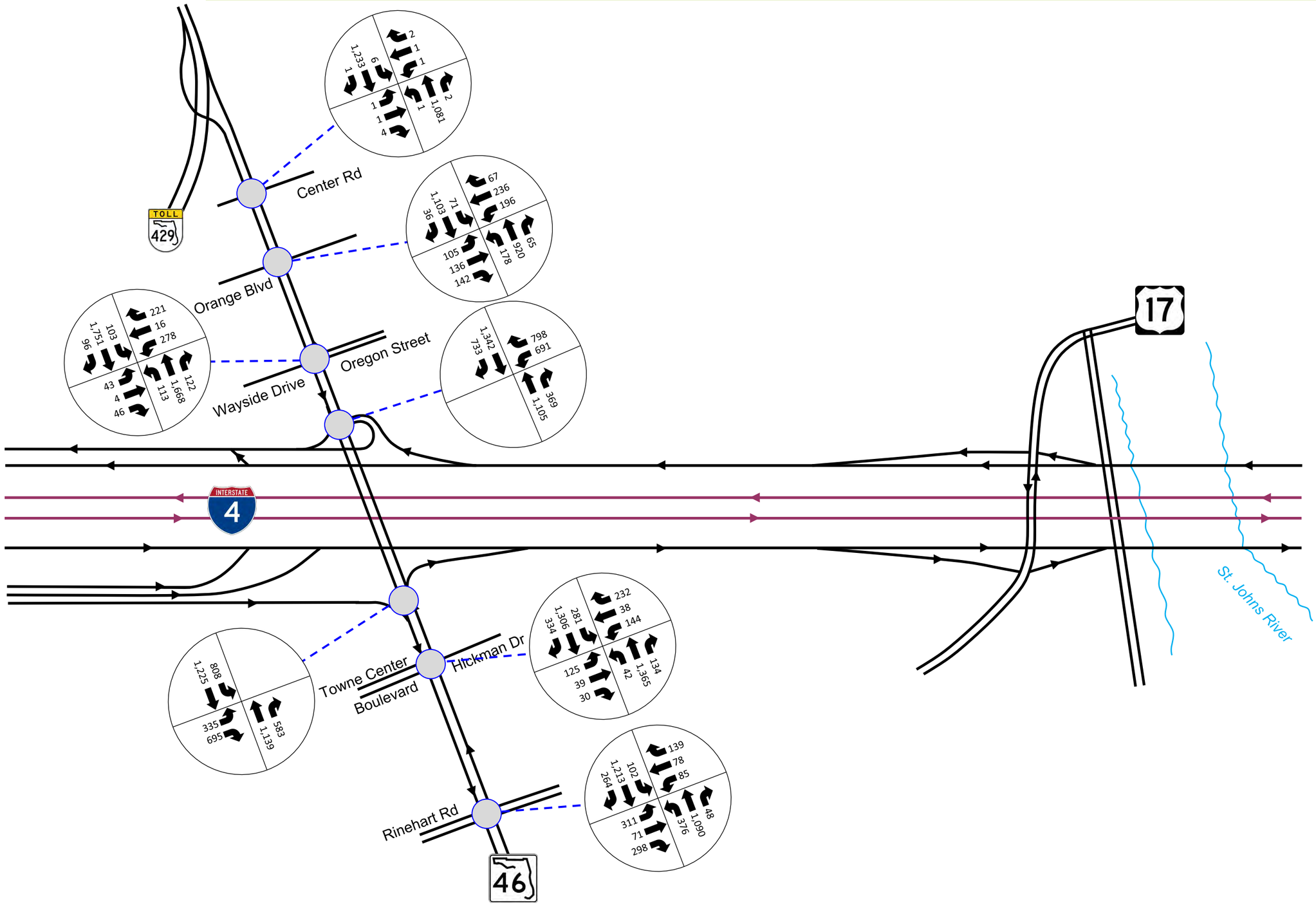


FDOT SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal 2043 PM** **Turning Movements**	Figure 3-41 Page 3-51

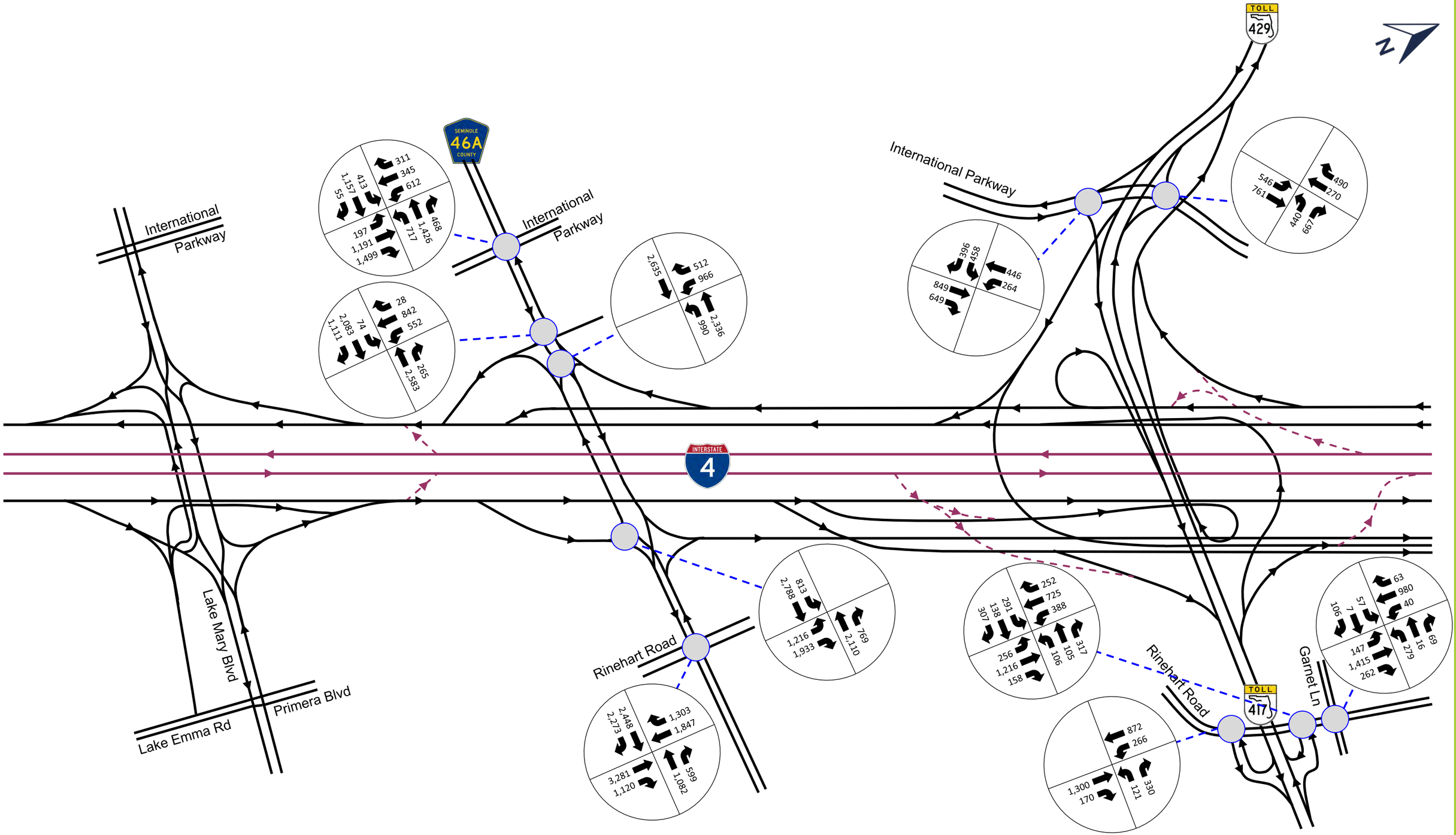




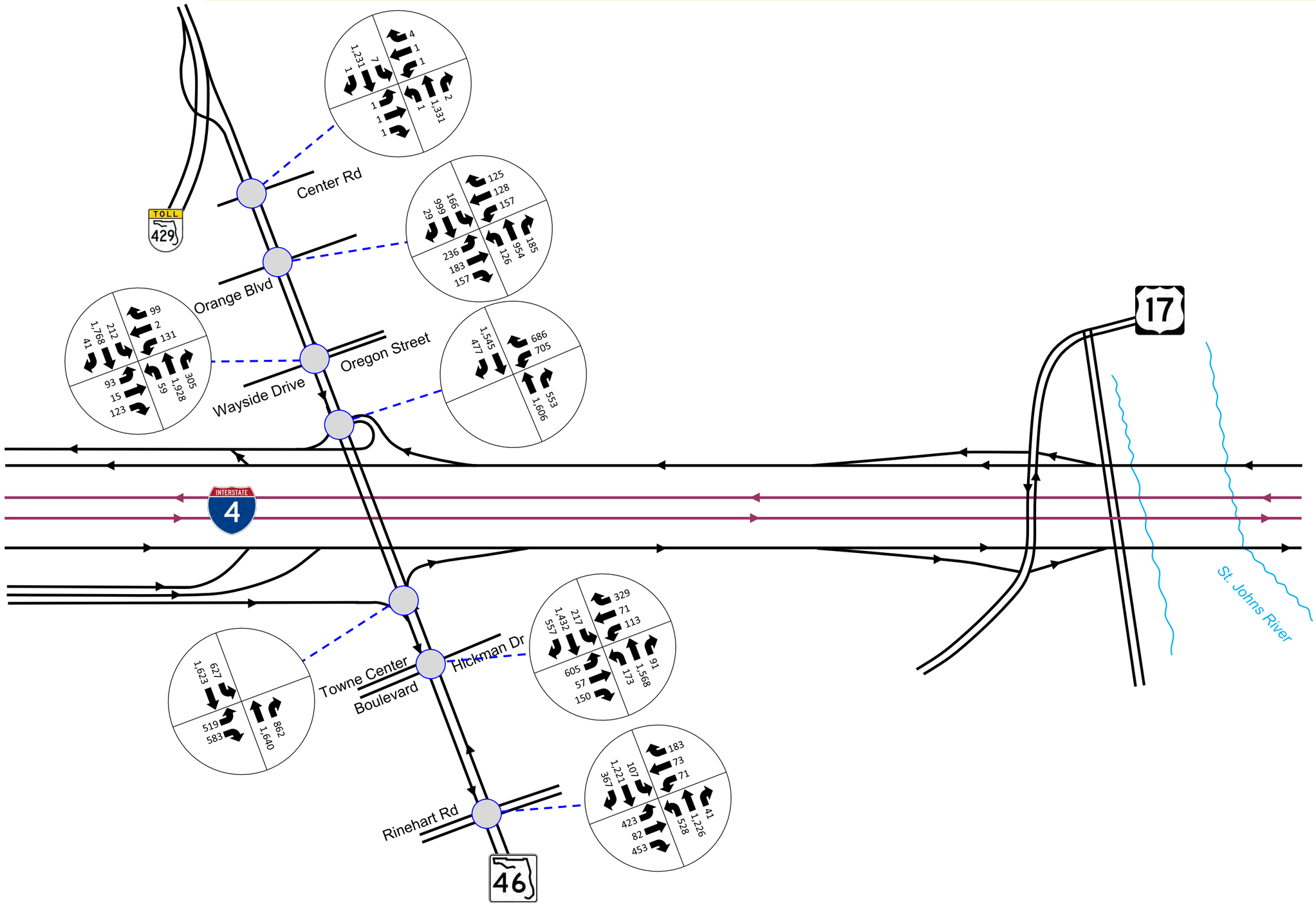
SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2043 AM** **Turning Movements**	Figure 3-43 Page 3-53



SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2043 AM** **Turning Movements**	Figure 3-44 Page 3-54



FDOT SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2043 PM** **Turning Movements**	Figure 3-45 Page 3-55



4 OPERATIONAL ANALYSIS

4.1 Highway Capacity Software Analysis

4.1.1 LOS Criteria and Methodology

The operational characteristics of the RFP Concept and the ATC #32 were analyzed using the Highway Capacity Software Version 7 (HCS7). The facility segments were divided into four types: basic segment, merge segment, diverge segment and weaving segment.

Table 4-1 shows the criteria for LOS on freeway segments.

Table 4-1: LOS Criteria for Freeway Segments

LOS	Density (passenger car/mile/lane)			
	Basic Freeway Segment	Freeway Merge and Diverge Segments	Weaving Segments	
			Freeway	C-D Roads
A	≤11	≤10	0-10	0-12
B	>11-18	>10-20	>10-20	>12-24
C	>18-26	>20-28	>20-28	>24-32
D	>26-35	>28-35	>28-35	>32-36
E	>35-45	>35	>35-43	>36-40
F	>45 or demand exceeds capacity	demand exceeds capacity	>43 or demand exceeds capacity	>40 or demand exceeds capacity

4.1.2 Data Inputs

HCS7 requires the following data inputs:

- Geometric Data - Number of lanes, base free flow speed, lane and shoulder widths, total ramp density (TRD), grade
- Demand Data - Traffic volume, truck factor, and peak hour factor
- Adjustment Factors - Driver familiarity, weather, and incident type

Number of lanes, lane width, and shoulder width were obtained from concept figures. Traffic volumes were obtained from the peak hour DDHVs figures shown in **Section 3**. Truck factors were applied based on the MLOU. Weather and incident factors were set to non-harmful. For express lanes, an "all familiar driver population" was assumed and for general use lanes, a "balanced mix" of familiar and non-familiar driver population was assumed.

TRD is defined as "Total number of on-ramps and off-ramps within ± 3 miles of the midpoint of the study segment, divided by 6 miles." TRD was calculated based on the definition for both concepts from the lane configuration diagram shown in **Appendix C**.

4.1.3 Segment Classification for RFP Concept and ATC #32

A total of 210 segments were analyzed for the RFP Concept and 214 segments for the ATC #32. This includes both analysis years (2023 and 2043) and both time periods (AM and PM).

A summary of segment classification for the RFP Concept is shown in **Table 4-2**. A summary of segment classification for the ATC #32 is shown in **Table 4-3.**

Table 4-2: RFP Segment Classification Counts

Segment	2023		2043		Total
	AM	PM	AM	PM	
Basic	21 *(45.65%)*	21 *(45.65%)*	27 *(45.76%)*	27 *(45.76%)*	**96** *(45.71%)*
Diverge	9 *(19.57%)*	9 *(19.57%)*	12 *(20.34%)*	12 *(20.34%)*	**42** *(20.00%)*
Merge	9 *(19.57%)*	9 *(19.57%)*	12 *(20.34%)*	12 *(20.34%)*	**42** *(20.00%)*
Weaving	7 *(15.22%)*	7 *(15.22%)*	8 *(13.56%)*	8 *(13.56%)*	**30** *(14.29%)*
Total	*46*	*46*	*59*	*59*	***210***

Table 4-3: ATC #32 Segment Classification Counts

Segment	2023		2043		Total
	AM	PM	AM	PM	
Basic	19 *(41.67%)*	19 *(41.67%)*	25 *(41.67%)*	25 *(41.67%)*	**86** *(41.12%)*
Diverge	10 *(20.83%)*	10 *(20.83%)*	13 *(21.67%)*	13 *(21.67%)*	**44** *(21.50%)*
Merge	11 *(22.92%)*	11 *(22.92%)*	14 *(23.33%)*	14 *(23.33%)*	**48** *(23.36%)*
Weaving	7 *(14.58%)*	7 *(14.58%)*	8 *(13.33%)*	8 *(13.33%)*	**30** *(14.02%)*
Total	*47*	*47*	*60*	*60*	***214***

Due to different geometric designs, the number of segments differ between the RFP Concept and the ATC #32. Moreover, the number of segments also change between analysis years due to a new interchange configuration at CR 46A and the introduction of Express Lanes in 2043.

4.1.4 LOS Results for RFP Concept and ATC #32

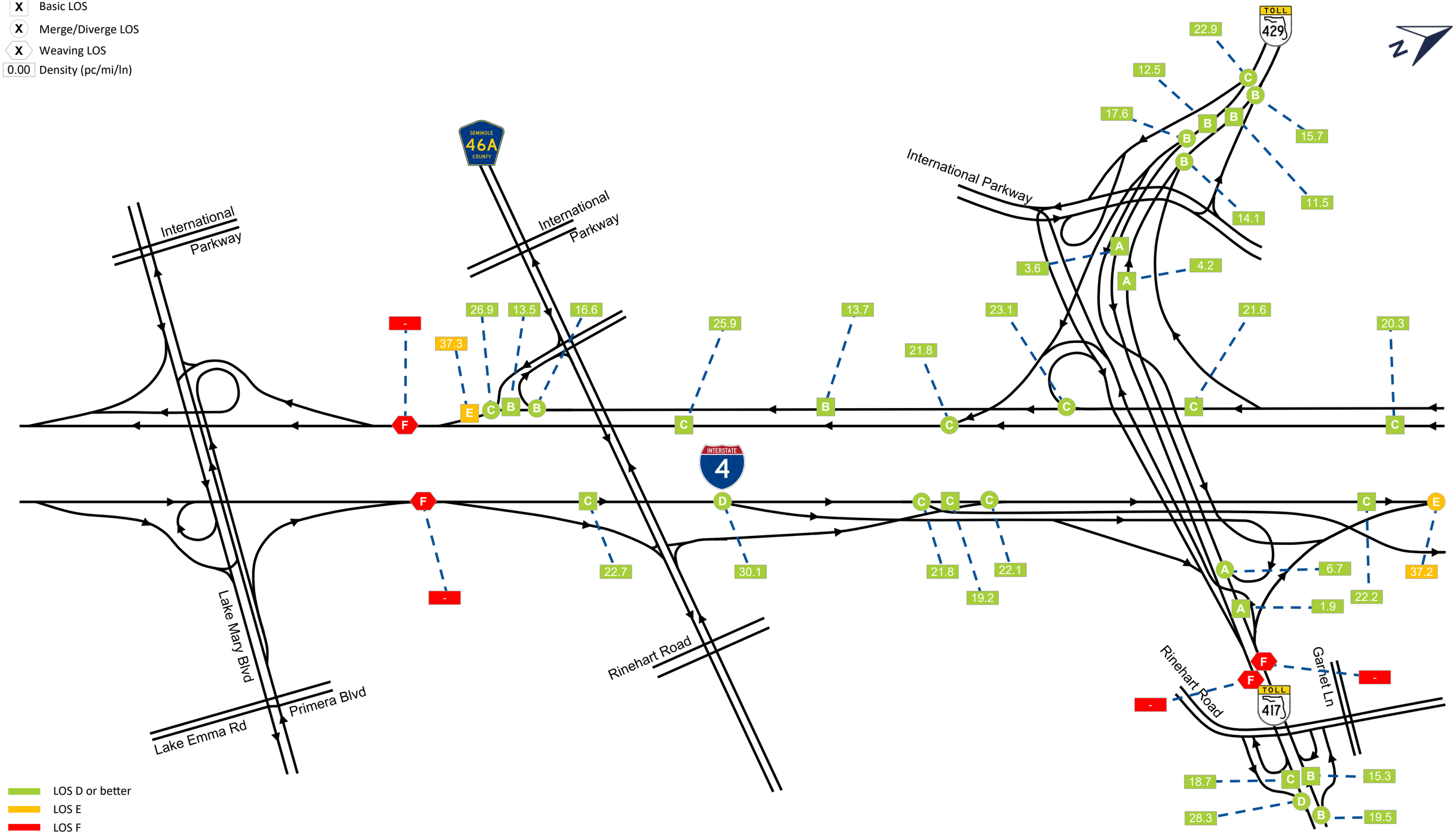
Figure 4-1 through **Figure 4-16** show the LOS at segments for both alternatives, analysis years and time periods. The reports for density based HCS LOS analysis are listed in **Appendix C**.

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

0.00 Density (pc/mi/ln)



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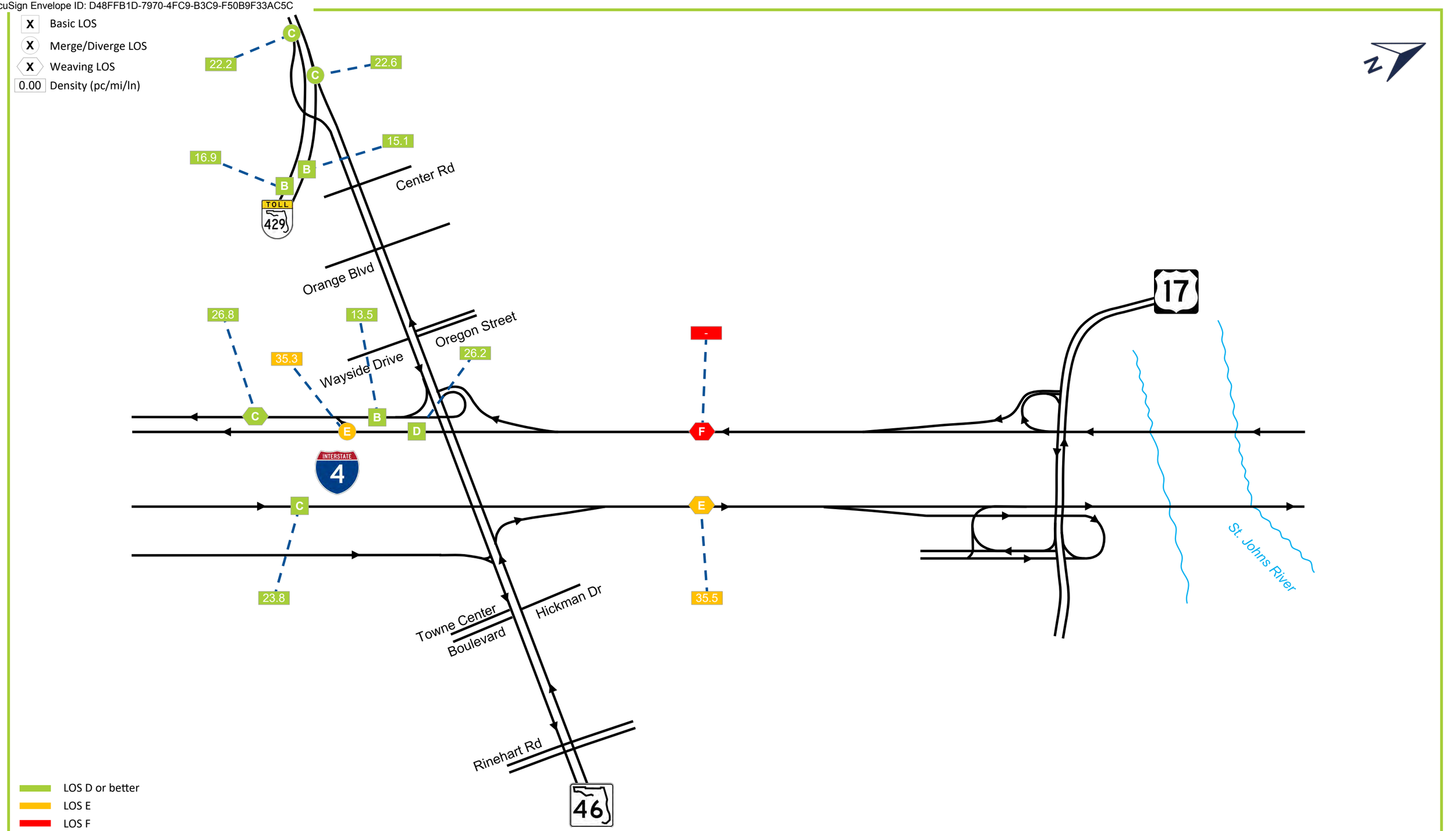
Highway Capacity Software - Freeway Level of Service

Figure 4-1



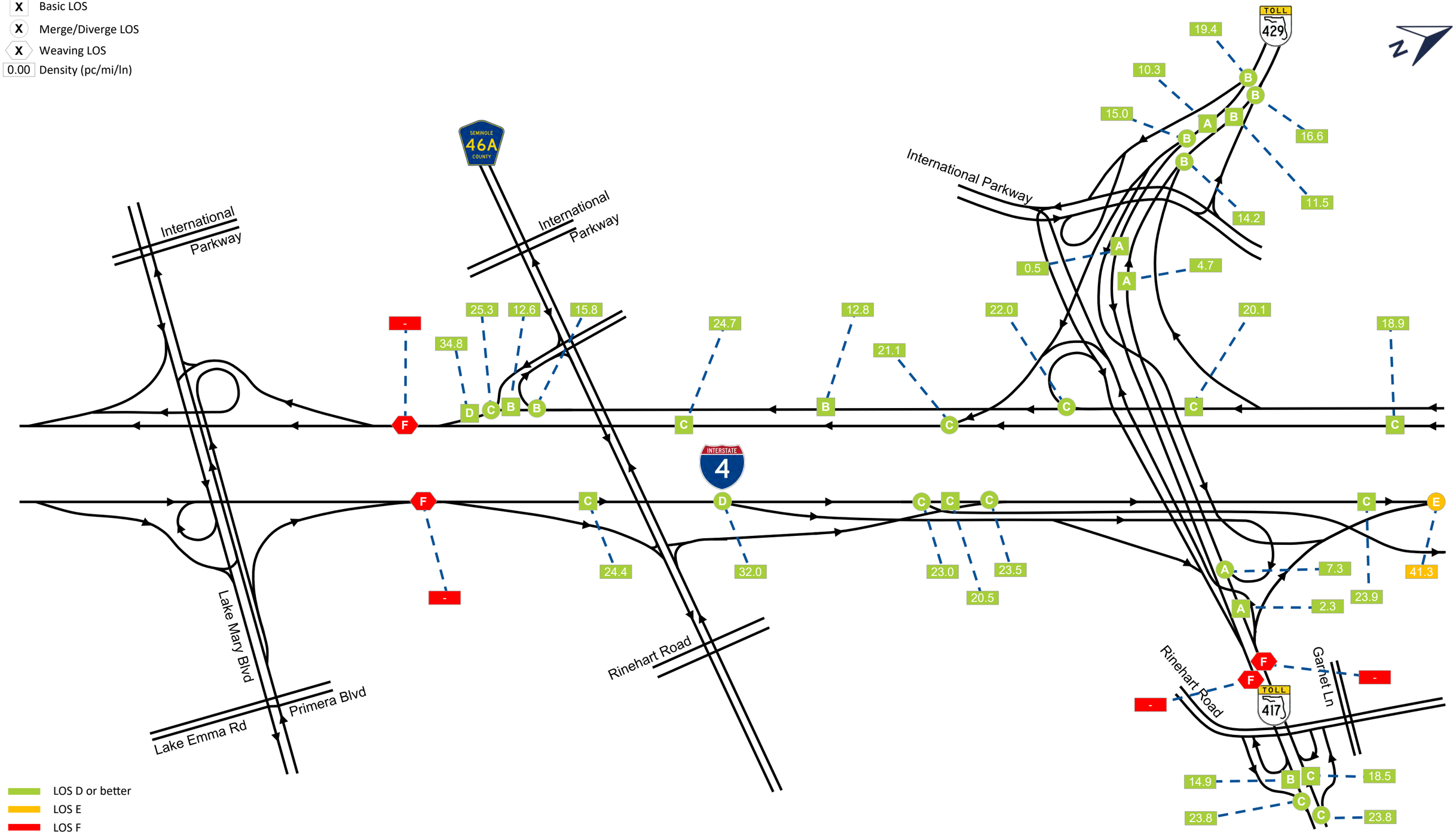
SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal 2023 AM** **Highway Capacity Software - Freeway Level of Service**	Figure 4-2 Page 4-4

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

0.00 Density (pc/mi/ln)



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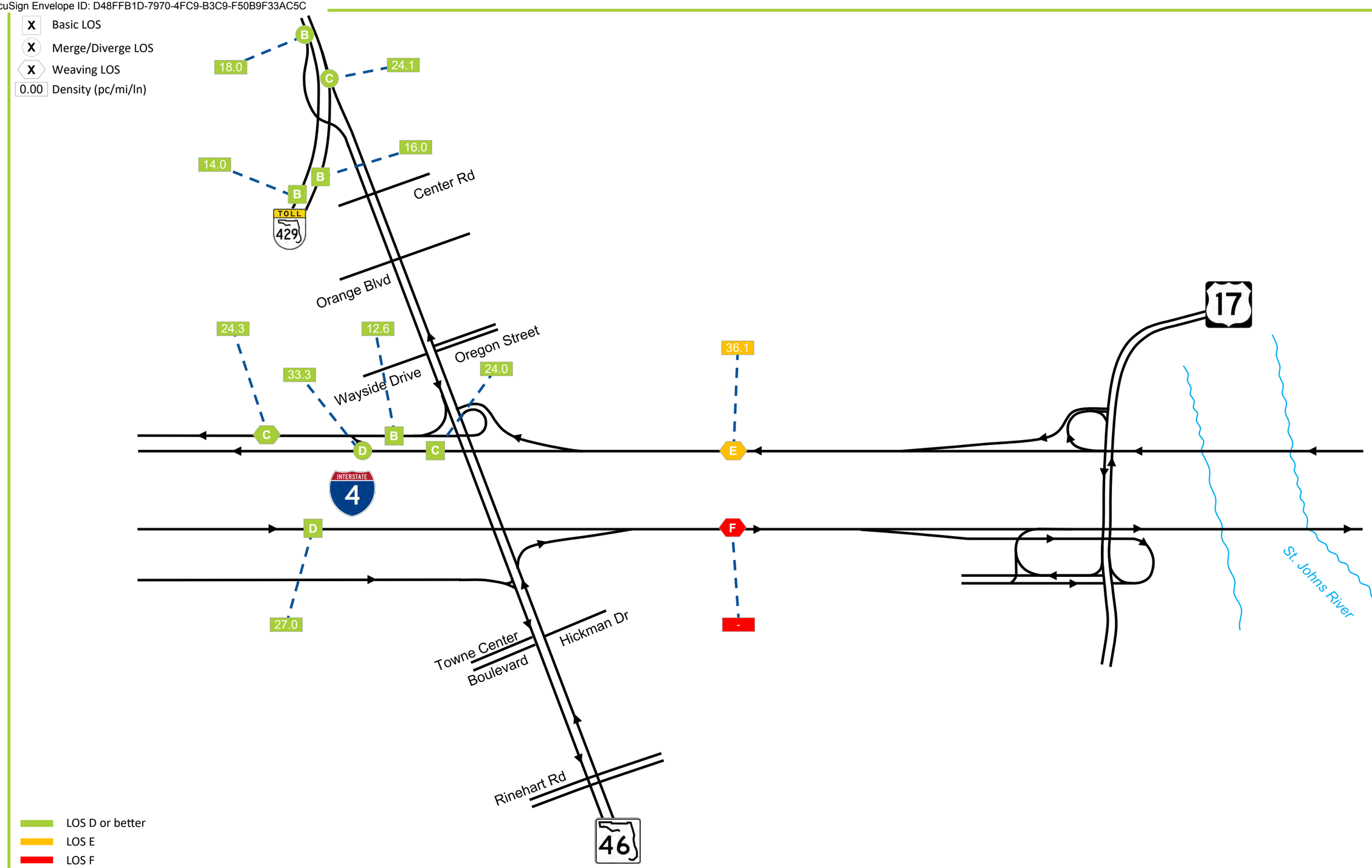
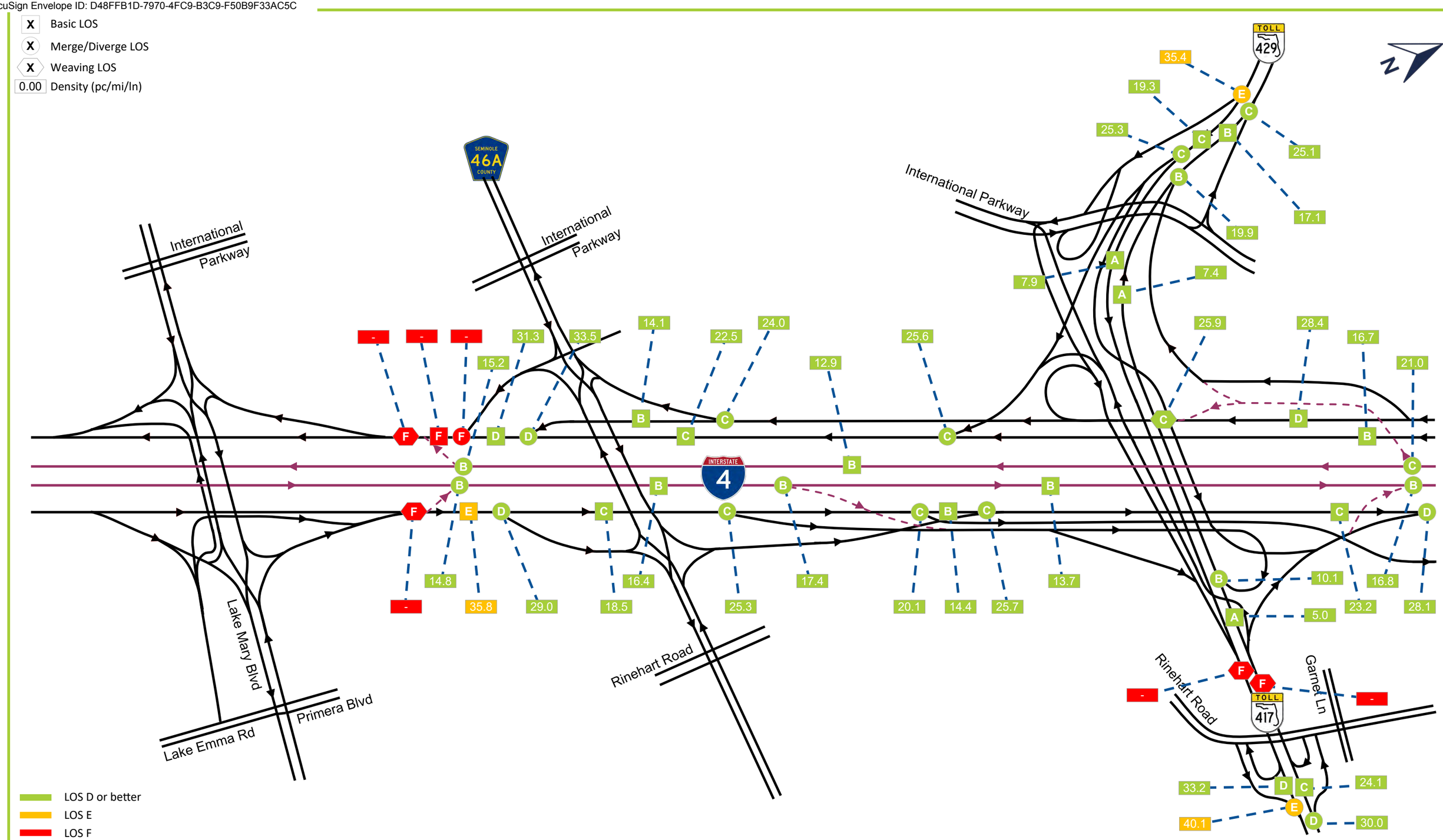
Highway Capacity Software - Freeway Level of Service

Figure 4-3

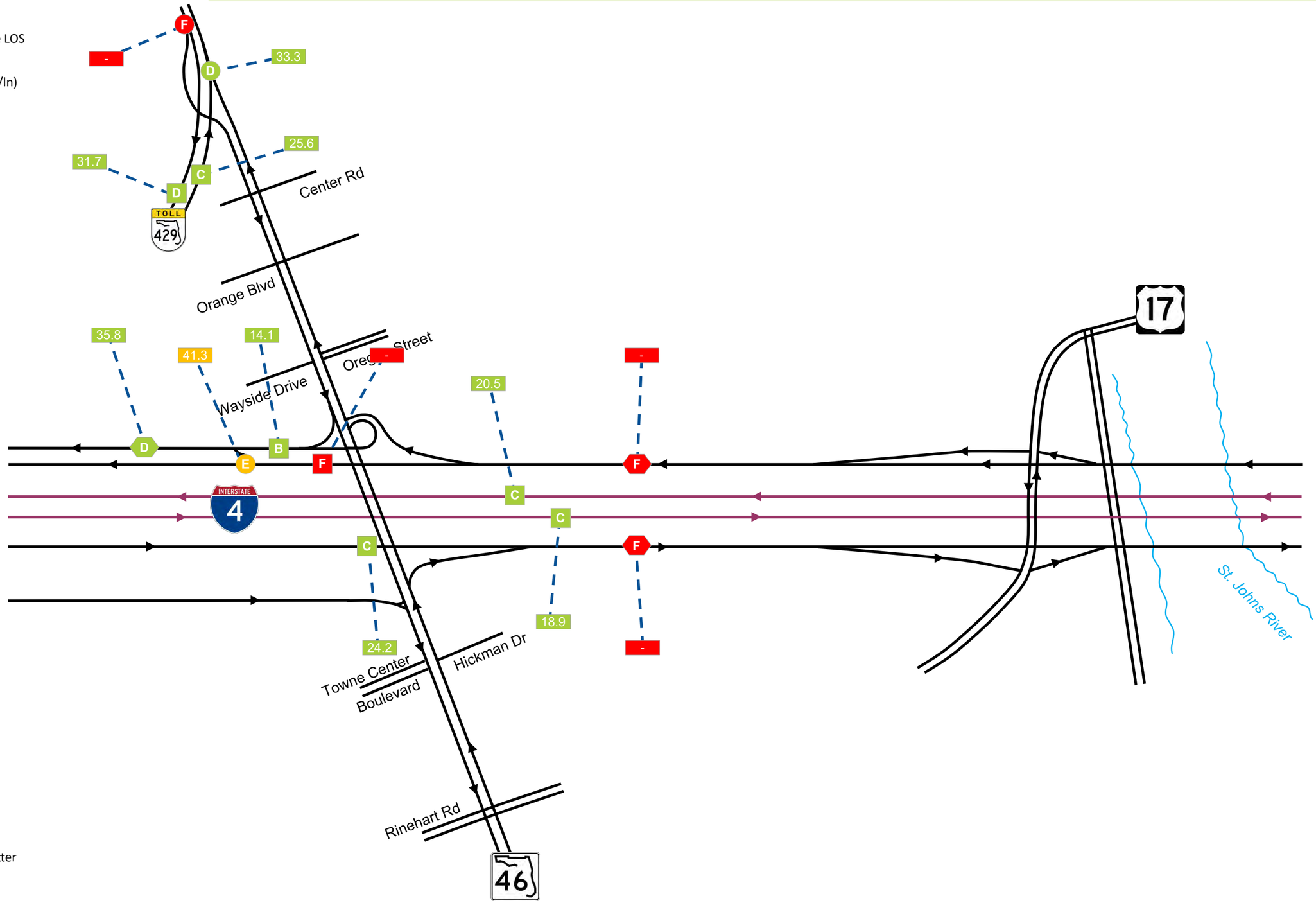


SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request for Proposal 2023 PM** **Highway Capacity Software - Freeway Level of Service**	Figure 4-4 Page 4-6



SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Request For Proposal 2043 AM** **Highway Capacity Software - Freeway Level of Service**	Figure 4-5 Page 4-7

X Basic LOS
X Merge/Diverge LOS
X Weaving LOS
0.00 Density (pc/mi/ln)



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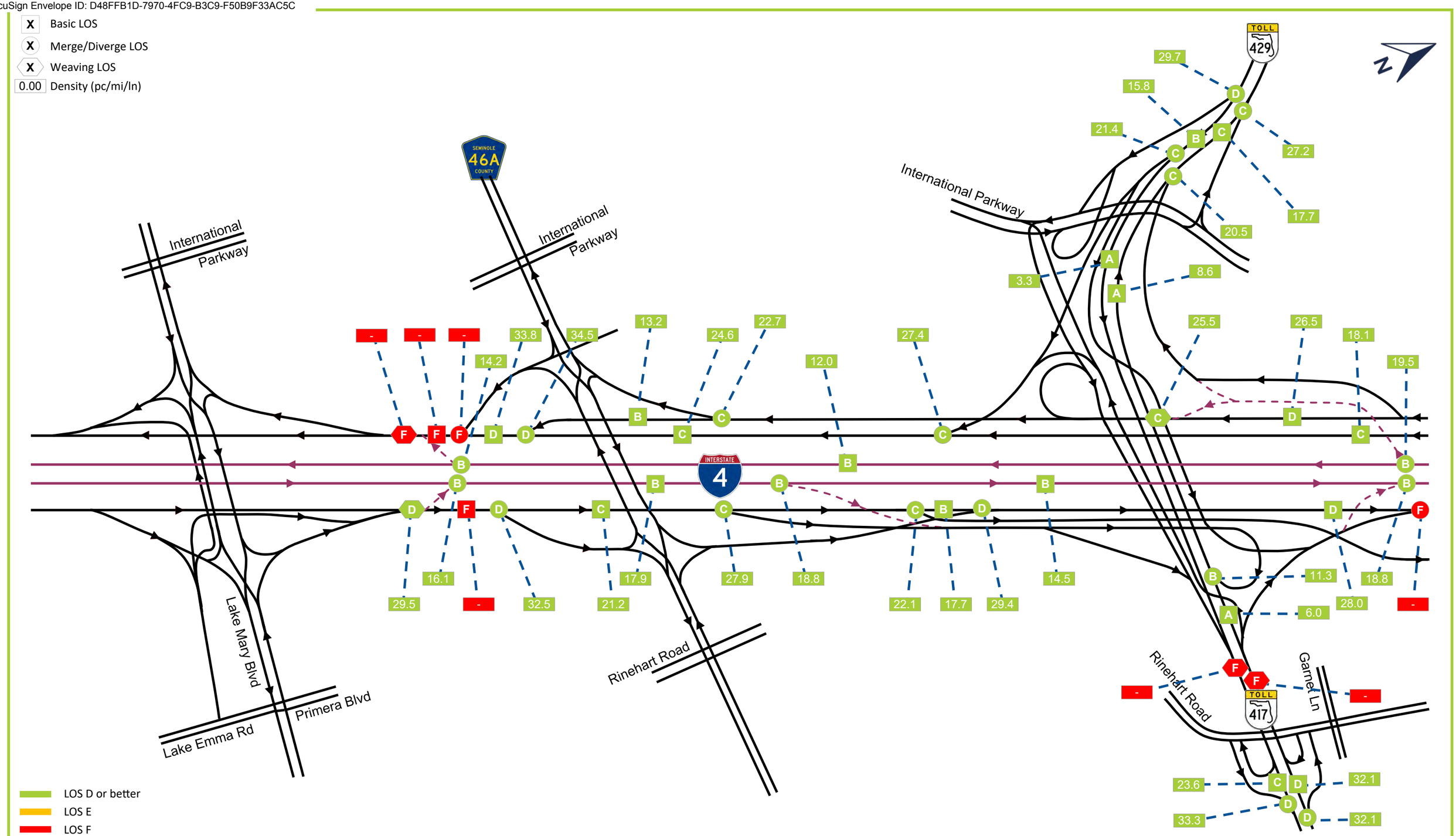
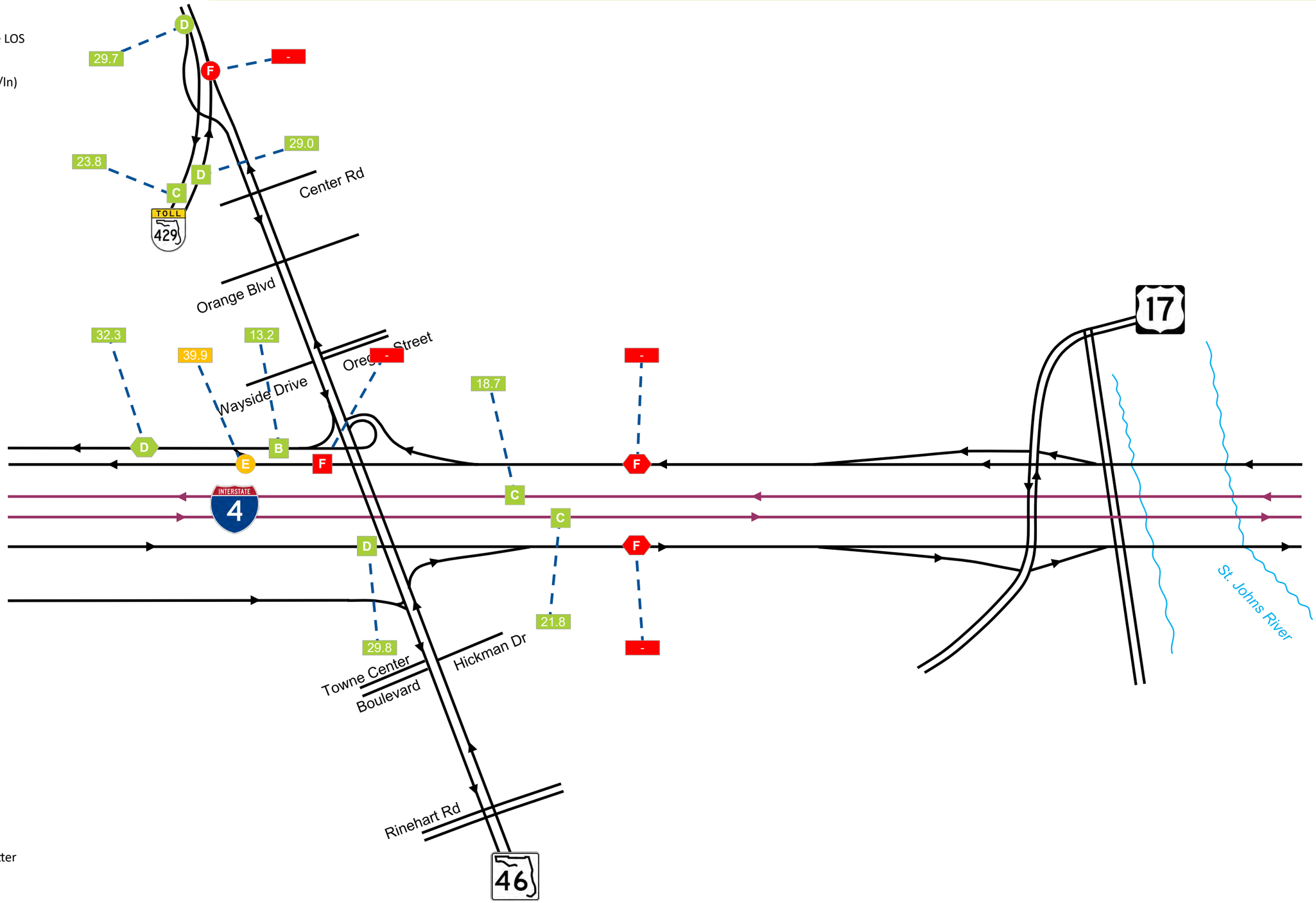
Highway Capacity Software - Freeway Level of Service

Figure 4-6



X Basic LOS
X Merge/Diverge LOS
X Weaving LOS
0.00 Density (pc/mi/ln)



LOS D or better
LOS E
LOS F

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Highway Capacity Software - Freeway Level of Service

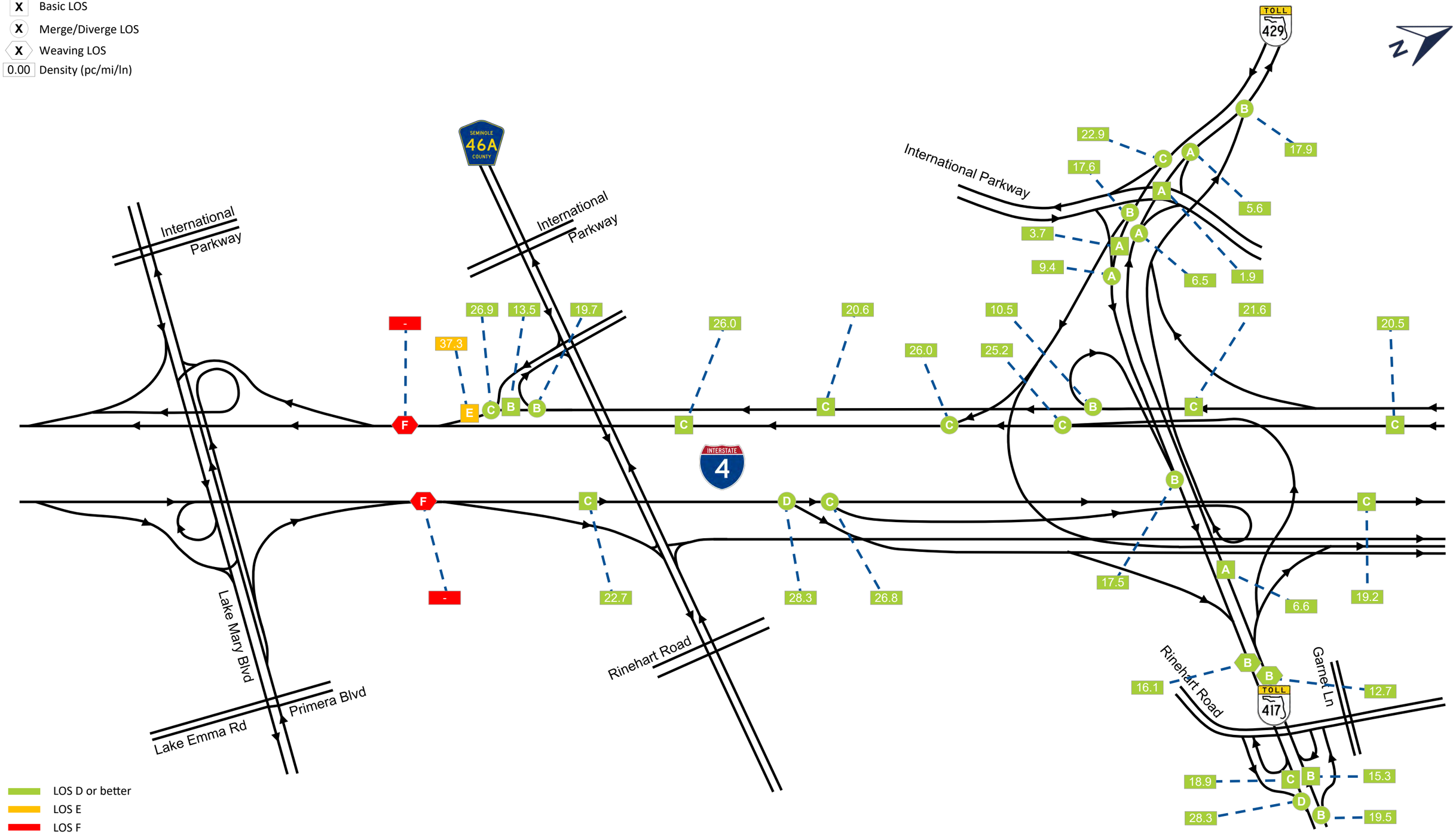
Figure 4-8

X Basic LOS

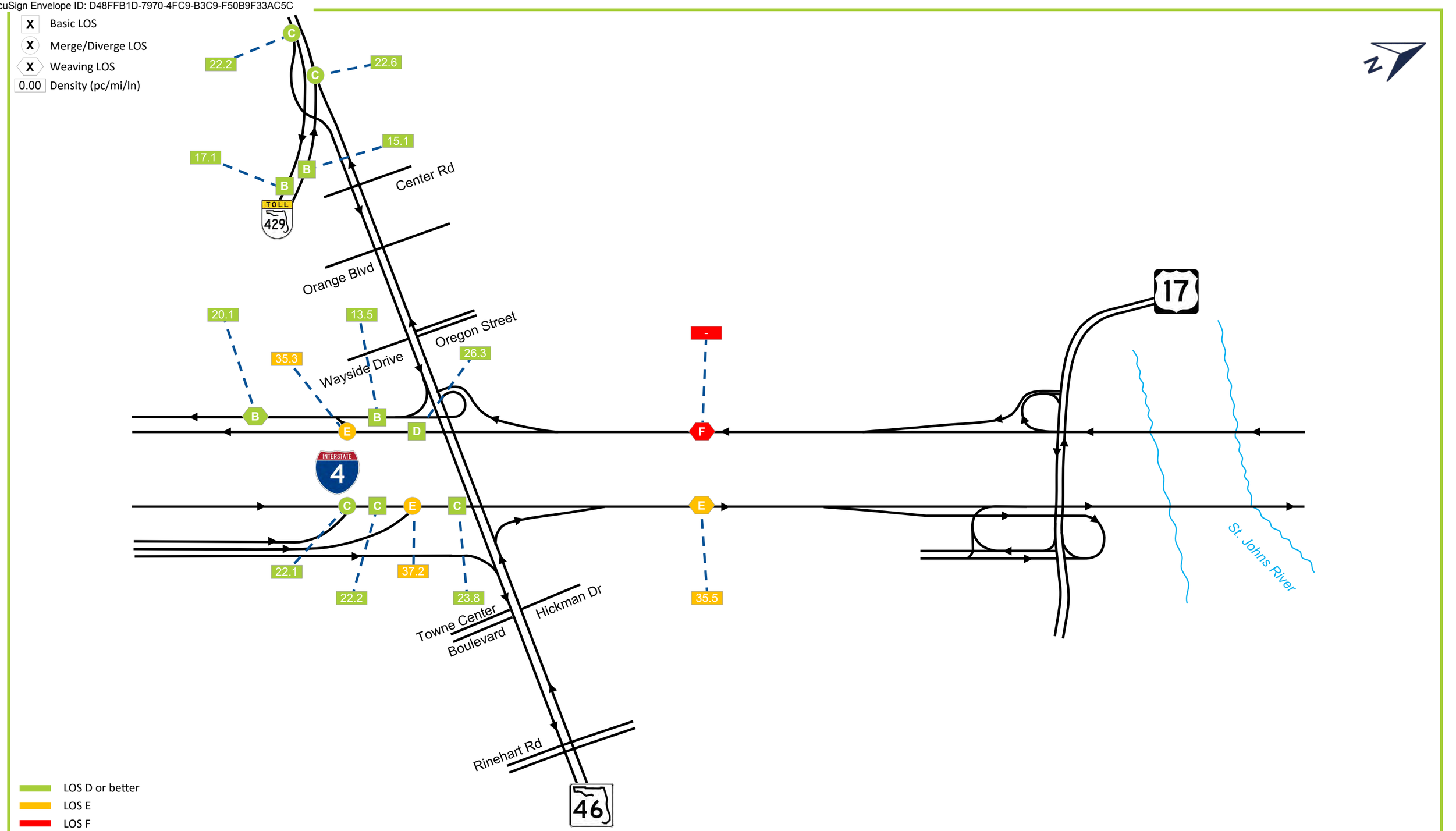
X Merge/Diverge LOS

X Weaving LOS

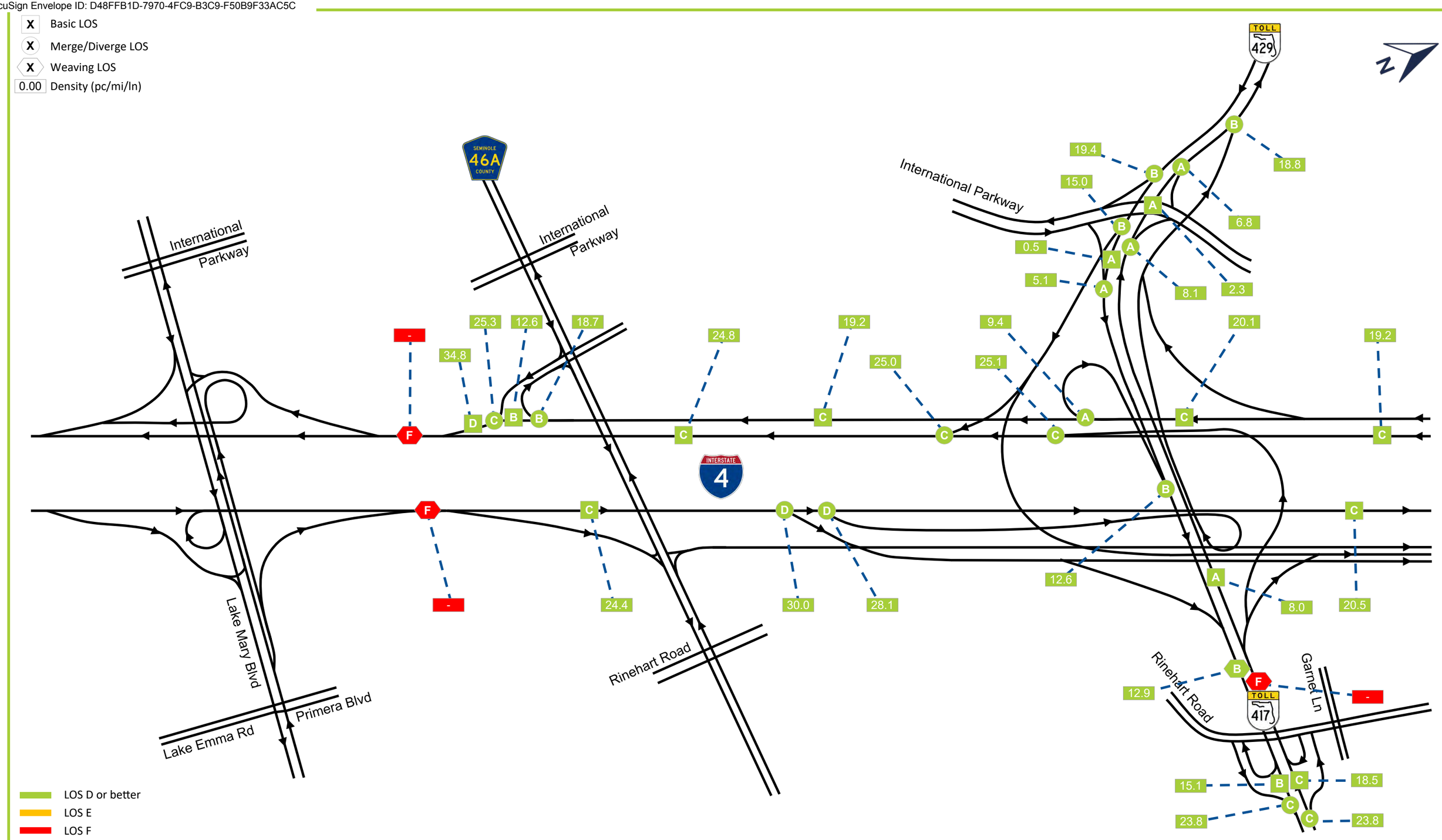
0.00 Density (pc/mi/ln)



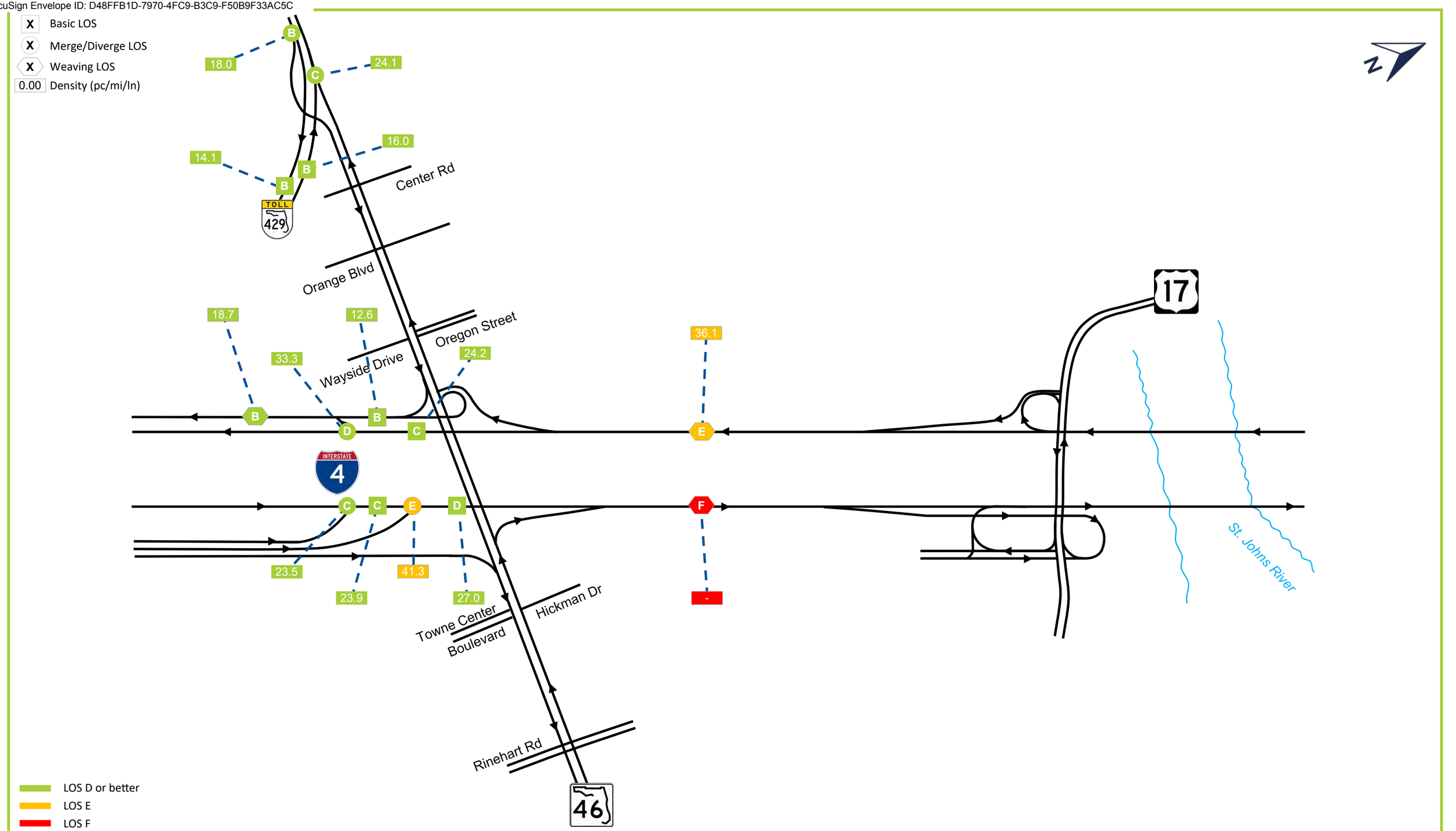
SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2023 AM** **Highway Capacity Software - Freeway Level of Service**	Figure 4-9 Page 4-11



SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2023 AM** **Highway Capacity Software - Freeway Level of Service**	Figure 4-10 Page 4-12



SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange Seminole County, Florida FM Number: 240200-4	**Alternative Technical Concept #32 2023 PM** **Highway Capacity Software - Freeway Level of Service**	Figure 4-11 Page 4-13



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Highway Capacity Software - Freeway Level of Service

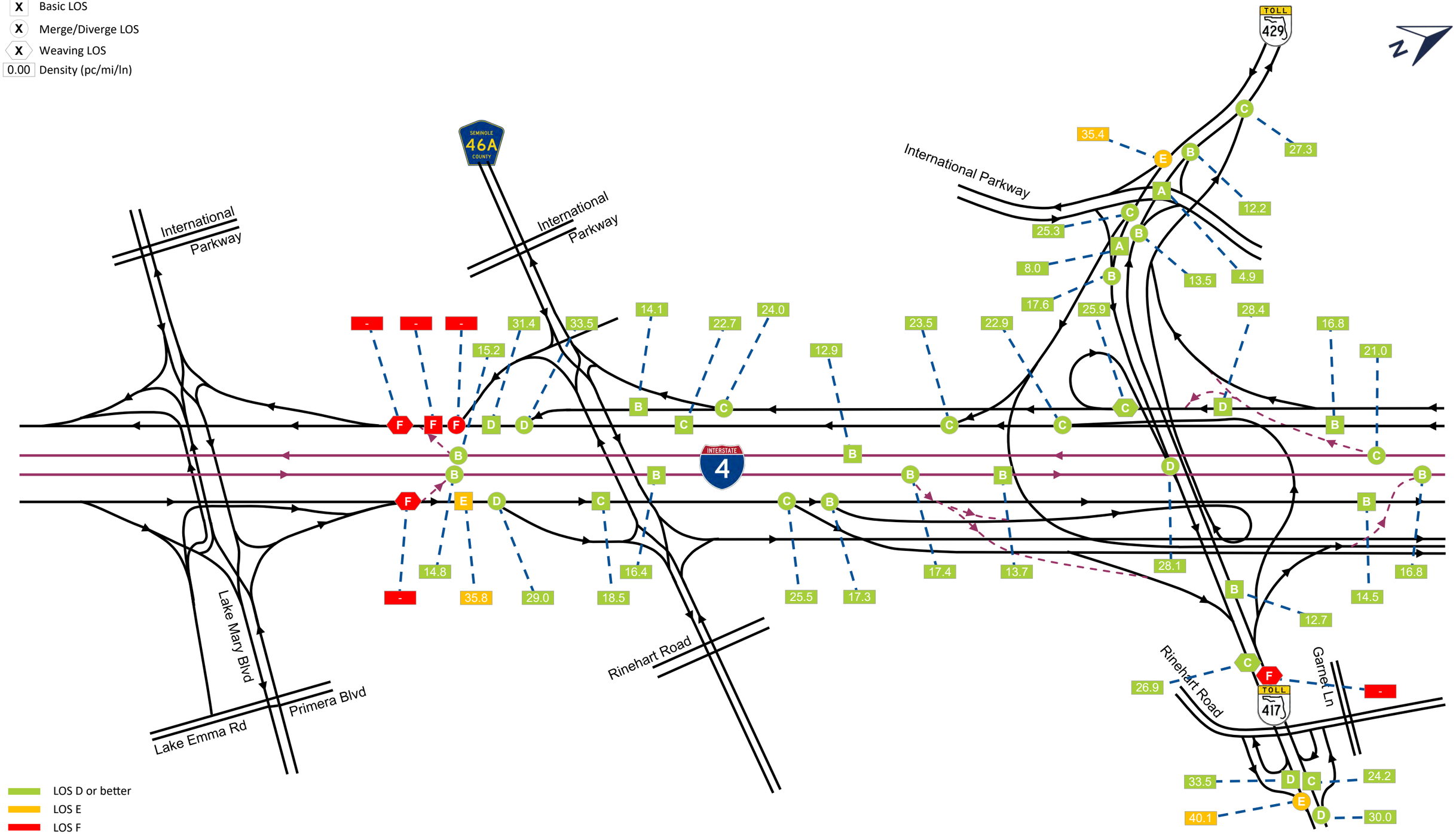
Figure 4-12

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

0.00 Density (pc/mi/ln)



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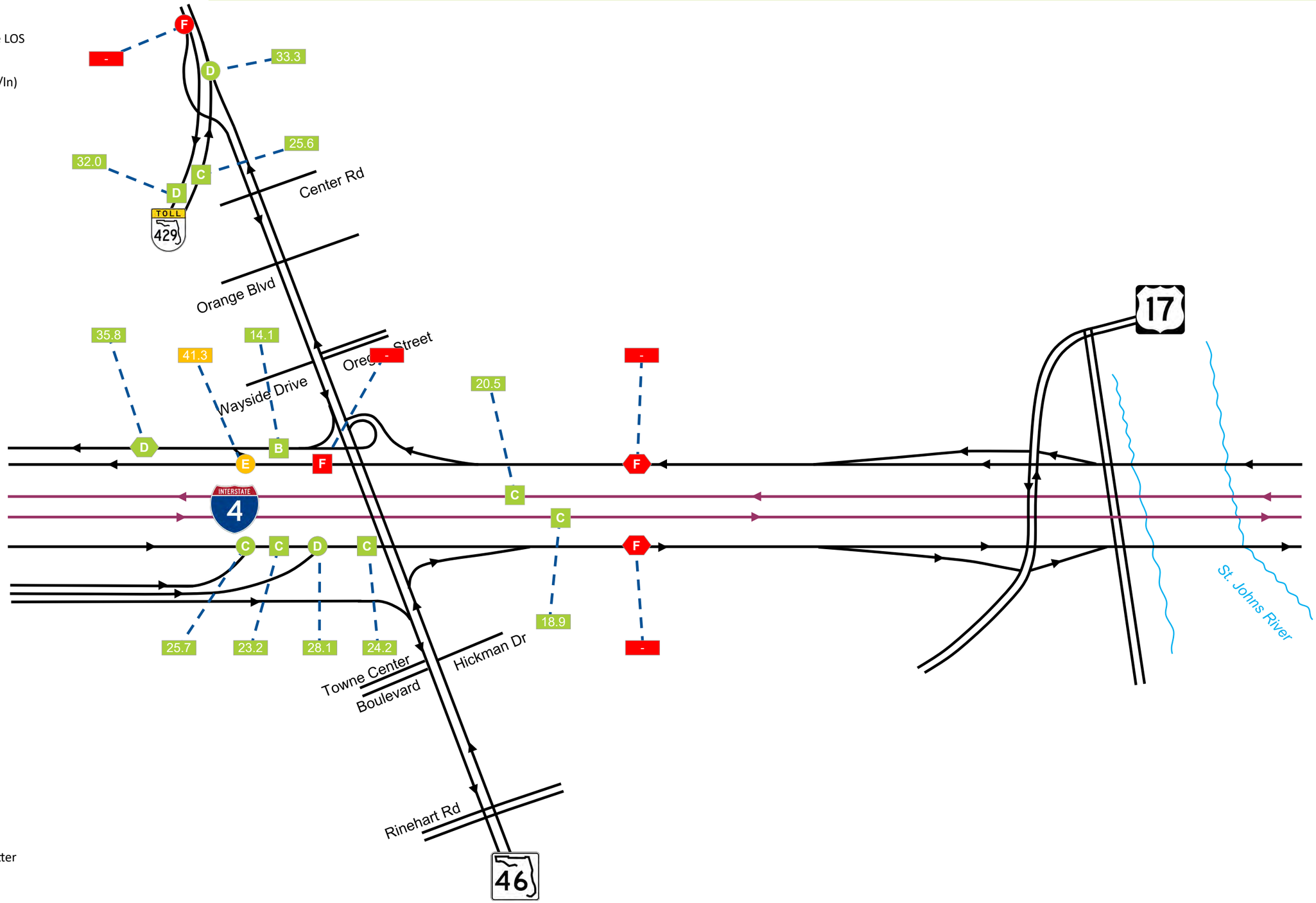
Highway Capacity Software - Freeway Level of Service

Figure 4-13

X Basic LOS
X Merge/Diverge LOS
X Weaving LOS
0.00 Density (pc/mi/ln)



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Highway Capacity Software - Freeway Level of Service

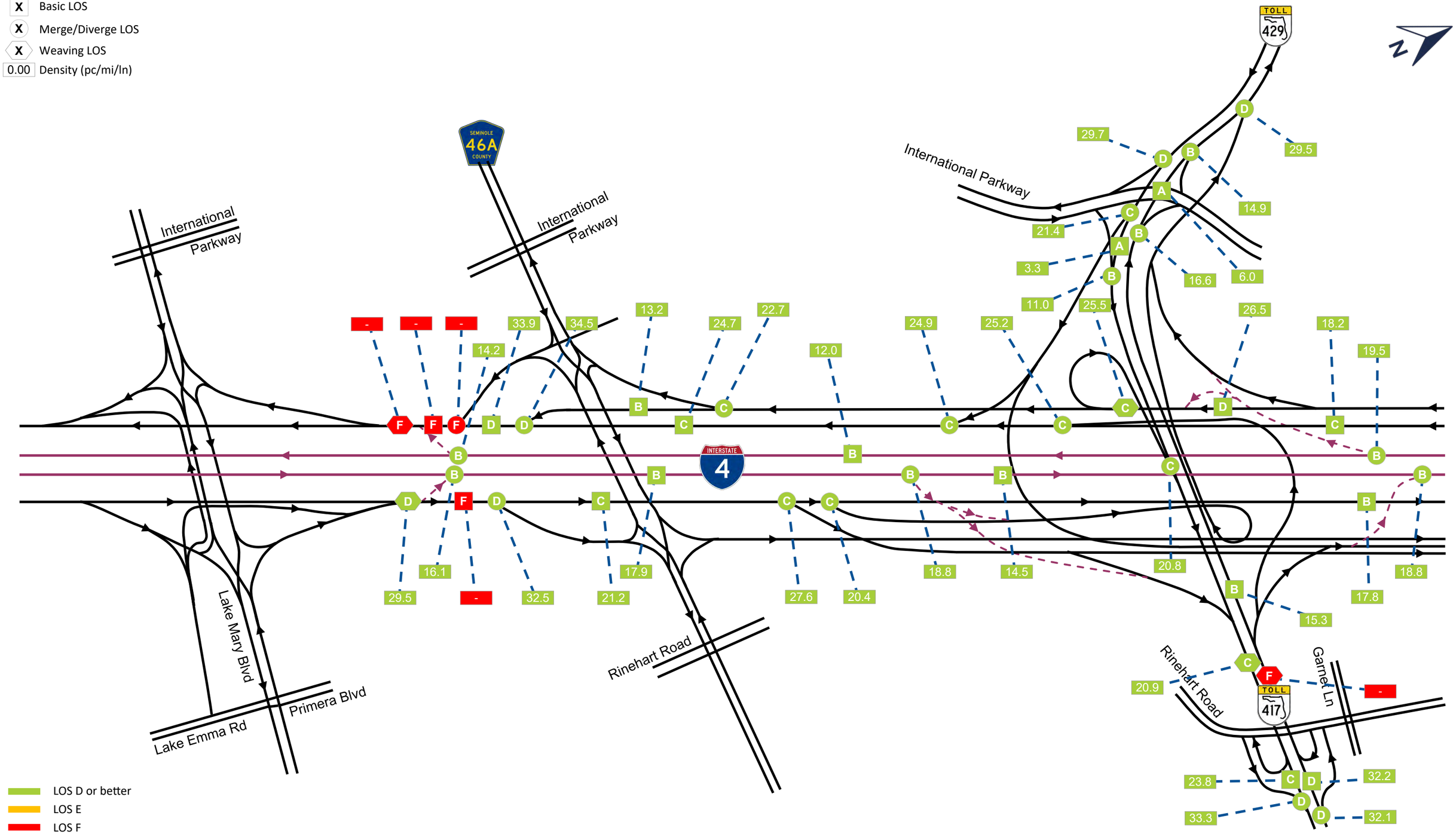
Figure 4-14

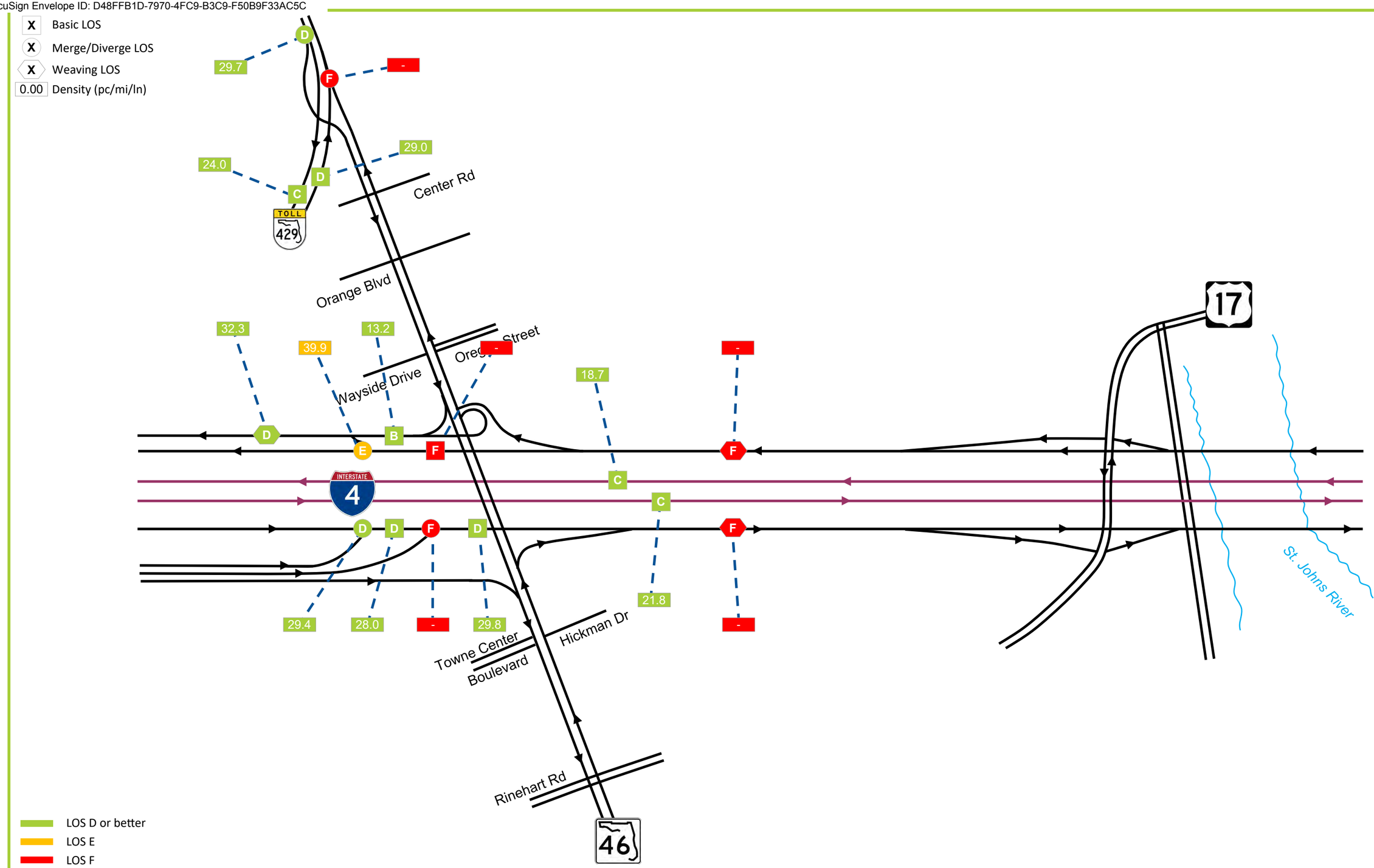
X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

0.00 Density (pc/mi/ln)





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Highway Capacity Software - Freeway Level of Service

Figure 4-16

4.1.5 Comparison of LOS results for RFP Concept and ATC #32

HCS results were compared to understand the operational benefits of both concepts.

The comparison is shown in two ways: figures and tables. The figures provide a visual side-by-side comparison of the density and LOS for each concept while the tables provide the same analysis by segments.

Figure 4-17 through **Figure 4-32** show a side-by-side comparison of the LOS results obtained from HCS 7.

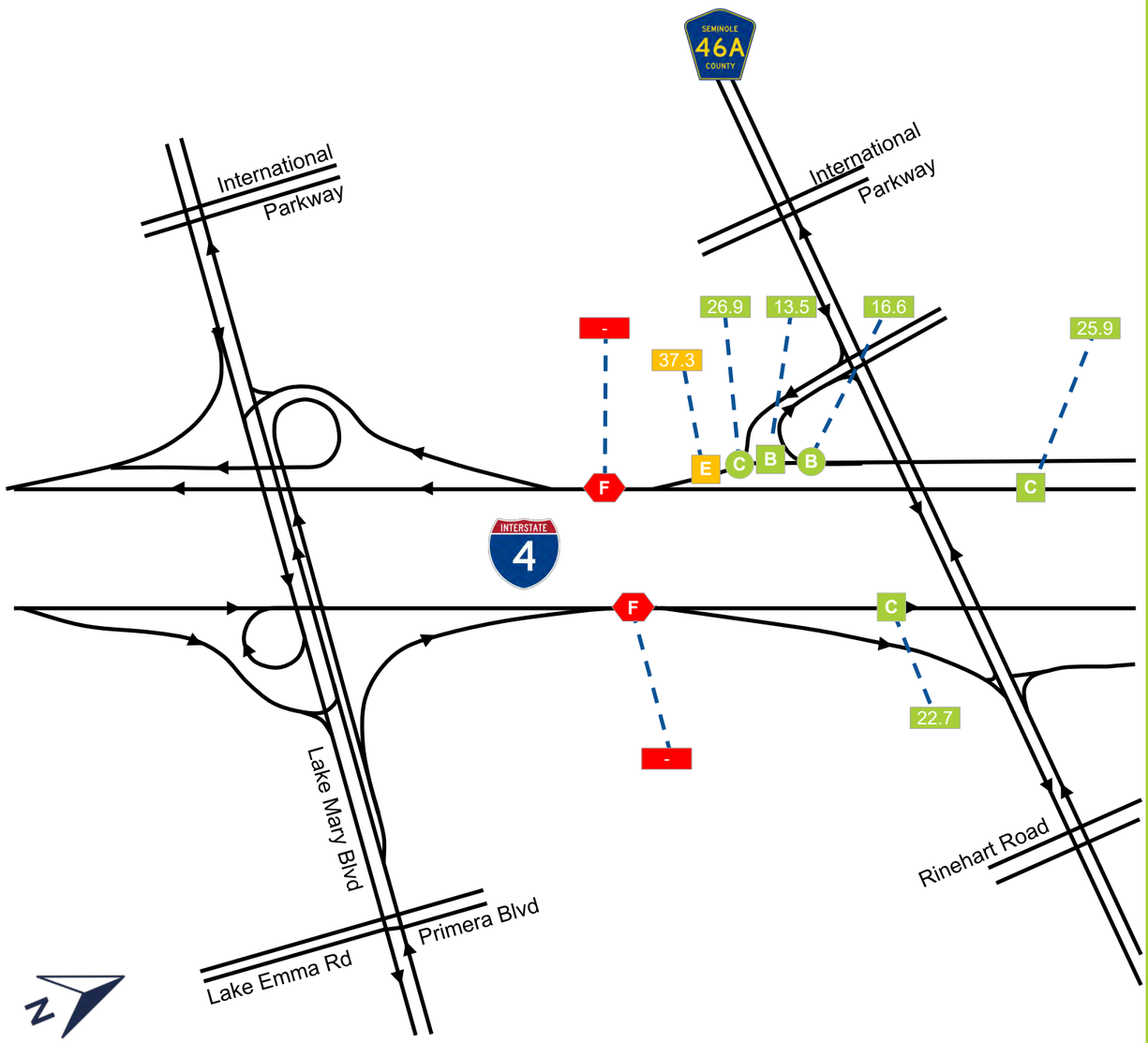
In addition to the figures, **Table 4-4** through **Table 4-11** show a detailed comparison of LOS results for both concepts.

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

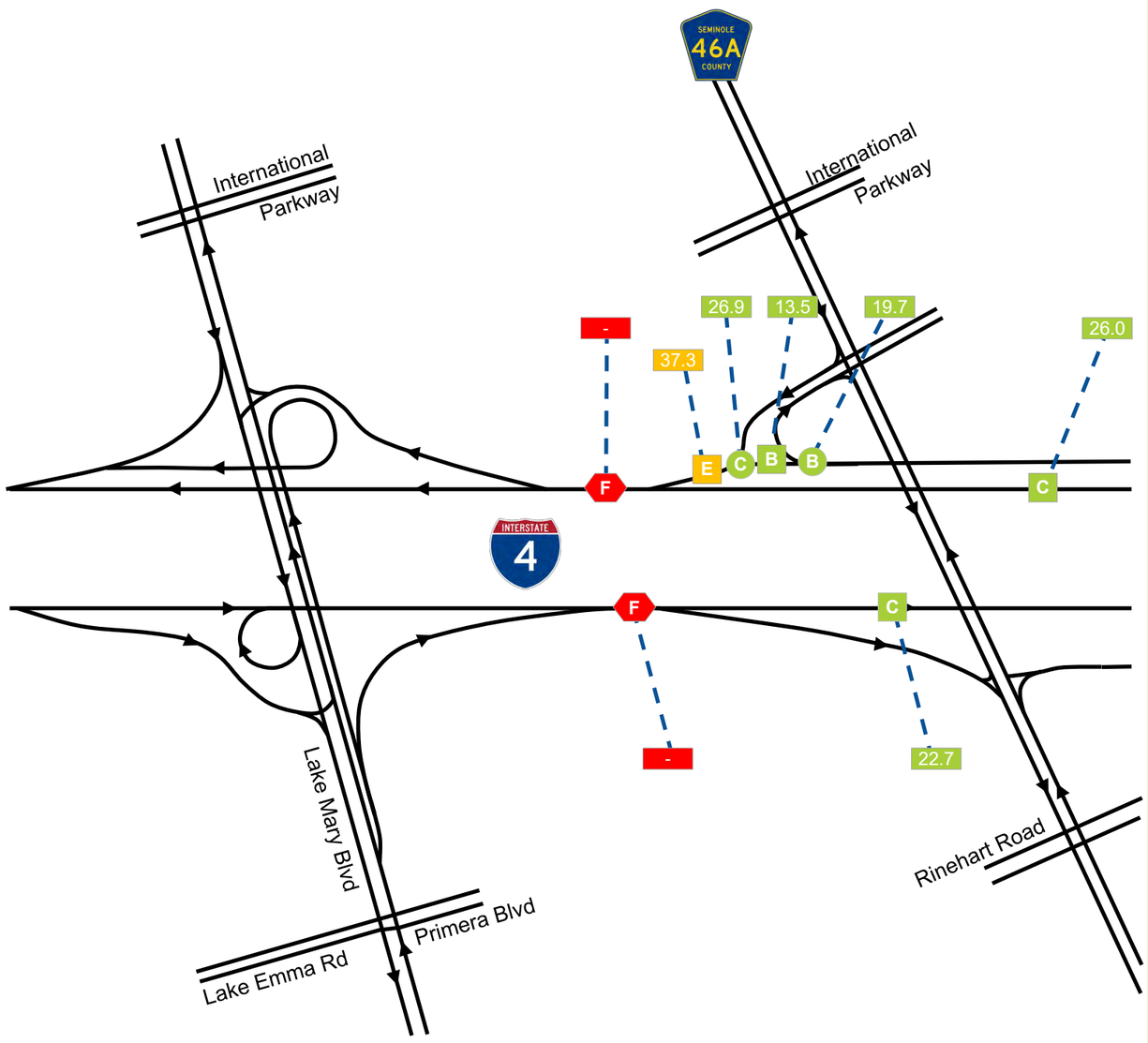
0.00 Density (pc/mi/ln)



LOS D or better

LOS E

LOS F



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Alternative Technical Concept #32

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Seminole County, Florida

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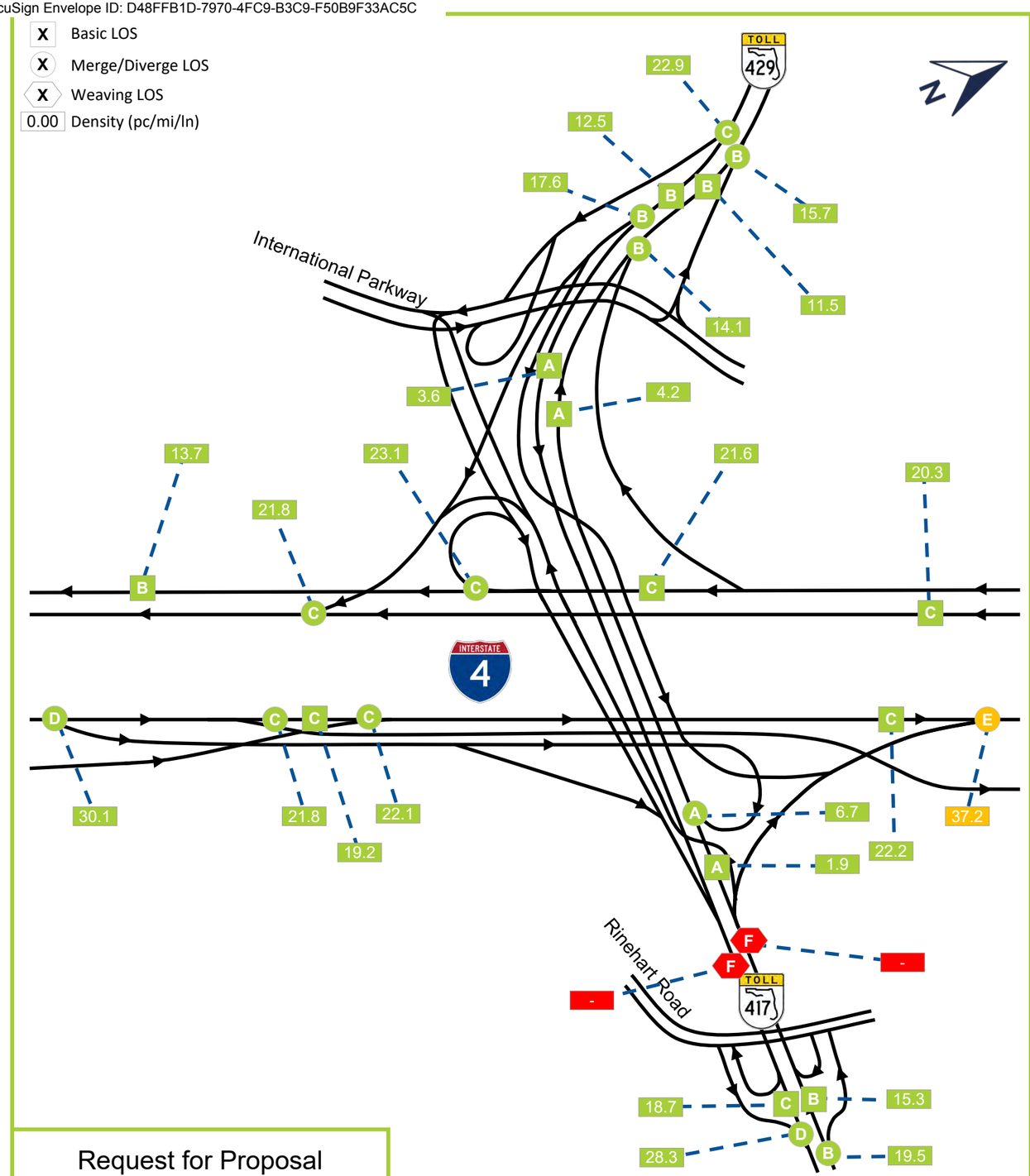
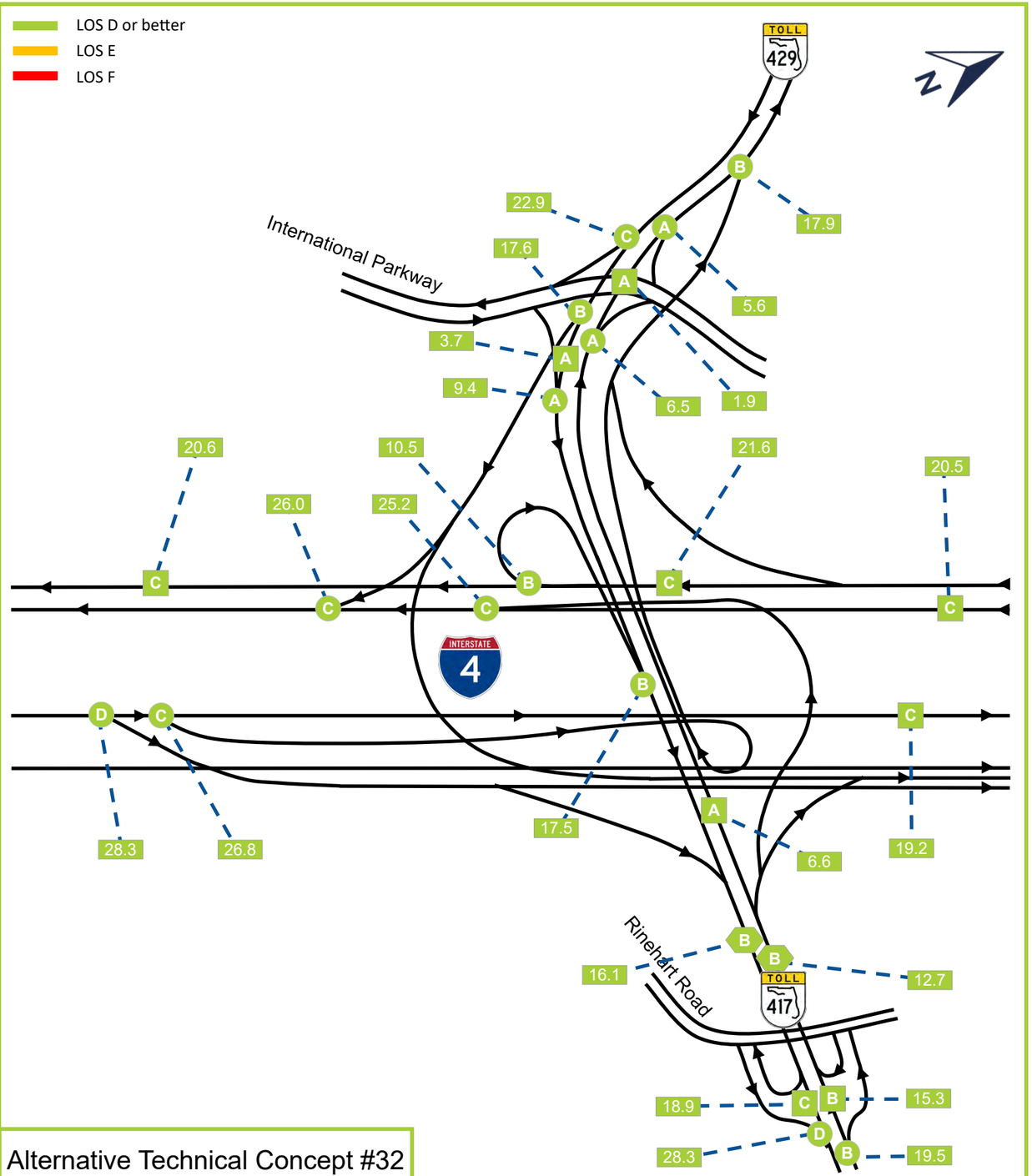
Comparison of Freeway Level of Service from Highway Capacity Software 2023 AM

Figure 4-17





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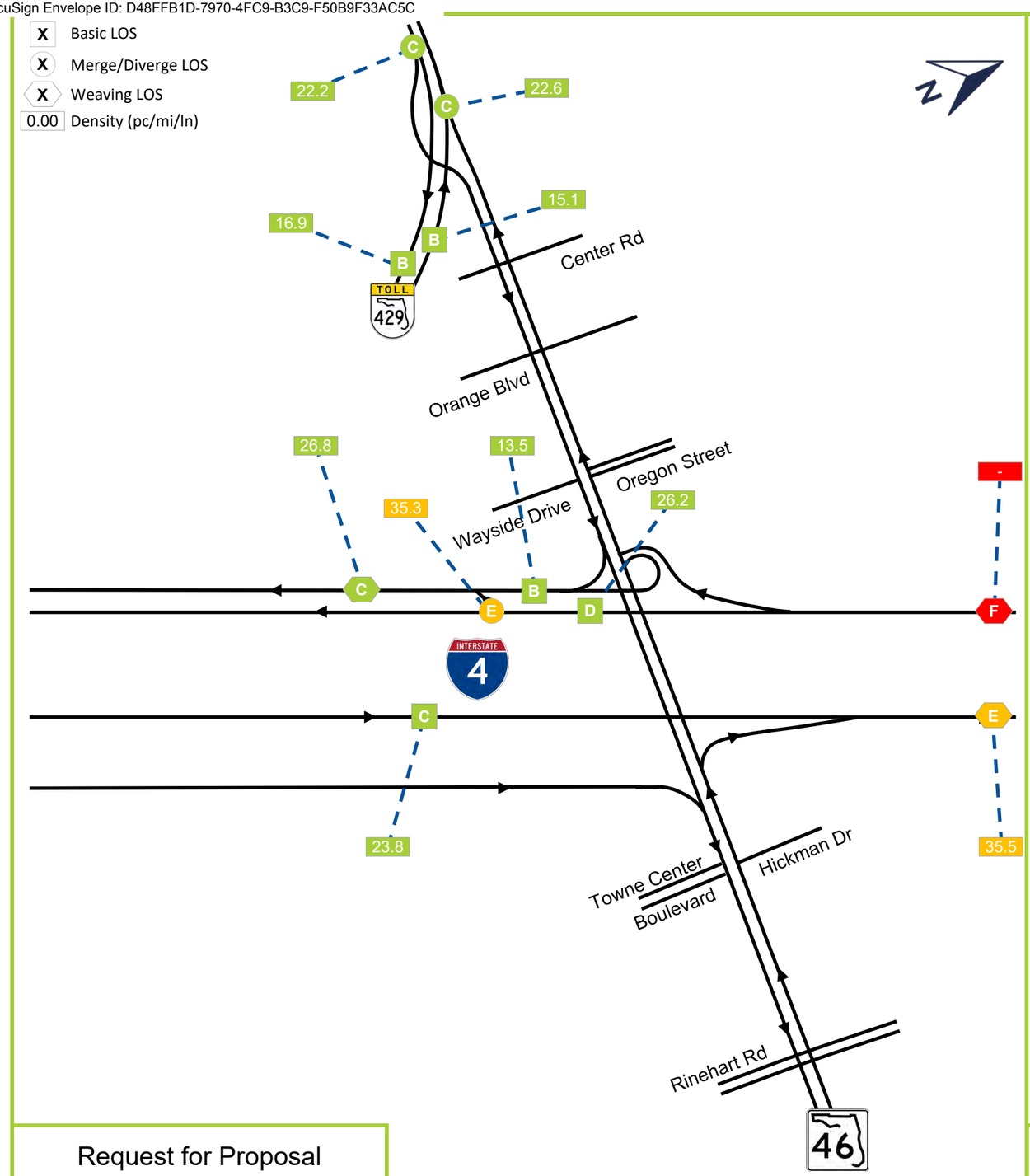
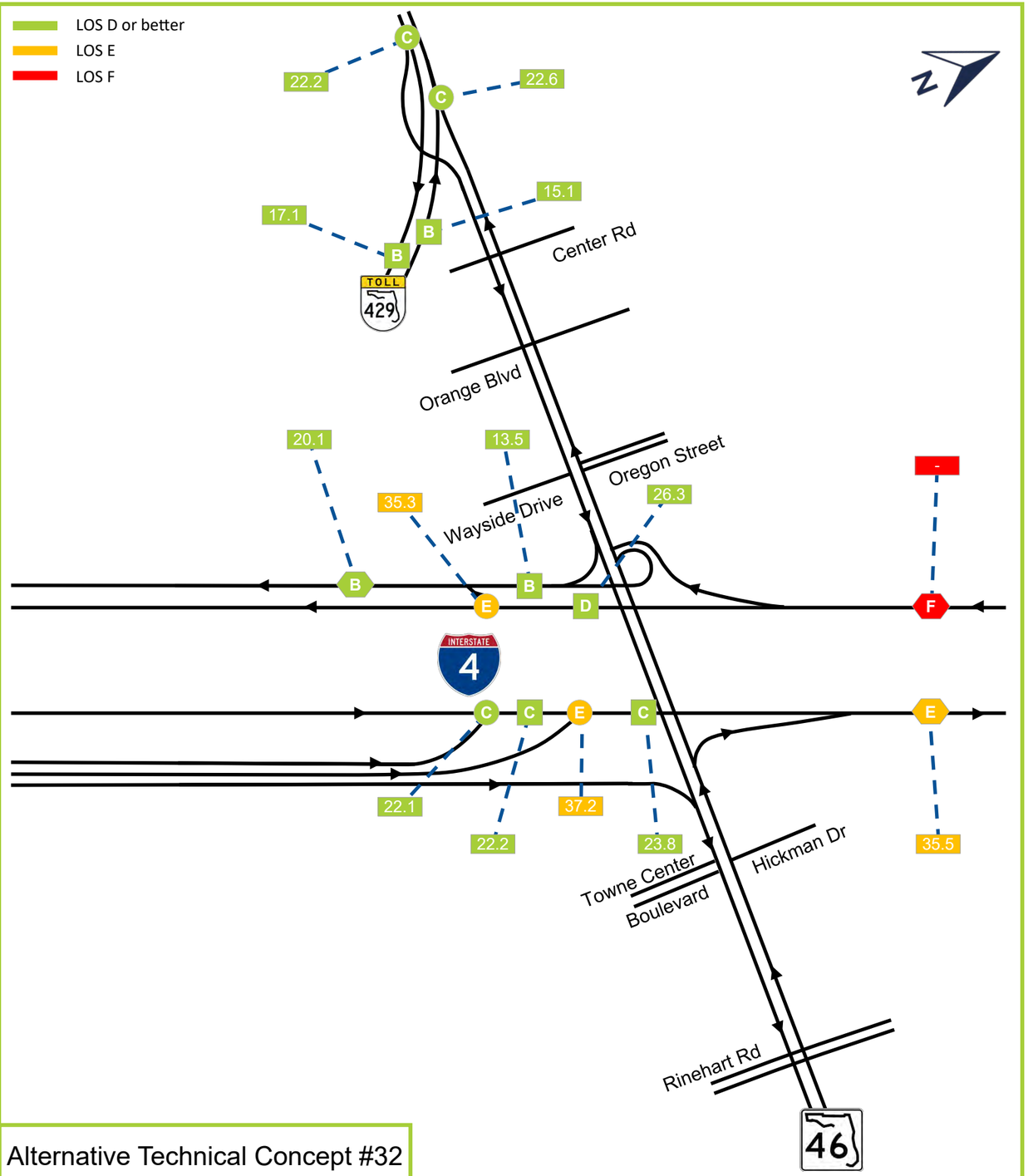
Comparison of Freeway Level of Service from Highway Capacity Software 2023 AM

Figure 4-18





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Alternative Technical Concept #32

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Comparison of Freeway Level of Service from Highway Capacity Software 2023 AM

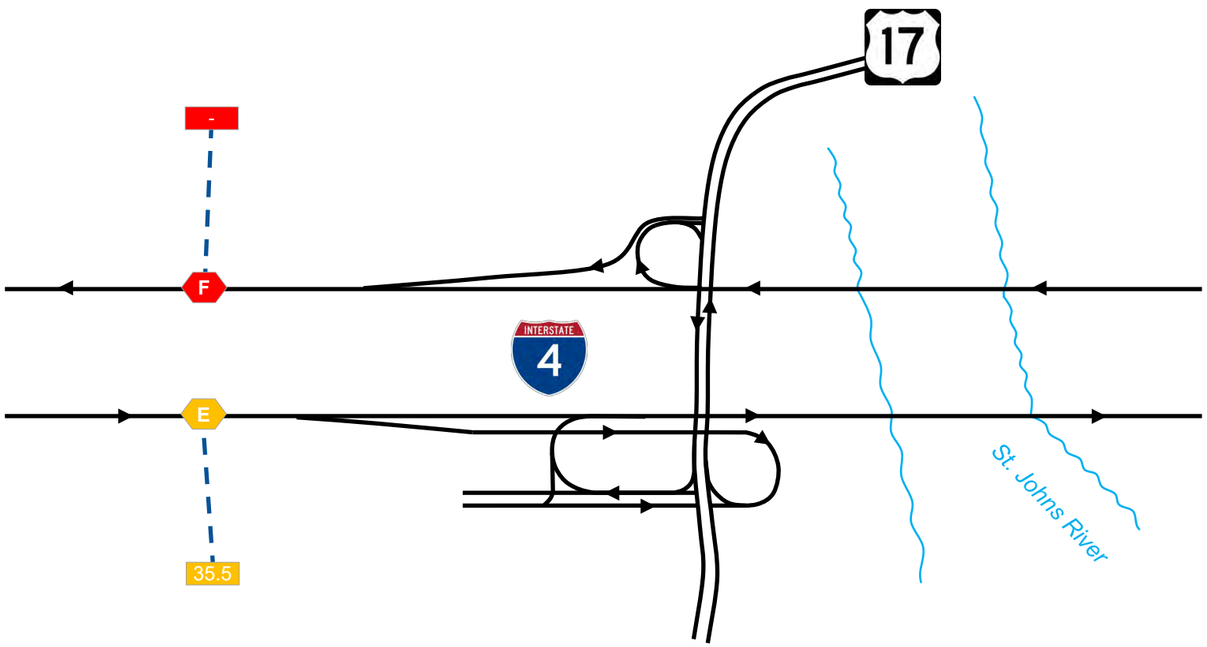
Figure 4-19

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

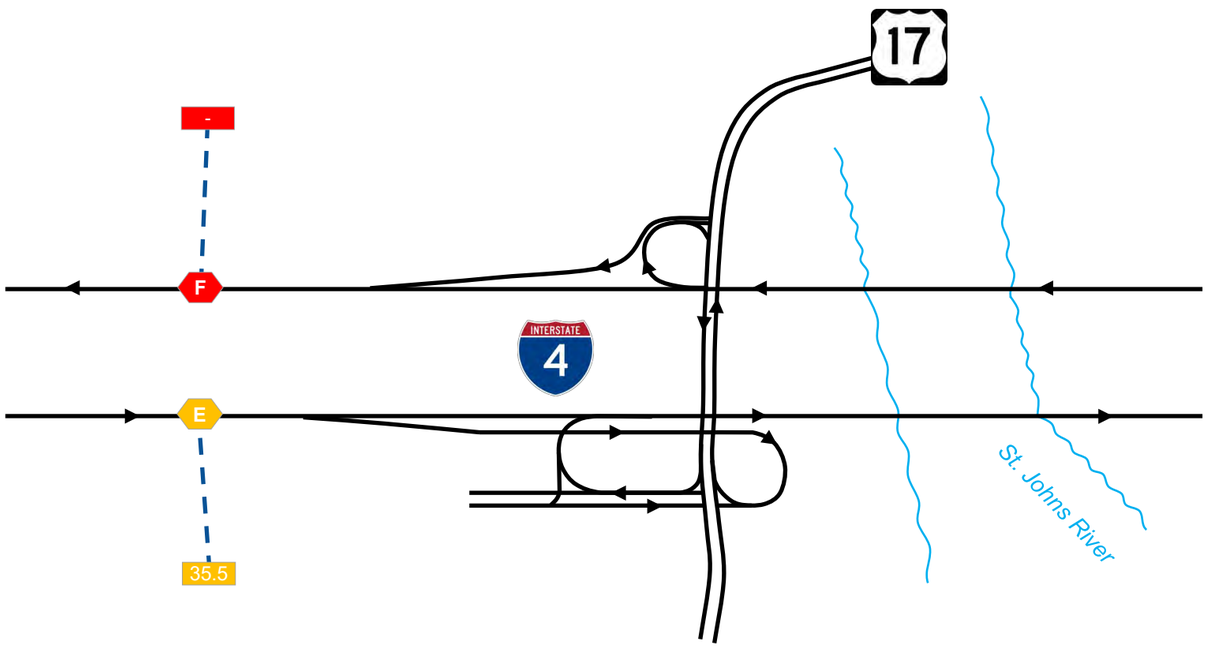
0.00 Density (pc/mi/ln)



LOS D or better

LOS E

LOS F



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Alternative Technical Concept #32

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Comparison of Freeway Level of Service from Highway Capacity Software 2023 AM

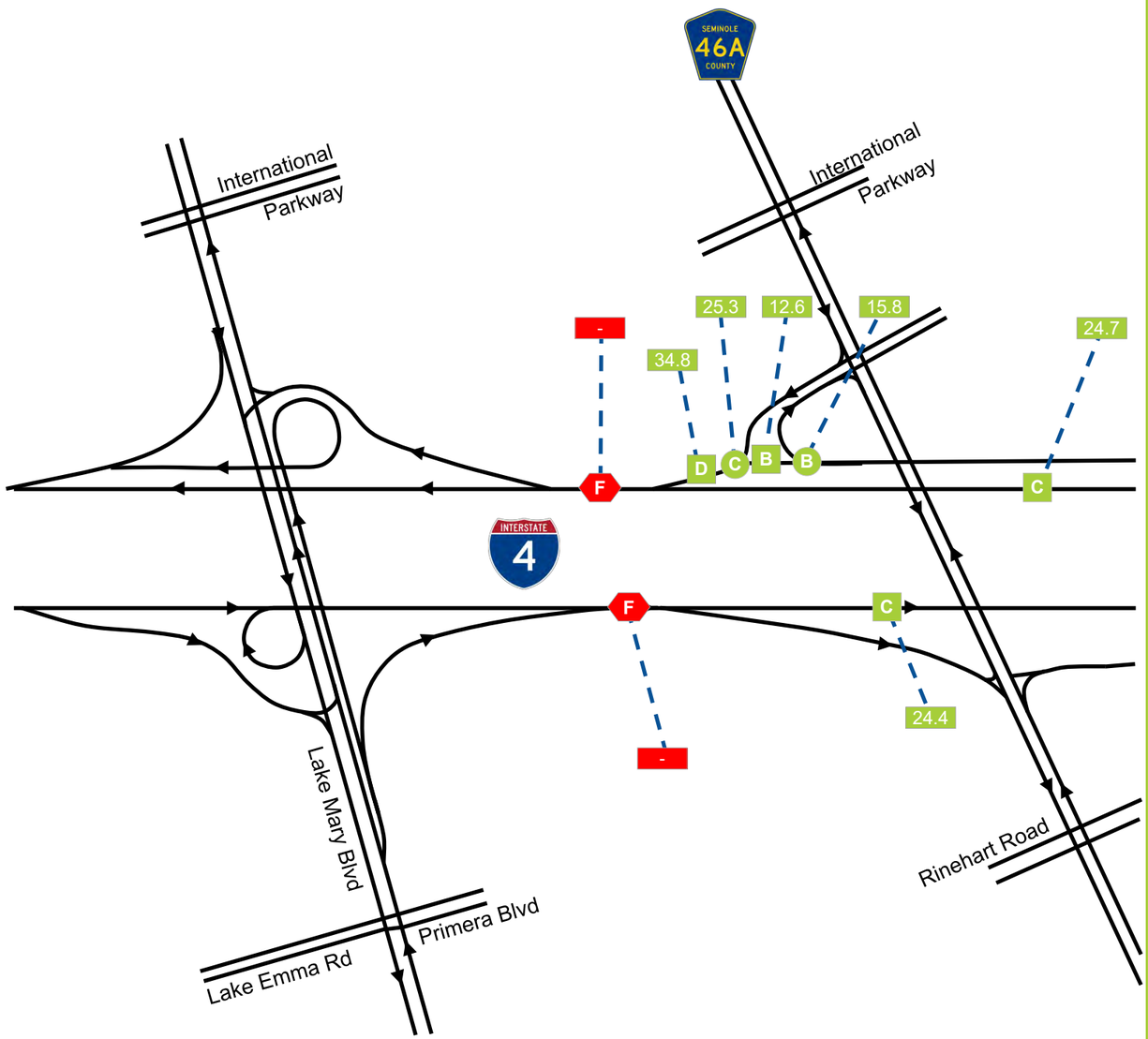
Figure 4-20

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

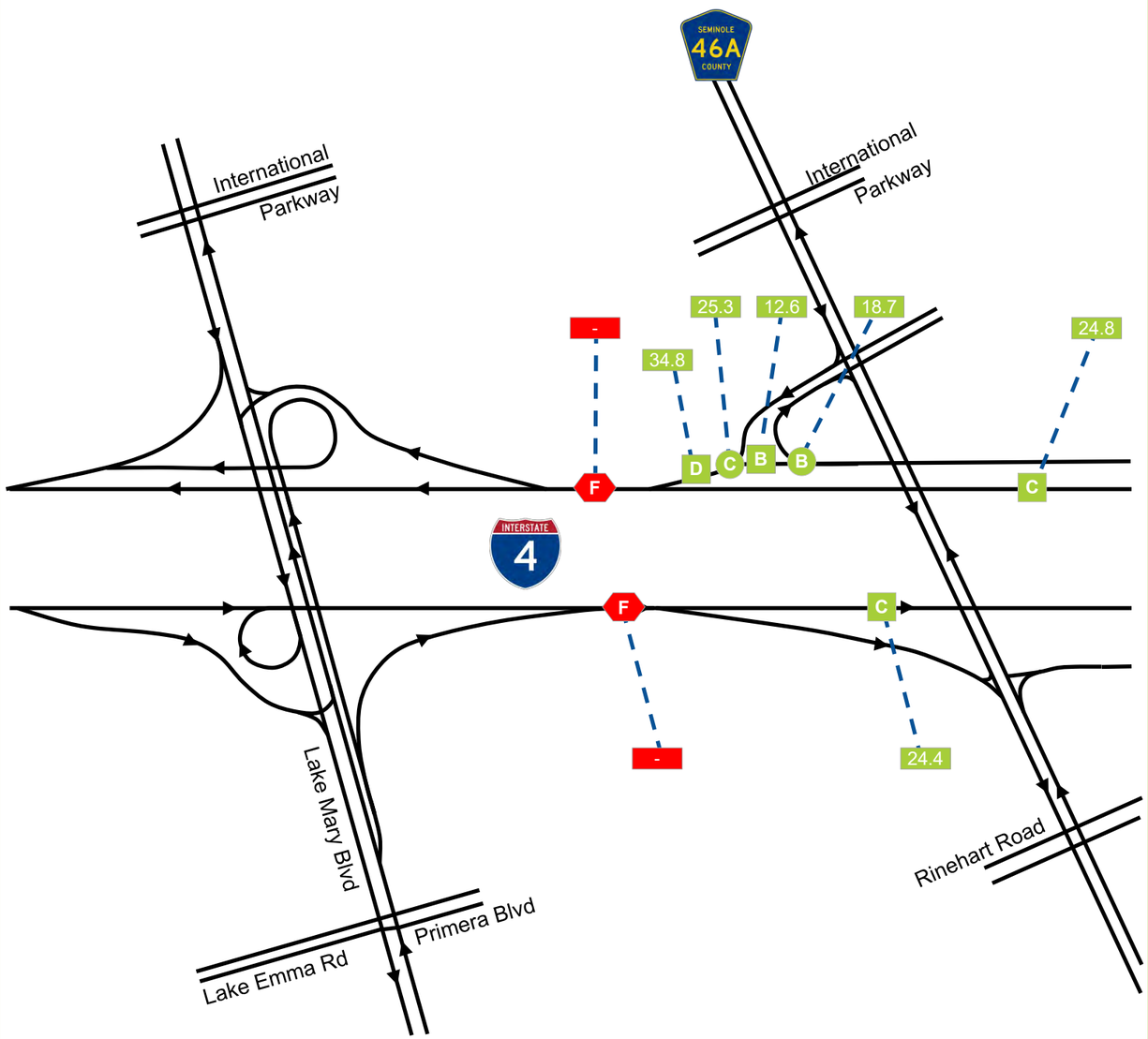
0.00 Density (pc/mi/ln)



LOS D or better

LOS E

LOS F



Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
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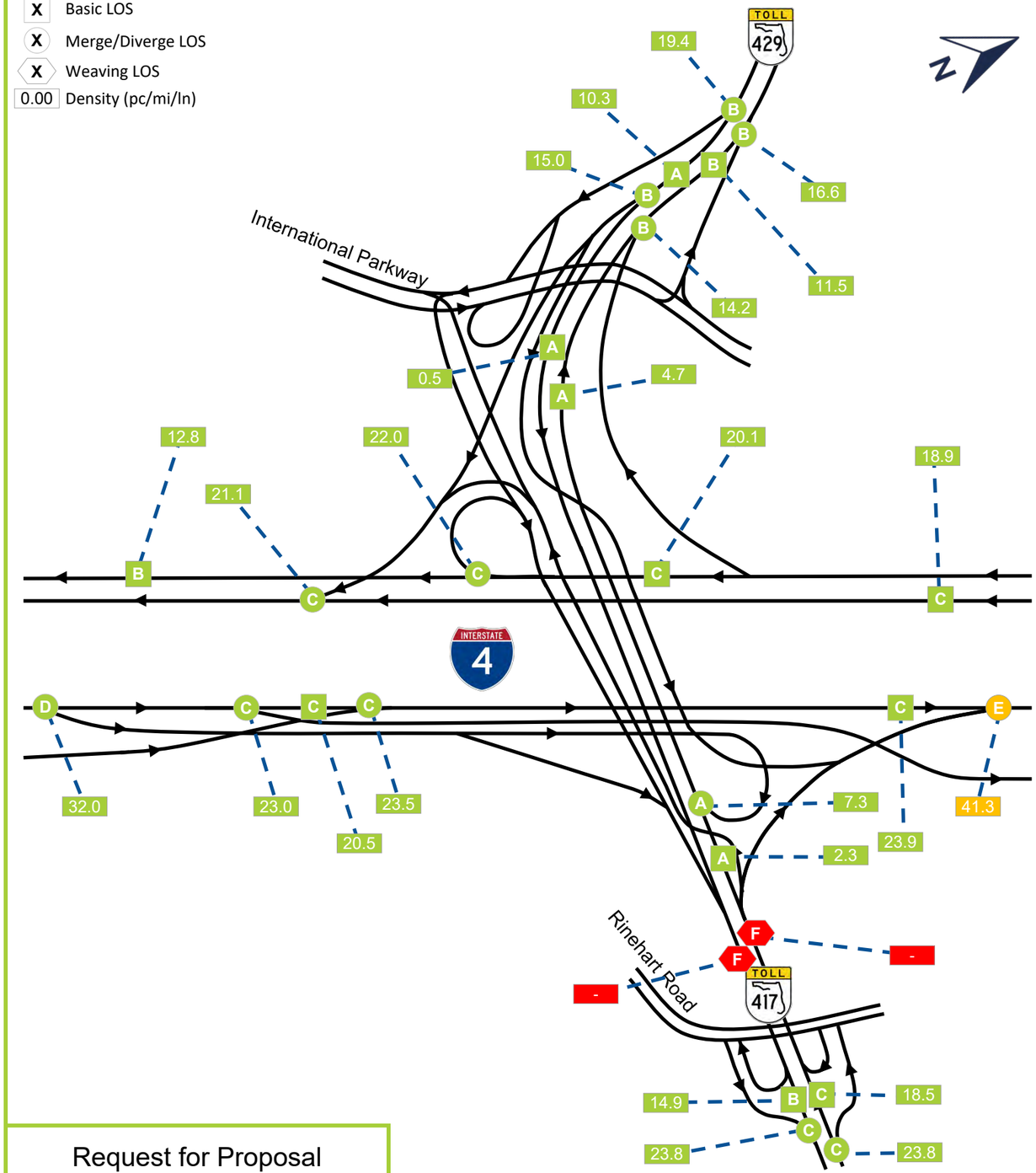
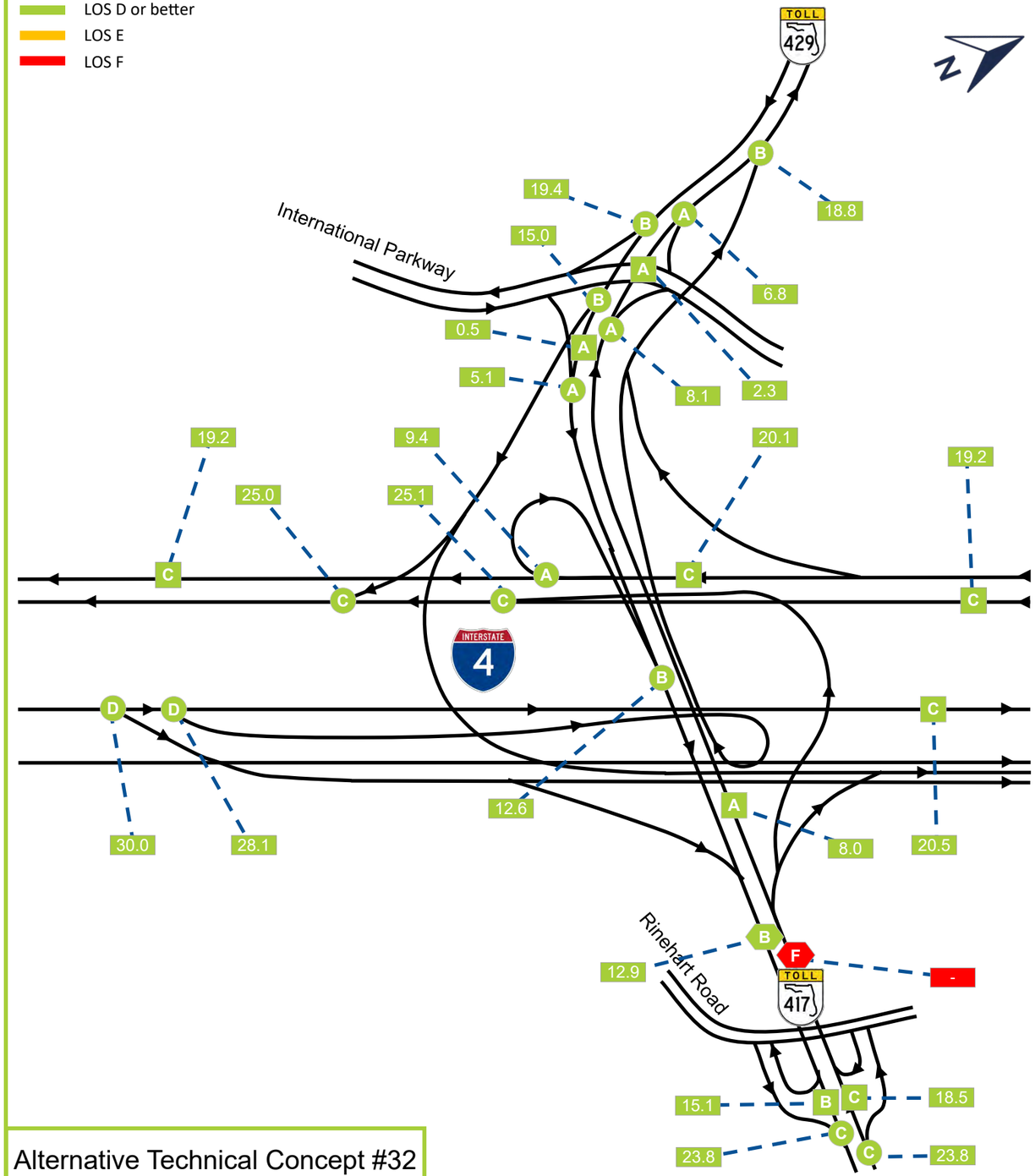
Comparison of Freeway Level of Service from Highway Capacity Software 2023 PM

Figure 4-21

X Basic LOS
X Merge/Diverge LOS
X Weaving LOS
0.00 Density (pc/mi/ln)

LOS D or better
LOS E
LOS F





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Alternative Technical Concept #32

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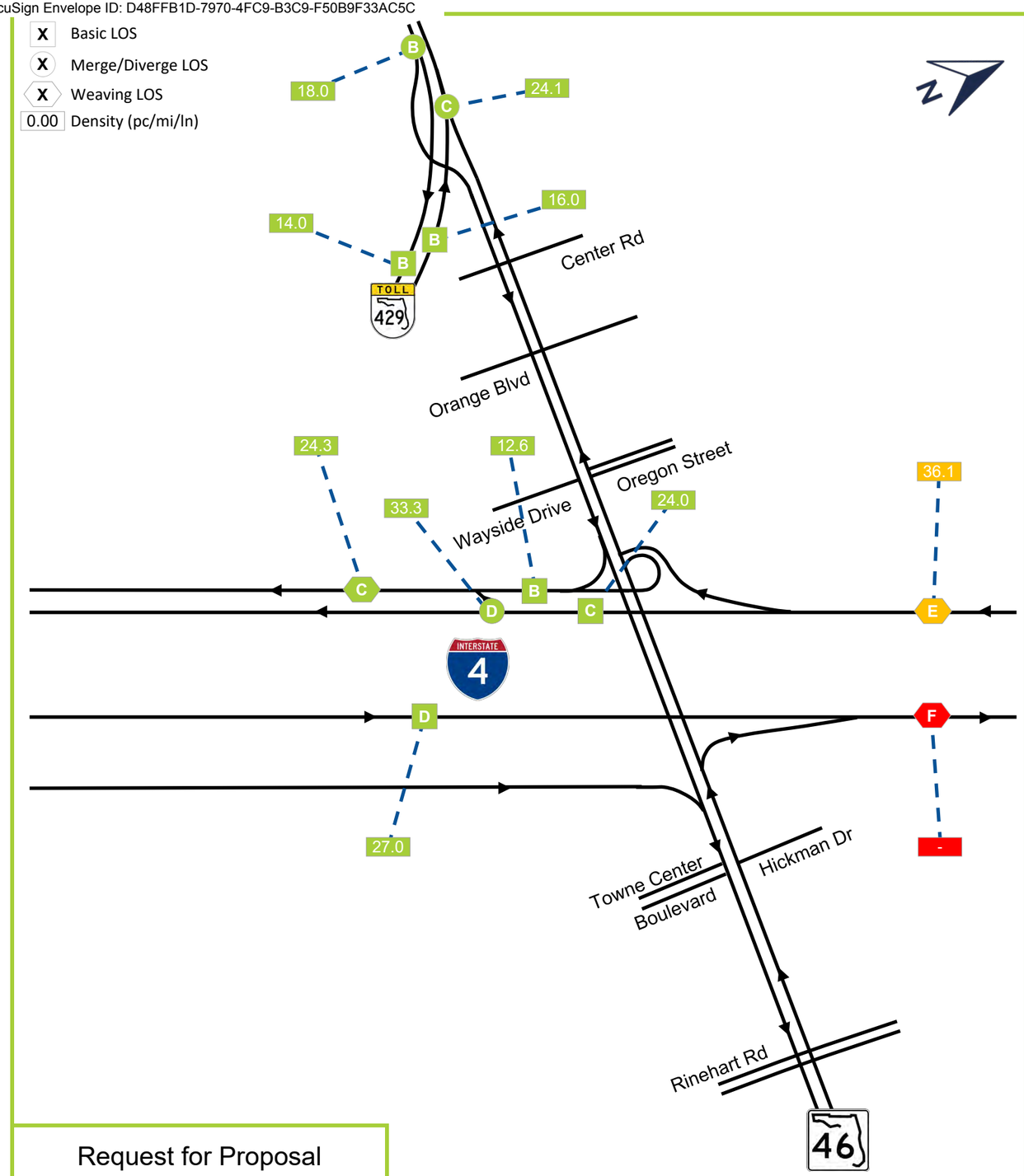
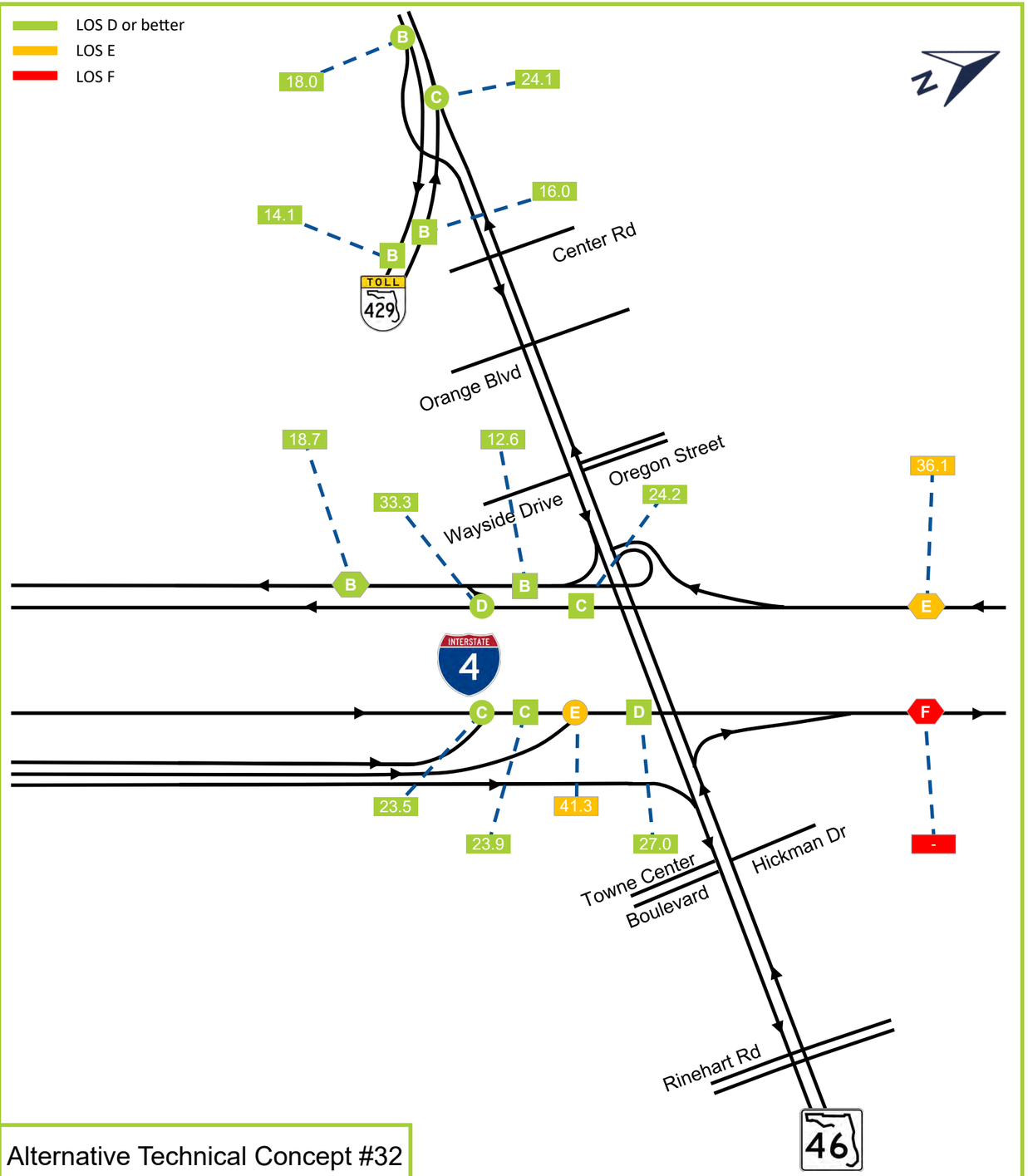
Comparison of Freeway Level of Service from Highway Capacity Software 2023 PM

Figure 4-22





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Comparison of Freeway Level of Service from Highway Capacity Software 2023 PM

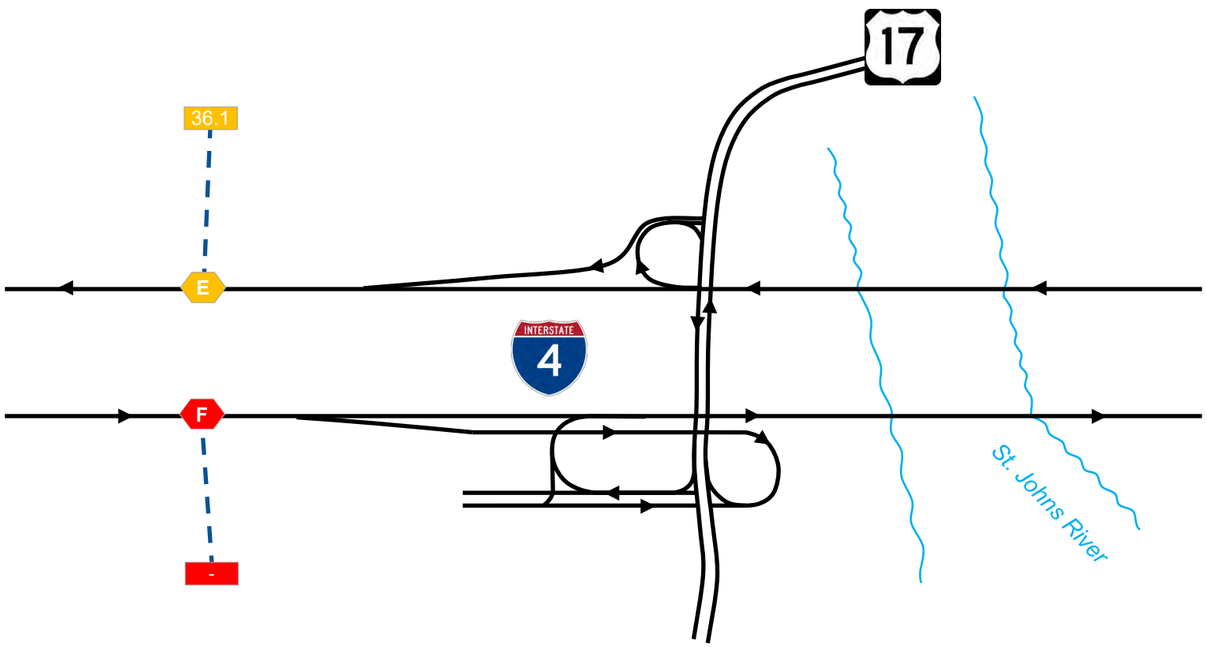
Figure 4-23

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

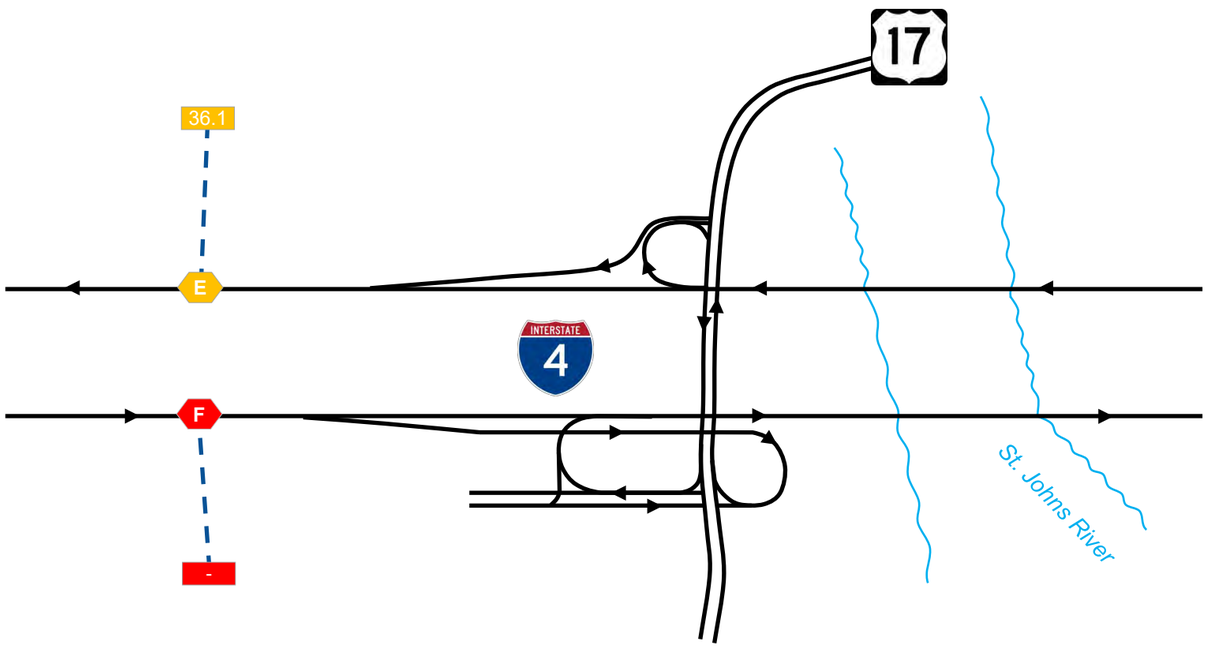
0.00 Density (pc/mi/ln)



LOS D or better

LOS E

LOS F



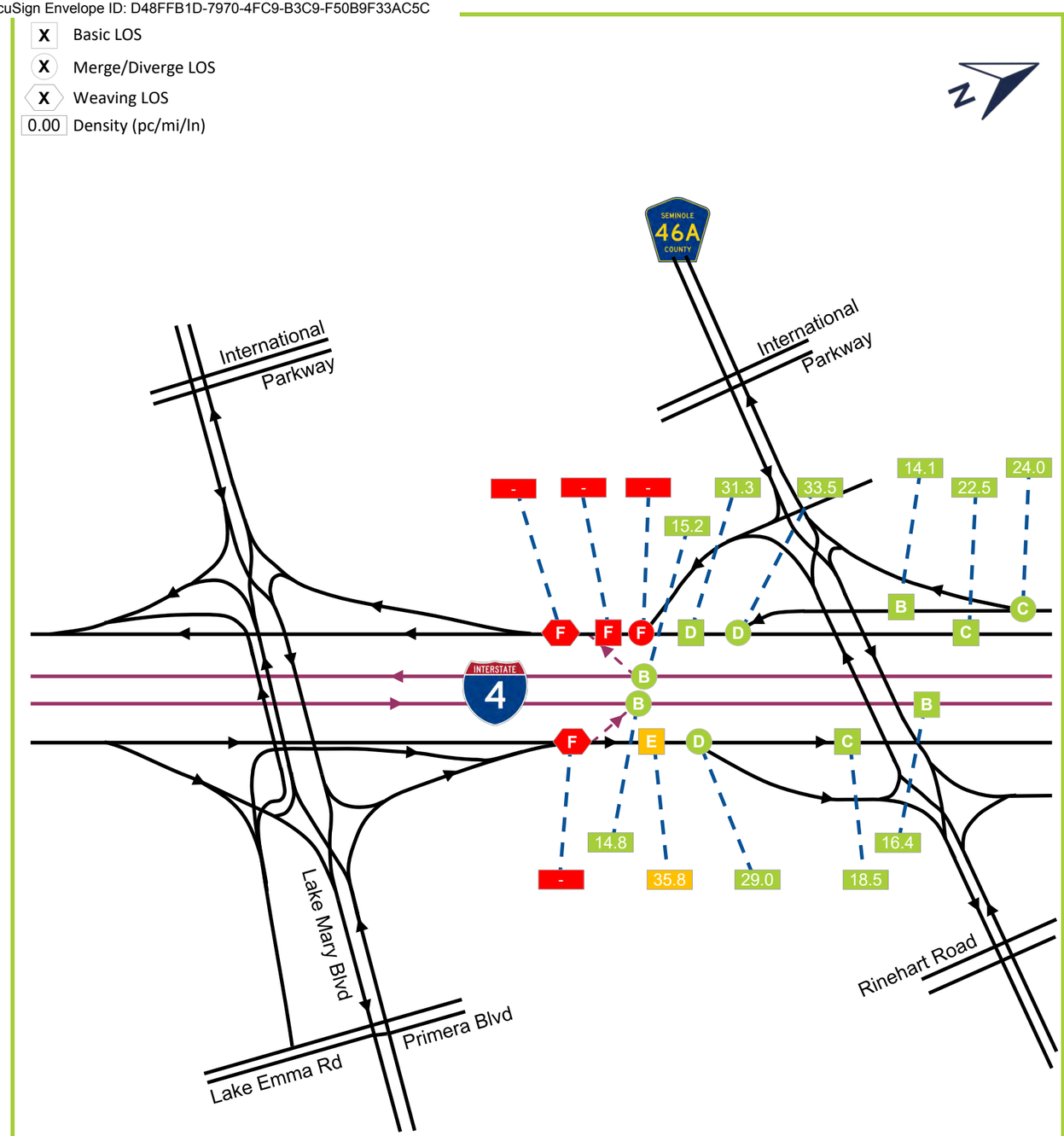
Request for Proposal

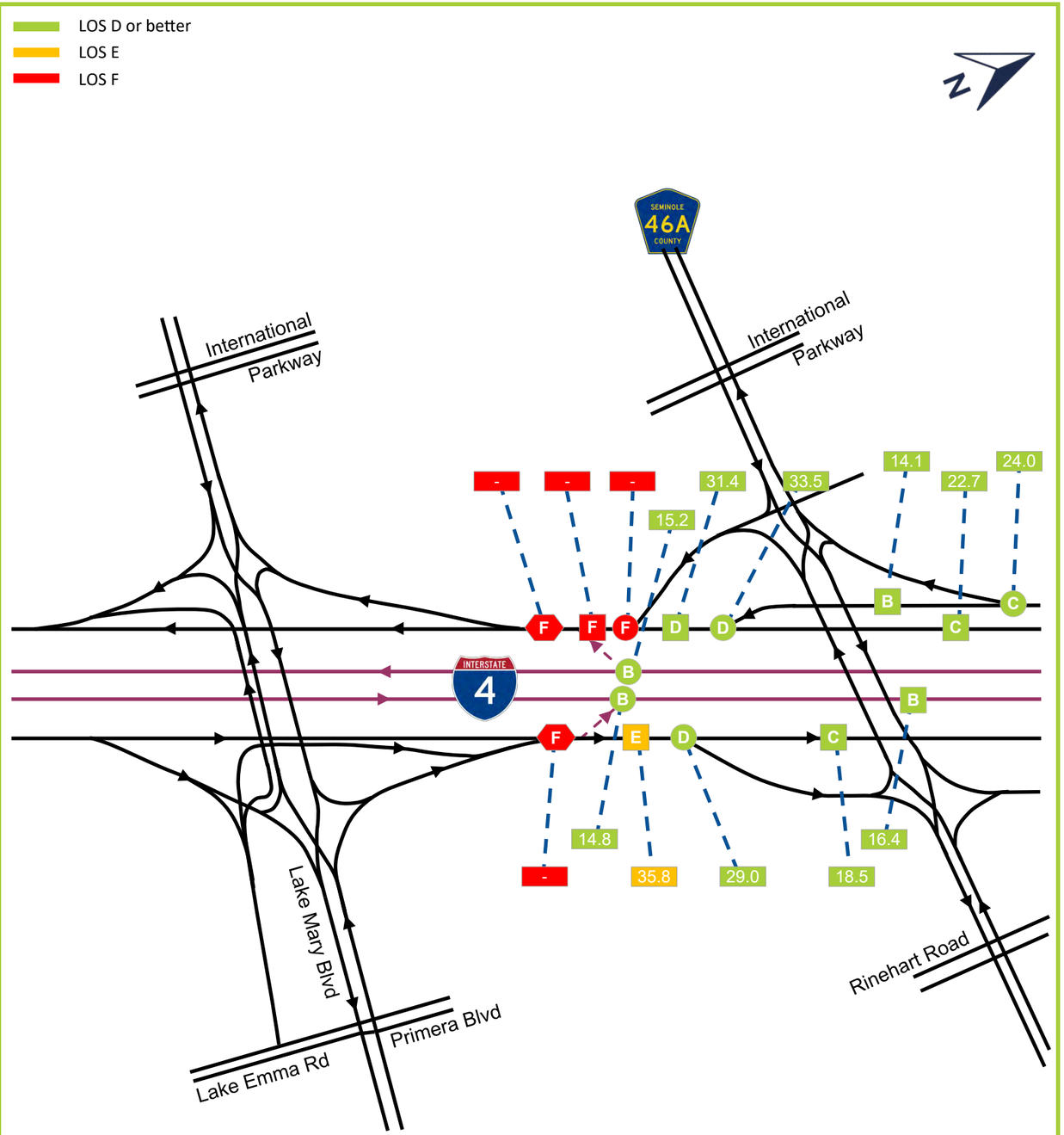
Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Comparison of Freeway Level of Service from Highway Capacity Software 2023 PM

Figure 4-24





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Alternative Technical Concept #32

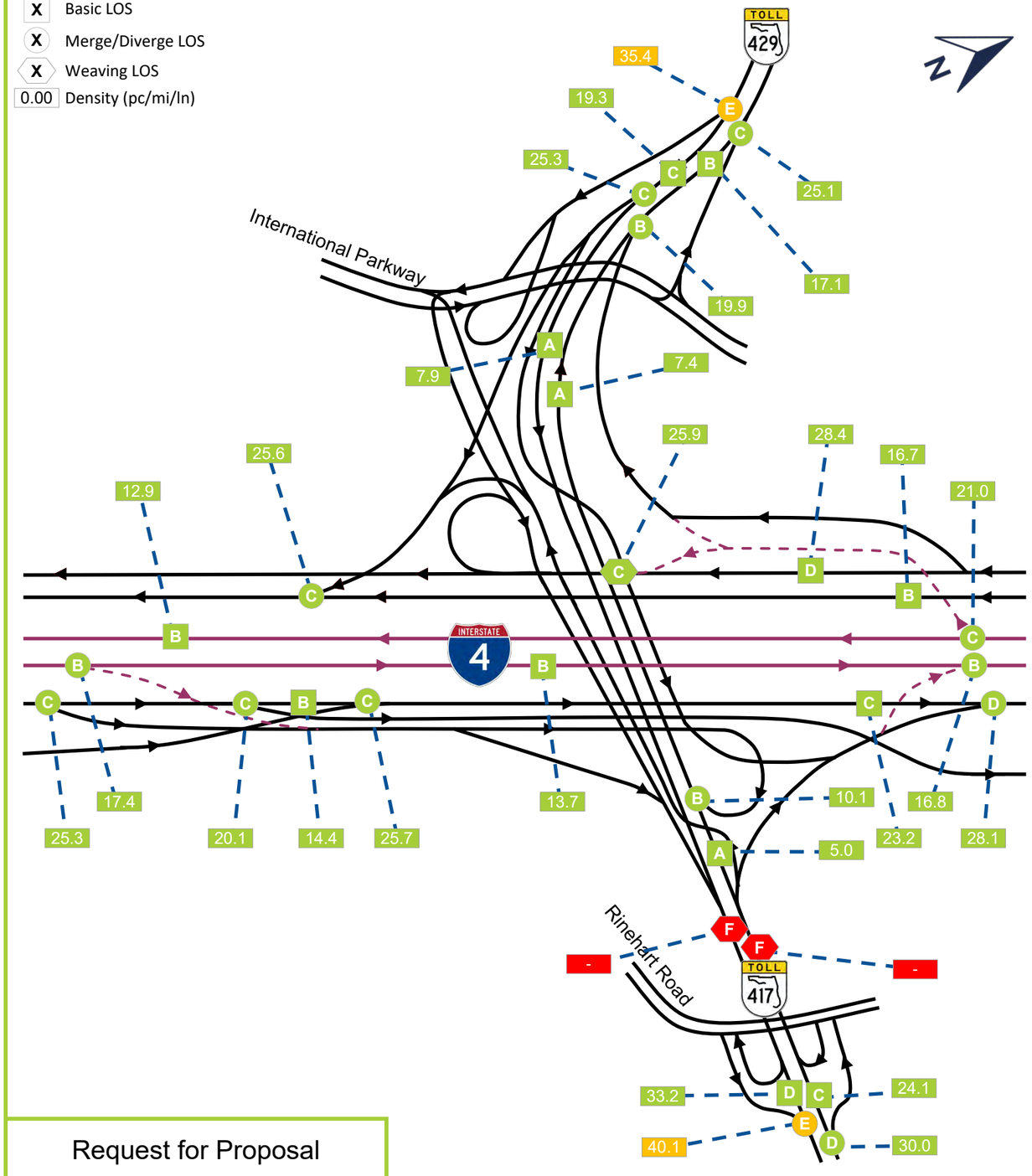
SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

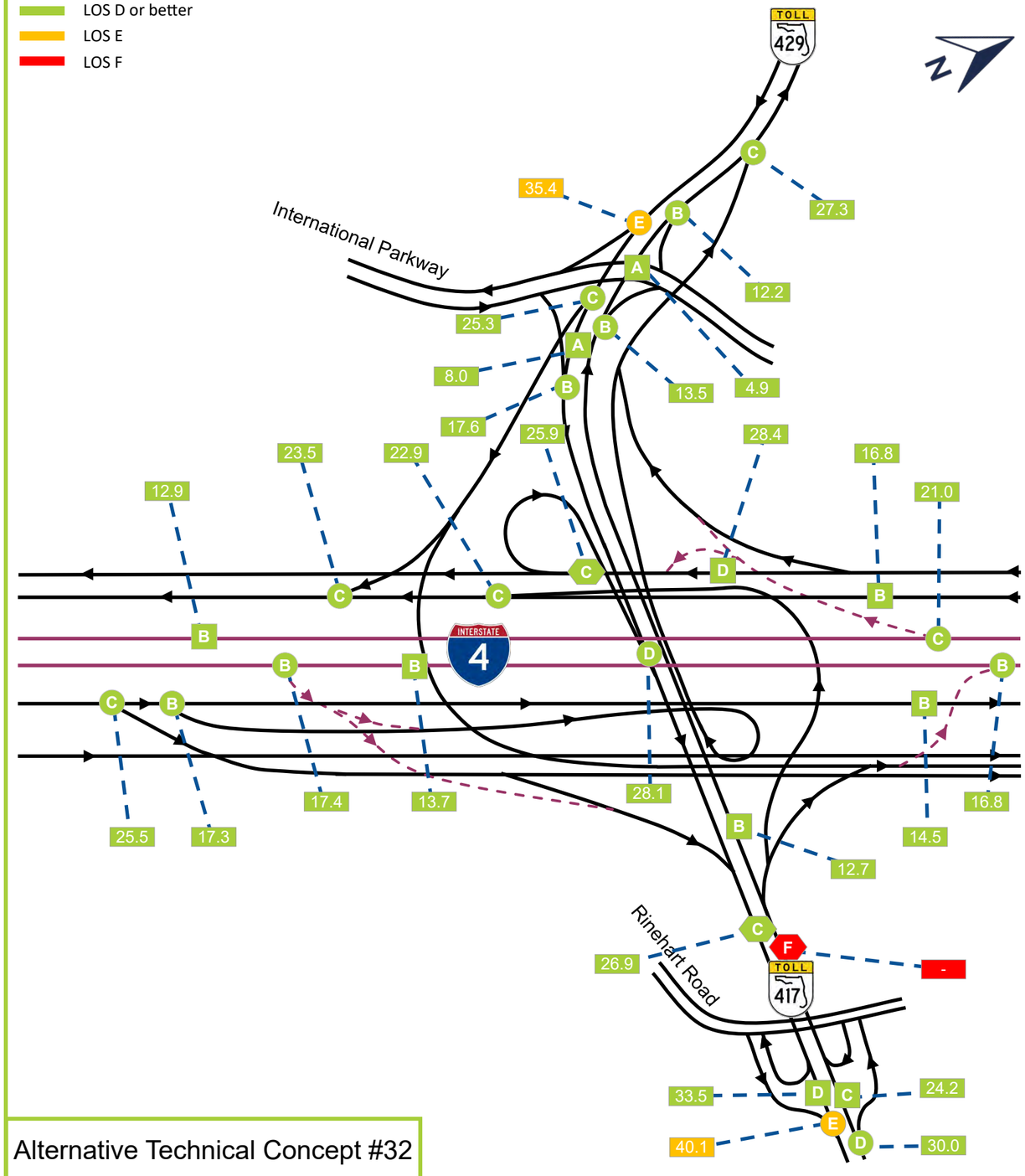
Comparison of Freeway Level of Service from Highway Capacity Software 2043 AM

Figure 4-25

X Basic LOS
X Merge/Diverge LOS
X Weaving LOS
0.00 Density (pc/mi/ln)

LOS D or better
LOS E
LOS F





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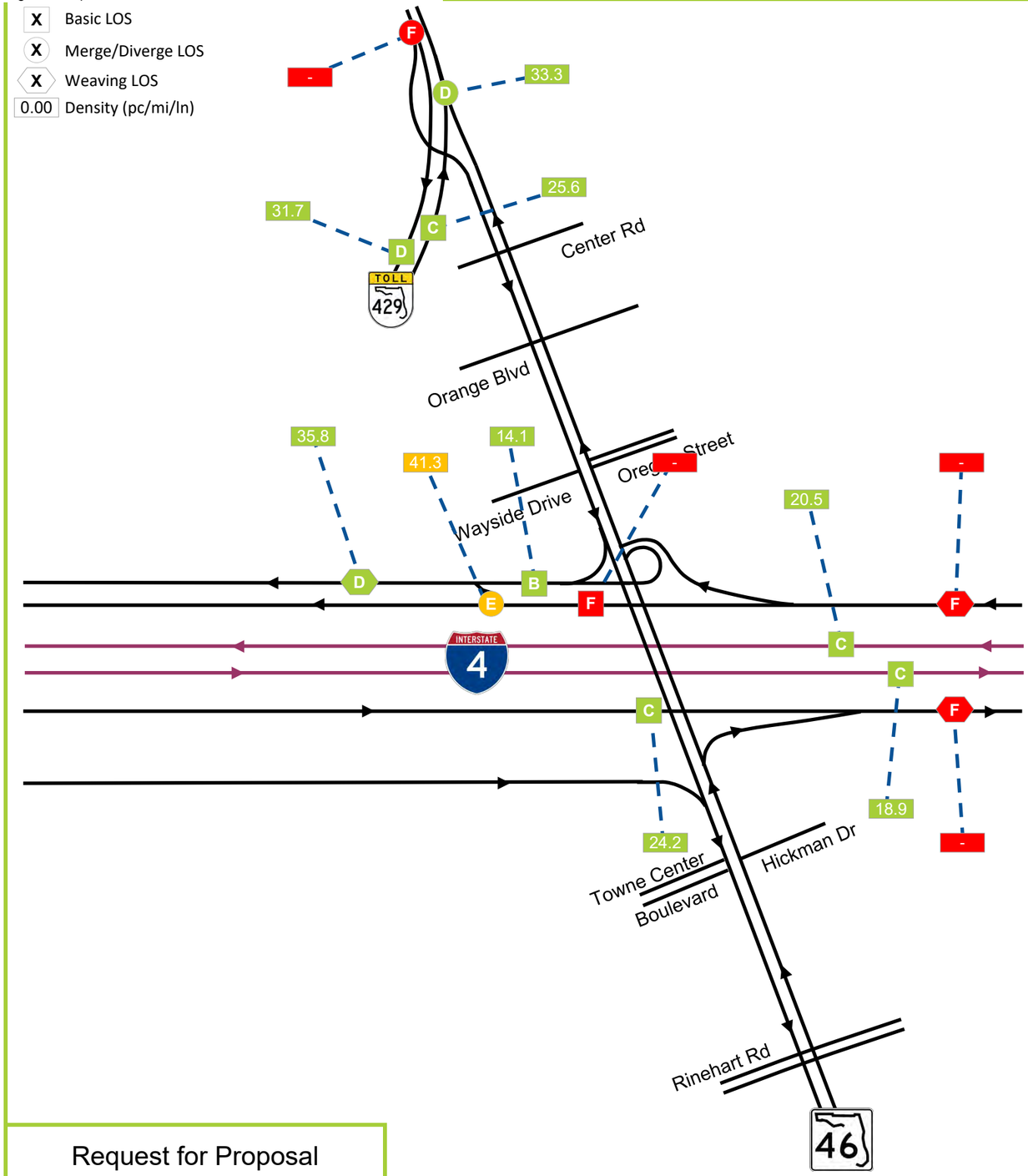
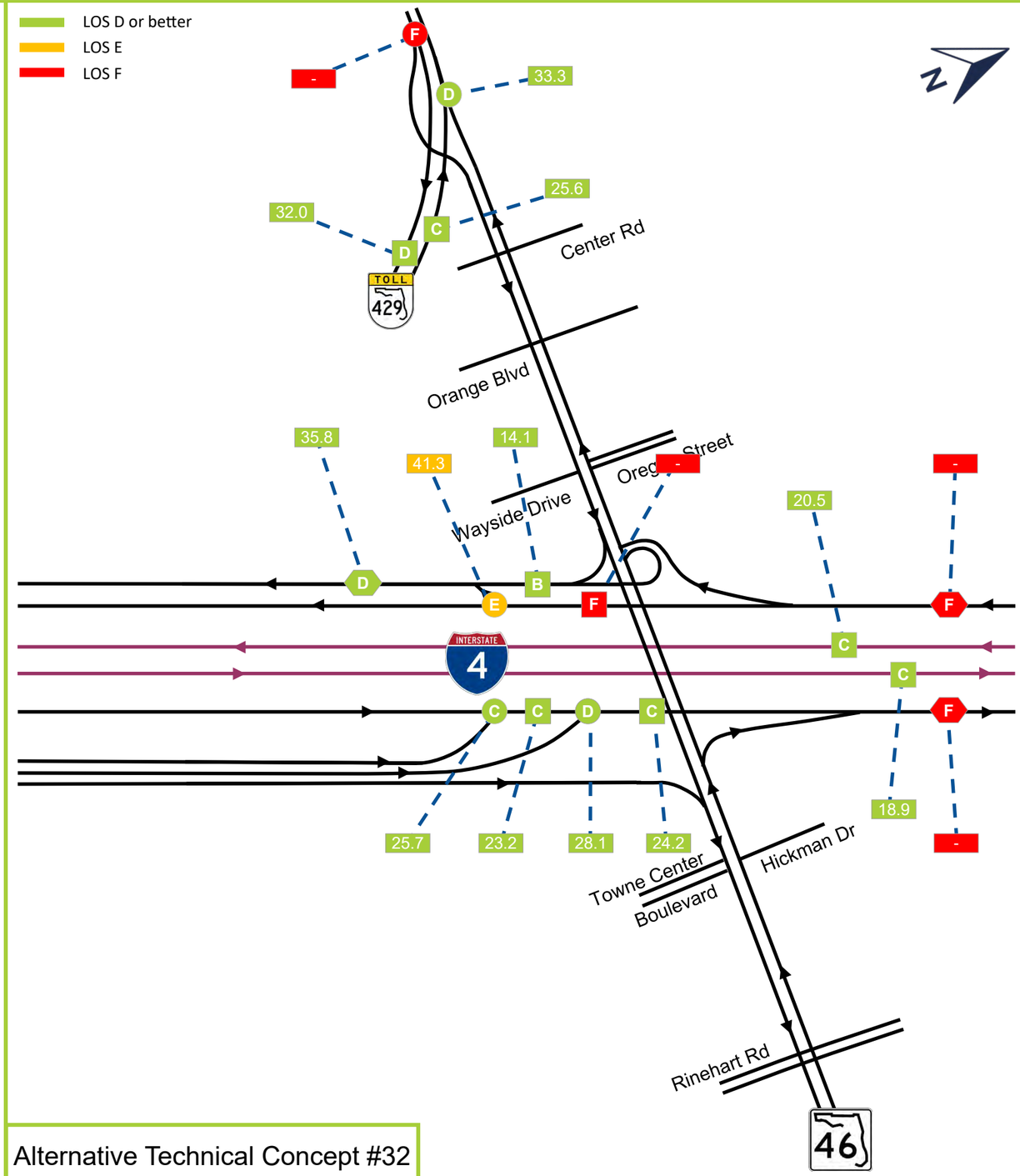
Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Comparison of Freeway Level of Service from Highway Capacity Software 2043 AM

Figure 4-26





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Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Comparison of Freeway Level of Service from Highway Capacity Software 2043 AM

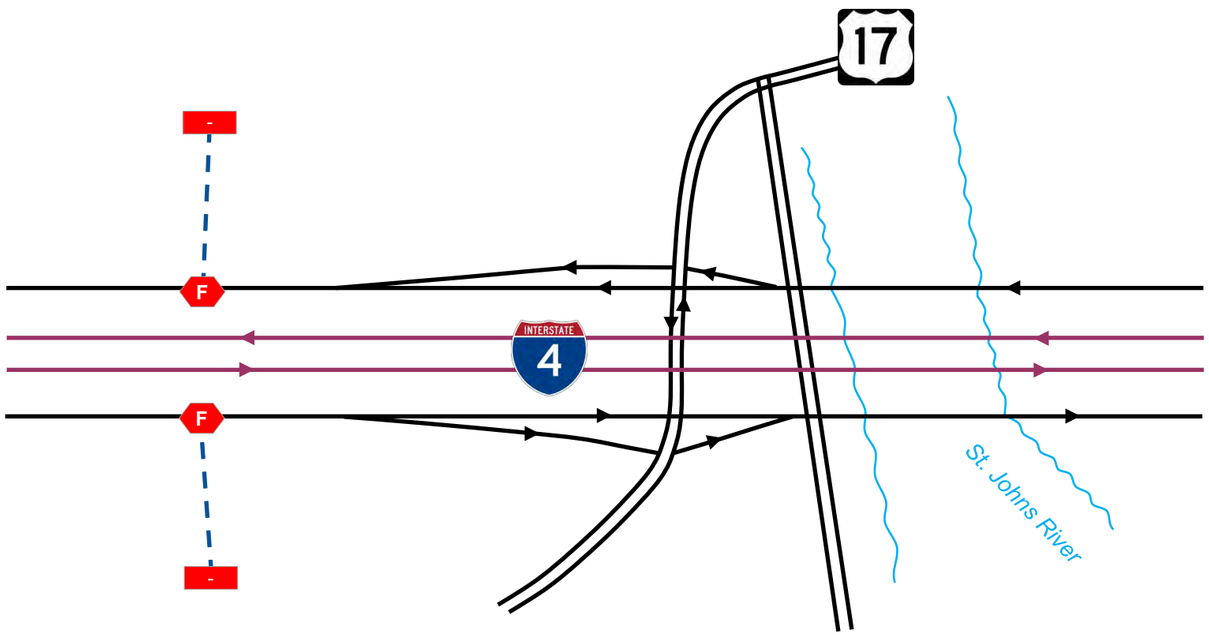
Figure 4-27

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

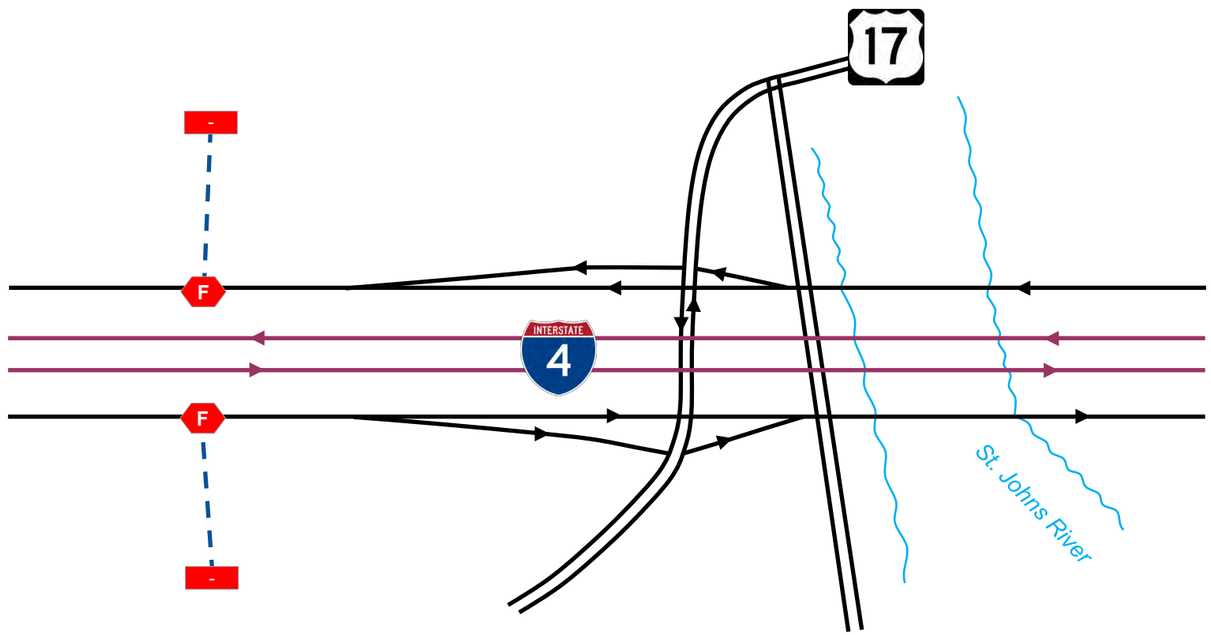
0.00 Density (pc/mi/ln)



LOS D or better

LOS E

LOS F



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Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Comparison of Freeway Level of Service from Highway Capacity Software 2043 AM

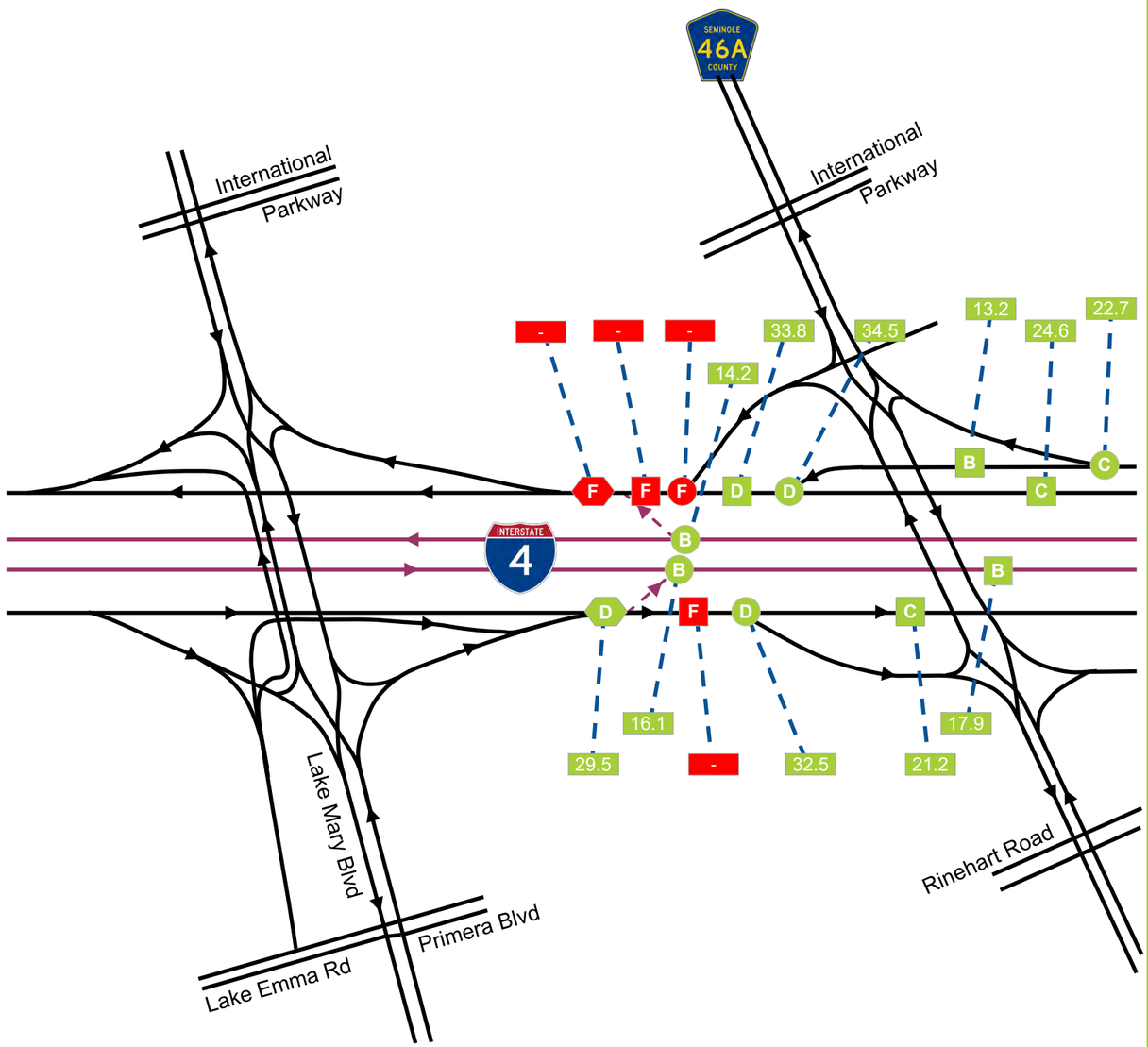
Figure 4-28

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

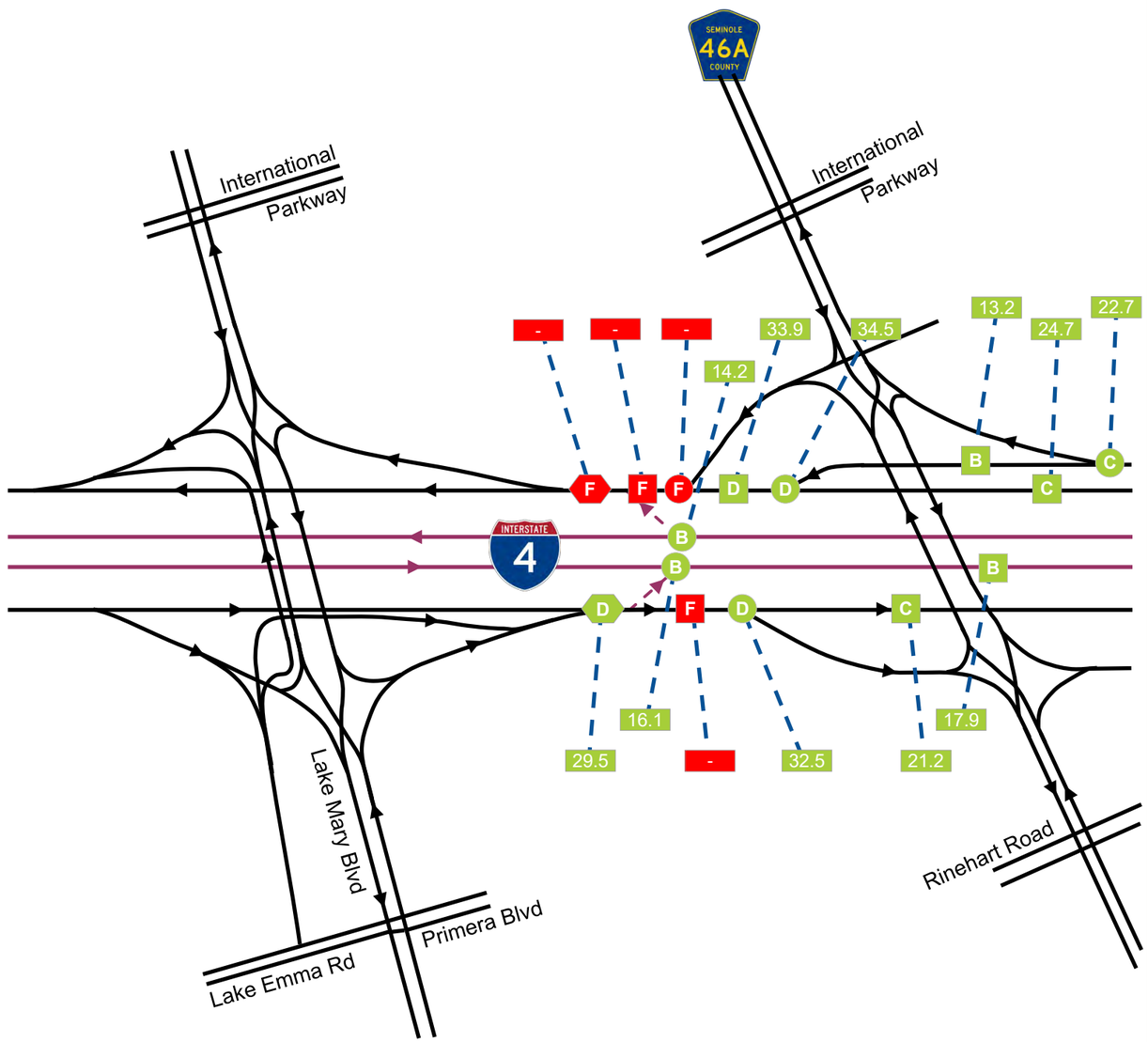
0.00 Density (pc/mi/ln)



LOS D or better

LOS E

LOS F



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Alternative Technical Concept #32

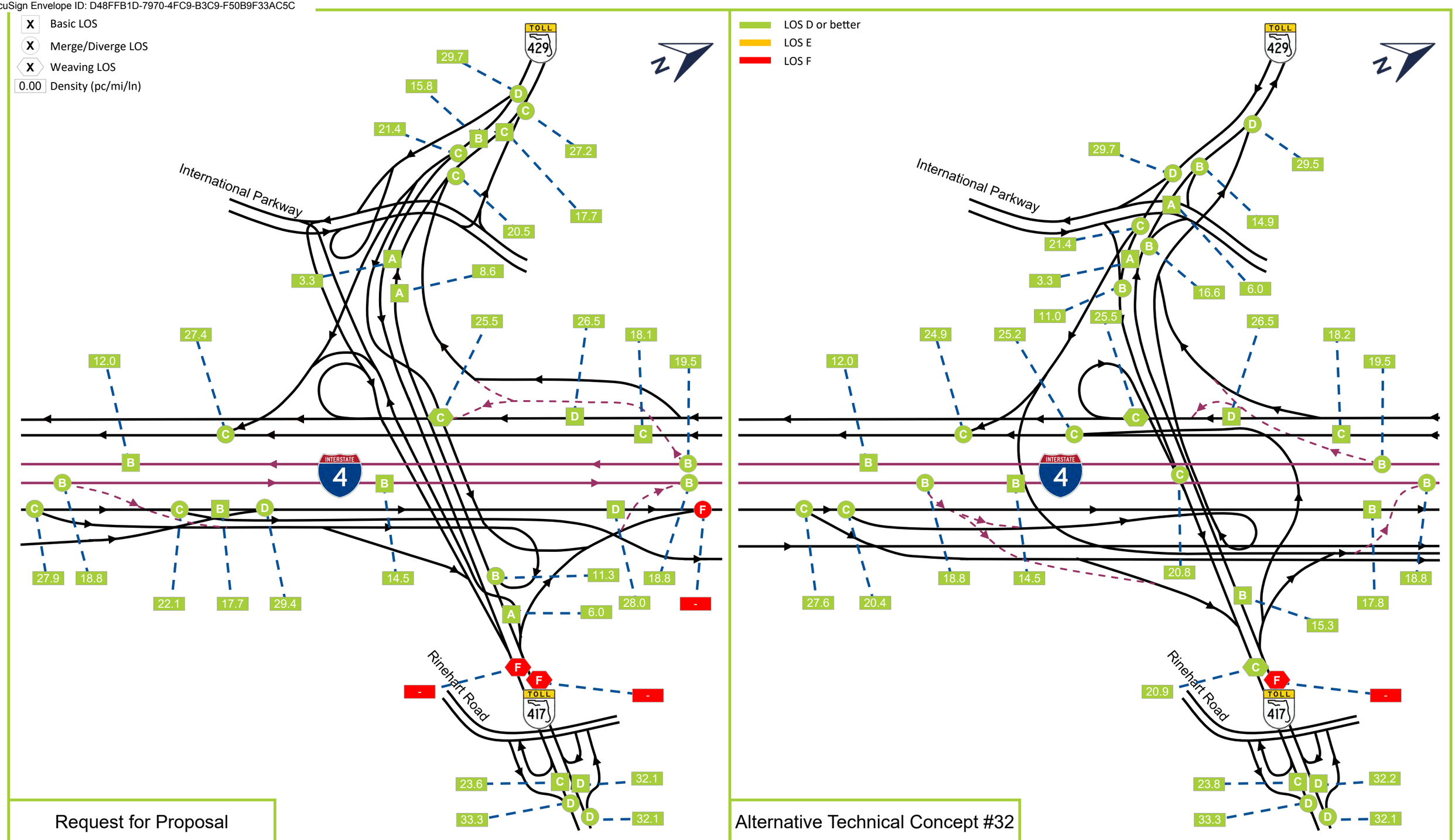
SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange

Seminole County, Florida

FM Number: 240200-4

Comparison of Freeway Level of Service from Highway Capacity Software 2043 PM

Figure 4-29



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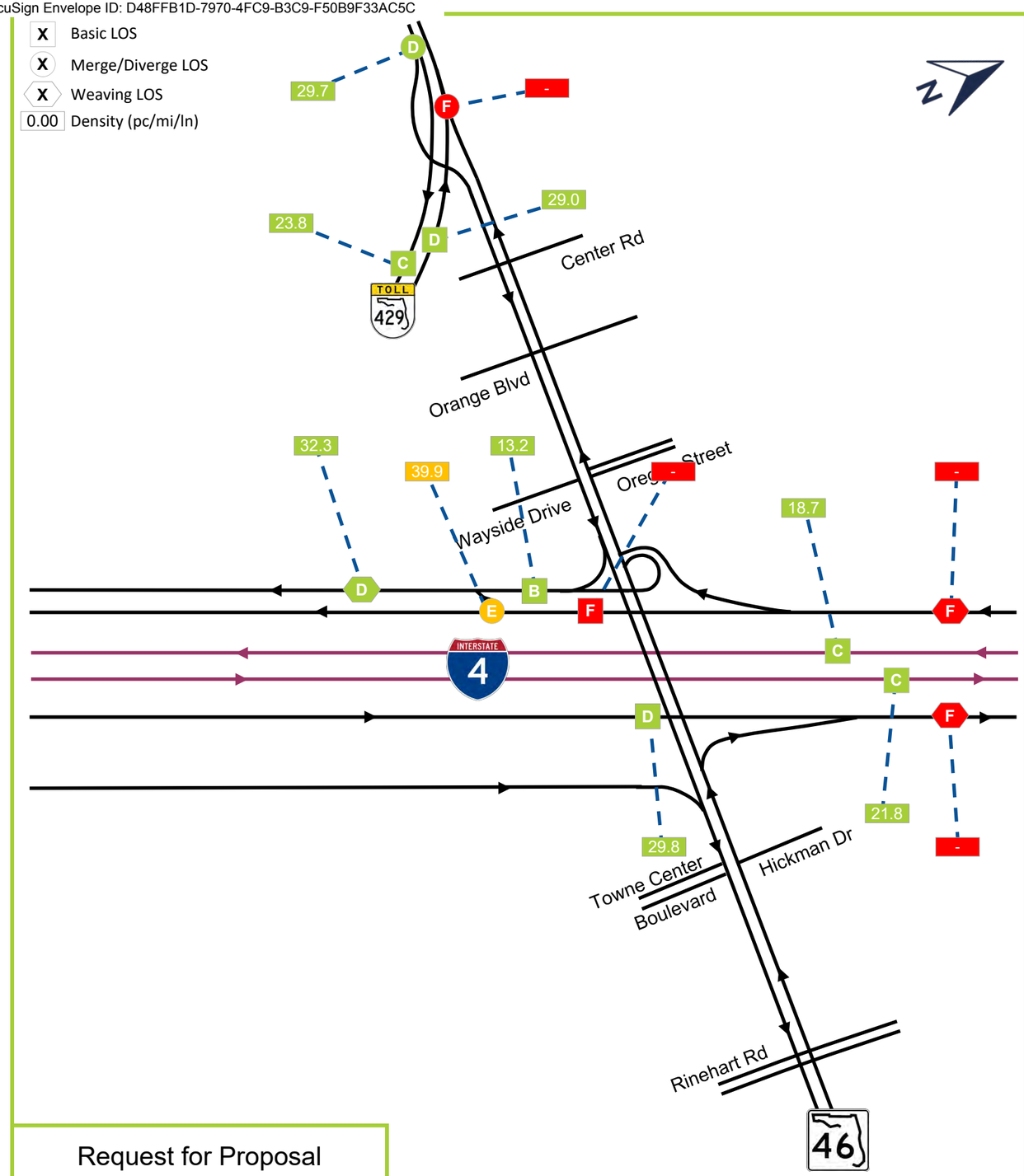
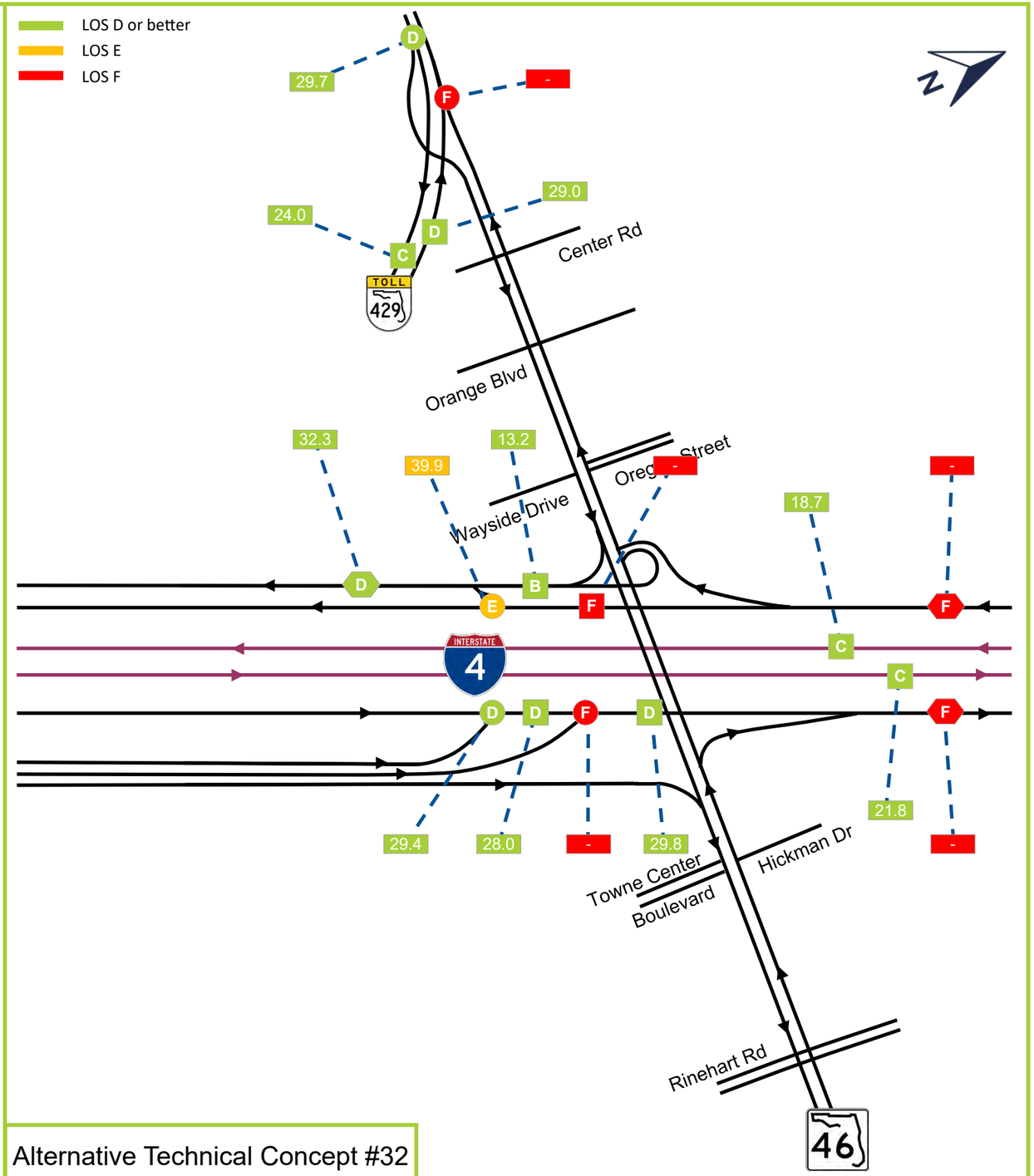
Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Comparison of Freeway Level of Service from Highway Capacity Software 2043 PM

Figure 4-30





Request for Proposal

Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Comparison of Freeway Level of Service from Highway Capacity Software 2043 PM

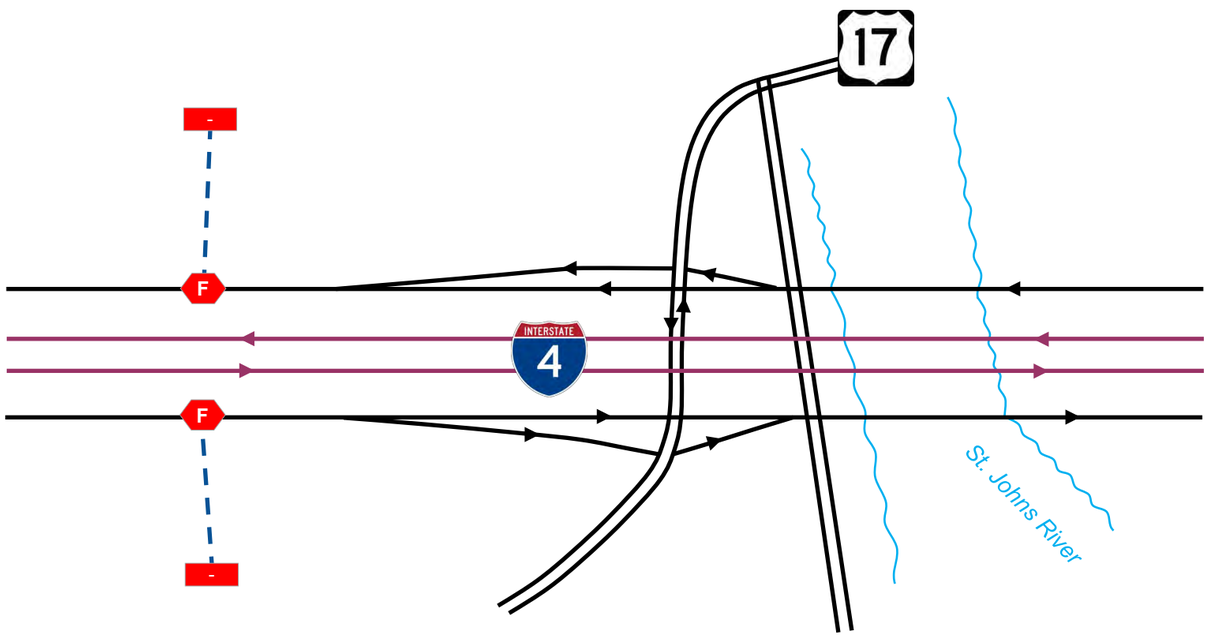
Figure 4-31

X Basic LOS

X Merge/Diverge LOS

X Weaving LOS

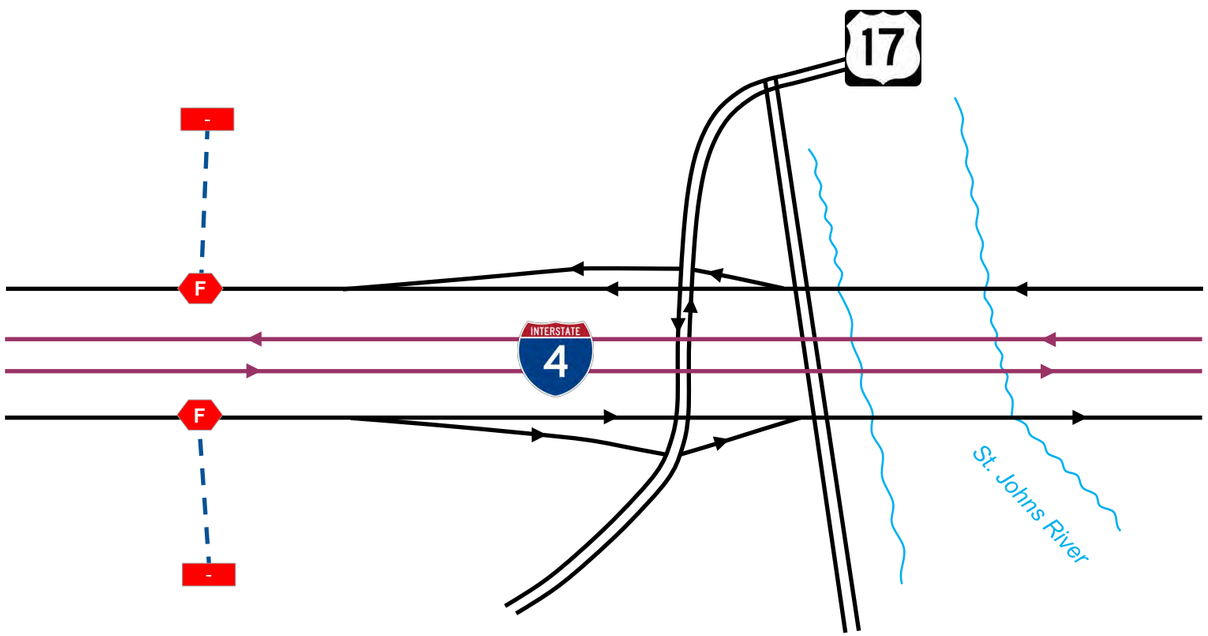
0.00 Density (pc/mi/ln)



LOS D or better

LOS E

LOS F



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Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Comparison of Freeway Level of Service from Highway Capacity Software 2043 PM

Figure 4-32

Table 4-4: HCS7 Basic Freeway Segments - LOS Comparison (2023)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP			ATC		
					Speed	Density	LOS	Speed	Density	LOS
Basic	I-4 EB	CR 46A off-ramp to SR 417/SR 46 off-ramp	2023	AM	62.1	22.7	C	62.1	22.7	C
Basic	I-4 EB	SR 429 off-ramp to CR 46A on-ramp	2023	AM	62.2	19.2	C	62.2	19.2	C
Basic	I-4 EB	CR 46A on-ramp to SR 417/SR 429 on-ramp	2023	AM	62.5	22.2	C	62.5	22.2	C
Basic	I-4 EB	SR 417/SR 429 on-ramp to SR 46 on-ramp	2023	AM	62.1	23.8	C	62.1	23.8	C
Basic	I-4 WB	SR 46 off-ramp to CD off-ramp	2023	AM	61.5	26.2	D	61.3	26.3	D
Basic	I-4 WB	CD off-ramp to SR 417 on-ramp	2023	AM	63.0	20.3	C	62.2	20.5	C
Basic	I-4 WB	SR 429 on-ramp to CD on-ramp	2023	AM	61.5	25.9	C	61.2	26.0	C
Basic	SR 417 NB	Rinehart off-ramp to Rinehart on-ramp	2023	AM	67.4	15.3	B	67.4	15.3	B
Basic	SR 417 NB	I-4 off-ramp to International Parkway off-ramp	2023	AM	--	--	--	67.4	6.6	A
Basic	SR 417 NB	I-4/International Parkway off-ramp to I-4 EB on-ramp	2023	AM	67.4	1.9	A	--	--	--
Basic	SR 429 SB	International Parkway off-ramp to International Parkway on-ramp	2023	AM	--	--	--	67.8	1.9	A
Basic	SR 417 NB	I-4 EB on-ramp to CD WB on-ramp	2023	AM	67.8	4.2	A	--	--	--
Basic	SR 429 SB	CD WB on-ramp to International Parkway on-ramp	2023	AM	67.8	11.5	B	--	--	--
Basic	SR 429 SB	I-4 EB/CD on-ramp to SR 46 on-ramp	2023	AM	68.2	15.1	B	68.2	15.1	B
Basic	SR 429 NB	SR 46 off-ramp to International Parkway off-ramp	2023	AM	68.6	16.9	B	67.8	17.1	B
Basic	SR 429 NB	International parkway off-ramp to I-4 off-ramp	2023	AM	68.2	12.5	B	--	--	--
Basic	SR 429 NB	I-4 off-ramp to International Parkway on-ramp	2023	AM	--	--	--	67.4	3.7	A
Basic	SR 429 NB	I-4 off-ramp to CD/I-4 EB/International Parkway on-ramp	2023	AM	68.2	3.6	A	--	--	--
Basic	SR 417 SB	Rinehart off-ramp to Rinehart on-ramp	2023	AM	67.6	18.7	C	66.8	18.9	C
Basic	C-D	SR 46 on-ramp to I-4 on-ramp	2023	AM	43.8	13.5	B	43.8	13.5	B
Basic	C-D	SR 429 off-ramp to SR 417 off-ramp	2023	AM	43.8	21.6	C	43.8	21.6	C
Basic	C-D	SR 417 off-ramp to CR 46A off-ramp	2023	AM	43.8	13.7	B	43.8	20.6	C
Basic	C-D	CR 46A off-ramp to CR 46A on-ramp	2023	AM	43.8	13.5	B	43.8	13.5	B
Basic	C-D	CR 46A on-ramp to I-4 off-ramp	2023	AM	43.8	37.3	E	43.8	37.3	E
Basic	I-4 EB	CR 46A off-ramp to SR 417/SR 46 off-ramp	2023	PM	61.9	24.4	C	61.9	24.4	C
Basic	I-4 EB	SR 429 off-ramp to CR 46A on-ramp	2023	PM	62.2	20.5	C	62.2	20.5	C
Basic	I-4 EB	CR 46A on-ramp to SR 417/429 on-ramp	2023	PM	62.1	23.9	C	62.1	23.9	C
Basic	I-4 EB	SR 417/429 on-ramp to SR 46 on-ramp	2023	PM	60.7	27.0	D	60.7	27.0	D
Basic	I-4 WB	SR 46 off-ramp to CD off-ramp	2023	PM	62.6	24.0	C	62.3	24.2	C
Basic	I-4 WB	CD off-ramp to SR 417 on-ramp	2023	PM	63.0	18.9	C	62.2	19.2	C
Basic	I-4 WB	SR 429 on-ramp to CD on-ramp	2023	PM	62.0	24.7	C	61.7	24.8	C
Basic	SR 417 NB	Rinehart off-ramp to Rinehart on-ramp	2023	PM	67.3	18.5	C	67.3	18.5	C
Basic	SR 417 NB	I-4 off-ramp to International Parkway off-ramp	2023	PM	--	--	--	67.4	8.0	A
Basic	SR 417 NB	I-4/International Parkway off-ramp to I-4 EB on-ramp	2023	PM	67.4	2.3	A	--	--	--
Basic	SR 429 SB	International Parkway off-ramp to International Parkway on-ramp	2023	PM	--	--	--	67.8	2.3	A
Basic	SR 417 NB	I-4 EB on-ramp to CD WB on-ramp	2023	PM	67.8	4.7	A	--	--	--
Basic	SR 429 SB	CD WB on-ramp to International Parkway on-ramp	2023	PM	67.8	11.5	B	--	--	--
Basic	SR 429 SB	I-4 EB/CD on-ramp to SR 46 on-ramp	2023	PM	68.2	16.0	B	68.2	16.0	B
Basic	SR 429 NB	SR 46 off-ramp to International Parkway off-ramp	2023	PM	68.6	14.0	B	67.8	14.1	B
Basic	SR 429 NB	International parkway off-ramp to I-4 off-ramp	2023	PM	68.2	10.3	A	--	--	--
Basic	SR 429 NB	I-4 off-ramp to International Parkway on-ramp	2023	PM	--	--	--	67.4	0.5	A
Basic	SR 429 NB	I-4 off-ramp to CD/I-4 EB/International Parkway on-ramp	2023	PM	68.2	0.5	A	--	--	--
Basic	SR 417 SB	Rinehart off-ramp to Rinehart on-ramp	2023	PM	67.8	14.9	B	66.9	15.1	B
Basic	C-D	SR 46 on-ramp to I-4 on-ramp	2023	PM	43.8	12.6	B	43.8	12.6	B
Basic	C-D	SR 429 off-ramp to SR 417 off-ramp	2023	PM	43.8	20.1	C	43.8	20.1	C
Basic	C-D	SR 417 off-ramp to CR 46A off-ramp	2023	PM	43.8	12.8	B	43.8	19.2	C
Basic	C-D	CR 46A off-ramp to CR 46A on-ramp	2023	PM	43.8	12.6	B	43.8	12.6	B
Basic	C-D	CR 46A on-ramp to I-4 off-ramp	2023	PM	43.8	34.8	D	43.8	34.8	D

Legend:

Better density and LOS

Worse density and LOS

Equal values for density and LOS

No comparison

Table 4-5: HCS7 Basic Freeway Segments - LOS Comparison (2043)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP			ATC		
					Speed	Density	LOS	Speed	Density	LOS
Basic	I-4 EB	Express Lanes Egress north of Lake Mary Blvd to CR 46A off-ramp	2043	AM	54.8	35.8	E	54.8	35.8	E
Basic	I-4 EB	CR 46A off to SR 417/SR 46 off-ramp	2043	AM	62.2	18.5	C	62.2	18.5	C
Basic	I-4 EB	SR 429 off-ramp to CR 46A on-ramp	2043	AM	62.2	14.4	B	61.8	14.5	B
Basic	I-4 EB	CR 46A on-ramp to SR 417/429 on-ramp	2043	AM	62.3	23.2	C	62.3	23.2	C
Basic	I-4 EB	SR 417/429 on-ramp to SR 46 on-ramp	2043	AM	62.0	24.2	C	62.0	24.2	C
Basic	I-4 WB	SR 46 off-ramp to CD off-ramp	2043	AM	-	-	F	-	-	F
Basic	I-4 WB	CD off-ramp to SR 429 on-ramp	2043	AM	62.6	16.7	B	62.2	16.8	B
Basic	I-4 WB	SR 429 on-ramp to CD on-ramp	2043	AM	62.5	22.5	C	62.1	22.7	C
Basic	I-4 WB	CD on-ramp to CR 46A on-ramp	2043	AM	58.0	31.3	D	57.8	31.4	D
Basic	I-4 WB	CR 46A on-ramp to Express Lanes Egress north of Lake Mary Blvd	2043	AM	-	-	F	-	-	F
Basic	SR 417 NB	Rinehart off-ramp to Rinehart on-ramp	2043	AM	64.8	24.1	C	64.5	24.2	C
Basic	SR 417 NB	I-4 off-ramp to International Parkway off-ramp	2043	AM	--	--	--	67.4	12.7	B
Basic	SR 429 SB	International Parkway off-ramp to International Parkway on-ramp	2043	AM	--	--	--	67.8	4.9	A
Basic	SR 417 NB	I-4, International Parkway off-ramp to I-4 EB on-ramp	2043	AM	67.4	5.0	A	--	--	--
Basic	SR 429 SB	I-4 EB on-ramp to CD System on-ramp	2043	AM	67.8	7.4	A	--	--	--
Basic	SR 429 SB	CD System on-ramp to International Parkway on-ramp	2043	AM	67.8	17.1	B	--	--	--
Basic	SR 429 SB	I-4 EB/CD on-ramp to SR 46 on-ramp	2043	AM	--	--	--	64.1	25.6	C
Basic	SR 429 SB	International Parkway on-ramp to SR 46 on-ramp	2043	AM	64.1	25.6	C	--	--	--
Basic	SR 429 NB	SR 46 off-ramp to International Parkway off-ramp	2043	AM	59.6	31.7	D	59.2	32.0	D
Basic	SR 429 NB	International parkway off-ramp to I-4 off-ramp	2043	AM	67.7	19.3	C	--	--	--
Basic	SR 429 NB	I-4 off-ramp to International Parkway on-ramp	2043	AM	68.2	7.9	A	67.4	8.0	A
Basic	SR 417 SB	Rinehart Road off-ramp to Rinehart Road on-ramp	2043	AM	58.2	33.2	D	57.7	33.5	D
Basic	I-4 EB EL	I-4 GL on-ramp to SR 417/SR 429 off-ramp	2043	AM	67.4	16.4	B	67.4	16.4	B
Basic	I-4 EB EL	SR 417/SR 429 off-ramp to SR 417/ SR 429 on-ramp	2043	AM	69.2	13.7	B	69.2	13.7	B
Basic	I-4 EB EL	SR 417/SR 429 off-ramp to AOI(US 17)	2043	AM	65.4	18.9	C	65.4	18.9	C
Basic	I-4 WB EL	AOI(US17) to SR 429/CD off-ramp	2043	AM	64.1	20.5	C	64.1	20.5	C
Basic	I-4 WB EL	SR 429/CD off-ramp to I-4 GL off-ramp	2043	AM	69.6	12.9	B	69.6	12.9	B
Basic	C-D	SR 46 on-ramp to I-4 on-ramp	2043	AM	43.3	14.1	B	43.3	14.1	B
Basic	C-D	SR 429 SB off-ramp to I-4 WB Express Lanes on-ramp	2043	AM	43.3	28.4	D	43.3	28.4	D
Basic	C-D	CR 46A off-ramp to I-4 off-ramp	2043	AM	43.3	14.1	B	43.3	14.1	B
Basic	I-4 EB	Express Lanes Egress north of Lake Mary Blvd to CR 46A off-ramp	2043	PM	-	-	F	-	-	F
Basic	I-4 EB	CR 46A off to SR 417/SR 46 off-ramp	2043	PM	62.2	21.2	C	62.2	21.2	C
Basic	I-4 EB	SR 429 off-ramp to CR 46A on-ramp	2043	PM	62.2	17.7	B	61.8	17.8	B
Basic	I-4 EB	CR 46A on-ramp to SR 417/429 on-ramp	2043	PM	60.1	28.0	D	60.1	28.0	D
Basic	I-4 EB	SR 417/429 on-ramp to SR 46 on-ramp	2043	PM	59.0	29.8	D	59.0	29.8	D
Basic	I-4 WB	SR 46 off-ramp to CD off-ramp	2043	PM	-	-	F	-	-	F
Basic	I-4 WB	CD off-ramp to SR 429 on-ramp	2043	PM	62.6	18.1	C	62.2	18.2	C
Basic	I-4 WB	SR 429 on-ramp to CD on-ramp	2043	PM	61.8	24.6	C	61.5	24.7	C
Basic	I-4 WB	CD on-ramp to CR 46A on-ramp	2043	PM	56.2	33.8	D	56.0	33.9	D
Basic	I-4 WB	CR 46A on-ramp to Express Lanes Egress north of Lake Mary Blvd	2043	PM	-	-	F	-	-	F
Basic	SR 417 NB	Rinehart off-ramp to Rinehart on-ramp	2043	PM	58.9	32.1	D	58.7	32.2	D
Basic	SR 417 NB	I-4 off-ramp to International Parkway off-ramp	2043	PM	--	--	--	67.4	15.3	B
Basic	SR 429 SB	International Parkway off-ramp to International Parkway on-ramp	2043	PM	--	--	--	67.8	6.0	A
Basic	SR 417 NB	I-4, International Parkway off-ramp to I-4 EB on-ramp	2043	PM	67.4	6.0	A	--	--	--
Basic	SR 429 SB	I-4 EB on-ramp to CD System on-ramp	2043	PM	67.8	8.6	A	--	--	--
Basic	SR 429 SB	CD System on-ramp to International Parkway on-ramp	2043	PM	67.7	17.7	B	--	--	--
Basic	SR 429 SB	I-4 EB/CD on-ramp to SR 46 on-ramp	2043	PM	--	--	--	61.6	29.0	D
Basic	SR 429 SB	International Parkway on-ramp to SR 46 on-ramp	2043	PM	61.6	29.0	D	--	--	--
Basic	SR 429 NB	SR 46 off-ramp to International Parkway off-ramp	2043	PM	65.6	23.8	C	65.1	24.0	C
Basic	SR 429 NB	International parkway off-ramp to I-4 off-ramp	2043	PM	68.2	15.8	B	--	--	--
Basic	SR 429 NB	I-4 off-ramp to International Parkway on-ramp	2043	PM	68.2	3.3	A	67.4	3.3	A
Basic	SR 429 NB	Rinehart Road off-ramp to Rinehart Road on-ramp	2043	PM	65.3	23.6	C	64.7	23.8	C
Basic	SR 417 SB	I-4 GL on-ramp to SR 417/SR 429 off-ramp	2043	PM	66.3	17.9	B	66.3	17.9	B
Basic	I-4 EB EL	SR 417/SR 429 off-ramp to SR 417/ SR 429 on-ramp	2043	PM	68.8	14.5	B	68.8	14.5	B
Basic	I-4 EB EL	SR 417/SR 429 off-ramp to AOI(US 17)	2043	PM	63.0	21.8	C	63.0	21.8	C
Basic	I-4 WB EL	AOI(US17) to SR 429/CD off-ramp	2043	PM	65.6	18.7	C	65.6	18.7	C
Basic	I-4 WB EL	SR 429/CD off-ramp to I-4 GL off-ramp	2043	PM	69.9	12.0	B	69.9	12.0	B
Basic	C-D	SR 46 on-ramp to I-4 on-ramp	2043	PM	43.3	13.2	B	43.3	13.2	B
Basic	C-D	SR 429 SB off-ramp to I-4 WB Express Lanes on-ramp	2043	PM	43.3	26.5	D	43.3	26.5	D
Basic	C-D	CR 46A off-ramp to I-4 off-ramp	2043	PM	43.3	13.2	B	43.3	13.2	B

Legend:

Better density and LOS

Worse density and LOS

Equal values for density and LOS

No comparison

Table 4-6: HCS7 Freeway Diverge Segments - LOS Comparison (2023)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP			ATC		
					Speed	Density	LOS	Speed	Density	LOS
Diverge	I-4 EB	SR 417/SR 46 off-ramp	2023	AM	--	--	--	62.8	28.3	D
Diverge	I-4 EB	SR 417/SR 429 off-ramp	2023	AM	62.6	30.1	D	--	--	--
Diverge	I-4 EB	SR 429 off-ramp	2023	AM	--	--	--	58.2	26.8	C
Diverge	I-4 EB	SR 46 off	2023	AM	64.0	21.8	C	--	--	--
Diverge	I-4 WB	CD off-ramp	2023	AM	60.6	35.3	E	60.6	35.3	E
Diverge	SR 417 NB	Rinehart Road off-ramp	2023	AM	60.8	19.5	B	60.8	19.5	B
Diverge	SR 429 SB	International Parkway off-ramp	2023	AM	--	--	--	56.4	6.5	A
Diverge	SR 429 NB	SR 46 off-ramp	2023	AM	55.9	22.2	C	55.9	22.2	C
Diverge	SR 429 NB	International Parkway off-ramp	2023	AM	56.4	22.9	C	56.4	22.9	C
Diverge	SR 429 NB	I-4 EB, WB off-ramp	2023	AM	58.5	17.6	B	58.5	17.6	B
Diverge	C-D	SR 417 SB off-ramp	2023	AM	48.6	23.1	C	48.6	10.5	B
Diverge	C-D	CR 46A off-ramp	2023	AM	47.8	16.6	B	45.8	19.7	B
Diverge	I-4 EB	SR 417/SR 46 off-ramp	2023	PM	--	--	--	62.4	30.0	D
Diverge	I-4 EB	SR 417/SR 429 off-ramp	2023	PM	62.4	32.0	D	--	--	--
Diverge	I-4 EB	SR 429 off-ramp	2023	PM	--	--	--	58.1	28.1	D
Diverge	I-4 EB	SR 46 off	2023	PM	63.7	23.0	C	--	--	--
Diverge	I-4 WB	CD off-ramp	2023	PM	61.0	33.3	D	61.0	33.3	D
Diverge	SR 417 NB	Rinehart Road off-ramp	2023	PM	60.6	23.8	C	60.6	23.8	C
Diverge	SR 429 SB	International Parkway off-ramp	2023	PM	--	--	--	56.0	8.1	A
Diverge	SR 429 NB	SR 46 off-ramp	2023	PM	56.1	18.0	B	56.1	18.0	B
Diverge	SR 429 NB	International Parkway off-ramp	2023	PM	56.7	19.4	B	56.7	19.4	B
Diverge	SR 429 NB	I-4 EB, WB off-ramp	2023	PM	58.1	15.0	B	58.1	15.0	B
Diverge	C-D	SR 417 SB off-ramp	2023	PM	48.7	22.0	C	48.7	9.4	A
Diverge	C-D	CR 46A off-ramp	2023	PM	47.7	15.8	B	45.8	18.7	B

Table 4-7: HCS7 Freeway Diverge Segments - LOS Comparison (2043)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP			ATC		
					Speed	Density	LOS	Speed	Density	LOS
Diverge	I-4 EB	CR 46A off-ramp	2043	AM	58.1	29.0	D	58.1	29.0	D
Diverge	I-4 EB	SR 417/SR 46 off-ramp	2043	AM		--	--	62.8	25.5	C
Diverge	I-4 EB	SR 417/SR 429 off-ramp	2043	AM	63.3	25.3	C		--	--
Diverge	I-4 EB	SR 429 off-ramp	2043	AM		--	--	59.4	17.3	B
Diverge	I-4 EB	SR 46 off-ramp	2043	AM	63.7	20.1	C		--	--
Diverge	I-4 WB	CD off-ramp	2043	AM	57.9	41.3	E	57.9	41.3	E
Diverge	SR 417 NB	Rinehart Road off-ramp	2043	AM	60.4	30.0	D	60.4	30.0	D
Diverge	SR 429 SB	International Parkway off-ramp	2043	AM	--	--	--	55.3	13.5	B
Diverge	SR 429 NB	SR 46 off-ramp	2043	AM	-	-	F	-	-	F
Diverge	SR 429 NB	International Parkway off-ramp	2043	AM	54.9	35.4	E	54.9	35.4	E
Diverge	SR 429 NB	I-4 EB, WB off-ramp	2043	AM	57.7	25.3	C	57.7	25.3	C
Diverge	I-4 EB EL	SR 417/SR 429 off-ramp	2043	AM	60.9	17.4	B	60.9	17.4	B
Diverge	I-4 WB EL	CD/SR 429 SB off-ramp	2043	AM	59.6	21.0	C	59.6	21.0	C
Diverge	I-4 WB EL	General Use lanes off-ramp	2043	AM	64.5	15.2	B	64.5	15.2	B
Diverge	C-D	CR 46A off-ramp	2043	AM	49.2	24.0	C	49.2	24.0	C
Diverge	I-4 EB	CR 46A off-ramp	2043	PM	57.6	32.5	D	57.6	32.5	D
Diverge	I-4 EB	SR 417/SR 46 off-ramp	2043	PM		--	--	62.7	27.6	C
Diverge	I-4 EB	SR 417/SR 429 off-ramp	2043	PM	63.2	27.9	C		--	--
Diverge	I-4 EB	SR 429 off-ramp	2043	PM		--	--	59.6	20.4	C
Diverge	I-4 EB	SR 46 off-ramp	2043	PM	63.6	22.1	C		--	--
Diverge	I-4 WB	CD off-ramp	2043	PM	58.7	39.9	E	58.7	39.9	E
Diverge	SR 417 NB	Rinehart Road off-ramp	2043	PM	60.1	32.1	D	60.1	32.1	D
Diverge	SR 429 SB	International Parkway off-ramp	2043	PM	--	--	--	54.7	16.6	B
Diverge	SR 429 NB	SR 46 off-ramp	2043	PM	55.7	29.7	D	55.7	29.7	D
Diverge	SR 429 NB	International Parkway off-ramp	2043	PM	55.5	29.7	D	55.5	29.7	D
Diverge	SR 429 NB	I-4 EB, WB off-ramp	2043	PM	57.2	21.4	C	57.2	21.4	C
Diverge	I-4 EB EL	SR 417/SR 429 off-ramp	2043	PM	60.7	18.8	B	60.7	18.8	B
Diverge	I-4 WB EL	CD/SR 429 SB off-ramp	2043	PM	59.7	19.5	B	59.7	19.5	B
Diverge	I-4 WB EL	General Use lanes off-ramp	2043	PM	64.5	14.2	B	64.5	14.2	B
Diverge	C-D	CR 46A off-ramp	2043	PM	49.3	22.7	C	49.3	22.7	C

Legend:

Better density and LOS

Worse density and LOS

Equal values for density and LOS

No comparison

Table 4-8: HCS7 Freeway Merge Segments - LOS Comparison (2023)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP			ATC		
					Speed	Density	LOS	Speed	Density	LOS
Merge	I-4 EB	CR 46A on-ramp	2023	AM	60.2	22.1	C	60.2	22.1	C
Merge	I-4 EB	SR 417/SR 429 on-ramp	2023	AM	55.0	37.2	E	55.0	37.2	E
Merge	I-4 WB	SR 417 on-ramp	2023	AM	60.3	21.8	C	59.4	25.2	C
Merge	I-4 WB	SR 429 on-ramp	2023	AM				59.1	26.0	C
Merge	SR 429 SB	International Parkway on-ramp	2023	AM	63.2	15.7	B	63.8	5.6	A
Merge	SR 429 SB	I-4 EB on-ramp	2023	AM	62.5	6.7	A	62.2	17.9	B
Merge	SR 429 SB	CD WB on-ramp	2023	AM	63.2	14.1	B			
Merge	SR 429 SB	SR 46 on-ramp	2023	AM	61.7	22.6	C	61.7	22.6	C
Merge	SR 429 NB	International Parkway on-ramp	2023	AM	--	--	--	63.7	9.4	A
Merge	SR 417 SB	CD on-ramp	2023	AM	--	--	--	62.4	17.5	B
Merge	SR 417 SB	Rinehart Road on-ramp	2023	AM	59.7	28.3	D	59.7	28.3	D
Merge	C-D	CR 46A on-ramp	2023	AM	48.3	26.9	C	48.3	26.9	C
Merge	I-4 EB	CR 46A on-ramp	2023	PM	59.8	23.5	C	59.8	23.5	C
Merge	I-4 EB	SR 417/SR 429 on-ramp	2023	PM	51.2	41.3	E	51.2	41.3	E
Merge	I-4 WB	SR 417 on-ramp	2023	PM	60.4	21.1	C	59.5	25.1	C
Merge	I-4 WB	SR 429 on-ramp	2023	PM				59.4	25.0	C
Merge	SR 429 SB	International Parkway on-ramp	2023	PM	63.1	16.6	B	63.8	6.8	A
Merge	SR 429 SB	I-4 EB on-ramp	2023	PM	62.5	7.3	A	62.1	18.8	B
Merge	SR 429 SB	CD WB on-ramp	2023	PM	62.5	14.2	B			
Merge	SR 429 SB	SR 46 on-ramp	2023	PM	61.3	24.1	C	61.3	24.1	C
Merge	SR 429 NB	International Parkway on-ramp	2023	PM	--	--	--	63.8	5.1	A
Merge	SR 417 SB	CD on-ramp	2023	PM	--	--	--	63.0	12.6	B
Merge	SR 417 SB	Rinehart Road on-ramp	2023	PM	60.6	23.8	C	60.6	23.8	C
Merge	C-D	CR 46A on-ramp	2023	PM	48.5	25.3	C	48.5	25.3	C

Table 4-9: HCS7 Freeway Merge Segments - LOS Comparison (2043)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP			ATC		
					Speed	Density	LOS	Speed	Density	LOS
Merge	I-4 EB	CR 46A on-ramp	2043	AM	59.2	25.7	C	59.2	25.7	C
Merge	I-4 EB	SR 417/SR 429 on-ramp	2043	AM	57.2	28.1	D	54.7	28.1	D
Merge	I-4 WB	SR 417 on-ramp	2043	AM	59.3	25.6	C	59.9	22.9	C
Merge	I-4 WB	SR 429 on-ramp	2043	AM				59.7	23.5	C
Merge	I-4 WB	CD on-ramp	2043	AM	57.0	33.5	D	57.0	33.5	D
Merge	I-4 WB	CR 46A on-ramp	2043	AM	-	-	F	-	-	F
Merge	SR 429 SB	International Parkway on-ramp	2043	AM	61.0	25.1	C	63.5	12.2	B
Merge	SR 429 SB	I-4 EB on-ramp	2043	AM	62.5	10.1	B	60.0	27.3	C
Merge	SR 429 SB	CD WB on-ramp	2043	AM	61.9	19.9	B			
Merge	SR 429 SB	SR 46 on-ramp	2043	AM	56.2	33.3	D	56.2	33.3	D
Merge	SR 429 NB	International Parkway on-ramp	2043	AM	--	--	--	62.9	17.6	B
Merge	SR 417 SB	CD on-ramp	2043	AM	--	--	--	59.0	28.1	D
Merge	SR 417 SB	Rinehart Road on-ramp	2043	AM	51.9	40.1	E	51.9	40.1	E
Merge	I-4 EB EL	General Use lanes on-ramp	2043	AM	63.9	14.8	B	63.9	14.8	B
Merge	I-4 EB EL	SR 417/SR 429 on-ramp	2043	AM	62.9	16.8	B	62.9	16.8	B
Merge	I-4 EB	CR 46A on-ramp	2043	PM	58.0	29.4	D	58.0	29.4	D
Merge	I-4 EB	SR 417/SR 429 on-ramp	2043	PM	-	-	F	-	-	F
Merge	I-4 WB	SR 417 on-ramp	2043	PM	58.8	27.4	C	59.5	25.2	C
Merge	I-4 WB	SR 429 on-ramp	2043	PM				59.4	24.9	C
Merge	I-4 WB	CD on-ramp	2043	PM	56.6	34.5	D	56.6	34.5	D
Merge	I-4 WB	CR 46A on-ramp	2043	PM	-	-	F	-	-	F
Merge	SR 429 SB	International Parkway on-ramp	2043	PM	60.0	27.2	C	63.3	14.9	B
Merge	SR 429 SB	I-4 EB on-ramp	2043	PM	62.4	11.3	B	59.0	29.5	D
Merge	SR 429 SB	CD WB on-ramp	2043	PM	61.8	20.5	C			
Merge	SR 429 SB	SR 46 on-ramp	2043	PM	-	-	F	-	-	F
Merge	SR 429 NB	International Parkway on-ramp	2043	PM	--	--	--	63.6	11.0	B
Merge	SR 417 SB	CD on-ramp	2043	PM	--	--	--	61.8	20.8	C
Merge	SR 417 SB	Rinehart Road on-ramp	2043	PM	57.7	33.3	D	57.7	33.3	D
Merge	I-4 EB EL	General Use lanes on-ramp	2043	PM	63.7	16.1	B	63.7	16.1	B
Merge	I-4 EB EL	SR 417/SR 429 on-ramp	2043	PM	62.5	18.8	B	62.5	18.8	B

Legend:

Better density and LOS
Worse density and LOS
Equal values for density and LOS
No comparison

Table 4-10: HCS7 Freeway Weaving Segments - LOS Comparison (2023)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP				ATC			
					Speed	Density	LOS	v/c ratio	Speed	Density	LOS	v/c ratio
Weaving	I-4 EB	Lake Mary on-ramp to CR 46A off-ramp	2023	AM	-	-	F	1.40	-	-	F	1.40
Weaving	I-4 EB	SR 46 on-ramp to US 17 off-ramp	2023	AM	50.7	35.5	E	1.00	50.7	35.5	E	1.00
Weaving	I-4 WB	US 17 on-ramp to SR 46 off-ramp	2023	AM	-	-	F	1.06	-	-	F	1.06
Weaving	I-4 WB	CR 46A on-ramp to Lake Mary off-ramp	2023	AM	-	-	F	2.02	-	-	F	2.02
Weaving	SR 417 NB	Rinehart Road on-ramp to I-4 EB (+Intl Pkwy,CD WB) off-ramp	2023	AM	-	-	F	**1.14**	63.9	12.7	B	**0.86**
Weaving	SR 417 SB	I-4 EB(+CD WB, Intl Pkwy-RFP) on-ramp to Rinehart Road off-ramp	2023	AM	-	-	F	**1.31**	61.7	16.1	B	**0.51**
Weaving	C-D	I-4 WB on-ramp to SR 429 off-ramp	2023	AM	35.5	26.8	C	**0.59**	47.6	20.1	B	**0.52**
Weaving	I-4 EB	Lake Mary on-ramp to CR 46A off-ramp	2023	PM	-	-	F	1.49	-	-	F	1.49
Weaving	I-4 EB	SR 46 on-ramp to US 17 off-ramp	2023	PM	-	-	F	1.06	-	-	F	1.06
Weaving	I-4 WB	US 17 on-ramp to SR 46 off-ramp	2023	PM	50.7	36.1	E	0.99	50.7	36.1	E	0.99
Weaving	I-4 WB	CR 46A on-ramp to Lake Mary off-ramp	2023	PM	-	-	F	1.89	-	-	F	1.89
Weaving	SR 417 NB	Rinehart Road on-ramp to I-4 EB (+Intl Pkwy,CD WB) off-ramp	2023	PM	-	-	F	**1.38**	-	-	F	**1.04**
Weaving	SR 417 SB	I-4 EB(+CD WB, Intl Pkwy-RFP) on-ramp to Rinehart Road on-ramp	2023	PM	-	-	F	**1.21**	62.2	12.9	B	**0.49**
Weaving	C-D	I-4 WB on-ramp to SR 429 off-ramp	2023	PM	36.5	24.3	C	**0.55**	47.9	18.7	B	**0.49**

Table 4-11: HCS7 Freeway Weaving Segments - LOS Comparison (2043)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP				ATC			
					Speed	Density	LOS	v/c ratio	Speed	Density	LOS	v/c ratio
Weaving	I-4 EB	Lake Mary on-ramp to Express Lanes Ingress north of Lake Mary Blvd	2043	AM	-	-	F	1.04	-	-	F	1.04
Weaving	I-4 EB	SR 46 on-ramp to US 17 off-ramp	2043	AM	-	-	F	1.44	-	-	F	1.44
Weaving	I-4 WB	US 17 on-ramp to SR 46 off-ramp	2043	AM	-	-	F	1.54	-	-	F	1.54
Weaving	I-4 WB	Express Lanes Egress north of Lake Mary Blvd to Lake Mary off-ramp	2043	AM	-	-	F	1.06	-	-	F	1.06
Weaving	SR 417 NB	Rinehart Road on-ramp to I-4 EB (+Intl Pkwy,CD WB) off-ramp	2043	AM	-	-	F	**1.54**	-	-	F	**1.08**
Weaving	SR 417 SB	I-4 EB(+CD WB, Intl Pkwy-RFP) on-ramp to Rinehart Road on-ramp	2043	AM	-	-	F	**1.79**	55.7	26.9	C	**0.73**
Weaving	C-D	I-4 WB on-ramp to SR 429 off-ramp	2043	AM	33.1	35.8	D	0.73	33.1	35.8	D	0.73
Weaving	C-D	I-4 Express Lanes on-ramp to SR 417 off-ramp	2043	AM	39.0	25.9	C	0.63	39.0	25.9	C	0.63
Weaving	I-4 EB	Lake Mary on-ramp to Express Lanes Ingress north of Lake Mary Blvd	2043	PM	58.3	29.5	D	0.88	58.3	29.5	D	0.88
Weaving	I-4 EB	SR 46 on-ramp to US 17 off-ramp	2043	PM	-	-	F	1.54	-	-	F	1.54
Weaving	I-4 WB	US 17 on-ramp to SR 46 off-ramp	2043	PM	-	-	F	1.44	-	-	F	1.44
Weaving	I-4 WB	Express Lanes Egress north of Lake Mary Blvd to Lake Mary off-ramp	2043	PM	-	-	F	1.06	-	-	F	1.06
Weaving	SR 417 NB	Rinehart Road on-ramp to I-4 EB (+Intl Pkwy,CD WB) off-ramp	2043	PM	-	-	F	**1.87**	-	-	F	**1.31**
Weaving	SR 417 SB	I-4 EB(+CD WB, Intl Pkwy-RFP) on-ramp to Rinehart Road on-ramp	2043	PM	-	-	F	**1.63**	57.5	20.9	C	**0.60**
Weaving	C-D	I-4 WB on-ramp to SR 429 off-ramp	2043	PM	34.3	32.3	D	0.68	34.3	32.3	D	0.68
Weaving	C-D	I-4 Express Lanes on-ramp to SR 417 off-ramp	2043	PM	39.4	25.5	C	0.59	39.4	25.5	C	0.59

Legend:

Better density and LOS
Worse density and LOS
Equal values for density and LOS
No comparison

There are overall 15 segments with better LOS in ATC #32 than RFP Concept. On the other hand, there are only two segments in total with a better LOS in RFP Concept than ATC #32.

The two segments which perform better in RFP Concept than ATC #32 are not located on I-4, but on the C-D system.

For 2023 AM peak period and 2023 PM peak period, the Basic C-D segment from SR 417 off-ramp to CR 46A off-ramp performs better for the RFP Concept than ATC #32. RFP Concept provides 3 lanes for this segment, while ATC #32 proposes a lane drop from 3 lanes to 2 lanes within the segment. Due to the lane drop, the LOS for this segment in RFP Concept is better than ATC #32.

While these two segments perform better in RFP Concept than ATC #32, these segments are at an acceptable LOS (LOS C) in ATC #32.

In order to compare the RFP Concept and the ATC #32, the number of segments for each LOS were counted and are shown in **Table 4-12** and **Table 4-13**.

Table 4-12: LOS by Segment Counts – RFP Concept

LOS	2023				2043			
	AM		PM		AM		PM	
A	4	8.70%	5	10.86%	3	5.09 %	3	5.09 %
B	13	28.26%	13	28.26%	14	23.73 %	14	23.73 %
C	17	36.96%	17	36.96%	18	30.50 %	15	25.42 %
D	3	6.52%	4	8.70%	10	16.95 %	15	25.42 %
E	4	8.70%	2	4.35%	4	6.78 %	1	1.70 %
F	5	10.86%	5	10.87%	10	16.95 %	11	18.64 %
Total	**46**	100%	**46**	100%	**59**	100%	**59**	100%

Table 4-13: LOS by Segment Counts – ATC #32

LOS	2023				2043			
	AM		PM		AM		PM	
A	6	12.77%	7	14.89%	2	3.33 %	2	3.33 %
B	14	29.79%	13	27.66%	16	26.67 %	15	25.00 %
C	17	36.17%	16	34.04%	18	30.00 %	16	26.67 %
D	3	6.38%	5	10.64%	11	18.33 %	16	26.67 %
E	4	8.51%	2	4.26%	4	6.67 %	1	1.66 %
F	3	6.38%	4	8.51%	9	15.00 %	10	16.67 %
Total	**47**	100**%**	**47**	100**%**	**60**	100%	**60**	100%

Based on these tables, the number of segments with an acceptable LOS (A through D) is higher for the ATC #32 than the RFP Concept. Conversely, the number of segments with an unacceptable LOS (E and F) are higher for the RFP Concept than the ATC #32.

Table 4-14 through **Table 4-21** show the LOS by segment type for each alternative, analysis year and time period.

Table 4-14: LOS by Segment Type Counts – RFP Concept 2023 AM

Segment	A	B	C	D	E	F	Total
Basic	3	8	8	1	1	0	21
Diverge	0	3	4	1	1	0	9
Merge	1	2	4	1	1	0	9
Weaving	0	0	1	0	1	5	7
Total	4	13	17	3	4	5	46
Percent	8.70%	28.26%	36.96%	6.52%	8.70%	10.87%	100%
	80.43%				19.57%		

Table 4-15: LOS by Segment Type Counts – ATC #32 2023 AM

Segment	A	B	C	D	E	F	Total
Basic	3	5	9	1	1	0	19
Diverge	1	4	3	1	1	0	10
Merge	2	2	5	1	1	0	11
Weaving	0	3	0	0	1	3	7
Total	6	14	17	3	4	3	47
Percent	12.77%	29.79%	36.17%	6.38%	8.51%	6.38%	100%
	85.11%				14.89%		

For 2023 AM peak period, the percentage of segments with an acceptable LOS is higher for the ATC #32 than the RFP Concept. Moreover, the percentage of segments with an unacceptable LOS is lower for the ATC #32 than the RFP Concept. Therefore, the ATC #32 design performs better than the RFP Concept design.

Table 4-16: LOS by Segment Type Counts – RFP Concept 2023 PM

Segment	A	B	C	D	E	F	Total
Basic	4	7	8	2	0	0	21
Diverge	0	4	3	2	0	0	9
Merge	1	2	5	0	1	0	9
Weaving	0	0	1	0	1	5	7
Total	5	13	17	4	2	5	46
Percent	10.87%	28.26%	36.96%	8.70%	4.35%	10.87%	100%
	84.78%				15.22%		

Table 4-17: LOS by Segment Type Counts – ATC #32 2023 PM

Segment	A	B	C	D	E	F	Total
Basic	3	5	9	2	0	0	19
Diverge	2	4	1	3	0	0	10
Merge	2	2	6	0	1	0	11
Weaving	0	2	0	0	1	4	7
Total	7	13	16	5	2	4	47
Percent	14.89%	27.66%	34.04%	10.64%	4.26%	8.51%	100%
	87.23%				12.77%		

For 2023 PM peak period, the percentage of segments with an acceptable LOS is higher for the ATC #32 than the RFP Concept. Moreover, the percentage of segments with an unacceptable LOS is lower for the ATC #32 than the RFP Concept. Therefore, the ATC #32 design performs better than the RFP Concept design.

Table 4-18: LOS by Segment Type Counts – RFP Concept 2043 AM

Segment	A	B	C	D	E	F	Total
Basic	3	8	9	4	1	2	27
Diverge	0	2	5	2	2	1	12
Merge	0	4	3	3	1	1	12
Weaving	0	0	1	1	0	6	8
Total	3	14	18	10	4	10	59
Percent	5.09%	23.73%	30.50%	16.95%	6.78%	16.95%	100%
	76.27%				23.73%		

Table 4-19: LOS by Segment Type Counts – ATC #32 2043 AM

Segment	A	B	C	D	E	F	Total
Basic	2	8	8	4	1	2	25
Diverge	0	4	4	2	2	1	13
Merge	0	4	4	4	1	1	14
Weaving	0	0	2	1	0	5	8
Total	2	16	18	11	4	9	60
Percent	3.33%	26.67%	30.00%	18.33%	6.67%	15.00%	100%
	78.33%				21.67%		

For 2043 AM peak period, the percentage of segments with an acceptable LOS is slightly higher for the ATC #32 than the RFP Concept. Moreover, the percentage of segments with an unacceptable LOS is slightly lower for the ATC #32 than the RFP Concept. Therefore, the ATC #32 design performs better than the RFP Concept design. The percentage of segments with an unacceptable LOS increased in 2043 when compared to 2023 due to higher congestion.

Table 4-20: LOS by Segment Type Counts – RFP Concept 2043 PM

Segment	A	B	C	D	E	F	Total
Basic	3	8	7	6	0	3	27
Diverge	0	3	4	4	1	0	12
Merge	0	3	3	3	0	3	12
Weaving	0	0	1	2	0	5	8
Total	3	14	15	15	1	11	59
Percent	5.09%	23.73%	25.42%	25.42%	1.70%	18.64%	100%
	79.66%				20.34%		

Table 4-21: LOS by Segment Type Counts – ATC #32 2043 PM

Segment	A	B	C	D	E	F	Total
Basic	2	7	7	6	0	3	25
Diverge	0	4	4	4	1	0	13
Merge	0	4	3	4	0	3	14
Weaving	0	0	2	2	0	4	8
Total	2	15	16	16	1	10	60
Percent	3.33%	25.00%	26.67%	26.67%	1.66%	16.67%	100%
	81.67%				18.33%		

For 2043 PM peak period, the percentage of segments with an acceptable LOS is higher for the ATC #32 than the RFP Concept. Moreover, the percentage of segments with an unacceptable LOS is lower for the ATC #32 than the RFP Concept. Therefore, the ATC #32 design performs better than the RFP Concept design. The percentage of segments with an unacceptable LOS increased in 2043 when compared to 2023 due to higher congestion.

4.1.5.1 Weaving Segments

Analysis of a weaving segment requires an additional step beyond that of basic freeway and ramp merge/diverge segment. In addition to forecasting traffic for freeway and ramp segments, the traffic for weaving movements (freeway-to-ramp and ramp-to-freeway) and non-weaving movements (freeway-to-freeway and ramp-to-ramp) must also be identified.

The weaving segment analysis assumes that the ramp-to-ramp volume is zero. Given the proximity of the adjacent interchanges, the congestion on I-4 and the availability of local north-south roads, it was assumed that all short local trips would use local arterials rather than I-4.

In addition to LOS, density, and speed, a column comparing the v/c ratio for each weaving segment is provided in **Table 4-22 and Table 4-23**.

A v/c ratio higher than 1.00 represents LOS F.

Table 4-22: HCS7 Freeway Weaving Segments - LOS Comparison (2023)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP				ATC			
					Speed	Density	LOS	v/c ratio	Speed	Density	LOS	v/c ratio
Weaving	I-4 EB	Lake Mary on-ramp to CR 46A off-ramp	2023	AM	-	-	F	1.40	-	-	F	1.40
Weaving	I-4 EB	SR 46 on-ramp to US 17 off-ramp	2023	AM	50.7	35.5	E	1.00	50.7	35.5	E	1.00
Weaving	I-4 WB	US 17 on-ramp to SR 46 off-ramp	2023	AM	-	-	F	1.06	-	-	F	1.06
Weaving	I-4 WB	CR 46A on-ramp to Lake Mary off-ramp	2023	AM	-	-	F	2.02	-	-	F	2.02
Weaving	SR 417 NB	Rinehart Road on-ramp to I-4 EB (+Intl Pkwy,CD WB) off-ramp	2023	AM	-	-	F	**1.14**	63.9	12.7	B	**0.86**
Weaving	SR 417 SB	I-4 EB(+CD WB, Intl Pkwy-RFP) on-ramp to Rinehart Road off-ramp	2023	AM	-	-	F	**1.31**	61.7	16.1	B	**0.51**
Weaving	C-D	I-4 WB on-ramp to SR 429 off-ramp	2023	AM	35.5	26.8	C	**0.59**	47.6	20.1	B	**0.52**
Weaving	I-4 EB	Lake Mary on-ramp to CR 46A off-ramp	2023	PM	-	-	F	1.49	-	-	F	1.49
Weaving	I-4 EB	SR 46 on-ramp to US 17 off-ramp	2023	PM	-	-	F	1.06	-	-	F	1.06
Weaving	I-4 WB	US 17 on-ramp to SR 46 off-ramp	2023	PM	50.7	36.1	E	0.99	50.7	36.1	E	0.99
Weaving	I-4 WB	CR 46A on-ramp to Lake Mary off-ramp	2023	PM	-	-	F	1.89	-	-	F	1.89
Weaving	SR 417 NB	Rinehart Road on-ramp to I-4 EB (+Intl Pkwy,CD WB) off-ramp	2023	PM	-	-	F	**1.38**	-	-	F	**1.04**
Weaving	SR 417 SB	I-4 EB(+CD WB, Intl Pkwy-RFP) on-ramp to Rinehart Road on-ramp	2023	PM	-	-	F	**1.21**	62.2	12.9	B	**0.49**
Weaving	C-D	I-4 WB on-ramp to SR 429 off-ramp	2023	PM	36.5	24.3	C	**0.55**	47.9	18.7	B	**0.49**

Legend:

Better density and LOS
Worse density and LOS
Equal values for density and LOS

For 2023 AM, the RFP Concept has one segment with an acceptable LOS and six segments with unacceptable LOS. Meanwhile, the ATC #32 has three segments with acceptable LOS and four segments with unacceptable LOS. The three ATC #32 segments with acceptable LOS not only have a better density but also higher speed and lower v/c ratio when compared with the RFP Concept.

For 2023 PM, the RFP Concept has one segment with an acceptable LOS and six segments with unacceptable LOS. Meanwhile, the ATC #32 has two segments with acceptable LOS and five segments with unacceptable LOS. The two ATC #32 segments with acceptable LOS not only have a better density but also higher speed and lower v/c ratio when compared with the RFP Concept.

The increase in number of segments operating at acceptable LOS are due to design changes of the ATC #32. For weaving segments, ATC #32 performs better than the RFP Concept.

Table 4-23: HCS7 Freeway Weaving Segments - LOS Comparison (2043)

Type of Segment	Highway	Name of Segment	Year	AM/PM	RFP				ATC			
					Speed	Density	LOS	v/c ratio	Speed	Density	LOS	v/c ratio
Weaving	I-4 EB	Lake Mary on-ramp to Express Lanes Ingress north of Lake Mary Blvd	2043	AM	-	-	F	1.04	-	-	F	1.04
Weaving	I-4 EB	SR 46 on-ramp to US 17 off-ramp	2043	AM	-	-	F	1.44	-	-	F	1.44
Weaving	I-4 WB	US 17 on-ramp to SR 46 off-ramp	2043	AM	-	-	F	1.54	-	-	F	1.54
Weaving	I-4 WB	Express Lanes Egress north of Lake Mary Blvd to Lake Mary off-ramp	2043	AM	-	-	F	1.06	-	-	F	1.06
Weaving	SR 417 NB	Rinehart Road on-ramp to I-4 EB (+Intl Pkwy,CD WB) off-ramp	2043	AM	-	-	F	**1.54**	-	-	F	**1.08**
Weaving	SR 417 SB	I-4 EB(+CD WB, Intl Pkwy-RFP) on-ramp to Rinehart Road on-ramp	2043	AM	-	-	F	**1.79**	55.7	26.9	C	**0.73**
Weaving	C-D	I-4 WB on-ramp to SR 429 off-ramp	2043	AM	33.1	35.8	D	0.73	33.1	35.8	D	0.73
Weaving	C-D	I-4 Express Lanes on-ramp to SR 417 off-ramp	2043	AM	39.0	25.9	C	0.63	39.0	25.9	C	0.63
Weaving	I-4 EB	Lake Mary on-ramp to Express Lanes Ingress north of Lake Mary Blvd	2043	PM	58.3	29.5	D	0.88	58.3	29.5	D	0.88
Weaving	I-4 EB	SR 46 on-ramp to US 17 off-ramp	2043	PM	-	-	F	1.54	-	-	F	1.54
Weaving	I-4 WB	US 17 on-ramp to SR 46 off-ramp	2043	PM	-	-	F	1.44	-	-	F	1.44
Weaving	I-4 WB	Express Lanes Egress north of Lake Mary Blvd to Lake Mary off-ramp	2043	PM	-	-	F	1.06	-	-	F	1.06
Weaving	SR 417 NB	Rinehart Road on-ramp to I-4 EB (+Intl Pkwy,CD WB) off-ramp	2043	PM	-	-	F	**1.87**	-	-	F	**1.31**
Weaving	SR 417 SB	I-4 EB(+CD WB, Intl Pkwy-RFP) on-ramp to Rinehart Road on-ramp	2043	PM	-	-	F	**1.63**	57.5	20.9	C	**0.60**
Weaving	C-D	I-4 WB on-ramp to SR 429 off-ramp	2043	PM	34.3	32.3	D	0.68	34.3	32.3	D	0.68
Weaving	C-D	I-4 Express Lanes on-ramp to SR 417 off-ramp	2043	PM	39.4	25.5	C	0.59	39.4	25.5	C	0.59

Legend:

Better density and LOS
Worse density and LOS
Equal values for density and LOS

For 2043 AM, the RFP Concept has two segments with an acceptable LOS and six segments with unacceptable LOS. Meanwhile, the ATC #32 has three segments with acceptable LOS and five segments with unacceptable LOS. The three ATC #32 segments with acceptable LOS not only have a better density but also higher speed and lower v/c ratio when compared with the RFP Concept.

For 2043 PM, the RFP Concept has three segments with an acceptable LOS and five segments with unacceptable LOS. Meanwhile, the ATC #32 has four segments with acceptable LOS and four segments with unacceptable LOS. The two ATC #32 segments with acceptable LOS not only have a better density but also higher speed and lower v/c ratio when compared with the RFP Concept.

The increase in number of segments operating at acceptable LOS are due to design changes of the ATC #32. For weaving segments, ATC #32 performs better than the RFP Concept.

Major highlights of the HCS comparison are listed below:

- The number of segments with acceptable LOS (A through D) are higher for the ATC #32 than the RFP Concept for all analysis years.
- There is a major improvement in weaving segments. 5 out of 30 segments improved from an unacceptable LOS (E and F) in the RFP Concept to an acceptable LOS (A through D) in the ATC #32.
- The ATC #32 design led to three major improvements in weaving segments.
    - SR 417 SB from the I-4 on-ramp to the Rinehart Road off-ramp improved from RFP Concept (LOS F) to the ATC #32 (LOS B) by 2023 for both AM and PM peak period.
    - SR 417 SB from the I-4 on-ramp to the Rinehart Road off-ramp improved from RFP Concept (LOS F) to the ATC #32 (LOS C) by 2043 for both AM and PM peak period.
    - The weaving segment on SR 417 NB from the Rinehart Road on-ramp to the I-4 off-ramp showed a better v/c ratio in ATC #32 than RFP Concept for all analysis years; 2023 AM peak period showing the best improvement from LOS F in RFP Concept to LOS B in ATC #32.
- For the 2023 AM peak period, there is one (basic) segment with a better LOS in the RFP Concept than ATC #32, while there are five (1 diverge, 1 merge, 3 weaving) segments with a better LOS in ATC #32 than the RFP Concept.
- For the 2023 PM peak period, there is one (basic) segment with a better LOS in the RFP Concept than ATC #32, while there are four (1 diverge, 1 merge, 2 weaving) segments with a better LOS in ATC #32 than the RFP Concept.
- For the 2043 AM peak period, there are no segments with a better LOS in the RFP Concept than ATC #32, while there are three (1 merge, 2 weaving) segments with a better LOS in ATC #32 than the RFP Concept.
- For the 2043 PM peak period, there are no segments with a better LOS in the RFP Concept than ATC #32, while there are three (1 merge, 2 weaving) segments with a better LOS in ATC #32 than the RFP Concept.
- Overall, there are 15 segments with a better LOS in ATC #32 while there are only two segments with a better LOS with the RFP concept.

Therefore, the analysis of freeway segments using HCS7 shows the ATC #32 design performs significantly better than the RFP Concept design.

4.2 Synchro Analysis

4.2.1 LOS Criteria and Methodology

Fifteen intersections, as listed in **Section 2.1.1**, were analyzed using Synchro 10 for both alternatives. Based on the Highway Capacity Manual (HCM) 6th Edition, the control delay defined LOS criteria is shown in **Table 4-24**.

Table 4-24: LOS Criteria for Intersections

LOS	Control Delay (seconds/vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	≤10	0-10
B	>10-20	>10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

4.2.2 Comparison of LOS results for RFP Concept and ATC #32

The delay-based Synchro LOS outputs are as shown in **Table 4-25** and **Table 4-26**.

Figure 4-33 through **Figure 4-36** show the LOS results at the International Parkway interchange.

The reports for delay-based Synchro LOS analysis are listed in **Appendix D**.

Table 4-25: Comparison of Synchro LOS Results – 2023

RFP						
Intersection		Methodology	AM		PM	
			Intersection Delay (s)	Intersection LOS	Intersection Delay (s)	Intersection LOS
1	SR 46 & Center Rd	HCM 6th TWSC	NB – 53.3 SB – 60.7	NB – F SB – F	NB – 100.3 SB – 69.7	NB – F SB – F
2	SR 46 & Orange Blvd	HCM 6th Signalized	16.9	B	15.3	B
3	SR 46 & N Oregon St	HCM 6th Signalized	41.4	D	37.8	D
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	21.4	C	20.1	C
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	32.8	C	31.4	C
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	27.9	C	60.9	E
7	SR 46 & Rinehart Rd	HCM 6th Signalized	36.9	D	32.6	C
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	4.6	A	6.0	A
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	15.9	B	23.5	C
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	45.8	D	14.9	B
11	CR 46A & Rinehart Rd	HCM 6th Signalized	138.9	F	123.3	F
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	46.1	D	64.8	E
13	CR 46A & I-4 WB Ramp/Colonial Center Pwky	HCM 2000 Signalized	83.0	F	101.1	F
14	CR 46A & International Pwky	HCM 6th Signalized	59.2	E	105.4	F
15	SR 429 On Ramp & International Pwky	HCM 6th Signalized	**10.4**	**B**	**7.0**	**A**
	SR 429 Off Ramp & International Pwky	HCM 6th TWSC	**25.3**	**D**	**11.7**	**B**
	SR 417 On/Off Ramps & International Pwky	HCM 6th Signalized	**35.3**	**D**	**16.2**	**B**

ATC						
Intersection		Methodology	AM		PM	
			Intersection Delay (s)	Intersection LOS	Intersection Delay (s)	Intersection LOS
1	SR 46 & Center Rd	HCM 6th TWSC	NB – 53.3 SB – 60.7	NB – F SB – F	NB – 100.3 SB – 69.7	NB – F SB – F
2	SR 46 & Orange Blvd	HCM 6th Signalized	16.9	B	15.3	B
3	SR 46 & N Oregon St	HCM 6th Signalized	41.4	D	37.8	D
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	21.4	C	20.1	C
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	32.8	C	31.4	C
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	27.9	C	60.9	E
7	SR 46 & Rinehart Rd	HCM 6th Signalized	36.9	D	32.6	C
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	4.6	A	6.0	A
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	15.9	B	23.5	C
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	45.8	D	14.9	B
11	CR 46A & Rinehart Rd	HCM 6th Signalized	138.9	F	123.3	F
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	46.1	D	64.8	E
13	CR 46A & I-4 WB Ramp/Colonial Center Pwky	HCM 2000 Signalized	83.0	F	101.1	F
14	CR 46A & International Pwky	HCM 6th Signalized	59.2	E	105.4	F
15	SR 429 SB & International Pwky	HCM 6th Signalized	**29.5**	**C**	**58.6**	**E**
	SR 429 NB & International Pwky	HCM 6th Signalized	**21.9**	**C**	**13.7**	**B**

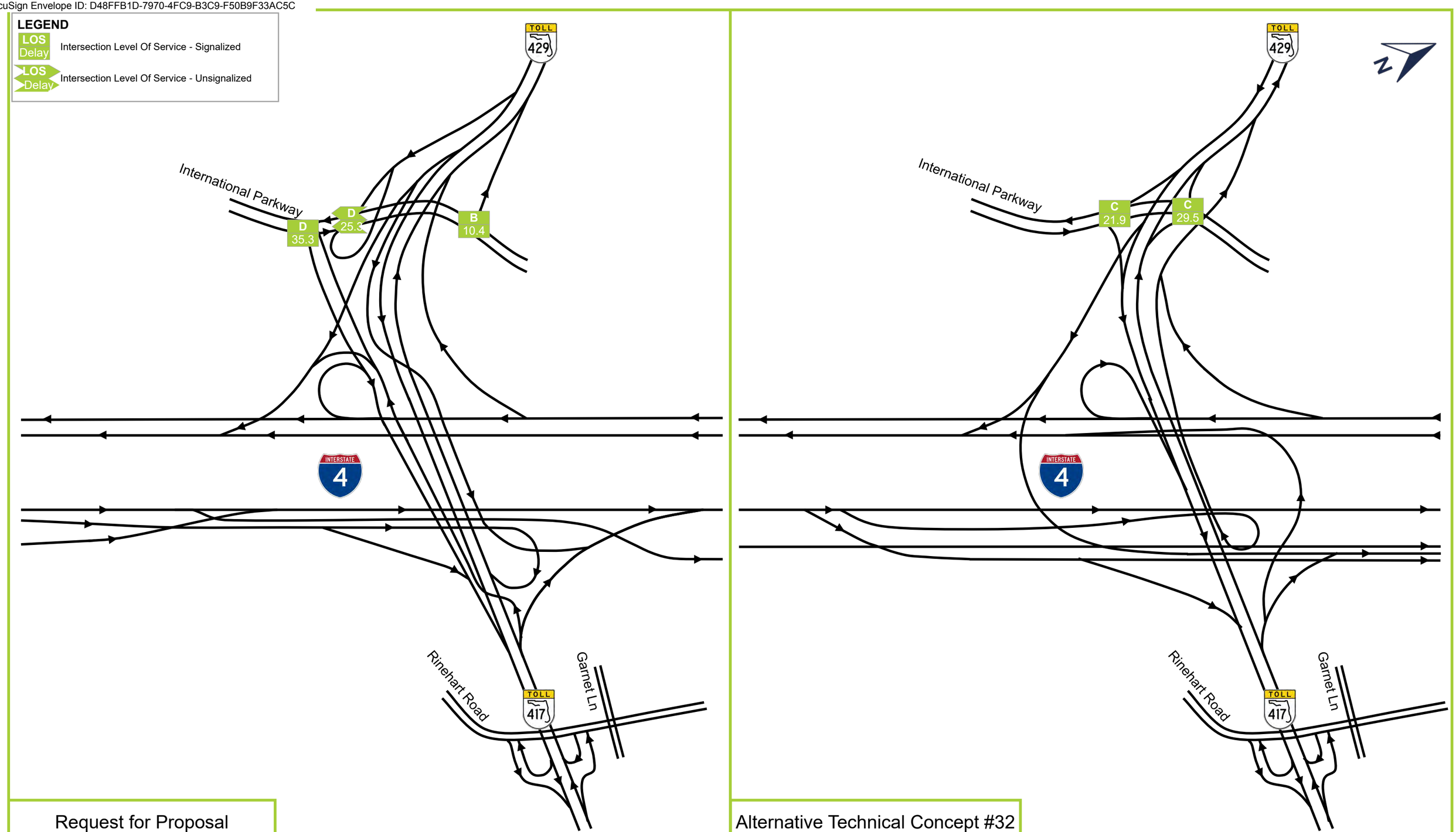
Note – Intersection #15 cannot be compared because the geometry of that intersection is not same.

Table 4-26: Comparison of Synchro LOS Results – 2043

RFP						
Intersection		Methodology	AM		PM	
			Intersection Delay (s)	Intersection LOS	Intersection Delay (s)	Intersection LOS
1	SR 46 & Center Rd	HCM 6th TWSC	NB – 87.5 SB – 111.6	NB – F SB – F	NB – 244.9 SB – 139.2	NB – F SB – F
2	SR 46 & Orange Blvd	HCM 6th Signalized	57.8	E	59.9	E
3	SR 46 & N Oregon St	HCM 6th Signalized	46.4	D	49.0	D
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	50.9	D	44.8	D
5	SR 46 & I-4 EB Ramps	Signalized	44.1 (HCM 6th)	D (HCM 6th)	36.8 (HCM 2000)	D (HCM 2000)
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	41.0	D	94.2	F
7	SR 46 & Rinehart Rd	HCM 6th Signalized	53.3	D	88.7	F
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	10.1	B	20.0	C
9	Rinehart Rd & NB SR 417 Ramps	Signalized	47.3 (HCM 2000)	D (HCM 2000)	87.7 (HCM 6th)	F (HCM 6th)
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	53.4	D	54.2	D
11	CR 46A & Rinehart Rd	HCM 2000 Signalized	33.2	C	199.4	F
12	CR 46A & I-4 EB Ramps	HCM 2000 Signalized	22.8	C	102.1	F
13	CR 46A & I-4 WB Ramps	HCM 2000 Signalized	26.5	C	27.6	C
	CR 46A & Colonial Center Pkwy	HCM 6th Signalized	48.1	D	92.4	F
14	CR 46A & International Pkwy	HCM 2000 Signalized	257.9	F	217.6	F
15	SR 429 On Ramp & International Pkwy	HCM 6th Signalized	27.4	C	11.8	B
	SR 429 Off Ramp & International Pkwy	HCM 6th TWSC	180.6	F	13.1	B
	SR 417 On/Off Ramps & International Pkwy	HCM 6th Signalized	124.6	F	65.0	E

ATC						
Intersection		Methodology	AM		PM	
			Intersection Delay (s)	Intersection LOS	Intersection Delay (s)	Intersection LOS
1	SR 46 & Center Rd	HCM 6th TWSC	NB – 87.5 SB – 111.6	NB – F SB – F	NB – 244.9 SB – 139.2	NB – F SB – F
2	SR 46 & Orange Blvd	HCM 6th Signalized	57.8	E	59.9	E
3	SR 46 & N Oregon St	HCM 6th Signalized	46.4	D	49.0	D
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	50.9	D	44.8	D
5	SR 46 & I-4 EB Ramps	Signalized	44.1 (HCM 6th)	D (HCM 6th)	36.8 (HCM 2000)	D (HCM 2000)
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	41.0	D	94.2	F
7	SR 46 & Rinehart Rd	HCM 6th Signalized	53.3	D	88.7	F
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	10.1	B	20.0	C
9	Rinehart Rd & NB SR 417 Ramps	Signalized	47.3 (HCM 2000)	D (HCM 2000)	87.7 (HCM 6th)	F (HCM 6th)
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	53.4	D	54.2	D
11	CR 46A & Rinehart Rd	HCM 2000 Signalized	33.2	C	199.4	F
12	CR 46A & I-4 EB Ramps	HCM 2000 Signalized	22.8	C	102.1	F
13	CR 46A & I-4 WB Ramps	HCM 2000 Signalized	26.5	C	27.6	C
	CR 46A & Colonial Center Pkwy	HCM 6th Signalized	48.1	D	92.4	F
14	CR 46A & International Pkwy	HCM 2000 Signalized	257.9	F	217.6	F
15	SR 429 SB & International Pkwy	HCM 6th Signalized	69.6	E	76.3	E
	SR 429 NB & International Pkwy	HCM 6th Signalized	29.4	C	41.2	D

Note – Intersection #15 cannot be compared because the geometry of that intersection is not same.



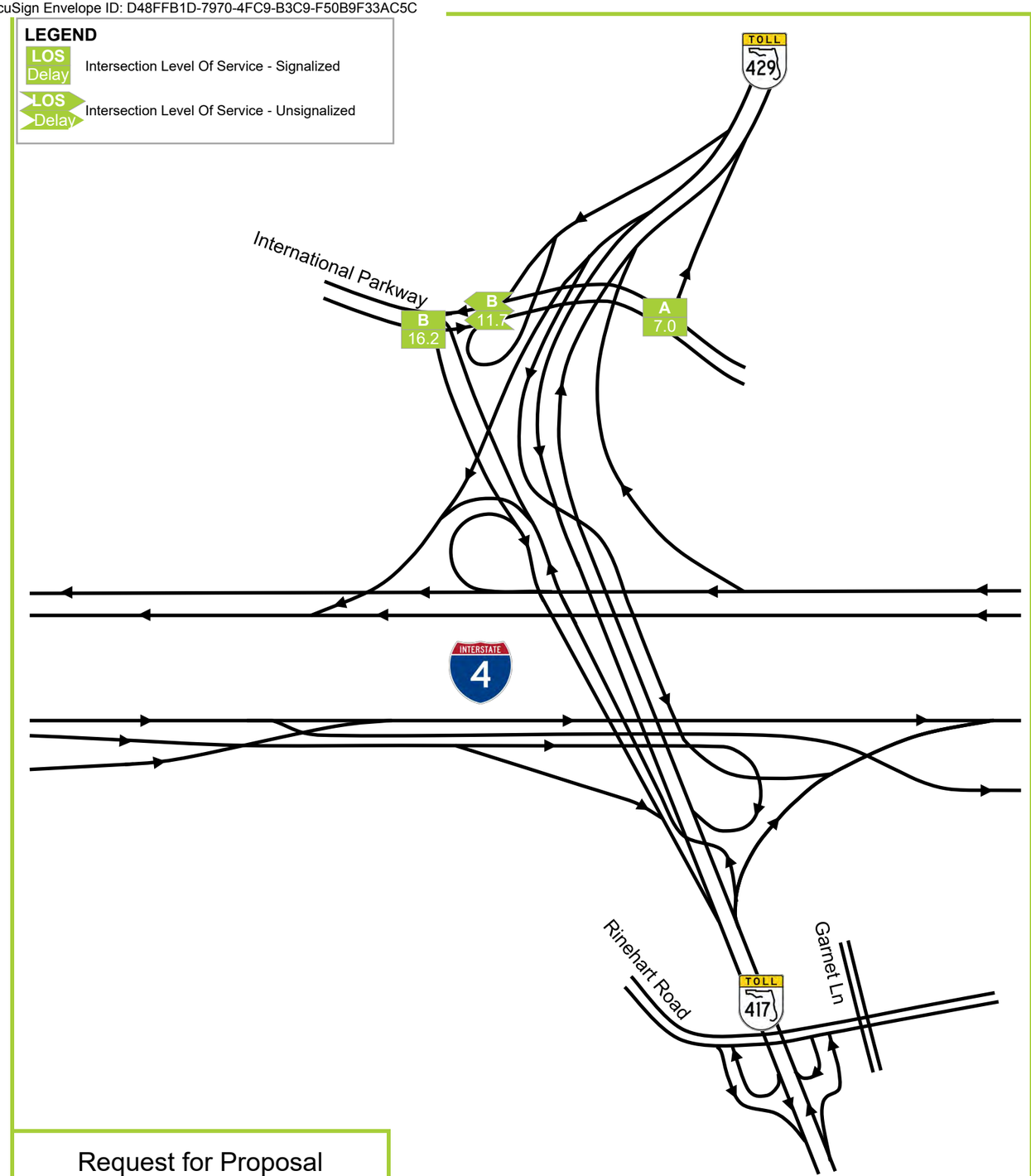
Request for Proposal

Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Comparison of Intersection Level of Service from Synchro 2023 AM

Figure 4-33



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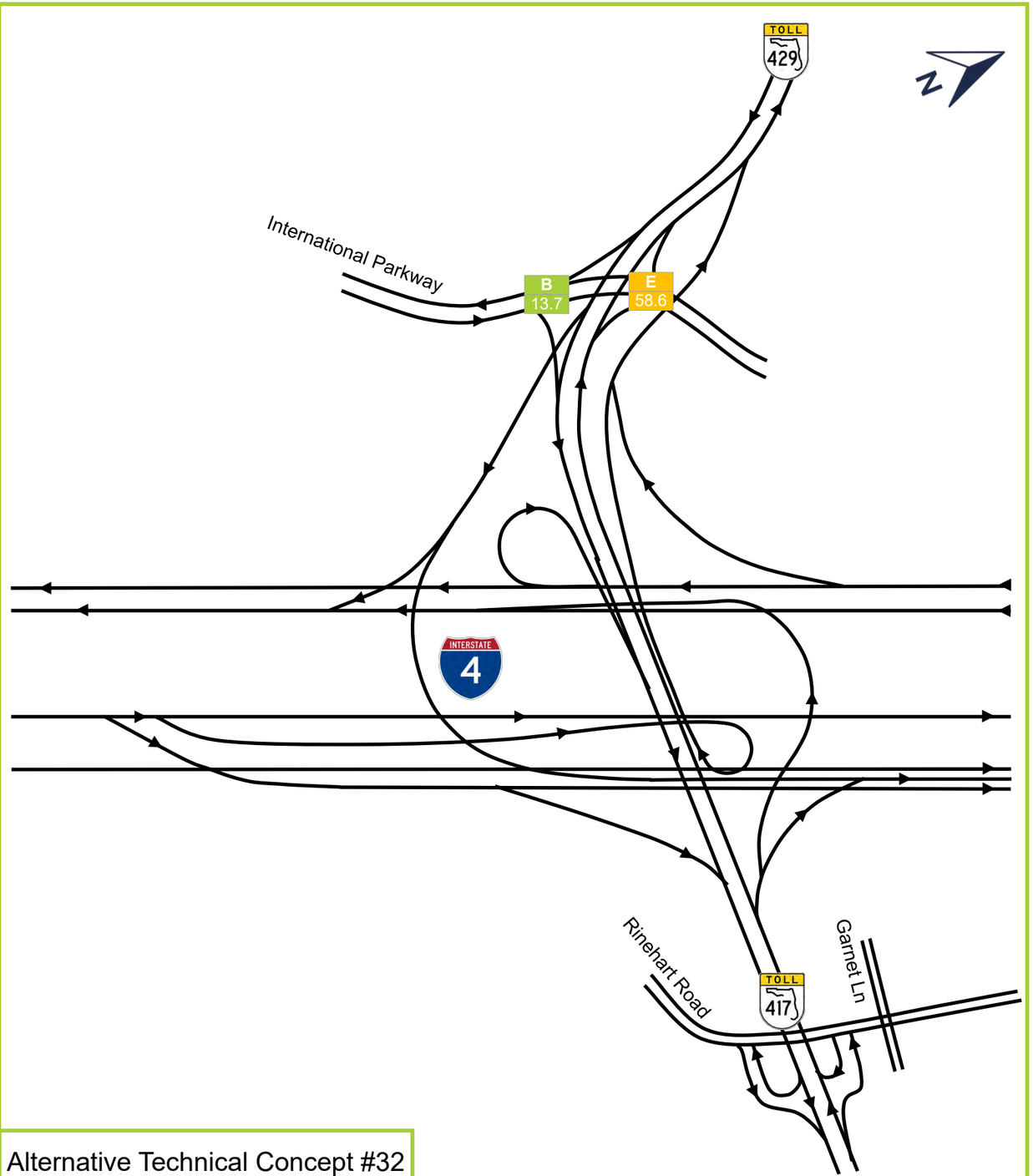


Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

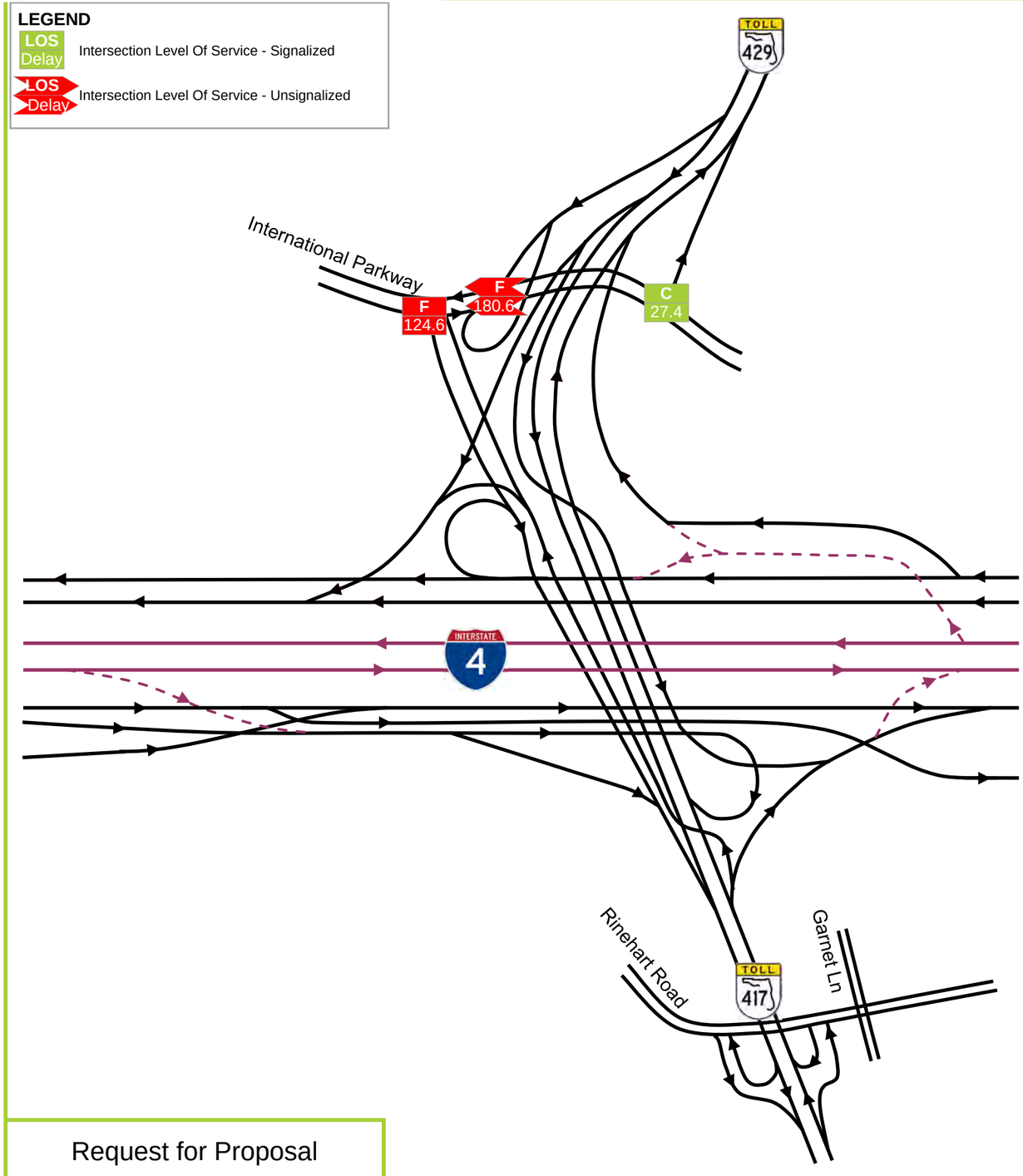
Comparison of Intersection Level of Service from Synchro 2023 PM

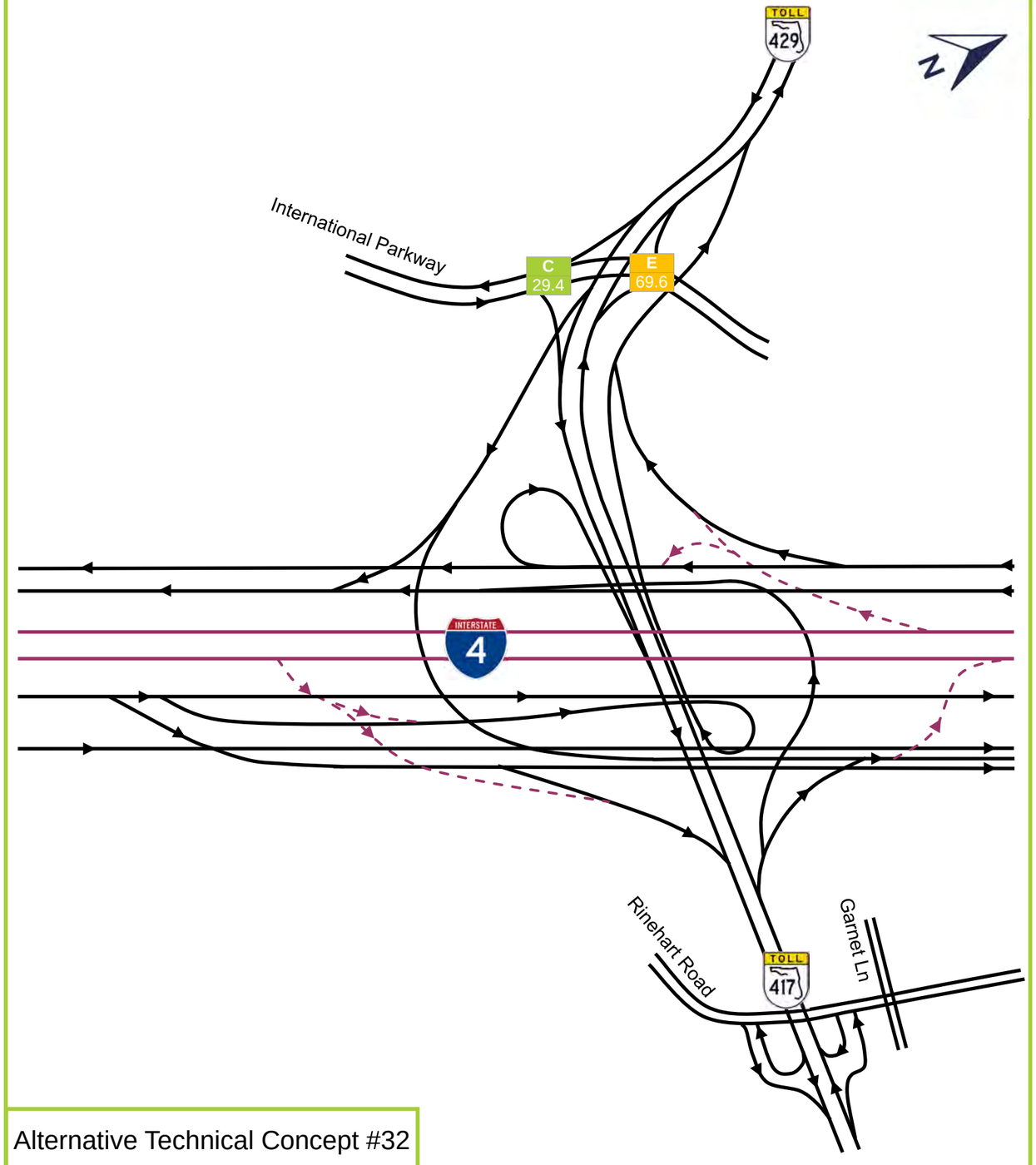
Figure 4-34

LEGEND

LOS Delay — Intersection Level Of Service - Signalized

LOS Delay — Intersection Level Of Service - Unsignalized





Request for Proposal

Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

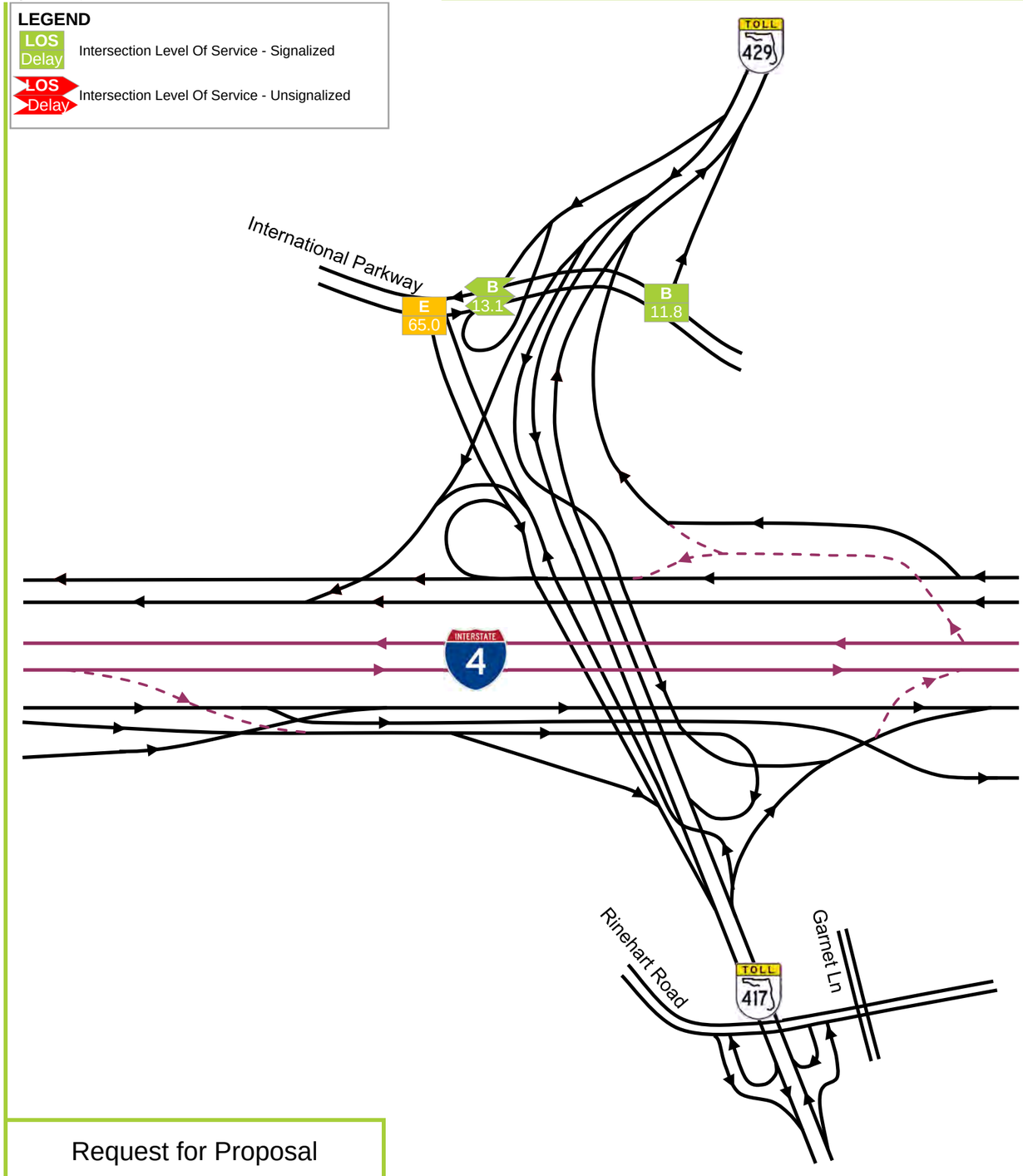
Comparison of Intersection Level of Service from Synchro 2043 AM

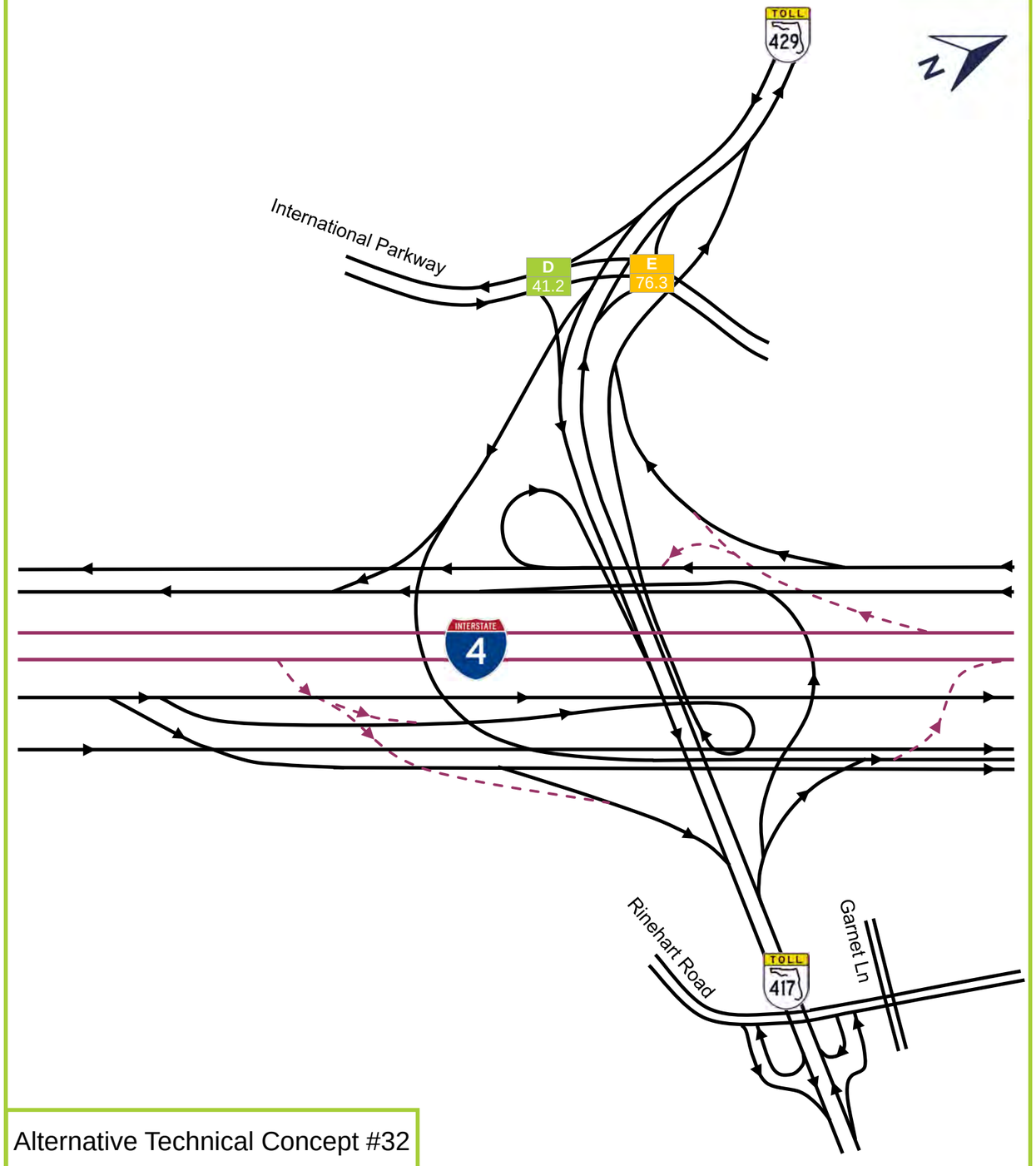
Figure 4-35

LEGEND

LOS Delay — Intersection Level Of Service - Signalized

LOS Delay — Intersection Level Of Service - Unsignalized





Request for Proposal

Alternative Technical Concept #32

SR 429 (Wekiva Parkway)/SR 417/I-4 Interchange
Seminole County, Florida
FM Number: 240200-4

Comparison of Intersection Level of Service from Synchro 2043 PM

Figure 4-36

Fourteen intersections out of the listed fifteen show equal delay values in all analysis periods. The intersection at International Parkway and Wekiva Parkway (SR 429) for the RFP Concept and ATC #32 cannot be compared directly as they accommodate different movements.

4.2.3 95th Percentile Queue Length for RFP Concept and ATC #32

The 95th percentile queue length is defined as the queue length (in vehicles) that has only 5-percent probability of being exceeded during the analysis time period. It is a useful parameter for determining the appropriate length of storage lanes.

Fourteen intersections out of the listed fifteen show similar queue lengths for turning movements. The intersection at International Parkway and Wekiva Parkway (SR 429) for the RFP Concept and ATC #32 cannot be compared directly as they accommodate different movements.

Table 4-27 through **Table 4-34** show the 95th percentile queue length for turns at all the intersections obtained from Synchro.

Table 4-27: Synchro 95th Percentile Available Storage Length and Queue Length (feet) – RFP Concept 2023 AM

Intersection		Methodology	Available Storage Length								Queue Length							
			EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
1	SR 46 & Center Rd	HCM 6th TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	SR 46 & Orange Blvd	HCM 6th Signalized	230	500	350	625	225	-	175	-	34	-	#157	14	72	#149	-	-
3	SR 46 & N Oregon St	HCM 6th Signalized	350	275	275	275	150	135	225	165	154	-	216	46	79	0	336	64
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	-	-	-	700	-	-	-	700	-	-	-	54	-	-	104	#469
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	650	-	-	-	250	160	-	-	#277	-	-	126	126	#264	-	-
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	700	650	575	250	450	-	200	-	m#246	m95	26	-	53	-	117	41
7	SR 46 & Rinehart Rd	HCM 6th Signalized	360	750	460	315	380	375	150	-	#114	47	#165	0	#157	42	65	0
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	125	-	74	-	165	200	240	260	8	-	34	-	6	13	4	0
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	225	380	245	425	370	370	475	450	26	0	84	32	m24	117	#93	0
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	-	-	300	-	-	375	375	-	-	-	97	48	-	34	#235	-
11	CR 46A & Rinehart Rd	HCM 6th Signalized	500	450	400	300	500	300	400	800	180	#1124	#401	17	#464	69	97	221
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	660	-	-	-	550	650	-	-	#151	-	-	55	#498	227	-	-
13	CR 46A & I-4 WB Ramp/Colonial Center Pwky	HCM 2000 Signalized	225	500	660	300	500	475	350	-	68	#1018	#789	48	#361	46	60	-
14	CR 46A & International Pwky	HCM 6th Signalized	450	400	800	500	350	280	545	-	98	0	#249	43	#105	40	169	-
15	SR 429 On Ramp & International Pwky	HCM 6th Signalized	200	-	-	-	-	-	-	-	135	-	-	-	-	-	-	-
	SR 429 Off Ramp & International Pwky	HCM 2000 Unsignalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SR 417 On/Off Ramps & International Pwky	HCM 6th Signalized	-	-	250	150	-	250	250	-	-	-	#447	23	-	54	#512	-

– 95th percentile volume exceeds capacity (queues may be longer)

m – Volume for 95th percentile queue is metered by upstream signal

Table 4-28: Synchro 95th Percentile Available Storage Length and Queue Length (feet) – ATC #32 2023 AM

	Intersection	Methodology	Available Storage Length								Queue Length							
			EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
1	SR 46 & Center Rd	HCM 6th TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	SR 46 & Orange Blvd	HCM 6th Signalized	230	500	350	625	225	-	175	-	34	-	#157	14	72	#149	-	-
3	SR 46 & N Oregon St	HCM 6th Signalized	350	275	275	275	150	135	225	165	154	-	216	46	79	0	336	64
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	-	-	-	700	-	-	-	700	-	-	-	54	-	-	104	#469
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	650	-	-	-	250	160	-	-	#277	-	-	126	126	#264	-	-
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	700	650	575	250	450	-	200	-	m#246	m95	26	-	53	-	117	41
7	SR 46 & Rinehart Rd	HCM 6th Signalized	360	750	460	315	380	375	150	-	#114	47	#165	0	#157	42	65	0
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	125	-	74	-	165	200	240	260	8	-	34	-	6	13	4	0
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	225	380	245	425	370	370	475	450	26	0	84	32	m24	117	#93	0
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	-	-	300	-	-	375	375	-	-	-	97	48	-	34	#235	-
11	CR 46A & Rinehart Rd	HCM 6th Signalized	500	450	400	300	500	300	400	800	180	#1124	#401	17	#464	69	97	221
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	660	-	-	-	550	650	-	-	#151	-	-	55	#498	227	-	-
13	CR 46A & I-4 WB Ramp/Colonial Center Pwky	HCM 2000 Signalized	225	500	660	300	500	475	350	-	68	#1018	#789	48	#361	46	60	-
14	CR 46A & International Pwky	HCM 6th Signalized	450	400	800	500	350	280	545	-	98	0	#249	43	#105	40	169	-
15	SR 429 SB & International Pwky	HCM 6th Signalized	400	-	350	-	-	-	-	-	#227	-	-	-	#350	36	-	-
	SR 429 NB & International Pwky	HCM 6th Signalized	-	500	400	-	-	-	-	-	-	37	#191	-	-	-	#248	86

– 95th percentile volume exceeds capacity (queues may be longer)

m – Volume for 95th percentile queue is metered by upstream signal

Table 4-29: Synchro 95th Percentile Available Storage Length and Queue Length (feet) – RFP Concept 2023 PM

Intersection		Methodology	Available Storage Length								Queue Length							
			EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
1	SR 46 & Center Rd	HCM 6th TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	SR 46 & Orange Blvd	HCM 6th Signalized	230	500	350	625	225	-	175	-	#124	-	#94	24	#135	-	93	-
3	SR 46 & N Oregon St	HCM 6th Signalized	350	275	275	275	150	135	225	165	#237	-	55	21	#113	0	#172	0
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	-	-	-	700	-	-	-	700	-	-	-	59	-	-	115	#389
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	650	-	-	-	250	160	-	-	#220	-	-	#340	#195	#231	-	-
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	700	650	575	250	450	-	200	-	284	83	#71	-	267	-	136	84
7	SR 46 & Rinehart Rd	HCM 6th Signalized	360	750	460	315	380	375	150	-	88	60	#204	0	#166	49	59	26
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	125	-	74	-	165	200	240	260	32	-	125	-	m33	m18	18	12
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	225	380	245	425	370	370	475	450	132	43	50	43	71	m51	#208	61
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	-	-	300	-	-	375	375	-	-	-	65	52	-	25	#170	-
11	CR 46A & Rinehart Rd	HCM 6th Signalized	500	450	400	300	500	300	400	800	#479	#741	#250	36	#636	#870	#312	72
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	660	-	-	-	550	650	-	-	#201	-	-	72	275	#687	-	-
13	CR 46A & I-4 WB Ramp/Colonial Center Pwky	HCM 2000 Signalized	225	500	660	300	500	475	350	-	102	#896	#470	39	#252	50	254	-
14	CR 46A & International Pwky	HCM 6th Signalized	450	400	800	500	350	280	545	-	161	-	#336	105	179	#364	#289	-
15	SR 429 SB & International Pwky	HCM 6th Signalized	200	-	-	-	-	-	-	-	135	-	-	-	-	-	-	-
	SR 429 NB & International Pwky	HCM 6th Signalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SR 417 On/Off Ramps & International Pwky	HCM 6th Signalized	-	-	250	150	-	250	250	-	-	-	216	35	-	36	84	-

– 95th percentile volume exceeds capacity (queues may be longer)

m – Volume for 95th percentile queue is metered by upstream signal

Table 4-30: Synchro 95th Percentile Available Storage Length and Queue Length (feet) – ATC #32 2023 PM

Intersection		Methodology	Available Storage Length								Queue Length							
			EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
1	SR 46 & Center Rd	HCM 6th TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	SR 46 & Orange Blvd	HCM 6th Signalized	230	500	350	625	225	-	175	-	#124	-	#94	24	#135	-	93	-
3	SR 46 & N Oregon St	HCM 6th Signalized	350	275	275	275	150	135	225	165	#237	-	55	21	#113	0	#172	0
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	-	-	-	700	-	-	-	700	-	-	-	59	-	-	115	#389
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	650	-	-	-	250	160	-	-	#220	-	-	#340	#195	#231	-	-
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	700	650	575	250	450	-	200	-	284	83	#71	-	267	-	136	84
7	SR 46 & Rinehart Rd	HCM 6th Signalized	360	750	460	315	380	375	150	-	88	60	#204	0	#166	49	59	26
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	125	-	74	-	165	200	240	260	32	-	125	-	m33	m18	18	12
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	225	380	245	425	370	370	475	450	132	43	50	43	71	m51	#208	61
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	-	-	300	-	-	375	375	-	-	-	65	52	-	25	#170	-
11	CR 46A & Rinehart Rd	HCM 6th Signalized	500	450	400	300	500	300	400	800	#479	#741	#250	36	#636	#870	#312	72
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	660	-	-	-	550	650	-	-	#201	-	-	72	275	#687	-	-
13	CR 46A & I-4 WB Ramp/Colonial Center Pwky	HCM 2000 Signalized	225	500	660	300	500	475	350	-	102	#896	#470	39	#252	50	254	-
14	CR 46A & International Pwky	HCM 6th Signalized	450	400	800	500	350	280	545	-	161	-	#336	105	179	#364	#289	-
15	SR 429 SB & International Pwky	HCM 6th Signalized	400	-	350	-	-	-	-	-	305	-	-	-	290	81	-	-
	SR 429 NB & International Pwky	HCM 6th Signalized	-	500	400	-	-	-	-	-	-	44	50	-	-	-	127	41

– 95th percentile volume exceeds capacity (queues may be longer)

m – Volume for 95th percentile queue is metered by upstream signal

Table 4-31: Synchro 95th Percentile Available Storage Length and Queue Length (feet) – RFP Concept 2043 AM

Intersection		Methodology	Available Storage Length								Queue Length							
			EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
1	SR 46 & Center Rd	HCM 6th TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	SR 46 & Orange Blvd	HCM 6th Signalized	230	500	350	625	225	-	175	-	131	-	#335	0	130	-	#293	-
3	SR 46 & N Oregon St	HCM 6th Signalized	350	275	275	275	150	135	225	165	143	-	m#158	m3	77	0	#610	87
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	-	-	-	700	-	-	-	700	-	-	-	m47	-	-	247	#1120
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	650	-	-	-	250	160	-	-	m#531	-	-	474	201	#496	-	-
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	700	650	575	250	450	-	200	-	m#489	m134	m46	-	95	-	221	88
7	SR 46 & Rinehart Rd	HCM 6th Signalized	360	750	460	315	380	375	150	-	175	61	251	0	202	176	#198	59
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	125	-	74	-	165	200	240	260	16	-	71	-	m10	m32	7	0
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	225	380	245	425	370	370	475	450	49	21	#263	78	m35	m137	187	0
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	-	-	300	-	-	375	375	-	-	-	#255	82	-	47	m#336	-
11	CR 46A & Rinehart Rd	HCM 6th Signalized	-	-	-	-	-	-	-	-	-	117	-	0	-	0	-	0
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CR 46A & I-4 WB Ramps	HCM 2000 Signalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	CR 46A & Colonial Center Pwky	HCM 6th Signalized	225	470	-	350	-	-	275	-	47	28	-	#127	-	-	41	0
14	CR 46A & International Pwky	HCM 6th Signalized	280	-	800	-	350	280	545	-	457	-	#1601	128	#228	34	#667	-
15	SR 429 On Ramp & International Pwky	HCM 6th Signalized	200	-	-	-	-	-	-	-	#448	-	-	-	-	-	-	-
	SR 429 Off Ramp & International Pwky	HCM 2000 Unsignalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SR 417 On/Off Ramps & International Pwky	HCM 6th Signalized	-	-	250	150	-	250	250	-	-	-	#1183	79	-	89	#1424	-

– 95th percentile volume exceeds capacity (queues may be longer)

m – Volume for 95th percentile queue is metered by upstream signal

Table 4-32: Synchro 95th Percentile Available Storage Length and Queue Length (feet) – ATC #32 2043 AM

Intersection		Methodology	Available Storage Length								Queue Length							
			EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
1	SR 46 & Center Rd	HCM 6th TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	SR 46 & Orange Blvd	HCM 6th Signalized	230	500	350	625	225	-	175	-	131	-	#335	0	130	-	#293	-
3	SR 46 & N Oregon St	HCM 6th Signalized	350	275	275	275	150	135	225	165	143	-	m#158	m3	77	0	#610	87
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	-	-	-	700	-	-	-	700	-	-	-	m47	-	-	247	#1120
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	650	-	-	-	250	160	-	-	m#531	-	-	474	201	#496	-	-
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	700	650	575	250	450	-	200	-	m#489	m134	m46	-	95	-	221	88
7	SR 46 & Rinehart Rd	HCM 6th Signalized	360	750	460	315	380	375	150	-	175	61	251	0	202	176	#198	59
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	125	-	74	-	165	200	240	260	16	-	71	-	m10	m32	7	0
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	225	380	245	425	370	370	475	450	49	21	#263	78	m35	m137	187	0
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	-	-	300	-	-	375	375	-	-	-	#255	82	-	47	m#336	-
11	CR 46A & Rinehart Rd	HCM 6th Signalized	-	-	-	-	-	-	-	-	-	117	-	0	-	0	-	0
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	CR 46A & I-4 WB Ramps	HCM 2000 Signalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CR 46A & Colonial Center Pkwy	HCM 6th Signalized	225	470	-	350	-	-	275	-	47	28	-	#127	-	-	41	0
14	CR 46A & International Pwky	HCM 6th Signalized	280	-	800	-	350	280	545	-	457	-	#1601	128	#228	34	#667	-
15	SR 429 SB & International Pwky	HCM 6th Signalized	400	-	350	-	-	-	-	-	m#581	-	-	-	#929	96	-	-
	SR 429 NB & International Pwky	HCM 6th Signalized	-	500	400	-	-	-	-	-	-	79	m315	-	-	-	#725	418

– 95th percentile volume exceeds capacity (queues may be longer)

m – Volume for 95th percentile queue is metered by upstream signal

Table 4-33: Synchro 95th Percentile Available Storage Length and Queue Length (feet) – RFP Concept 2043 PM

Intersection		Methodology	Available Storage Length								Queue Length							
			EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
1	SR 46 & Center Rd	HCM 6th TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	SR 46 & Orange Blvd	HCM 6th Signalized	230	500	350	625	225	-	175	-	#310	-	#256	58	275	-	184	-
3	SR 46 & N Oregon St	HCM 6th Signalized	350	275	275	275	150	135	225	165	319	-	m27	m28	164	13	#365	0
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	-	-	-	700	-	-	-	700	-	-	-	m0	-	-	308	#1007
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	650	-	-	-	250	160	-	-	445	-	-	m589	#468	189	-	-
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	700	650	575	250	450	-	200	-	m310	125	#188	-	#569	-	198	168
7	SR 46 & Rinehart Rd	HCM 6th Signalized	360	750	460	315	380	375	150	-	191	381	#431	0	267	339	#185	71
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	125	-	74	-	165	200	240	260	72	-	#330	-	m72	m14	33	0
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	225	380	245	425	370	370	475	450	#431	87	125	85	m138	m81	m#647	m154
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	-	-	300	-	-	375	375	-	-	-	171	106	-	61	#362	-
11	CR 46A & Rinehart Rd	HCM 6th Signalized	-	-	-	-	-	-	-	-	-	0	-	0	-	0	-	0
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	CR 46A & I-4 WB Ramp Off Ramp	HCM 2000 Signalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CR 46A & Colonial Center Pwky/I-4 WB On Ramp	HCM 6th Signalized	225	470	-	350	-	-	275	-	#183	686	-	185	-	-	263	0
14	CR 46A & International Pwky	HCM 6th Signalized	280	-	800	-	350	280	545	-	#1172	-	#964	#694	360	1016	#804	-
15	SR 429 On Ramp & International Pwky	HCM 6th Signalized	200	-	-	-	-	-	-	-	275	-	-	-	-	-	-	-
	SR 429 Off Ramp & International Pwky	HCM 2000 Unsignalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SR 417 On/Off Ramps & International Pwky	HCM 6th Signalized	-	-	250	150	-	250	250	-	-	-	#433	105	-	78	#370	-

– 95th percentile volume exceeds capacity (queues may be longer)

m – Volume for 95th percentile queue is metered by upstream signal

Table 4-34: Synchro 95th Percentile Available Storage Length and Queue Length (feet) – ATC #32 2043 PM

Intersection		Methodology	Available Storage Length								Queue Length							
			EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
1	SR 46 & Center Rd	HCM 6th TWSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	SR 46 & Orange Blvd	HCM 6th Signalized	230	500	350	625	225	-	175	-	#310	-	#256	58	275	-	184	-
3	SR 46 & N Oregon St	HCM 6th Signalized	350	275	275	275	150	135	225	165	319	-	m27	m28	164	13	#365	0
4	SR 46 & I-4 WB Ramps	HCM 6th Signalized	-	-	-	700	-	-	-	700	-	-	-	m0	-	-	308	#1007
5	SR 46 & I-4 EB Ramps	HCM 6th Signalized	650	-	-	-	250	160	-	-	445	-	-	m589	#468	189	-	-
6	SR 46 & Towne Center Blvd/ Hickman Dr	HCM 6th Signalized	700	650	575	250	450	-	200	-	m310	125	#188	-	#569	-	198	168
7	SR 46 & Rinehart Rd	HCM 6th Signalized	360	750	460	315	380	375	150	-	191	381	#431	0	267	339	#185	71
8	Rinehart Rd & Garnet Ln	HCM 6th Signalized	125	-	74	-	165	200	240	260	72	-	#330	-	m72	m14	33	0
9	Rinehart Rd & NB SR 417 Ramps	HCM 6th Signalized	225	380	245	425	370	370	475	450	#431	87	125	85	m138	m81	m#647	m154
10	Rinehart Rd & SB SR 417 Ramps	HCM 6th Signalized	-	-	300	-	-	375	375	-	-	-	171	106	-	61	#362	-
11	CR 46A & Rinehart Rd	HCM 6th Signalized	-	-	-	-	-	-	-	-	-	0	-	0	-	0	-	0
12	CR 46A & I-4 EB Ramps	HCM 6th Signalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	CR 46A & I-4 WB Ramps	HCM 2000 Signalized	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CR 46A & Colonial Center Pkwy	HCM 6th Signalized	225	470	-	350	-	-	275	-	#183	686	-	185	-	-	263	0
14	CR 46A & International Pwky	HCM 6th Signalized	280	-	800	-	350	280	545	-	#1172	-	#964	#694	360	1016	#804	-
15	SR 429 SB & International Pwky	HCM 6th Signalized	400	-	350	-	-	-	-	-	#774	-	-	-	427	#782	-	-
	SR 429 NB & International Pwky	HCM 6th Signalized	-	500	400	-	-	-	-	-	-	101	m131	-	-	-	471	147

– 95th percentile volume exceeds capacity (queues may be longer)

m – Volume for 95th percentile queue is metered by upstream signal

4.3 VISSIM Analysis

4.3.1 LOS Criteria and Methodology

VISSIM is a traffic microsimulation software package used in operational analysis to obtain LOS results based on simulations. A major advantage of applying VISSIM microsimulation to the network is to perform an integrated analysis which incorporates the operation of the mainline, ramps, and traffic signals, and their interaction with each other. The HCM method was performed on segments in isolated condition, while VISSIM allows the analysis of the network as a whole.

The Wekiva Parkway (SR 429) network was created using PTV VISSIM (version 7.00-16) and PTV VISUM (version 18.02-08). The network was analyzed for the year 2043. **Figure 4-37** shows the VISSIM network on the AOI.

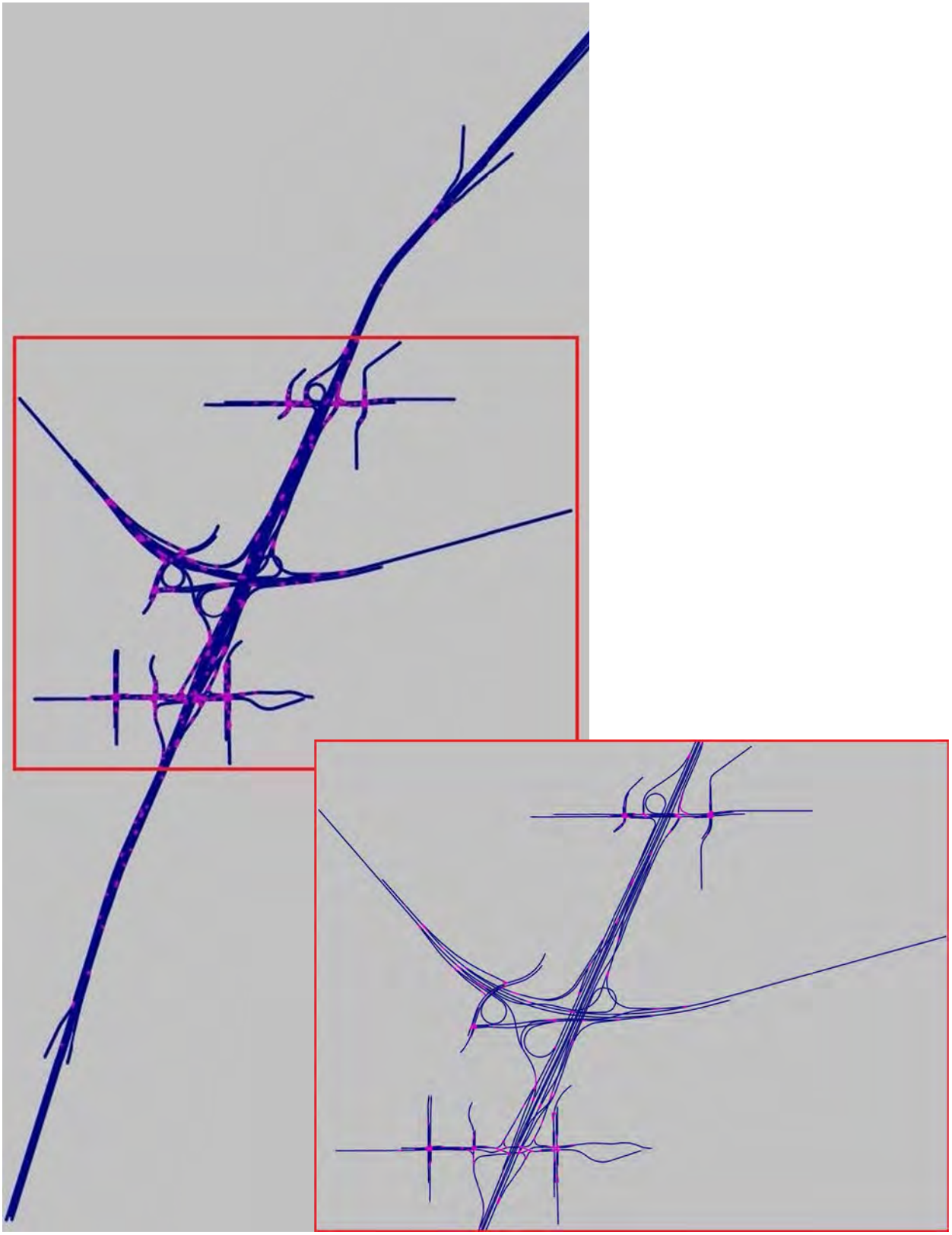


Figure 4-37: VISSIM Network

4.3.2 Model Development for Analysis

4.3.2.1 RFP VISSIM Model Development

The model for the RFP Concept was extracted from 2040 I-4 BtU VISSIM model. Most parameters from the original BtU VISSIM model were maintained for consistency. Other network objects were modified as specified in the MLOU and corresponding drawings.

The simulation covered a total duration of 1.5 hours in the AM period and 1.5 hours in the PM period – 0.5 hour seeding and 1-hour peak period.

A. *Roadway Geometry*

Most links within the study area were preserved. The links and connectors out of the study area were deleted. The links used by the vehicles to enter/exit the study network were extended to up to one half-mile in either direction of the proposed access change for warm-up.

The roadway geometry was adjusted in accordance with the RFP Concept figure produced by FDOT for Public Meetings. The intersection of International Parkway at SR 429 was set to match the existing conditions, which is different from the 2040 BtU network for this intersection.

B. *Signal Timing*

The Synchro files were imported to the RFP VISSIM model to generate corresponding signal timing files (.rbc file) as signal controllers.

Since the Synchro analysis does not include the Rinehart Road SB and NB U-turns, the signal timing settings for these two locations were calibrated to adapt to the traffic on CR 46A. In the AM peak hour, the signal timing settings were maintained the same as the 2040 BtU VISSIM network. In the PM peak hour, the signal timing settings were modified to adapt to the heavy traffic flow on CR 46A.

C. *Traffic Volumes*

The 15-minute volume distribution percentage from the original 2040 BtU VISSIM models was used. The 2043 balanced DDHV and turning movements were used for the OD route development and vehicle input development for the 2043 RFP VISSIM network.

D. *Truck Factors*

The 2043 VISSIM models used the truck percentage at the entry link for each roadway as stated in the MLOU. If the truck factor of a roadway was not listed in the MLOU, the truck factor of its closest roadway was used. For example, the entry link of SR 429 used the truck percentage factor of SR 417, which is 7.8%.

E. *Origin-Destination (OD) Routes*

Both General Purpose Lanes (GPL) and Express Lanes (EL) in the original 2040 BtU VISSIM network could not be preserved since the corresponding links outside the study area were deleted. VISUM 18 was used to develop the new static OD routes within the study area. The steps are as follows:

1) Create nodes at the entrances, exits and intersections in the VISSIM network for the study area extracted from the 2040 BtU VISSIM network and export the network to VISUM.
2) Build the OD matrix in VISUM. Generate the skim matrix and manually edited to create the initial seed matrix for the Origin-Destination Matrix Estimation (ODME) process.
3) Add the 2043 balanced directional design hour volume (DDHV) and turning movements to each link and intersection.
4) Run ODME assignment and demand matrix correction in VISUM. This process will balance the OD matrix and assign volume to match the 2043 DDHV and turning movements on each link and node. The result will converge within several runs. The OD routes will be generated in VISUM. **Figure 4-38** shows how the volumes match the counts.
5) Export the OD routes to VISSIM and make necessary adjustments.

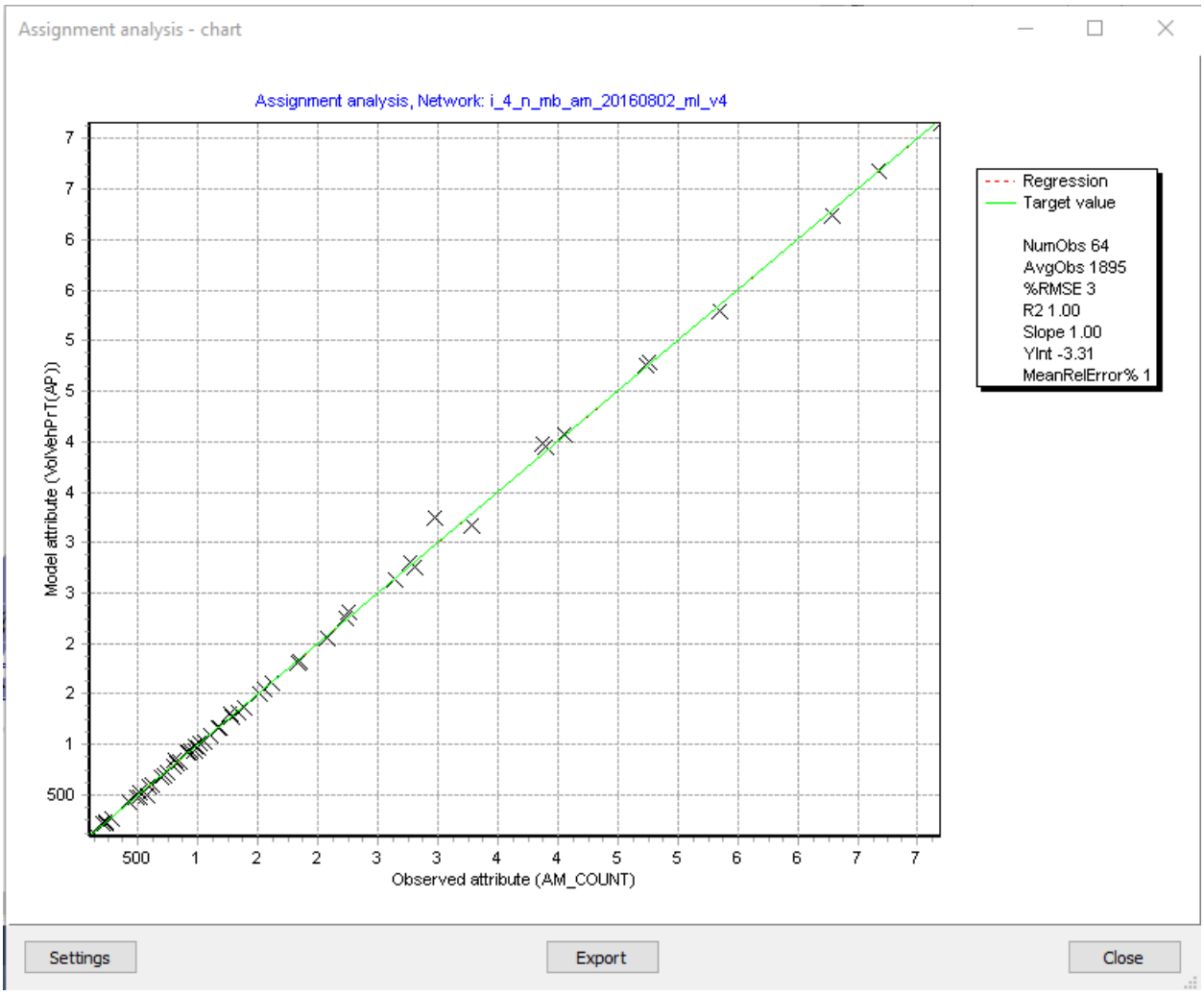


Figure 4-38: Assignment Analysis

F. *Express Lane Facilities*

In the 2043 RFP VISSIM network, the static routes and pre-determined express lane traffic were used. The traffic split of the GPL and EL were determined by the DDHVs as shown in **Section 3.7**.

4.3.2.2 ATC #32 VISSIM Model Development

A. *Roadway Geometry*

The roadway geometry for ATC #32 was modified from the RFP Concept model based on the concept and configuration of ATC #32.

B. *Signal Timing*

For the intersections on SR 46 and CR 46A, the Synchro files were imported to the ATC VISSIM model to generate corresponding signal timing files (.rbc file) as signal controllers.

For Rinehart Rd Southbound and Northbound U-turns, the signal timing settings in 2043 ATC VISSIM models kept the same as 2043 RFP VISSIM models.

For the new intersections on SR 429 and International Parkway, the corresponding ATC Synchro files were imported into the 2043 ATC VISSIM model to generate corresponding signal timing *.rbc files as signal controllers. To achieve the coordination of the two intersections (SR 429 NB at International Parkway and SR 429 SB at International Parkway), the signal timing settings were manually adjusted when imported into VISSIM.

C. *Traffic Routes*

The OD routes in 2043 RFP VISSIM models were used as a starting point for the 2043 ATC VISSIM network. The OD routes were modified properly to be consistent with the geometry changes in ATC #32.

D. *Vehicle Input Volumes*

The same vehicle input volumes from the 2043 RFP VISSIM models were used for the 2043 ATC VISSIM models.

E. *Other Network Object Parameters*

For locations with unmodified geometry, the settings in 2043 ATC VISSIM models were kept the same as the 2043 RFP VISSIM models. For locations with modified geometry which cannot be compared between RFP and ATC, the settings for similar movements or geometry were used as references, including desired speed decisions, lane change distance, reduced speed area, etc. For example, the loop ramp in the 2043 ATC design referred to the loop ramp settings in 2043 RFP design for desired speed decisions.

4.3.3 VISSIM Results and Comparison for RFP Concept and ATC #32

All VISSIM simulation outputs were based on the average data from 12 simulation runs which were conducted using VISSIM version 7.00-16. Consistent with the approved MLOU, the MOEs that were assessed from the simulation analysis included the following items:

- Network-wide Performance – Total Travel Time, Total Delay Time, Average Delay Time, Latent Delay Time, Number of Arrived Vehicles, Latent Vehicles, Average Speed
- Freeway Link Evaluation Results – Speed and Volume
- Intersection Node Evaluation Results – Delay
- Data Collection Points Speed – Speed

The microsimulation result summary and analysis focused on the operations along I-4 mainline segments and future Wekiva Parkway segments. All summary files are included in **Appendix E**.

4.3.3.1 Network-wide Performance

The network-wide output summarized in **Table 4-35** and **Table 4-36** provides additional insight for the VISSIM models. The statistics in **Table 4-35** show that the 2043 ATC AM VISSIM model is performing better than the 2043 RFP AM VISSIM model with differences at 1% and 2%. The

statistics in **Table 4-36** show that the 2043 ATC PM VISSIM model is performing at the same level as the 2043 RFP PM VISSIM model.

Table 4-35: 2043 AM Network Wide Summary

Parameter	RFP AM Peak Hour	ATC AM Peak Hour	% Change
Total Travel Time (hr)	4,100	4,067	-1%
Total Delay Time (hr)	1,184	1,158	-2%
Average Delay Time (sec/veh)	90	88	-2%
Latent Delay Time (hr)	1	1	0%
Number of Arrived Vehicles	43,070	43,070	0%
Percentage of Latent Vehicles	0%	0%	0%
Total Delay + Latent Delay (hr)	1,185	1,159	-2%
Average Speed (miles/hr)	43	43	0%

Table 4-36: 2043 PM Network Wide Summary

Parameter	RFP PM Peak Hour	ATC PM Peak Hour	% Change
Total Travel Time (hr)	4,672	4,675	0%
Total Delay Time (hr)	1,619	1,624	0%
Average Delay Time (sec/veh)	115	115	0%
Latent Delay Time (hr)	654	657	0%
Number of Arrived Vehicles	46,015	46,017	0%
Percentage of Latent Vehicles	3%	3%	0%
Total Delay + Latent Delay (hr)	2,272	2,282	0%
Average Speed (miles/hr)	39	39	0%

4.3.3.2 Freeway Operation Profile

The average speed and volume profiles along the I-4 corridor for the RFP Concept and ATC #32 are shown in **Figure 4-39** through **Figure 4-54**.

The AM peak hour is summarized in **Figure 4-39** through **Figure 4-46** for both I-4 eastbound and westbound. For most freeway segments, the RFP Concept and the ATC #32 show the same level of performance.

The PM peak hour is summarized in **Figure 4-47** through **Figure 4-54** for both I-4 EB and WB directions. While the PM peak hour has more demand than AM peak hour, the operation profiles show similar characteristics. With higher traffic volumes in PM peak hour, the congested I-4 EB segment between Lake Mary Blvd and CR 46A shows lower speed as compared to AM peak hour.

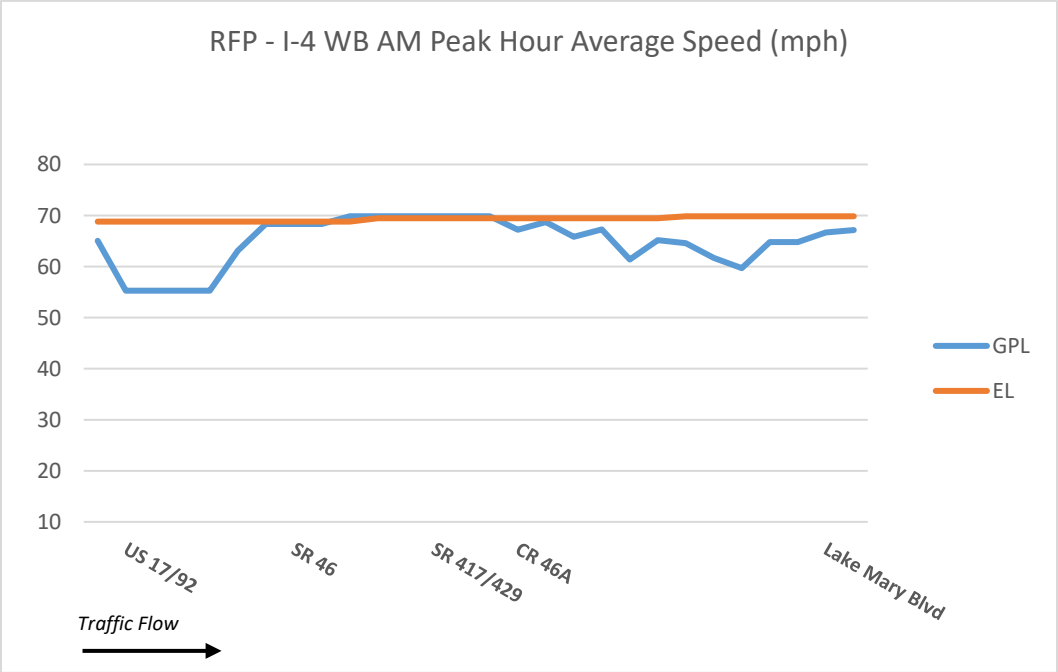


Figure 4-39: 2043 Westbound Average Speed AM Peak Hour – RFP

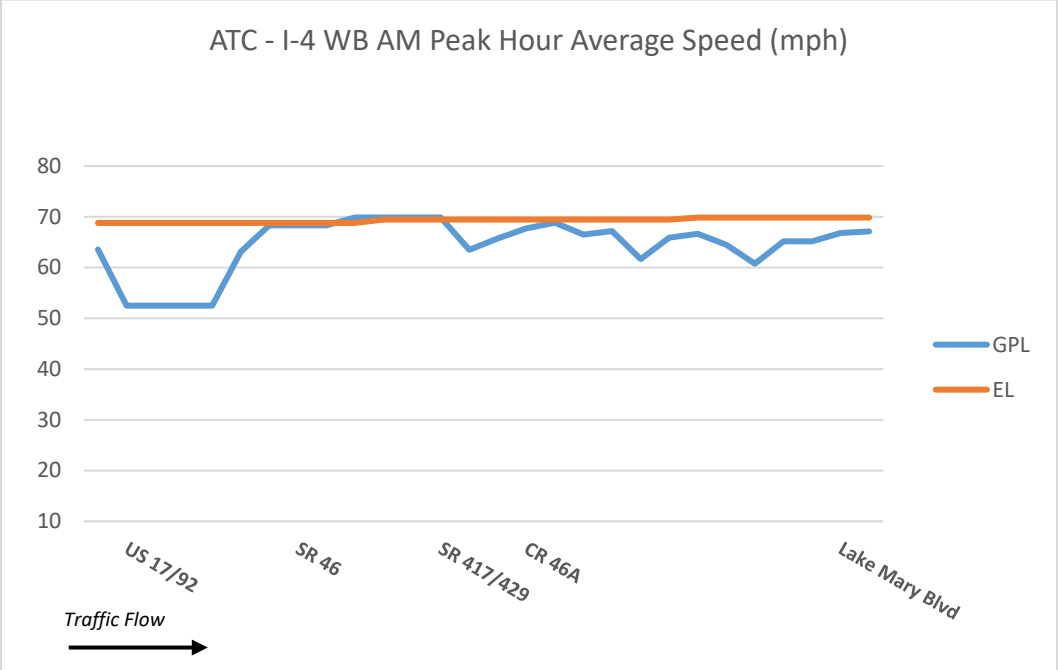


Figure 4-40: 2043 Westbound Average Speed AM Peak Hour - ATC #32

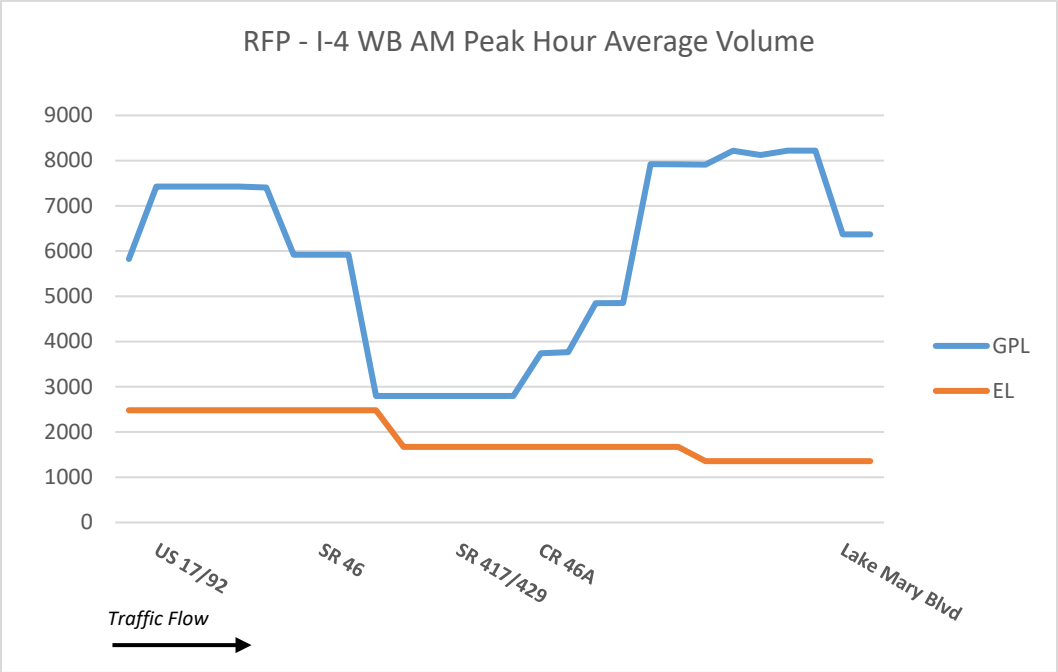


Figure 4-41: 2043 Westbound Average Volume AM Peak Hour – RFP

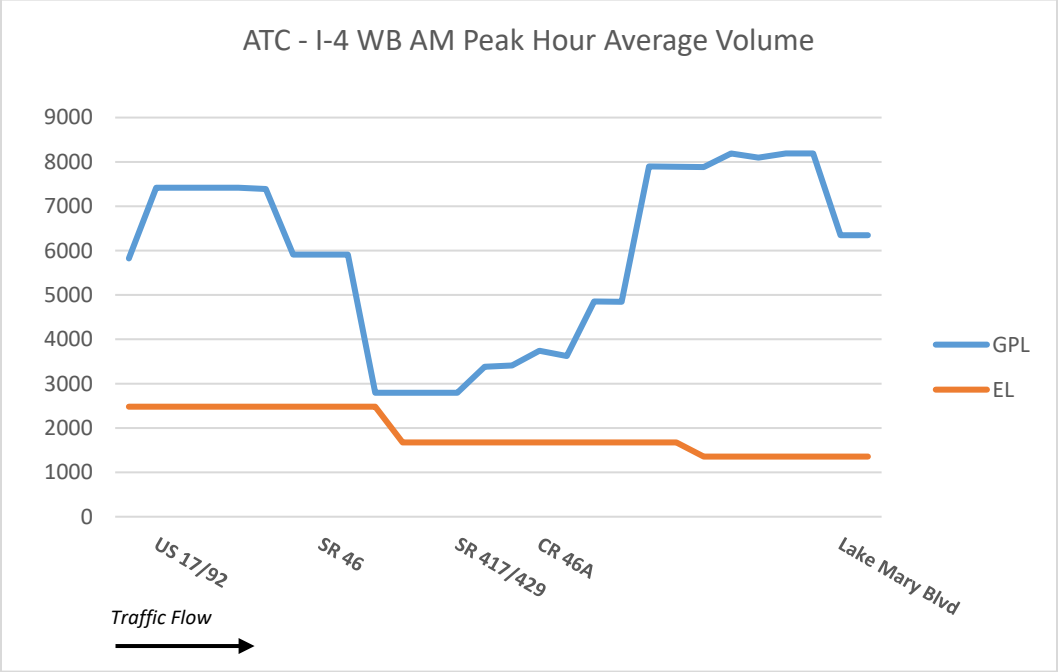


Figure 4-42: 2043 Westbound Average Volume AM Peak Hour - ATC #32

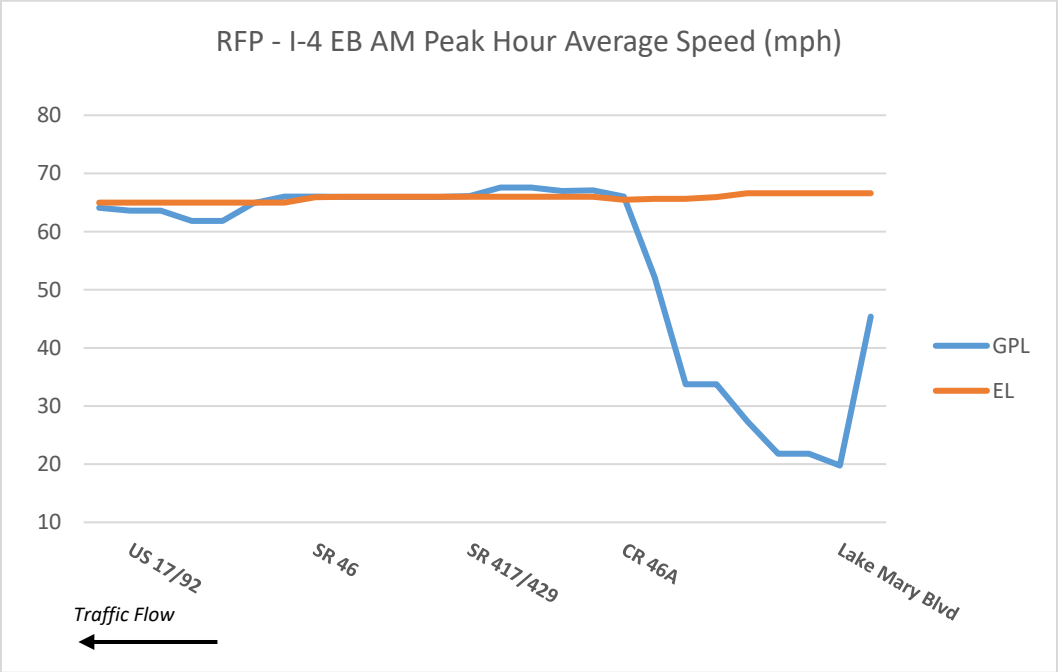


Figure 4-43: 2043 Eastbound Average Speed AM Peak Hour – RFP

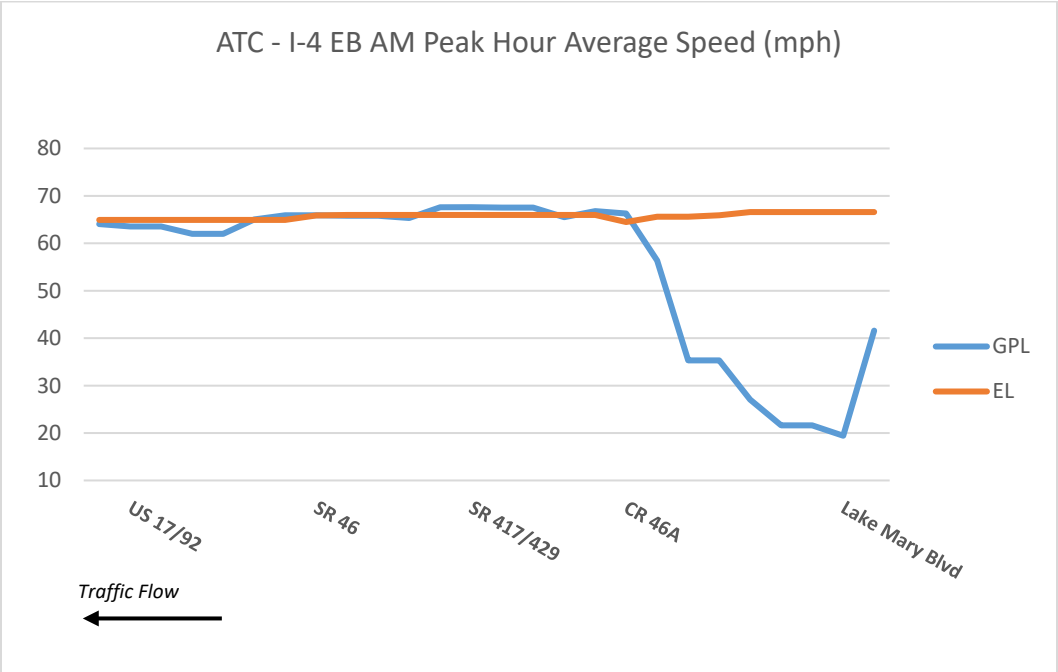


Figure 4-44: 2043 Eastbound Average Speed AM Peak Hour - ATC #32

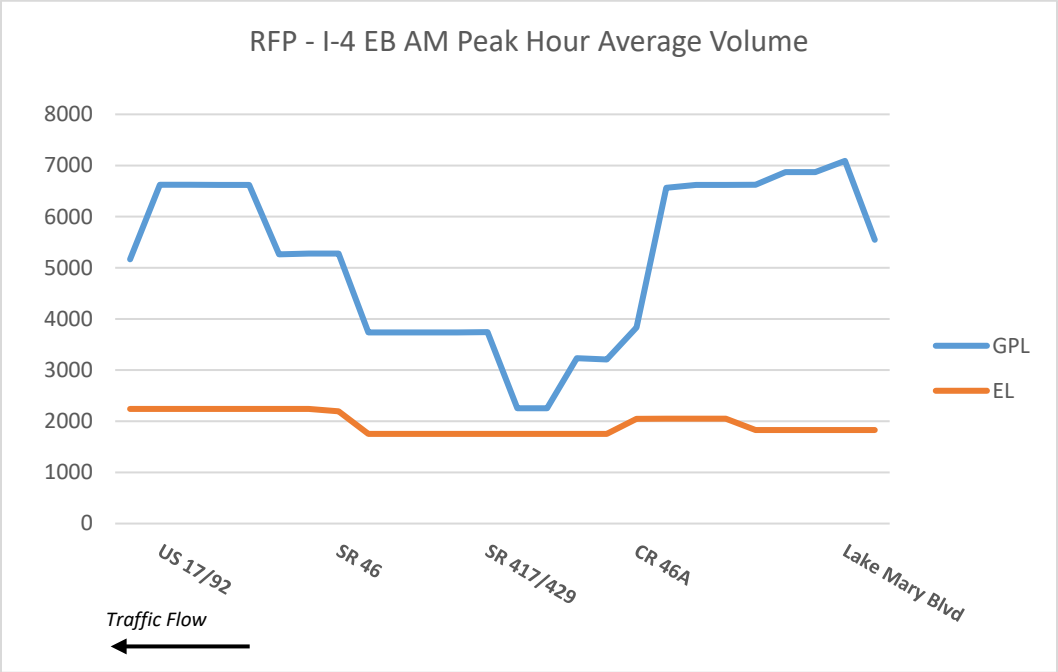


Figure 4-45: 2043 Eastbound Average Volume AM Peak Hour – RFP

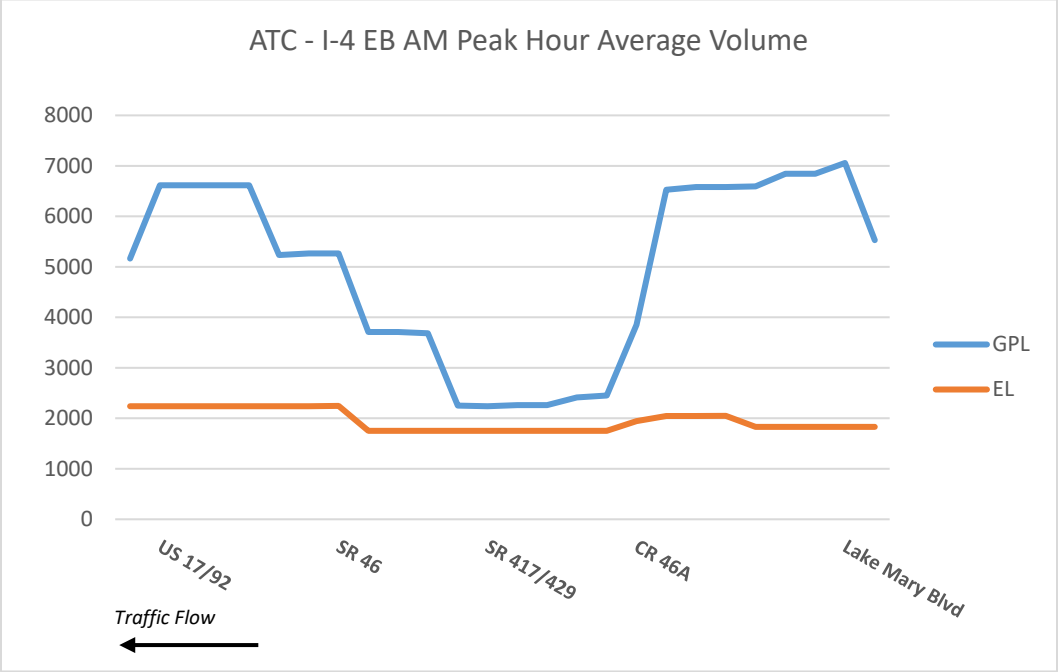


Figure 4-46: 2043 Eastbound Average Volume AM Peak Hour - ATC #32

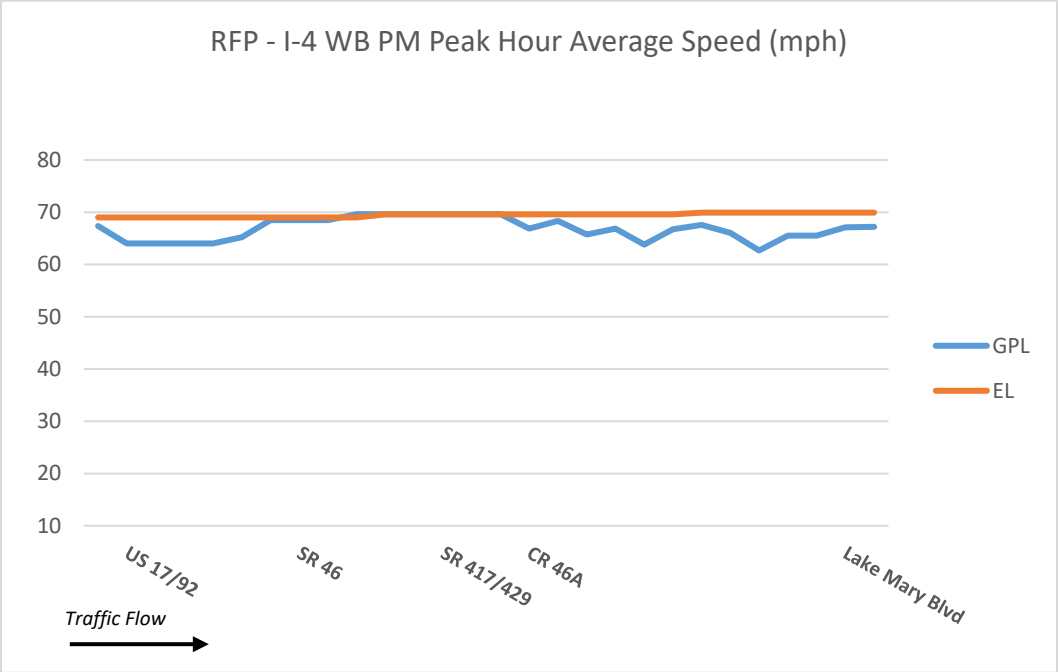


Figure 4-47: 2043 Westbound Average Speed PM Peak Hour – RFP

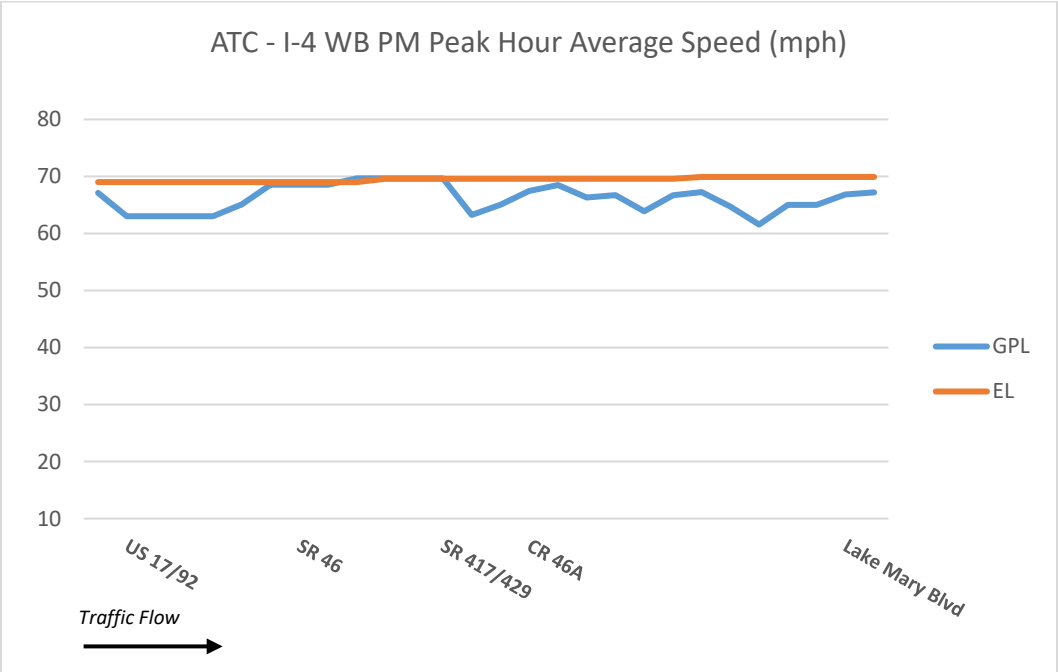


Figure 4-48: 2043 Westbound Average Speed PM Peak Hour - ATC #32

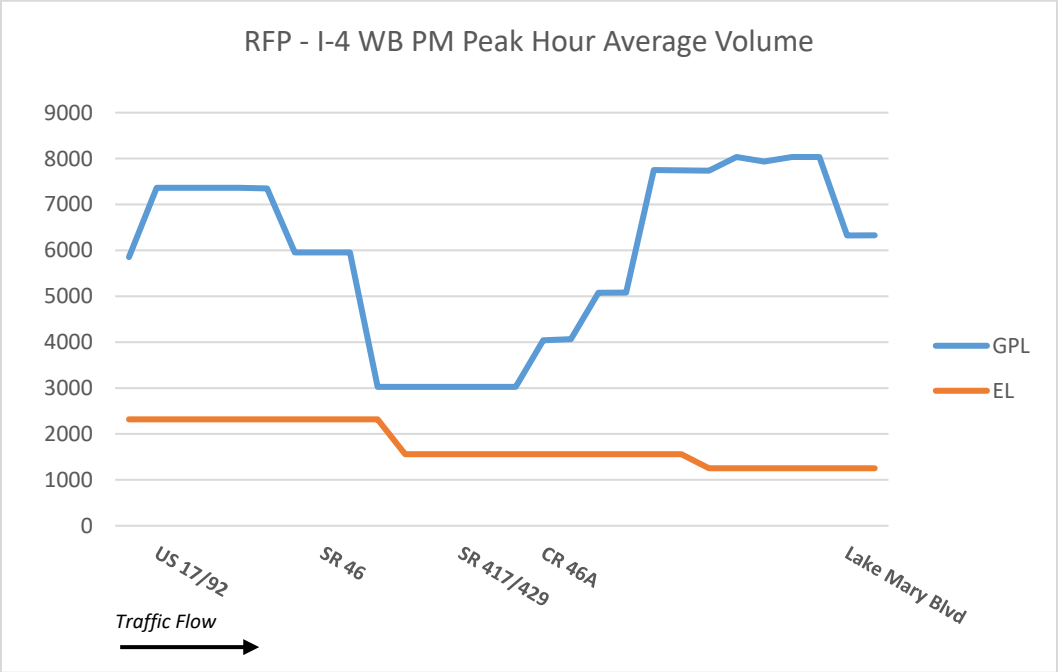


Figure 4-49: 2043 Westbound Average Volume PM Peak Hour – RFP

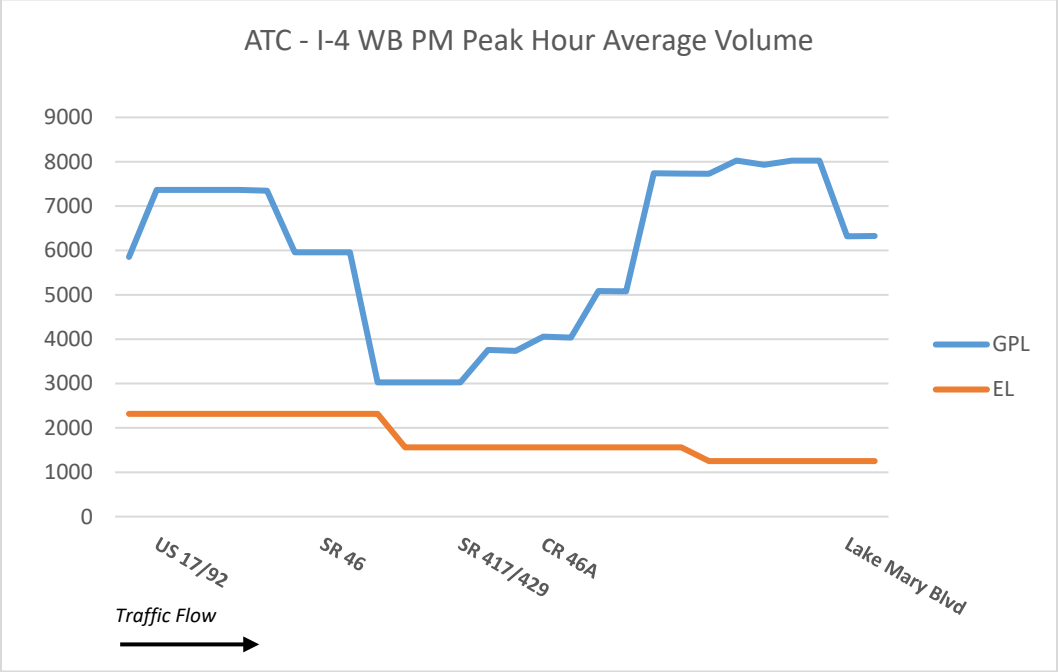


Figure 4-50: 2043 Westbound Average Volume PM Peak Hour - ATC #32

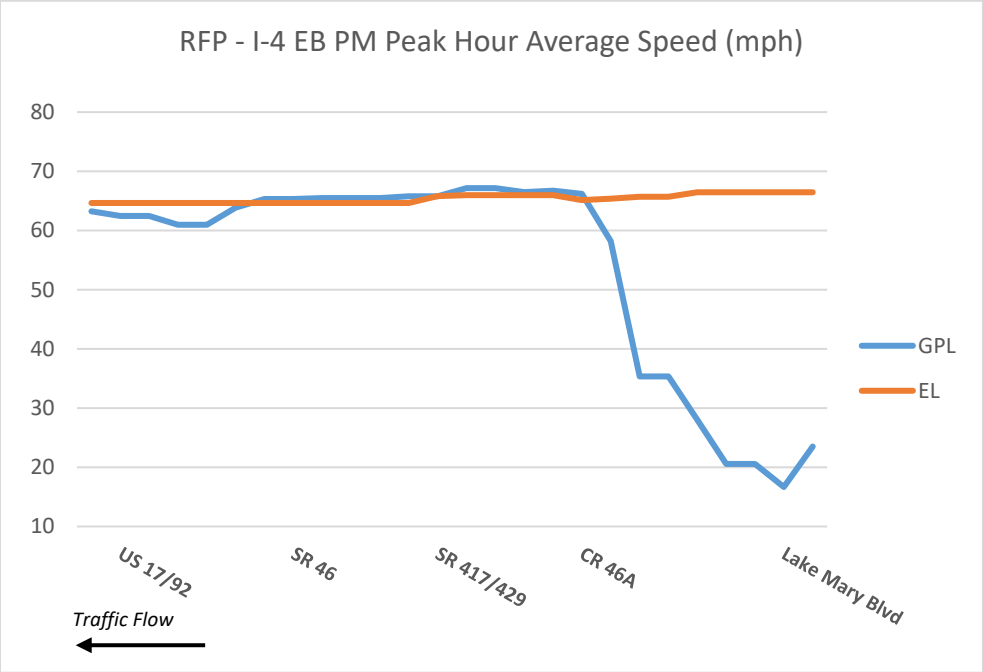


Figure 4-51: 043 Eastbound Average Speed PM Peak Hour – RFP

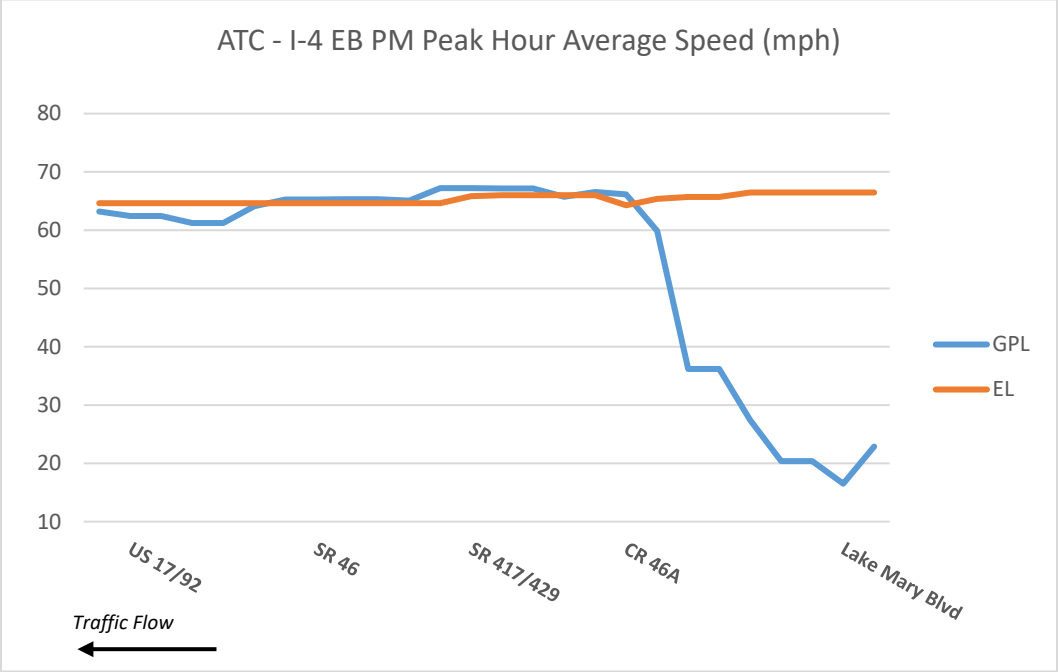


Figure 4-52: 2043 Eastbound Average Speed PM Peak Hour - ATC #32

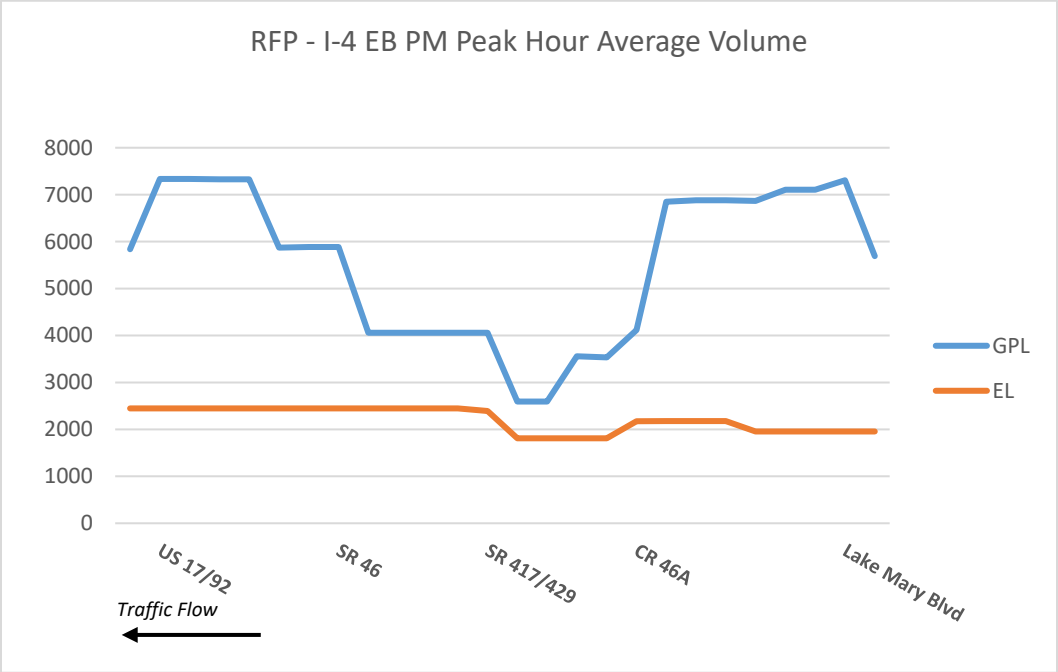


Figure 4-53: 2043 Eastbound Average Volume PM Peak Hour – RFP

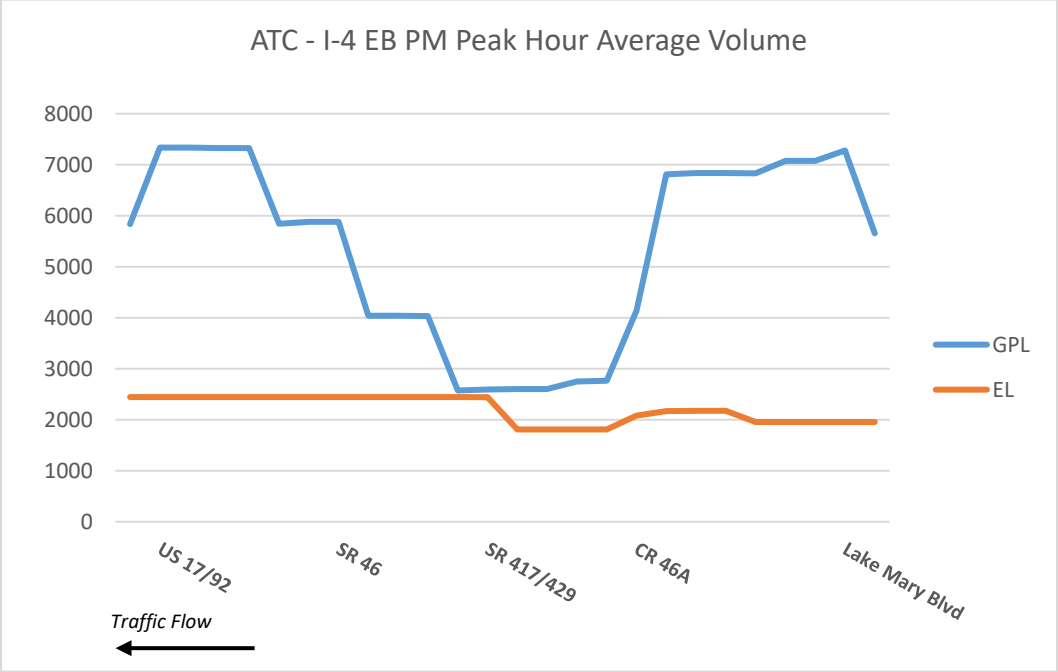


Figure 4-54: 2043 Eastbound Average Volume PM Peak Hour - ATC #32

4.3.3.3 Intersection Node Evaluation Results

The VISSIM simulation also analyzed the intersection performance for delay. There were 11 intersections analyzed in both 2043 RFP and ATC VISSIM models. For most of the intersections, the 2043 ATC VISSIM models maintain similar intersection performance compared to the RFP models. The intersection geometry at International Parkway and SR 429 was modified in ATC #32, so the summarized results for International Parkway intersections in **Table 4-37** and **Table 4-38** are not completely comparable. A detailed summary for each intersection is included in **Appendix E**.

The intersection node analysis indicates that the following intersections in ATC #32 improved compared to the RFP Concept.

- During AM peak hour:
  - Three intersections at SR 46 interchange in ATC #32 have less delay time than those in RFP Concept.
  - Four intersections at CR 46A interchange in ATC #32 have less delay time than those in RFP Concept.
- During PM peak hour:
  - Two intersections at SR 46 interchange in ATC #32 have less delay time than those in RFP Concept.
  - Four intersections at CR 46A interchange in ATC #32 have less delay time than those in RFP Concept.

Table 4-37: RFP VISSIM Model Node Summary

Primary Road	Secondary Road	VISSIM			
		AM Peak		PM Peak	
		Delay	Estimated LOS	Delay	Estimated LOS
SR 46	Oregon St	35.78	D	21.31	C
	I-4 WB Ramps	24.57	C	21.12	C
	I-4 EB Ramps	23.85	C	23.06	C
	Towne Center Blvd	26.48	C	33.10	C
CR 46A	International Pkwy	84.23	F	102.43	F
	I-4 WB On-ramp	28.71	C	39.32	D
	I-4 WB Off-ramp	33.00	C	38.58	D
	I-4 EB Ramps	25.47	C	33.47	C
	Rinehart Rd	52.02	D	83.56	F
International Pkwy	SR 429 Ramps	10.94	B	6.98	A
	SR 417 Ramps	53.23	D	22.38	C

Table 4-38: ATC VISSIM Model Node Summary

Primary Road	Secondary Road	VISSIM			
		AM Peak		PM Peak	
		Delay	Estimated LOS	Delay	Estimated LOS
SR 46	Oregon St	38.20	D	21.10	C
	I-4 WB Ramps	19.21	B	20.94	C
	I-4 EB Ramps	23.05	C	22.95	C
	Towne Center Blvd	26.27	C	33.23	C
CR 46A	International Pkwy	84.02	F	101.66	F
	I-4 WB On-ramp	28.44	C	39.60	D
	I-4 WB Off-ramp	32.87	C	34.38	C
	I-4 EB Ramps	24.09	C	31.88	C
	Rinehart Rd	52.50	D	83.07	F
International Pkwy	SR 429 SB Ramps	18.71	B	10.90	B
	SR 429 NB Ramps	16.51	B	17.50	B

4.3.3.4 Data Collection Points Heat Diagram

The data collection point speeds are summarized in **Table 4-39** and **Table 4-40**. All data collection points show similar travel speed in the RFP Concept and the ATC #32. The data collection point speed analysis indicates that most freeway segments operate with speeds greater than 60 mph.

For I-4 WB west of SR 417 / SR 429, the traffic operates with speed approximately 65 mph in the ATC #32 and approximately 70 mph in the RFP Concept. The speed change in the ATC #32 was expected due to the access location change and shortened length of weaving segments.

Table 4-39: RFP Data Collection Points Summary

Location	GP VISSIM ID	EL VISSIM ID		RFP																	
				GP Average Speed (mph)										EL Average Speed (mph)									
				AM					PM					AM					PM				
				0-15min	15-30min	30-45min	45-60min	AM Peak Hour	0-15min	15-30min	30-45min	45-60min	PM Peak Hour	0-15min	15-30min	30-45min	45-60min	AM Peak Hour	0-15min	15-30min	30-45min	45-60min	PM Peak Hour
I-4 Eastbound																							
1-4 EB West of US 17/92	19	40	Traffic Flow Direction	64.69	63.98	64.19	64.09	64.23	63.67	63.18	63.02	63.46	63.33	65.64	65.11	65.44	65.58	65.43	65.44	64.75	65.17	64.98	65.07
1-4 EB East of SR 46	18	39		63.99	63.02	63.25	63.52	63.43	63.88	62.94	63.04	62.88	63.18	66.01	65.42	65.67	65.87	65.73	65.77	65.28	65.56	65.43	65.50
1-4 EB West of SR 46	17	38		66.86	66.61	66.61	66.70	66.69	66.35	66.12	66.16	66.02	66.16	66.77	66.61	66.70	66.90	66.74	66.85	66.58	66.71	66.63	66.69
1-4 EB East of SR 417(429)	16	37		66.69	66.39	66.53	66.48	66.52	66.23	65.98	66.04	66.01	66.06	66.30	66.28	66.26	66.56	66.35	66.72	66.28	66.17	66.35	66.38
1-4 EB West of SR 417(429)	44	43		68.19	68.23	68.24	68.10	68.19	67.80	67.73	67.71	67.67	67.73	66.51	66.57	66.45	66.85	66.59	66.70	66.49	66.40	66.52	66.53
1-4 EB East of CR 46A	15	36		68.01	68.11	68.04	67.92	68.02	67.70	67.62	67.55	67.43	67.58	66.59	66.74	66.62	67.01	66.74	66.86	66.57	66.53	66.76	66.68
1-4 EB West of CR 46A	14	34		61.32	60.00	60.30	56.23	59.47	61.12	60.69	60.86	60.57	60.81	66.20	65.95	65.98	66.40	66.13	66.09	65.65	65.53	66.02	65.82
1-4 EB East of Lake Mary Blvd	13	32		64.70	52.88	25.82	26.14	42.88	60.37	27.63	26.46	26.06	35.82	66.62	66.44	66.51	66.75	66.58	66.62	66.26	66.26	66.73	66.46
I-4 Westbound																							
1-4 WB West of US 17/92	1	23	Traffic Flow Direction	66.26	63.07	57.89	60.91	62.03	66.75	65.94	66.33	67.24	66.55	68.97	68.72	68.87	69.07	68.90	69.14	68.99	69.00	69.22	69.08
1-4 WB East of SR 46	2	24		62.83	56.87	54.25	61.99	58.90	65.74	62.53	63.03	66.04	64.28	68.69	68.57	68.55	68.89	68.67	68.99	68.83	68.88	69.09	68.94
1-4 WB West of SR 46	3	25		68.79	68.57	68.52	68.85	68.68	68.94	68.64	68.58	68.96	68.77	68.71	68.31	68.46	68.67	68.53	68.93	68.60	68.81	68.89	68.80
1-4 WB East of SR 417(429)	4	26		69.92	69.80	69.78	69.90	69.85	69.82	69.55	69.61	69.95	69.73	68.20	67.76	68.09	68.20	68.06	68.57	68.21	68.41	68.56	68.43
1-4 WB West of SR 417(429)	42	27		70.09	70.04	70.15	70.18	70.11	69.91	69.73	69.75	69.99	69.84	69.91	69.59	69.72	69.70	69.73	70.04	69.68	69.91	69.99	69.90
1-4 WB East of CR 46A	5	45		66.59	66.60	66.53	66.62	66.58	66.55	66.15	66.37	66.45	66.37	69.89	69.48	69.74	69.64	69.68	69.95	69.57	69.82	69.87	69.80
1-4 WB West of CR 46A	7	28		61.96	60.52	60.38	62.22	61.24	63.29	63.71	62.77	64.12	63.47	69.65	69.29	69.54	69.45	69.48	69.70	69.35	69.47	69.60	69.52
1-4 WB East of Lake Mary Blvd	8	30		67.51	66.26	66.41	66.51	66.65	67.51	66.60	66.85	67.20	67.03	70.30	69.97	70.20	69.99	70.11	70.15	69.96	70.27	70.27	70.16

Table 4-40: ATC Data Collection Points Summary

Location	GP VISSIM ID	EL VISSIM ID		ATC																			
				GP Average Speed (mph)										EL Average Speed (mph)									
				AM					PM					AM					PM				
				0-15min	15-30min	30-45min	45-60min	AM Peak Hour	0-15min	15-30min	30-45min	45-60min	PM Peak Hour	0-15min	15-30min	30-45min	45-60min	AM Peak Hour	0-15min	15-30min	30-45min	45-60min	PM Peak Hour
I-4 Eastbound																							
1-4 EB West of US 17/92	22	42	Traffic Flow Direction	64.81	63.90	64.30	64.14	64.28	63.70	63.23	62.73	63.35	63.24	65.73	65.23	65.32	65.52	65.44	65.30	64.73	65.12	65.06	65.04
1-4 EB East of SR 46	21	41		64.00	63.41	63.47	63.30	63.54	63.66	62.92	62.90	62.92	63.09	65.83	65.38	65.56	65.88	65.65	65.75	65.14	65.69	65.46	65.50
1-4 EB West of SR 46	20	40		66.56	66.34	66.44	66.28	66.40	66.03	65.71	65.69	65.75	65.79	66.68	66.48	66.61	66.75	66.63	66.67	66.54	66.55	66.57	66.58
1-4 EB East of SR 417(429)	19	43		66.31	66.03	66.08	66.05	66.11	65.77	65.67	65.29	65.62	65.58	66.29	66.21	66.14	66.39	66.26	66.51	66.22	66.30	66.34	66.34
1-4 EB West of SR 417(429)	45	44		68.04	68.23	68.12	68.26	68.16	67.76	67.64	67.72	67.67	67.70	66.62	66.52	66.45	66.84	66.60	66.62	66.48	66.45	66.62	66.54
1-4 EB East of CR 46A	17	38		67.49	67.38	67.39	67.54	67.45	67.32	67.11	67.28	67.22	67.23	66.62	66.96	66.60	66.90	66.77	66.81	66.54	66.65	66.87	66.71
1-4 EB West of CR 46A	16	36		62.95	62.39	62.38	60.42	62.04	63.03	62.36	62.26	62.46	62.53	66.23	65.75	65.91	66.40	66.06	65.87	65.56	65.56	66.09	65.76
1-4 EB East of Lake Mary Blvd	15	34		64.67	49.94	26.56	25.68	42.15	59.66	25.89	25.64	26.06	34.98	66.60	66.41	66.56	66.81	66.59	66.62	66.28	66.31	66.68	66.47
I-4 Westbound																							
1-4 WB West of US 17/92	2	25	Traffic Flow Direction	66.11	61.97	51.77	54.95	58.74	66.70	64.08	65.26	67.29	65.79	68.97	68.73	68.88	69.07	68.91	69.15	69.02	69.04	69.26	69.11
1-4 WB East of SR 46	3	26		63.43	56.06	56.51	61.54	59.31	65.61	61.89	63.70	66.08	64.26	68.70	68.63	68.60	68.91	68.71	69.02	68.81	68.91	69.13	68.96
1-4 WB West of SR 46	4	27		68.88	68.57	68.43	68.86	68.68	68.97	68.67	68.67	69.04	68.83	68.69	68.34	68.54	68.79	68.58	68.89	68.65	68.85	68.93	68.83
1-4 WB East of SR 417(429)	5	28		70.04	70.02	69.87	70.05	69.99	69.91	69.77	69.77	69.95	69.85	67.21	66.59	67.31	67.75	67.20	67.91	67.06	67.10	67.65	67.42
1-4 WB West of SR 417(429)	6	29		65.81	65.73	65.48	66.00	65.75	65.62	64.95	65.67	65.58	65.45	69.88	69.66	69.74	69.73	69.75	70.05	69.68	69.90	70.03	69.91
1-4 WB East of CR 46A	7	46		68.63	68.47	68.40	68.65	68.54	68.35	68.00	68.14	68.46	68.23	69.85	69.52	69.72	69.65	69.68	69.95	69.53	69.83	69.83	69.78
1-4 WB West of CR 46A	9	30		62.25	61.14	60.81	62.73	61.71	63.99	63.99	62.77	64.90	63.89	69.64	69.24	69.54	69.45	69.46	69.77	69.33	69.59	69.58	69.56
1-4 WB East of Lake Mary Blvd	10	32		67.27	66.34	66.54	67.42	66.87	67.41	66.22	66.29	67.12	66.74	70.32	69.98	70.27	70.03	70.15	70.15	69.98	70.17	70.24	70.13

4.3.3.5 Freeway and Intersection LOS

The following figures combined the LOS for freeways and intersections discussed in the previous sections to provide an overall view of the performance for 2043 RFP and ATC #32 scenarios. Areas performing at LOS D or better are marked in green, LOS E in yellow, and LOS F in red. **Figure 4-55** and **Figure 4-56** show that most segments and intersections in ATC #32 are maintaining the same LOS as RFP. The details are summarized in the link evaluation diagrams in **Appendix E**.

For the AM, most segments on I-4 have the same LOS in both RFP and ATC #32. For SR 417 northbound (SR 429 southbound), both RFP and ATC #32 are operating at similar LOS. Most SR 417 southbound (SR 429 northbound) segments in ATC #32 maintained the LOS at D or better. Westbound I-4 from US 17/92 to SR 46 performs better in the RFP Concept (LOS D) than ATC #32 (LOS E). However, this segment has a density of 35.3 and only exceeded the LOS D threshold by 0.3 pc/mi/ln.

For the PM, most segments on I-4 have the same LOS in both scenarios. For SR 417 northbound (SR 429 southbound) and SR 417 southbound (SR 429 northbound), ATC #32 is operating at similar LOS compared to RFP.

There was a significant change in geometry on SR 417 southbound (SR 429 northbound), so not all segments are comparable.

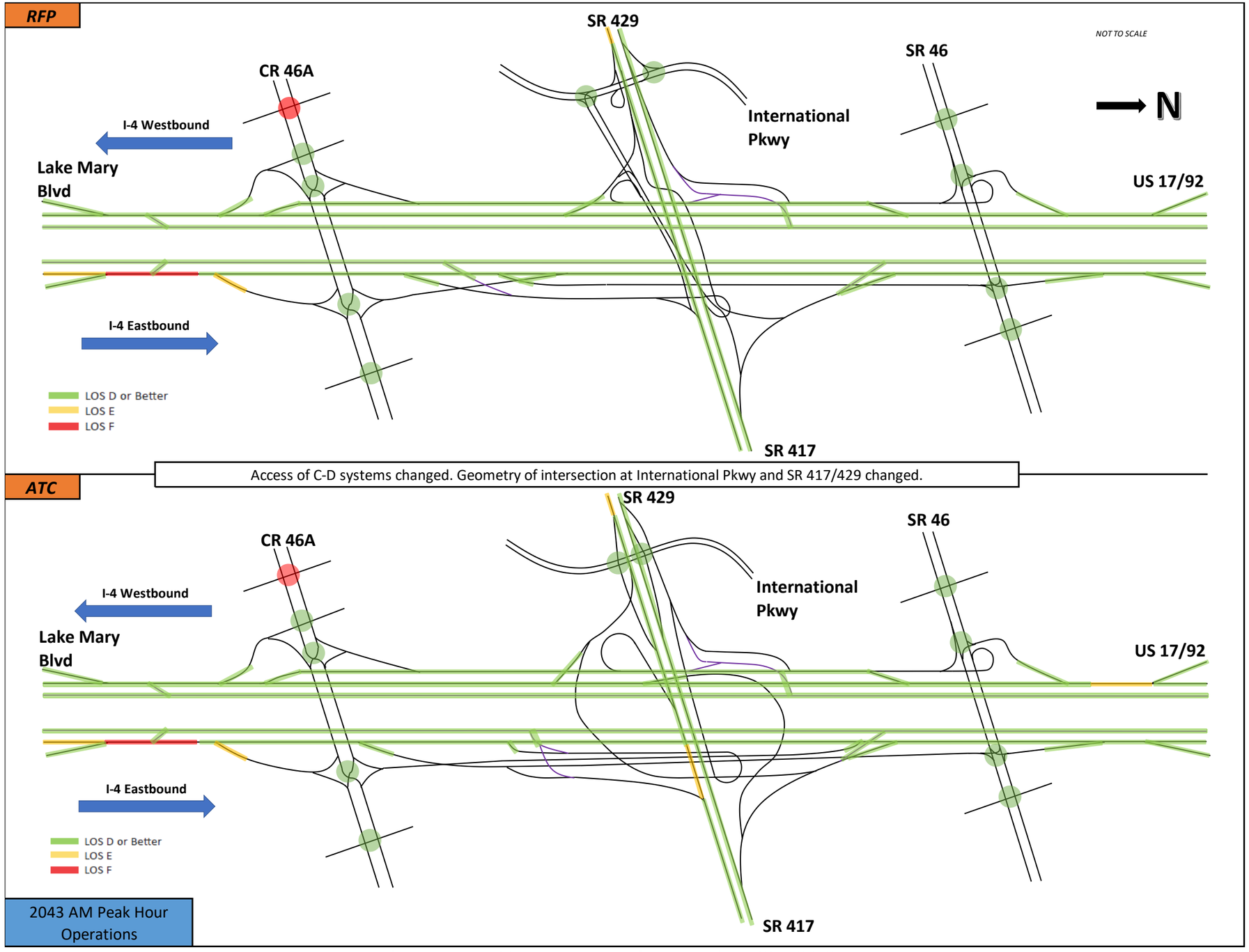


Figure 4-55: VISSIM Freeway and Intersection LOS – 2043 AM

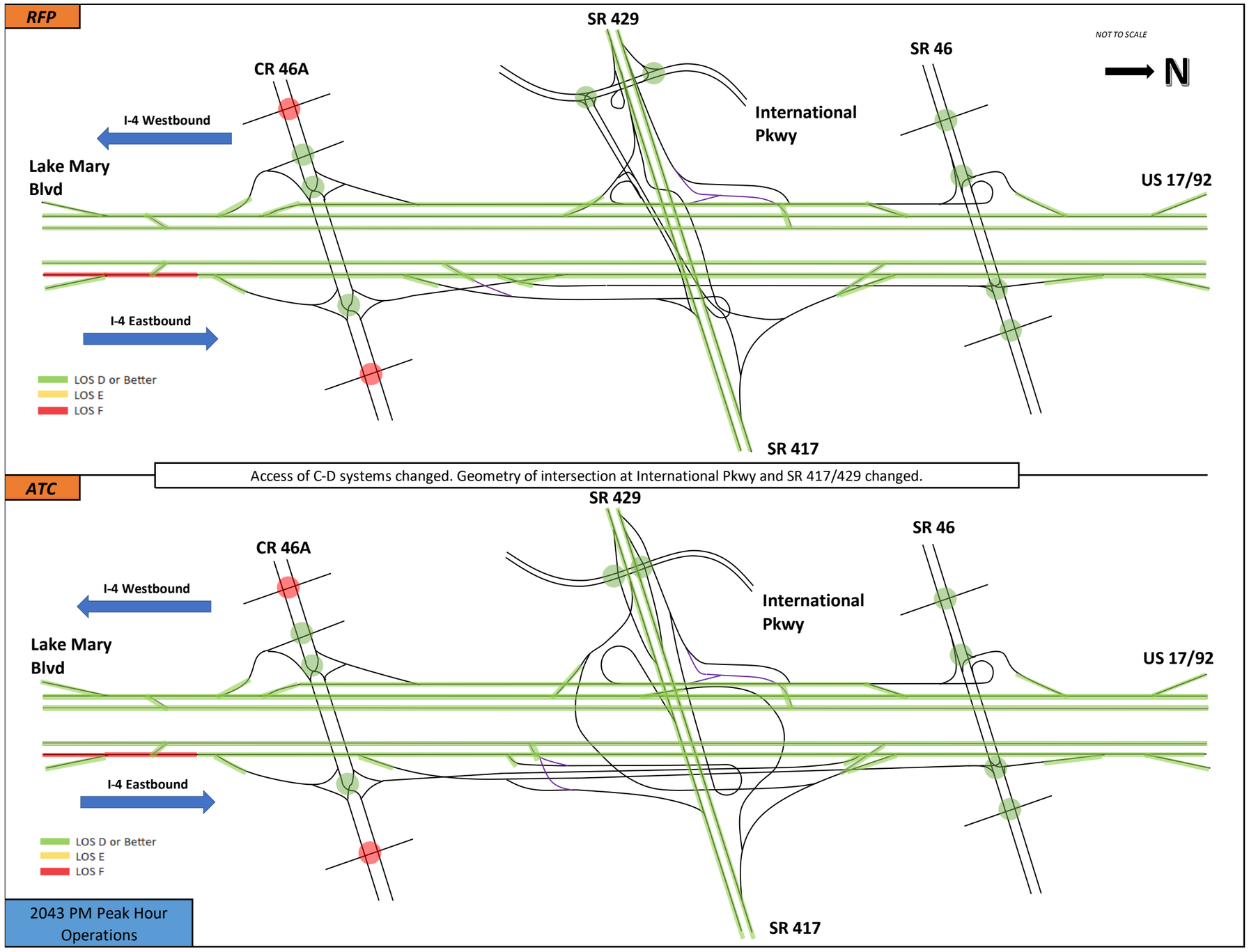


Figure 4-56: VISSIM Freeway and Intersection LOS – 2043 PM

5 SAFETY ANALYSIS

5.1 Safety Evaluation

A safety analysis, consistent with the FDOT IARUG (January 2018), was performed to compare the RFP Concept and the ATC #32. The analysis was performed using the Enhanced Interchange Safety Analysis Tool (ISATe).

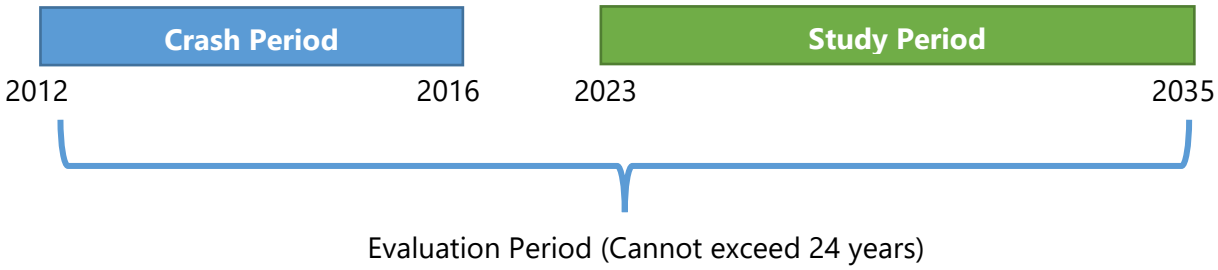
The basic purpose of ISATe is to provide design and safety engineers with an automated tool to aid in assessing the safety effects of geometric features and traffic control options. The ISATe can also be used to predict the safety performance of design alternatives for new interchanges before reconstruction of existing interchanges.

ISATe incorporates the disaggregate safety evaluation approach recommended by the Highway Safety Manual for its Part C predictive methods. In this regard, the freeway facility is disaggregated into one or more freeway sections and interchanges. The interchange is disaggregated into one or more ramps, C-D roads, and crossroad ramp terminals. Thus, a freeway facility consists of the following basic facility components:

- Freeway sections (with or without speed-change lanes).
- Ramps or C-D roads.
- Crossroad ramp terminals (i.e., the intersection between one or more ramps and the crossroad).

ISATe Limitations:

ISATe can accommodate a crash period that is 1 to 5 years in duration and an evaluation period that is 1 to 24 years in duration. If no crash data is available, then the study period is the same as the evaluation period.



5.1.1 Crash Data

The AOI includes both state roads and non-state roads. Hence, the crash data was obtained from Signal 4 Analytics. It is the only portal that includes crash data for both state roads and non-state roads.

Crash data was obtained for the most recent five years. At the time of data collection effort, the most recent five-year period for which the crash data was available is January 1, 2012, through December 31, 2016.

Crash data collection effort included the following roadways:

- I-4, from milepost 8.400 to 13.900
- SR 417, from milepost 16.200 to 17.455
- SR 46, from milepost 3.300 to 5.800
- International Parkway, from south of CR 46A (HE. Thomas Jr. Parkway) to north of SR 46
- Rinehart Road, from south of CR 46A (HE. Thomas Jr. Parkway) to north of SR 46
- CR 46A (H.E. Thomas Jr. Parkway), from west of International Parkway to east of Rinehart Road
- Garnet Lane, from west of Towne Center Boulevard to E Rinehart Road

In addition to the roadways, the data collection effort included the following interchanges and ramps:

- SR 417 interchange with Rinehart Road
    - SB on-ramp
    - SB off-ramp
    - NB on-ramp
    - NB off-ramp
- SR 417 interchange with I-4
    - NB SR 417 ramp to EB I-4
    - NB SR 417 ramp to WB I-4
    - WB I-4 ramp to SB SR 417
    - EB I-4 ramp to SB SR 417
- SR 417 at International Parkway
    - NB off-ramp
    - SB on-ramp
- I-4 at Lake Mary Boulevard
    - EB on-ramp
    - WB off-ramp
- I-4 at CR 46A (H.E. Thomas Jr. Parkway)
    - EB off-ramp
    - EB on-ramp
    - WB on-ramp
    - WB off-ramp
- I-4 at SR 46
    - WB on-ramp
    - WB off-ramp

  - EB on-ramp
  - EB off-ramp
- I-4 at US 17/92 (Seminole Boulevard)
  - EB off-ramp
  - WB on-ramp

5.1.2 Predictive Safety Analysis

ISATe includes predictive safety methods that are used to estimate the predictive average crash frequency for each segment. Additionally, since crash data was available, the Empirical Bayes (EB) Method was used by combining the predictive average crash frequency with five years of observed crash data to obtain a more reliable estimate of the expected crash frequency.

Depending on the geometric input, a CMF is associated with one geometric design or traffic control feature.

No calibration factors were applied.

The process includes the following steps:

- A severity distribution function (SDF) is used to compute the severity distribution for each site. This distribution is used to obtain an estimate of the expected average crash frequency by severity level.
- A crash type distribution is used to obtain an estimate of the expected average crash frequency by crash type category (e.g., head on, fixed object, etc.).
- The estimates of expected average crash frequency are summed for all years to obtain an estimate of the expected number of crashes for each site during the study period.
- The calculations for estimating the predictive average crash frequency is processed on a segment-by-segment and year-by-year basis. The process is repeated for each segment and year.

5.2 Data Inputs

ISATe requires geometric design features, traffic demand, traffic control features, and crash data (if available) for safety analysis. The data needed in ISATe is as summarized in **Table 5-1**.

Table 5-1: Data Inputs for Safety Analysis

Data Category	Description
Basic Roadway Data	Number of through lanes, segment length
Alignment Data	Horizontal curve radius and length of a curve
Cross Section Data	Lane width, outside shoulder width, inside shoulder width, median width, rumble strips and barrier details
Roadside Data	Clear zone and presence of a barrier
Access Data	Ramp length, number of lanes, shoulder width
Traffic Data	AADT for the freeway segments, ramp segments, and ramp terminals
Crash Data	Number of crashes per year

5.3 RFP and ATC #32 Concept Segments

The ISATe method requires the freeway facility to be broken into separate homogenous segments so that the appropriate CMF could be applied to individual segments. The ISATe manual suggests that the freeway facility be segmented if there is at least one change in the following features:

1. Number of through lanes
2. Lane width
3. Outside shoulder width
4. Inside shoulder width
5. Median width
6. Ramp presence
7. Clear zone width

Segmentation of the area of influence for the freeway facility resulted in 14 segments for the RFP Concept and 17 segments for ATC #32. **Figure 5-1** and **Figure 5-2** show the segments on I-4 for the RFP Concept and ATC #32.

The data inputs based on these segments are provided in **Appendix F**.

Figure 5-1: Freeway Segments for Safety Analysis on I-4 - RFP Concept

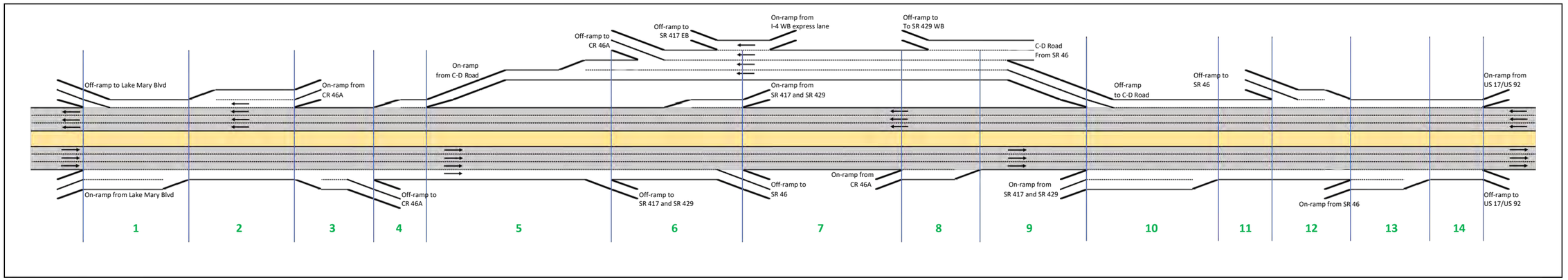
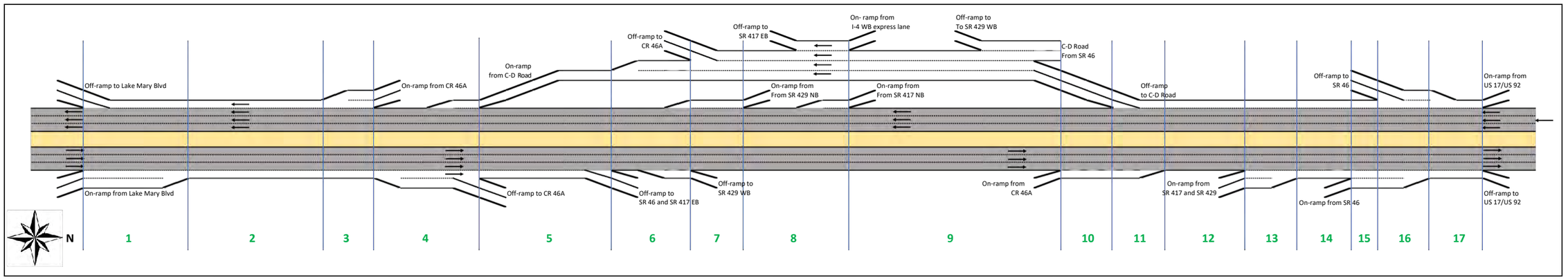


Figure 5-2: Freeway Segments for Safety Analysis on I-4 – ATC #32



5.4 Predicted Crash Results for ATC #32 and RFP Concept

5.4.1 Freeway Segments

For freeway segments, the expected crash frequencies, AADTs, and the length of the segments were used to calculate the expected crash rates (crash rate per million vehicle miles traveled per year) for both alternatives. **Table 5-2** and **Table 5-3** show the predicted crashes and crash rate by segment for the RFP Concept and ATC #32 respectively.

Table 5-2: Predicted Crashes for Freeway Segments in RFP Concept

Segment No.	Predicted Crashes	Segment Length (miles)	AADT	Average Vehicle Exposure (MVM) [a]	Predicted Crash Rate [b]	% of Network
1	414.8	1.07	191,553	74.818	5.544	21.98%
2	142.1	0.33	191,553	23.170	6.134	6.81%
3	61.5	0.19	163,706	11.885	5.179	4.09%
4	43.8	0.12	135,859	6.104	7.178	2.53%
5	78.1	0.20	124,151	9.439	8.272	4.28%
6	54.8	0.19	113,109	8.212	6.670	4.09%
7	59.6	0.32	90,360	10.620	5.614	6.62%
8	58.6	0.33	105,749	12.792	4.581	6.81%
9	137.2	0.60	105,749	23.394	5.863	12.45%
10	131.4	0.43	167,128	26.572	4.947	8.95%
11	69.5	0.22	167,128	13.866	5.012	4.67%
12	66.4	0.09	182,091	6.294	10.546	1.95%
13	106.5	0.29	197,053	21.117	5.041	6.03%
14	178.3	0.42	197,053	30.647	5.817	8.75%
Total	**1602.6**	4.868		Weighted Avg. [c]	**5.765**	

a MVM= (ADT x 365 x Segment Length in Miles)/1 Million]
b Predicted Crash Rate = Number of Crashes/ Million Vehicle Miles [Crash per MVM per year]
c Weighted Average Crash Rate = (Σ Segment Predicted Crash Rate x Segment i Length)/ (Σ Segment Length)

Table 5-3: Predicted Crashes for Freeway Segments in ATC #32

Segment No.	Predicted Crashes	Segment Length (miles)	AADT	Average Vehicle Exposure (MVM) [a]	Predicted Crash Rate [b]	% of Network
1	421.3	1.07	191,553	74.818	5.631	21.99%
2	144.5	0.33	191,553	23.170	6.236	6.81%
3	67.7	0.19	191,553	13.906	4.870	4.09%
4	49.7	0.12	163,778	7.359	6.755	2.53%
5	27.2	0.11	124,223	5.151	5.276	2.33%
6	69.8	0.20	104,995	7.983	8.740	4.28%
7	52.5	0.20	101,474	7.715	6.806	4.28%
8	14.4	0.09	97,952	3.386	4.261	1.95%
9	108.6	0.66	90,432	21.881	4.961	13.62%
10	27.3	0.09	105,821	3.658	7.461	1.95%
11	89.5	0.28	144,133	14.946	5.988	5.84%
12	47.4	0.19	144,133	10.464	4.526	4.09%
13	106.9	0.25	167,128	15.598	6.850	5.25%
14	64.1	0.20	127,128	12.707	5.042	4.28%
15	13.8	0.09	182,091	6.294	2.198	1.95%
16	48.2	0.29	197,053	21.117	2.284	6.03%
17	62.9	0.42	191,053	30.647	2.053	8.75%
Total	**1415.7**	4.867		Weighted Avg. [c]	**5.195**	

a MVM= (ADT x 365 x Segment Length in Miles)/1 Million]
b Predicted Crash Rate = Number of Crashes/ Million Vehicle Miles [Crash per MVM per year]
c Weighted Average Crash Rate = (Σ Segment Predicted Crash Rate x Segment i Length)/ (Σ Segment Length)

5.4.2 Ramp Segments

The ramps are considered as individual segments in safety analysis. The RFP Concept included six merge and five diverge ramps for a total of 11 ramps. The ATC #32 included six merge and six diverge ramps for a total of 12 ramps. **Table 5-4** and **Table 5-5** show the predicted crashes and crash rate by segment for RFP Concept and ATC #32 respectively.

Table 5-4: Predicted Crashes for Ramp Segments in RFP Concept

Segment No.	Segment Description	Predicted Crashes	Segment Length (miles)	AADT	Average Vehicle Exposure (MVM)[a]	Predicted Crash Rate [b]
1	EB off-ramp to CR 46A	11.4	0.23	29,353	2.464	4.626
2	EB on-ramp from CR 46A	8.2	0.37	13,027	1.759	4.653
3	EB off-ramp to SR 417,429	13.4	0.64	11,131	2.600	5.155
4	EB off-ramp to SR 46	36.1	1.52	12,102	6.714	5.372
5	EB on-ramp from SR 417, SR 429	85.8	1.26	25,202	11.590	7.406
6	EB on-ramp from SR 46	15.0	0.37	15,473	2.090	7.201
7	WB off-ramp to SR 46	11.5	0.39	14,456	2.058	5.571
8	WB off-ramp to C-D	29.9	0.43	29,467	4.625	6.461
9	WB on-ramp from SR429 SB	20.7	0.95	11,169	3.873	5.335
10	WB on-ramp from C-D	2.1	0.08	11,311	0.330	6.341
11	WB on-ramp from CR 46A	18.0	0.30	27,422	3.003	6.002
	Total	252.1	6.540	Weighted Avg. c		**5.898**

a MVM= (ADT x 365 x Segment Length in Miles)/1 Million]
b Predicted Crash Rate = Number of Crashes/ Million Vehicle Miles [Crash per MVM per year]
c Weighted Average Crash Rate = (Σ Segment Predicted Crash Rate x Segment i Length)/ (Σ Segment Length)

Table 5-5: Predicted Crashes for Ramp Segments in ATC #32

Segment No.	Segment Description	Predicted Crashes	Segment Length (Mile)	AADT	Average Vehicle Exposure (MVM)[a]	Predicted Crash Rate [b]
1	EB off-ramp to CR 46A	10.4	0.23	28,386	2.383	4.371
2	EB off-ramp to SR 46, SR 417 SB	64.1	1.81	19,846	13.111	4.892
3	EB off-ramp to SR 417/429	12.9	1.45	3,242	1.716	7.522
4	EB on-ramp from CR 46A	20.3	0.87	12,600	4.001	5.078
5	EB on-ramp from SR 417/ SR 429	92.2	1.37	22,995	11.499	8.017
6	EB on-ramp from SR 46	13.1	0.37	14,962	2.021	6.500
7	WB off-ramp to SR 46	12.0	0.39	14,962	2.130	5.631
8	WB off-ramp to C-D	5.9	0.08	35,595	1.039	5.653
9	WB on-ramp from SR 417	17.5	0.91	7,520	2.498	7.000
10	WB on-ramp to SR 429	6.6	0.78	3,242	0.923	7.162
11	WB on-ramp from C-D	9.3	0.52	11,708	2.222	4.170
12	WB on-ramp from CR 46A	16.4	0.30	28,386	3.108	5.279
	Total	280.7	9.080	Weighted Avg. c		**6.270**

a MVM= (ADT x 365 x Segment Length in Miles)/1 Million]
b Predicted Crash Rate = Number of Crashes/ Million Vehicle Miles [Crash per MVM per year]
c Weighted Average Crash Rate = (Σ Segment Predicted Crash Rate x Segment i Length)/ (Σ Segment Length)

5.4.3 Ramp Terminals

The Highway Safety Manual defines an interchange ramp terminal as an at grade intersection where a freeway interchange ramp intersects with a non-freeway cross street. While there are major differences between the RFP and the ATC #32 on freeways and ramps, the ramp terminals were identical for both alternatives.

5.5 Comparison of Safety Results for RFP and ATC #32

5.5.1 Crashes

Safety analysis was conducted to evaluate and compare the RFP Concept and the ATC #32. The overall predictions for the total number of crashes based on ISATe for the year 2035 was **2407.97** crashes for RFP Concept and **2249.8** crashes for ATC #32.

As explained in **Section 5.1**, ISATe limits the evaluation period to 24 years. Therefore, the analysis results are limited to year 2035 for both concepts. The crash frequency predicted per year in ISATe is not uniform and could not be extrapolated to year 2043. Nevertheless, the crash frequency in ATC #32 is lower than in the RFP Concept for each year; thus, the crash frequency will be lower for ATC#32 than the RFP Concept. The output sheets from ISATe are provided in **Appendix F**.

5.5.2 Crash Cost based on KABCO

Crash costs were calculated for both concepts based on KABCO crash costs from "Table 122.6.2 – FDOT KABCO Crash Costs" of the Florida Design Manual. The table is included in **Appendix F**.

Based on the predicted number of crashes obtained from ISATe, the cost of those crashes was calculated. **Table 5-6** shows the predicted KABCO crash costs for both concepts for the year 2035.

Table 5-6: KABCO Crash Cost Analysis

Type of Crash	Cost Associated	Crashes		Cost of Crashes ($)	
		RFP	ATC	RFP	ATC
Fatal (K)	10,670,000	12.5	11.7	133,789,294	125,090,633
Severe Injury (A)	872,612	41.0	39.2	35,790,647	34,159,246
Moderate Injury (B)	174,018	249.1	237.7	43,350,373	41,371,351
Minor Injury (C)	106,215	724.2	667.9	76,918,285	70,942,012
Property Damage Only (O)	7,700	1381.1	1293.3	10,634,360	9,958,076
	Total	**2407.9**	**2249.8**	**300,482,958**	**281,521,318**

5.5.3 Benefit Comparison

A comparison of safety benefits between the RFP Concept and ATC #32 was performed based on the KABCO crash costs. The ATC #32 design provides a benefit of $19 million in crash costs. Additionally, the ATC #32 construction cost is approximately $21 million is less than the RFP Concept.

6 ENVIRONMENTAL CONSIDERATIONS

The PD&E study for the Wekiva Parkway (SR 429)/SR 46 Realignment was completed in 2012, the FONSI was signed by FHWA on May 11, 2012 and re-evaluated on July 27, 2017.

The proposed design changes all occur within the existing evaluated right-of-way. We do not anticipate any changes in impacts from the original documents. All commitments made during project development and the NEPA process are being addressed and environmental permits have been received.

A re-evaluation will be completed by District 5 once the IMR is approved to document any changes to the natural, social, physical, and cultural environment and to any commitments made during the previous phases.

7 ANTICIPATED DESIGN EXCEPTIONS AND VARIATIONS

No design exceptions were required for this project.

A design variation for horizontal alignment was approved by FDOT District 5 on February 1, 2017. However, ATC #32 eliminated all design variations for horizontal curves less than the Plans Preparation Manual requirement of 15V or 1050'. The list of curve locations and lengths is provided below:

Table 7-1: Curve Locations and Lengths

Alignment	Curve Number	Length	Disposition
EB I-4	SR 400EB-1	502.47	Reconstructed in BtU3
EB I-4	SR 400EB-2	506.06	Reconstructed in BtU3
EB I-4	SR 400EB-3	502.24	Eliminated in ATC # 32
EB I-4	SR 400EB-4	512.46	Eliminated in ATC # 32
EB I-4	SR 400EB-5	845.01	Eliminated in ATC # 32
EB I-4	SR 400EB-7	382.42	Extended in BtU3 to 885'
WB I-4	SR 400WB-1	973.53	Reconstructed in BtU3
WB I-4	SR 400WB-3	677.61	Eliminated in ATC # 32
WB I-4	SR 400WB-4	431.92	Eliminated in ATC # 32
WB I-4	SR 400WB-5	540.36	Reconstructed in BtU3
WB I-4	SR 400WB-7	691.75	Reconstructed in BtU3

This leaves only five curves that require a design variation. However, these variations are temporary, and the curves will be reconstructed in the BtU3 project.

8 CONCEPTUAL SIGNING PLAN

A conceptual signing and marking plan for ATC #32 is provided in **Appendix G**.

9 ACCESS MANAGEMENT PLAN

One of the main differences between the RFP Concept and ATC #32 is the location of the ramps on International Parkway. The ATC #32 provides a tight urban diamond interchange design with two closely spaced signalized intersections while the RFP concept provides a non-traditional interchange design with one signalized intersection and one unsignalized intersection.

The ATC #32 will relocate a signalized intersection and convert a directional median opening at Pebble Ridge Lane to a full median opening. However, International Parkway is not a state road, and, therefore, no access management plan changes are required.

10 FHWA POLICY POINTS

FHWA Policy Point #1

An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations (CFR), paragraphs 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, should be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access should include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute, and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request should also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

An in-depth operational and safety analysis was conducted to documents the impacts of the proposed project. Several performance measures were used to compare the operations of the RFP Concept and ATC #32. Key measures included freeway densities, v/c ratios, intersection delays, level of service and 95th percentile queue lengths.

Operational Analysis

Freeway Analysis using Highway Capacity Software (HCS)

A comparison of the LOS by segments showed the ATC #32 has a higher percentage of segments within LOS range A-D and a smaller percentage of segments at LOS E and F.

Concept (Year Time Period)	% of segments within LOS A-D	% of segments at LOS E	% of segments at LOS F
RFP Concept (2023 AM)	80	9	11
ATC #32 (2023 AM)	85	9	6
RFP Concept (2023 PM)	85	4	11
ATC #32 (2023 PM)	87	4	9
RFP Concept (2043 AM)	76	7	17
ATC #32 (2043 AM)	77	8	15
RFP Concept (2043 PM)	80	2	19
ATC #32 (2043 PM)	82	2	17

HCS analysis showed that:

- The number of segments with acceptable LOS (A through D) are higher for the ATC #32 than the RFP Concept for all analysis years.
- There is a major improvement in weaving segments. 5 out of 30 segments improved from an unacceptable LOS (E and F) in the RFP Concept to an acceptable LOS (A through D) in the ATC #32.
- Overall, there are 15 segments with a better LOS in ATC #32 while there are only two segments with a better LOS in the RFP concept.

Therefore, the analysis of freeway segments using HCS7 shows the ATC #32 design performs significantly better than the RFP Concept design.

Intersection Analysis using Synchro

Fifteen intersections were identified within the Area of Influence (AOI). Fourteen out of the fifteen intersections showed equal delay values in all analysis periods. The intersection at International Parkway and Wekiva Parkway (SR 429) for the RFP Concept and ATC #32 cannot be compared directly as it accommodates different movements.

Microsimulation Analysis using VISSIM

The network-wide output produced by the VISSIM models provide additional insight into operational conditions. For the AM period, the 2043 ATC VISSIM model is performing 1% to 2% better than the 2043 RFP VISSIM model. For the PM period, the 2043 ATC VISSIM model is performing equally as the 2043 RFP VISSIM model.

2043 AM Network Wide Summary

Parameter	RFP AM Peak Hour	ATC AM Peak Hour	% Change
Total Travel Time (hr)	4,100	4,067	-1%
Total Delay Time (hr)	1,184	1,158	-2%
Average Delay Time (sec/veh)	90	88	-2%
Latent Delay Time (hr)	1	1	0%
Number of Arrived Vehicles	43,070	43,070	0%
Percentage of Latent Vehicles	0%	0%	0%
Total Delay + Latent Delay (hr)	1,185	1,159	-2%
Average Speed (miles/hr)	43	43	0%

2043 PM Network Wide Summary

Parameter	RFP PM Peak Hour	ATC PM Peak Hour	% Change
Total Travel Time (hr)	4,672	4,675	0%
Total Delay Time (hr)	1,619	1,624	0%
Average Delay Time (sec/veh)	115	115	0%
Latent Delay Time (hr)	654	657	0%
Number of Arrived Vehicles	46,015	46,017	0%
Percentage of Latent Vehicles	3%	3%	0%
Total Delay + Latent Delay (hr)	2,272	2,282	0%
Average Speed (miles/hr)	39	39	0%

Safety Analysis

A detailed safety analysis was conducted using ISATe. The analysis showed a reduction of 7% in the total number of expected crashes when comparing the ATC #32 to the RFP Concept. This results in a 19-million-dollar economic saving. The ATC #32 showed a reduction in crashes in each severity distribution (fatal, severity injury, moderate injury, minor injury, and property damage) when compared with the RFP Concept.

Type of Crash	Cost Associated	Crashes		Cost of Crashes ($)	
		RFP	ATC	RFP	ATC
Fatal (K)	10,670,000	12.5	11.7	133,789,294	125,090,633
Severe Injury (A)	872,612	41.0	39.2	35,790,647	34,159,246
Moderate Injury (B)	174,018	249.1	237.7	43,350,373	41,371,351
Minor Injury (C)	106,215	724.2	667.9	76,918,285	70,942,012
Property Damage Only (O)	7,700	1381.1	1293.3	10,634,360	9,958,076
	Total	**2407.9**	**2249.8**	**300,482,958**	**281,521,318**

Overall, the ATC #32 provides significantly better traffic operations and enhanced safety when compared to the RFP Concept.

A conceptual signing plan has been developed for the ATC #32 showing signage requirements for the proposed improvements and the interchange.

In conclusion, the comparison of the ATC #32 and the RFP Concept show that the ATC #32 will provide better LOS and safer operating conditions. The proposed ATC #32 modifications are not anticipated to have a negative impact on operations or safety on the I-4 mainline or adjacent interchange when compared with the RFP Concept.

FHWA Policy Point 2

The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial-interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.

The proposed Wekiva Parkway (SR 429) /I-4 interchange will provide full access to Wekiva Parkway (SR 429), SR 417 and I-4. There will be no missing movements.

The proposed Wekiva Parkway (SR 429) /I-4 interchange is designed to meet current standards for federal-aid projects on the interstate system and conforms to FDOT design standards and American Association of State and Transportation Officials (AASHTO) standards.

11 CONCLUSION

Consistent with FDOT IARUG, a detailed operations and safety analysis for the RFP Concept and the ATC #32 was performed. The results can be summarized in the following categories:

Operations Analysis

Freeway Analysis using Highway Capacity Software (HCS)

A comparison of the level of service (LOS) by segments was performed and shows the ATC #32 has a higher percentage of segments within LOS range A-D and a smaller percentage of segments at LOS E and F.

Concept (Year Time Period)	% of segments within LOS A-D	% of segments at LOS E	% of segments at LOS F
RFP Concept (2023 AM)	80	9	11
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ATC #32 (2043 AM)	77	8	15
RFP Concept (2043 PM)	80	2	19
ATC #32 (2043 PM)	82	2	17

HCS analysis showed that:

- The number of segments with acceptable LOS (A through D) are higher for the ATC #32 than the RFP Concept for all analysis years.
- There is a major improvement in weaving segments. 5 out of 30 segments improved from an unacceptable LOS (E and F) in the RFP Concept to an acceptable LOS (A through D) in the ATC #32.
- The ATC #32 design led to three major improvements in weaving segments.
  - SR 417 SB from the I-4 on-ramp to the Rinehart Road off-ramp improved from the RFP Concept (LOS F) to the ATC #32 (LOS B) by 2023 for both AM and PM peak period.
  - SR 417 SB from the I-4 on-ramp to the Rinehart Road off-ramp improved from the RFP Concept (LOS F) to the ATC #32 (LOS C) by 2043 for both AM and PM peak period.
  - The weaving segment on SR 417 NB from the Rinehart Road on-ramp to the I-4 off-ramp showed a better v/c ratio in ATC #32 than the RFP Concept for all analysis years; 2023 AM peak period showing the best improvement from LOS F in the RFP Concept to LOS B in ATC #32.
- For the 2023 AM peak period, there is one (basic) segment with a better LOS in the RFP Concept than ATC #32, while there are five (1 diverge, 1 merge, 3 weaving) segments with a better LOS in ATC #32 than the RFP Concept.

- For the 2023 PM peak period, there is one (basic) segment with a better LOS in the RFP Concept than ATC #32, while there are five (1 diverge, 1 merge, 3 weaving) segments with a better LOS in ATC #32 than the RFP Concept.
- For the 2043 AM peak period, there is one (merge) segment with a better LOS in the RFP Concept than ATC #32, while there are three (1 merge, 2 weaving) segments with a better LOS in ATC #32 than the RFP Concept.
- For the 2043 PM peak period, there are no segments with a better LOS in the RFP Concept than ATC #32, while there are three (1 merge, 2 weaving) segments with a better LOS in ATC #32 than the RFP Concept.
- Overall, there are 15 segments with a better LOS in ATC #32 while there are only two segments with a better LOS with the RFP concept. The two segments in which the RFP Concept performs better are located on the C-D system and not on I-4, SR 429, or SR 417. And both segments are operating at an acceptable LOS (LOS C) in ATC #32.

Therefore, the analysis of freeway segments using HCS7 shows the ATC #32 design performs significantly better than the RFP Concept design.

Intersection Analysis using Synchro

Fifteen intersections were identified within the Area of Influence (AOI). Fourteen out of the fifteen intersections showed equal delay values in all analysis periods. The intersection at International Parkway and Wekiva Parkway (SR 429) for the RFP Concept and ATC #32 cannot be compared directly as it accommodates different movements.

Microsimulation Analysis using VISSIM

The network-wide output produced by the VISSIM models provide additional insight into operational conditions. For the AM period, the 2043 ATC VISSIM model is performing 1% to 2% better than the 2043 RFP VISSIM model. For the PM period, the 2043 ATC VISSIM model is performing equally as the 2043 RFP VISSIM model.

2043 AM Network Wide Summary

Parameter	RFP AM Peak Hour	ATC AM Peak Hour	% Change
Total Travel Time (hr)	4,100	4,067	-1%
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Percentage of Latent Vehicles	0%	0%	0%
Total Delay + Latent Delay (hr)	1,185	1,159	-2%
Average Speed (miles/hr)	43	43	0%

2043 PM Network Wide Summary

Parameter	RFP PM Peak Hour	ATC PM Peak Hour	% Change
Total Travel Time (hr)	4,672	4,675	0%
Total Delay Time (hr)	1,619	1,624	0%
Average Delay Time (sec/veh)	115	115	0%
Latent Delay Time (hr)	654	657	0%
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Average Speed (miles/hr)	39	39	0%

Safety Analysis

A detailed safety analysis was conducted using ISATe. The analysis showed a reduction of 7% in the total number of expected crashes when comparing the ATC #32 to the RFP Concept. This results in a 19-million-dollar economic saving. The ATC #32 showed a reduction in crashes in each severity distribution (fatal, severity injury, moderate injury, minor injury, and property damage) when compared with the RFP Concept.

Type of Crash	Cost Associated	Crashes		Cost of Crashes ($)	
		RFP	ATC	RFP	ATC
Fatal (K)	10,670,000	12.5	11.7	133,789,294	125,090,633
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	Total	**2407.9**	**2249.8**	**300,482,958**	**281,521,318**

Overall, the ATC #32 provides significantly better traffic operations and enhanced safety when compared to the RFP Concept.

In conclusion, the comparison of the ATC #32 and the RFP Concept show that the ATC #32 will provide better LOS and safer operating conditions. The proposed ATC #32 modifications are not anticipated to have a negative impact on operations or safety on the I-4 mainline or adjacent interchange when compared with the RFP Concept. Finally, this IMR is consistent with the Environmental Impact Statement (EIS) for the I-4 Beyond the Ultimate (BtU) Segment 3 in the design year and the proposed Wekiva Parkway (SR 429) /I-4 interchange will provide full access to Wekiva Parkway (SR 429), SR 417 and I-4 and there will be no missing movements.