



*Florida Department of Transportation*

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GOVERNOR

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JARED W. PERDUE, P.E.  
SECRETARY

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INTEROFFICE MEMORANDUM

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**DATE:** December 7, 2022

**To:** **MS # 503**  
John Tyler

**From:** Melissa McKinney, District Planning Manager

Please authorize/execute the document submitted through DocuSign:

- System Interchange Modification Report (SIMR) Approval for CFX's SR 516/Lake Orange County Connector from US 27 to SR 429 Project

         **Director Approval – Please initial for your approval.**

  X   **District Secretary Approval – Please DocuSign for your approval.**

**Overview**

This is a CFX project for the Lake Orange County Connector (SR 516) from US 27 to SR 429 as shown in the figure on the next page. The primary purposes of the new SR 516 corridor are to expand regional system linkage and connectivity in Lake and Orange Counties, enhance mobility between US 27 and SR 429, and accommodate the expected increase in traffic due to population and employment growth within the study area while being consistent with accepted local and regional plans. The needs for the project are to provide improved system connectivity/linkage, accommodate anticipated transportation demand, provide consistency with local and regional plans, support economic viability and job creation, support intermodal opportunities, and enhance evacuation and emergency service.

**Funding**

This project is listed for construction in CFX's Five-Year Work Program and is currently in design for all three segments. The fact sheet has additional information regarding the segments as well as an exhibit showing the connection to US 27.

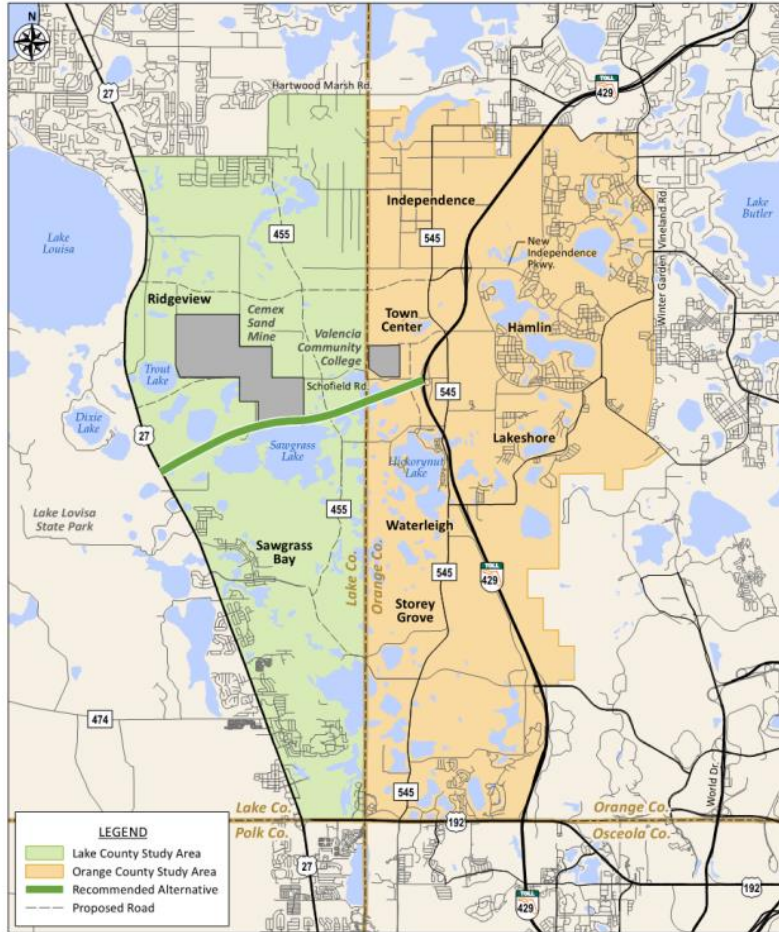


Figure 1: Lake Orange Connector (SR 516) Project Study Area

## Operations

Freeway analysis of the segments, and merge/diverge movements show acceptable LOS for 2025 and 2045 conditions. Interchange alternative evaluations confirm that the grade separated interchange at US 27 will perform with shorter delays, better LOS, and shorter queue lengths over the traditional T-intersection with either a signal or stop condition. The Build alternative has new access points and higher traffic along US 27 when compared to the No-Build, which results in a slightly higher prediction of potential crashes of approximately three percent. However, the Build will reduce travel time within the network by providing a direct and shorter east-west connection between US 27 and SR 429. Reduction in regional travel time/congestion for the Build alternative is expected to reduce potential crashes in the area and improve safety.

The Build alternative is predicted to have a 20-year travel time savings of approximately \$645 Million compared to the No-Build alternative. This study concludes that the grade separated ramps at SR 516 and US 27 will provide the best traffic operations for the interchange.



# LAKE/ORANGE EXPRESSWAY

## US 27 TO STATE ROAD 429

### DESIGN DESCRIPTION

The Central Florida Expressway Authority is designing a new four-lane limited access expressway from US 27 to SR 429 which has been designated as State Road 516. The expressway is divided into three segments for design and construction purposes. The new expressway is expected to improve connectivity between Lake and Orange counties, as well as meet future traffic needs.

### WHAT TO EXPECT

During design, surveying along the project corridor is done to assist in roadway design, drainage systems, structures and lighting locations, as well as Intelligent Transportation Systems technology such as overhead dynamic message signs and traffic monitoring stations. Geotechnical investigations will also be performed.

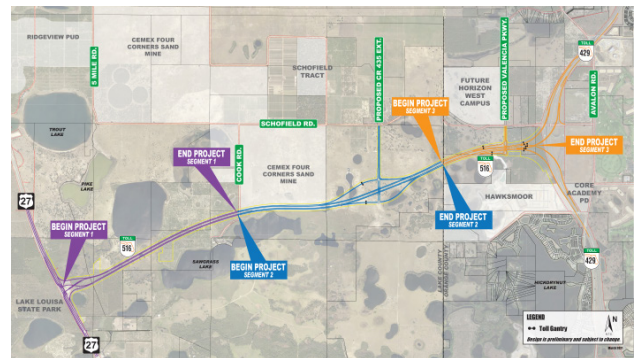
### PROJECT GOALS

- Improve connectivity opportunities for Lake and Orange counties.
- Meet anticipated transportation demand for planned growth.
- Support economic viability/job creation for the Wellness Way Area Plan.
- Increase intermodal opportunities with Horizon West Town Center.
- Provide evacuation and emergency services access for emergency events such as hurricanes.

### Design Start Dates:

- **Segment 1 – September 2020:**  
US 27 to west of Cook Road
- **Segment 2 – January 2021:**  
West of Cook Road to Lake/Orange County Line
- **Segment 3 – October 2020:**  
Lake/Orange County Line to SR 429

### DESIGN MAP (LARGER MAP ON BACK)



### QUICK FACTS

**Design Timeline:**  
September 2020 - Early 2023

**Estimated Design Cost:**  
\$20.4 Million

For more information:

407-383-5817

Construction@CFXway.com

www.CFXway.com

@DriveEPASS

**CENTRAL  
FLORIDA  
EXPRESSWAY  
AUTHORITY**



The Central Florida Expressway Authority (CFX) is an independent agency of the State of Florida that operates and maintains a regional network of expressways for 3.3 million residents of Brevard, Lake, Orange, Osceola, and Seminole counties and more than 75 million annual visitors to Central Florida. CFX's 125-centerline mile, user-funded system which includes 73 interchanges, 14 mainline toll plazas, 5 mainline gantries, 76 ramp toll plazas and 343 bridges. On average, more than 1.3 million toll transactions are recorded daily, over 95 percent of them electronically. CFX operates E-PASS, the first electronic toll collection system in Florida, with more than one million E-PASS accounts. For more information, visit CFXway.com.

Central Florida Expressway Authority: 4974 ORL Tower Road, Orlando, FL 32807  
Phone: 407.690.5000 | Fax: 407.690.5011 | Email: Info@CFXWay.com

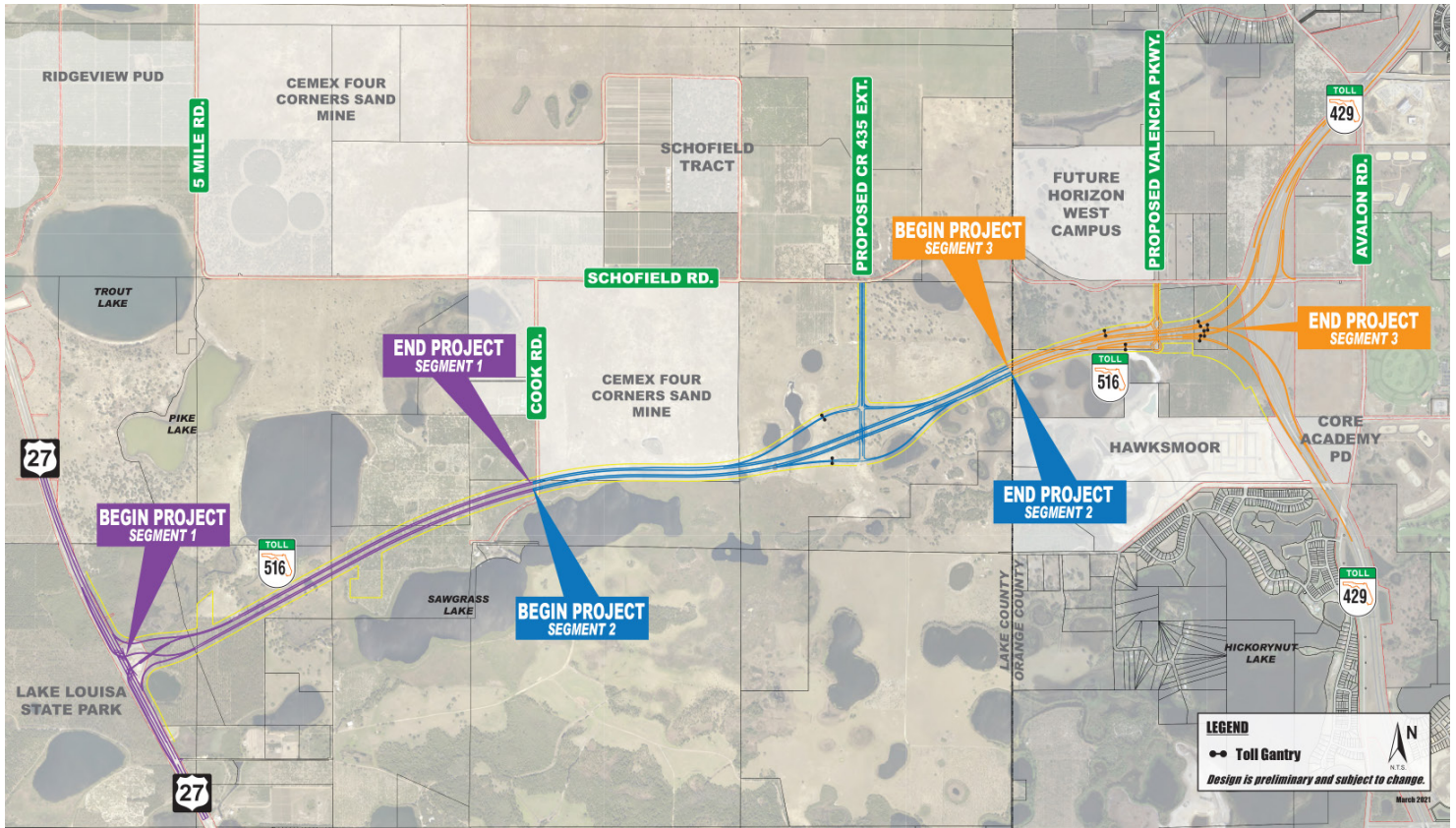




# LAKE/ORANGE EXPRESSWAY

## US 27 TO STATE ROAD 429

### DESIGN MAP





**CENTRAL  
FLORIDA  
EXPRESSWAY  
AUTHORITY**

EXIT 2B  
Orlando Executive  
Airport  
NEXT RIGHT

# **SYSTEM INTERCHANGE MODIFICATION REPORT (SIMR)**

SR 516/Lake Orange County Connector  
Preliminary Design  
From US 27 to SR 429  
Lake and Orange Counties, FL

CFX Project Nos. 516-236, 516-237 & 516-238

**November 2022**

# System Interchange Modification Report(SIMR)



## Lake Orange County Connector/SR 516

CFX 516-236, 516-237, 516-238

### Florida Department of Transportation

#### Determination of Safety, Operational and Engineering Acceptability

Acceptance of this document indicates successful completion of the review and determination of safety, operational and engineering 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	<p>DocuSigned by: <i>Glenn Pressimone</i> 260EC3064706442...</p> <hr/> <p>Glenn M. Pressimone, P.E. Chief of Infrastructure, Central Florida Expressway Authority</p>	<p>12/8/2022   2:50 PM EST</p> <hr/> <p>Date</p>
Interchange Review Coordinator	<p>DocuSigned by: <i>Melissa McKinney</i> 06F854BBA29945C...</p> <hr/> <p>Melissa S. McKinney District Five</p>	<p>12/9/2022   8:38 AM EST</p> <hr/> <p>Date</p>
Systems Management Administrator	<p>DocuSigned by: <i>Jenna Bowman</i> 4AD03E6A237F4C1...</p> <hr/> <p>Jenna Bowman, PE Systems Implementation Office – Central Office</p>	<p>12/12/2022   8:19 AM EST</p> <hr/> <p>Date</p>
District Secretary	<p>DocuSigned by: <i>John Tyler</i> 4ACA0FB45FC2461...</p> <hr/> <p>John E. Tyler, P.E. District Five Secretary</p>	<p>12/13/2022   8:08 AM EST</p> <hr/> <p>Date</p>

## PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with CDM Smith, Inc., a Florida corporation authorized under the provisions of Section 471.023, Florida Statutes, to offer engineering services to the public through Professional Engineering, duly licensed under Chapter 471, Florida Statutes, (CA Lic. No. 20) 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:** SR 516/Lake Orange County Connector Systems Interchange Modification Report


**LOCATION:** Lake and Orange Counties, FL

**CFX Project No.** 516-236; 516-237; 516-238

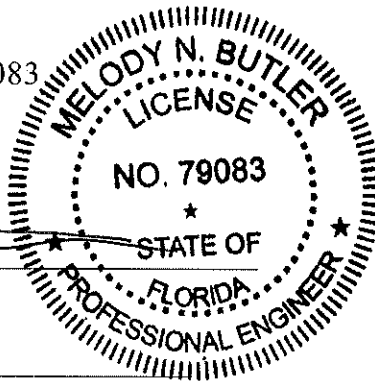
This report includes a summary of data collection effort, traffic analysis, discussion of preferred alternative and summary of conclusions. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation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

Name: Melody N. Butler, P.E.

Florida P.E. No.: 79083

Signature: 

Date: 11.15.2022





## Executive Summary

The Central Florida Expressway Authority (CFX) has performed several studies on the SR 516/Lake Orange Connector, as referenced in this Systems Interchange Modification Report (SIMR), to evaluate the need, preferred alignment, cross-section, interchange type and local road improvements along US 27, CR 455 Extension, Valencia Parkway and SR 429. The SR 516/Lake Orange Connector, which is an expansion project, is a new four-lane tolled expressway alignment connecting SR 429 to US 27. The alignment is midway between SR 50 to the north and US 192 to the south and provides the only regionally significant connection between these roadways for 19 miles. This expressway provides a much-needed east-west facility in this area of the Orlando metropolitan area, connecting two principal arterials, and significantly improving regional mobility. The new expressway will include an interchange with US 27 and realignment of US 27 to accommodate the improvements while avoiding impacts to Lake Louisa State Park. The project corridor is expected to improve connectivity between Lake and Orange counties, as well as meet future traffic needs.

Freeway analysis of the segments, and merge/diverge movements show acceptable Level of Service (LOS) for 2025 and 2045 conditions. Interchange alternative evaluations confirm that the grade separated interchange at US 27 will perform with shorter delays, better LOS, and shorter queue lengths over a T-intersection with either a signal or stop condition. The Build alternative has new access points and higher traffic along US 27 when compared to the No-Build, which results in a slightly higher prediction of potential crashes of approximately three percent. However, the Build will reduce travel time within the network by providing a direct and shorter east-west connection between US 27 and SR 429. Reduction in regional travel time/congestion for the Build alternative is expected to reduce potential crashes in the area and improve safety. The Build alternative is predicted to have a 20-year travel time savings of approximately \$645 Million compared to the No-Build alternative.

This study concludes that the grade separated interchange at SR 516 and US 27 will improve overall traffic flow and operations of the roadway network in the area. In concert with other CFX roadway improvement projects proposed along SR 429, the new SR 516 expressway will become an integral part of the toll road system and regional highway network, providing an improved experience for public roadway and tollway users.

## 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, 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 (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroad 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 crossroads and local street network (23 CFR 625.2(a) and 655.603(d)). Each request should include a conceptual plan of the type and location of signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).*

## Summary Findings

Operational and safety analyses were performed to evaluate the impacts of the proposed Lake Orange County Connector Expressway (SR 516) including a new interchange access at US 27. A traffic operations and safety analysis of the existing, future No-Build, and three alternative Build conditions for the US 27 interchange have been conducted within this study using several performance measures. The first intersections on either side of the proposed access location on US 27 were evaluated in addition to the analysis completed as part of the Lake Orange County Connector Project Traffic Analysis Report (PTAR). These measures of effectiveness are based on freeway density, freeway speeds, following density, levels of service, intersection delay, stop queues, safety benefits, and user benefits. Overall, the network will be improved with the SR 516 Expressway, and it will become an integral part of the toll road system, the regional highway network and supplement other CFX roadway improvement projects along SR 429.

As the proposed four-lane divided facility, the SR 516 Expressway freeway density would be LOS C or better. The new expressway is driven by regional mobility needs in this rapidly growing area of Central Florida. The ramp terminals for all interchanges along the SR 516 corridor will operate at LOS D or better. The merge and diverge operations are LOS C or better for all freeway movements, except the on-ramp merge condition along northbound SR 429 from eastbound SR 516 which operates at LOS D in the AM peak hour. The intersections of US 27 at Lake Louisa State Park and Sawgrass Bay Boulevard were degraded slightly by the increased traffic volumes, but still operate at LOS D or better in the 2045 Build condition in both the AM and PM peak hours. The traffic operations analysis showed that the grade separated alternative performed better than the stop-control and signalized intersection conditions related to LOS, delay, and queue lengths.

Trips currently using long and, in some cases, circuitous routes to travel from south Lake County to west Orange County will have the option to use a direct and faster connection. SR 516 will also include north/south connections at CR 455 and Valencia Parkway, enhancing travel throughout the region. As a result, the Build alternative is expected to reduce Vehicle Hours of Travel (VHT) by approximately 9,900 hours in 2025 and 9,000 hours in 2045, respectively, within the travel demand model subarea for facilities impacted by SR 516. The reduction in VHT (*aka*, travel time savings) translated to a 20-year user benefit of \$645 Million for the Build alternative compared to the No-Build. Reduction in regional travel time/congestion for the Build alternative is expected to significantly reduce potential crashes in the region and improve safety. In addition, the design of the project follows FDOT standards to provide features that mitigate potential crashes such as long auxiliary lanes, adequate sight distances, gentle cross-slopes, super elevation, wide curve radii, wide shoulders, signing and lighting among others. Overall, it is expected that SR 516 will significantly improve regional mobility, traffic operations and safety in the area. The conceptual signing plan for the project is provided in **Appendix F**.

## 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, HOVs, HOT 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 analysis to the partial-interchange options. 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.*

## Summary Findings

The proposed new SR 516 expressway with a grade separated interchange at US 27 will provide full access and facilitate all traffic movements from the SR 516 expressway to US 27. There will be a full access interchange at the proposed CR 455 Extension, a half an interchange at the proposed Valencia Parkway, providing access to and from the west, and a full access, grade-separated interchange at SR 429. A half interchange at Valencia Parkway is proposed due to its proximity to the SR 429 grade-separated interchange. The proposed alignment meets current design standards and conforms to American Association of State and Highway Transportation Officials (AASHTO) and the FDOT design standards.

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# 1. Introduction

## 1.1 Project Description

The Central Florida Expressway Authority (CFX) has conducted a Project Development and Environmental (PD&E) study (CFX Project No.: 516-236; 516-237; 516-238) to evaluate the Lake Orange County Connector (SR 516) from US 27 in south Lake County to SR 429 in west Orange County. The project study area is shown in **Figure 1**. SR 516 will provide a new limited-access, direct connection expressway in the east-west direction. This project has been identified as a need in several local comprehensive plans, long-range transportation plans and expressway authority master plans, listed below:

- MetroPlan Orlando 2045 Metropolitan Transportation Plan (MTP) Cost Feasible Plan
- CFX 2045 Master Plan
- CFX Five-Year Work Plan (2023-2027)
- Lake-Sumter MPO 2045 Long Range Transportation Plan (LRTP)

Segment 1 (from US 27 to Cook Road) of SR 516 consists of a four-lane rural expressway within 330 feet of right-of-way and will feature grade separations to maintain local roadway access. Segment 2 (from Cook Road to the Lake/Orange County Line) also consists of a four-lane rural expressway within 330 feet of right-of-way. The alignment shifts in this segment to minimize impacts to the Cemex Four Corners Sand Mine. There will be an interchange provided at the proposed CR 455 Extension to maintain local access. Segment 3 (from the Lake/Orange County Line to the SR 429 and Schofield Road interchange) will consist of the same four-lane rural expressway within 330 feet of right-of-way. There will be a partial interchange at the proposed Valencia Parkway providing access to/from the west. At the existing Schofield Road interchange with SR 429, direct connect ramps will provide access to/from northbound and southbound SR 429. The purpose of this report is to evaluate the operations and impacts of the Build alternatives for the new SR 516 and US 27 interchange, across from Lake Louisa State Park.

As developed in the PD&E study, the primary purposes of the new SR 516 corridor are to expand regional system linkage and connectivity in Lake and Orange Counties, enhance mobility between US 27 and SR 429, and accommodate the expected increase in traffic due to population and employment growth within the study area while being consistent with accepted local and regional plans. The needs for the project are to provide improved system connectivity/linkage, accommodate anticipated transportation demand, provide consistency with local and regional plans, support economic viability and job creation, support intermodal opportunities, and enhance evacuation and emergency service.



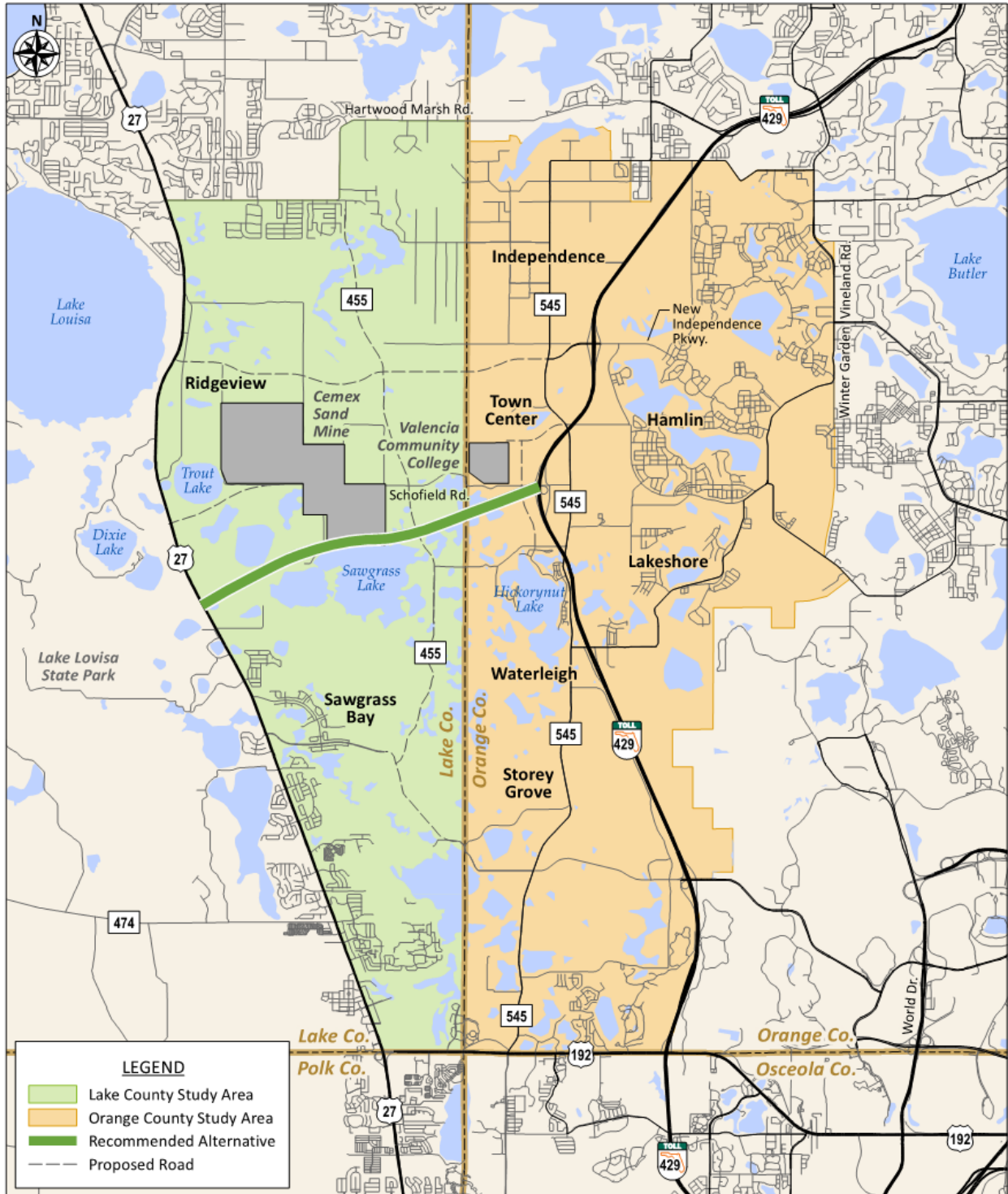


Figure 1: Lake Orange Connector (SR 516) Project Study Area

## 1.2 Project Location

The Systems Interchange Modification Report (SIMR) will consider the construction of the proposed Lake Orange County Connector/SR 516, which will connect the two major north-south facilities serving the project area: SR 429 and US 27, and have new access at two new roadway facilities, CR 455 Extension, and Valencia Parkway. The SR 516 connects to US 27 across from Lake Louisa State Park, and SR 429 adjacent to the Schofield Road local access interchange, as shown in **Figure 2**.

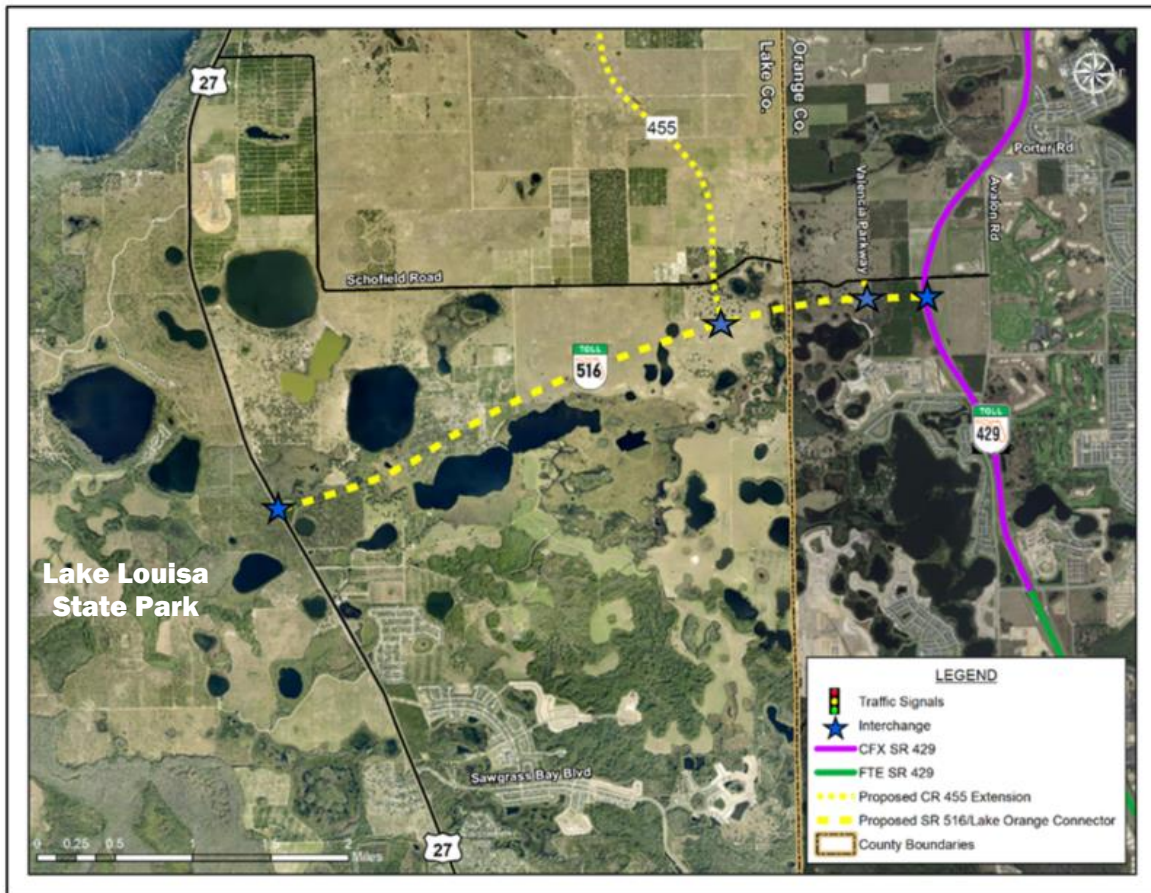


Figure 2: Interchange Access Request Location – SR 516 at US 27 and SR 429

## 1.3 Area of Influence

According to the Interchange Access Request User's Guide (IARUG, September 2020), the crossroad area of influence shall extend at a minimum, up to one half-mile in either direction of the proposed access change. If there are signalized intersections along the crossroad, the area of influence shall extend to include at least one signalized intersection in either direction. According to these guidelines, the area of influence is defined as follows:

Interchanges on SR 516:

- SR 516 at US 27
- SR 516 at CR 455 Extension
- SR 516 at Valencia Parkway
- SR 516 at SR 429



## Intersections on US 27:

- US 27 at Lake Louisa State Park Entrance
- US 27 at SR 516
- US 27 at Sawgrass Bay Boulevard

## Intersections on CR 455:

- SR 516 EB Ramps
- SR 516 WB Ramps

## Intersections on Valencia Parkway:

- SR 516 EB Ramp
- SR 516 WB Ramp

## Ramp Junctions on SR 429:

- SR 516/SR 429 Ramps to/from South
- SR 516/SR 429 Ramps to/from North

**Figure 3** depicts the Area of Influence (AOI) for this SIMR.

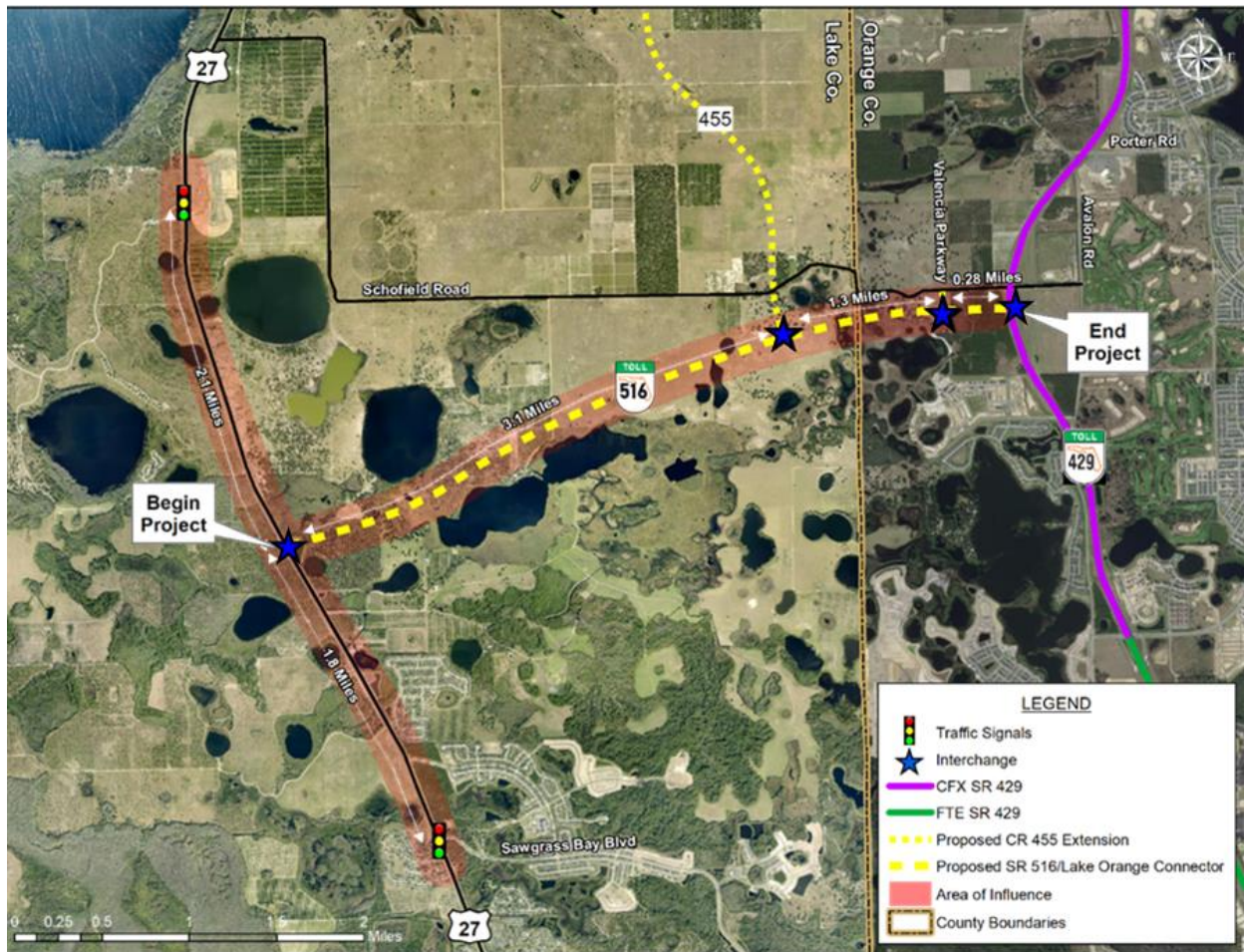


Figure 3: SR 516 Interchange Access Request Area of Influence

## 2. Methodology

An Interchange Access Request Methodology Letter of Understanding (MLOU) was prepared and approved in November 2021 to document the methodology for the analysis of this SIMR. A copy of the MLOU is provided in **Appendix A**. The following sections summarize the traffic operational methodology used to perform the analysis in this report.

### 2.1 Analysis Years

The following years were established for the traffic operational analyses:

- Existing Year – 2018
- Opening Year – 2025
- Design Year – 2045

The analysis years for the SIMR are consistent with the approved *Project Traffic Analysis Report dated September 2019* prepared as part of the PD&E Study.

### 2.2 Travel Demand Forecasting

The travel demand model used to analyze the Lake Orange County Connector/SR 516 preliminary alignment alternatives for the PD&E Study is based on an updated and improved travel demand model developed specifically to forecast toll facilities in Central Florida. The CFX Model 3.0, used for evaluating the Osceola County Expressway Authority (OCX) Master Plan projects, is based on the Central Florida Regional Planning Model (CFRPM) version 6.1, covering ten counties plus portions of three other counties in Central Florida. Using the CFX Model 3.0 as a starting point, CFX made updates and refinements with special emphasis on the I-4 corridor and SR 429 for better base year validation and updated the base year to 2017. This model was designated CFX Model 3.1. For the Lake Orange County Connector/SR 516, a project specific model was developed using the CFX 3.1 model as a base and is designated CFX 3.5.

Linear growth rates were computed using future model year to base model year volumes as well as future model year to existing year volumes. Historical growth rates were also computed for the study area roadway segments based on historical trends analysis and population growth. The different growth rate methods were used to confirm that the model derived Annual Average Daily Traffic (AADTs) were reasonable. Additional adjustments were made to model volumes to produce balanced AADTs along the mainline and crossroads.

The analysis years for the Travel Demand Model are as follows:

- Base Year – 2017
- Horizon Year – 2045

### 2.3 Traffic Factors

A Peak Hour Factor (PHF) of 0.95 were assumed for the Lake Orange Connector traffic analysis. A Directional Distribution Factor (D) of 60.0 percent and a daily truck factor (T) of 4.0 percent was assumed for the future



conditions on the Lake Orange Connector and a D factor of 55.0 percent and a T factor of 7.0 percent was assumed for the future conditions on US 27 and SR 429 in this study. The traffic factors shown in **Table 1** were used to develop the future design hour volumes in the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report dated September 2019*. The T factor on Schofield Road was increased to 15 percent due to the proposed CEMEX Four Corners Mine currently under permitting and not known at the time of the PD&E study. Toll roads are choice facilities for most customers, and peak hour traffic is a relatively high percentage of daily traffic compared to non-toll roads. Therefore, the higher K-factor of 11 percent for the toll road expansion provides more conservative Directional Design Hour Volumes (DDHV) to prevent under-designing the facility. This K-factor is consistent with other expansion facility design traffic forecasts and has been observed on SR 429 and SR 414.

*Table 1: Summary of Traffic Factors*

Roadway	K	D	T	T <sub>f</sub>	PHF	MOCF
<b>Lake Orange Connector</b>	11.0%	60.0%	4.0%	2.0%	0.95	0.94
<b>US 27</b>	9.0%	55.0%	7.0%	3.5%	0.95	0.94
<b>SR 429</b>	10.0%	55.0%	7.0%	3.5%	0.95	0.94
<b>Schofield Road, CR 455, and Valencia Parkway</b>	9.0%	60.0%	15.0%	7.5%	0.95	0.94

Source: SR 429 factors are based on the existing traffic data and uses a conservative estimate. The Standard K-Factor from Florida Traffic Online (FTO) was used for US 27.

## 2.4 LOS Target

The adopted Level of Service (LOS) target within the area of influence are listed below:

- Lake Orange County Connector/SR 516 mainline and ramps – LOS D
- US 27 – LOS C
- SR 429 – LOS D

## 2.5 Analysis Procedures

The guidelines outlined in the *2014 FDOT Traffic Analysis Handbook* were followed as this was the most current version at the time of the PD&E study. Synchro 11 was used for signalized intersection analyses and traffic signal optimization. The future year Synchro models use optimized signal timings and phasing plans. Freeway and arterial segments (basic, weave, merge, and diverge) and intersections were evaluated following the Highway Capacity Manual (HCM), 6<sup>th</sup> Edition LOS guidelines.

Measures of Effectiveness (MOEs) such as delays, volume to capacity (v/c) ratios, speed, density, and queue lengths obtained from the Synchro and HCS analyses were documented. The MOEs from Synchro utilized the HCM 6<sup>th</sup> Edition reports. Queue lengths were reported based on the 95<sup>th</sup> percentile values in Synchro. The queue lengths were utilized to evaluate necessary turn lane lengths on the off-ramps to prevent traffic from extending onto SR 516 from the proposed interchange and along US 27 to ensure turn lanes are adequate.

## 2.6 Alternatives Considered

The following scenarios were considered for this SIMR:

- SR 429 Existing Year (2018)
  - AM and PM peak hours
- US 27 Existing Year (2021)
  - AM and PM peak hours
- Opening Year (2025)
  - No-Build – AM and PM peak hours
  - Build – AM and PM peak hours
    - Stop-Controlled Intersection – AM and PM peak hours
    - Signalized Intersection – AM and PM peak hours
    - Grade Separated Ramps – AM and PM peak hours
- Design Year (2045)
  - No-Build – AM and PM peak hours
  - Build – AM and PM peak hours
    - Stop-Controlled Intersection – AM and PM peak hours
    - Signalized Intersection – AM and PM peak hours
    - Grade Separated Ramps – AM and PM peak hours

The existing year 2018 was used for SR 429 as this was the existing year for the PD&E analysis. As part of the SIMR analysis additional traffic counts were taken in 2021 for the analysis of the US 27 intersections, as US 27 was under construction at the time of the PD&E study.

The build alternatives for the US 27 interchange with SR 516 considered for this analysis were a stop condition, signalized intersection and grade separated ramps. The PD&E study recommended grade separated ramps to accommodate future traffic in the area, and during the design process these ramps were refined to go under US 27 to lessen sight impacts to Lake Louisa State Park. For this analysis the recommended grade separated ramps were analyzed in addition to a stop-controlled and signalized intersection. The concepts for these three interchange alternatives are shown in **Figures 4, 5 and 6**.

The stop-controlled alternative, shown in **Figure 4**, has a T-intersection at US 27, with exclusive southbound left-turn and northbound right-turn lanes on US 27 and two lanes in each direction on SR 516 in both the 2025 and 2045 analysis years.

The signalized intersection alternative also has a T-intersection at US 27, with a southbound left-turn

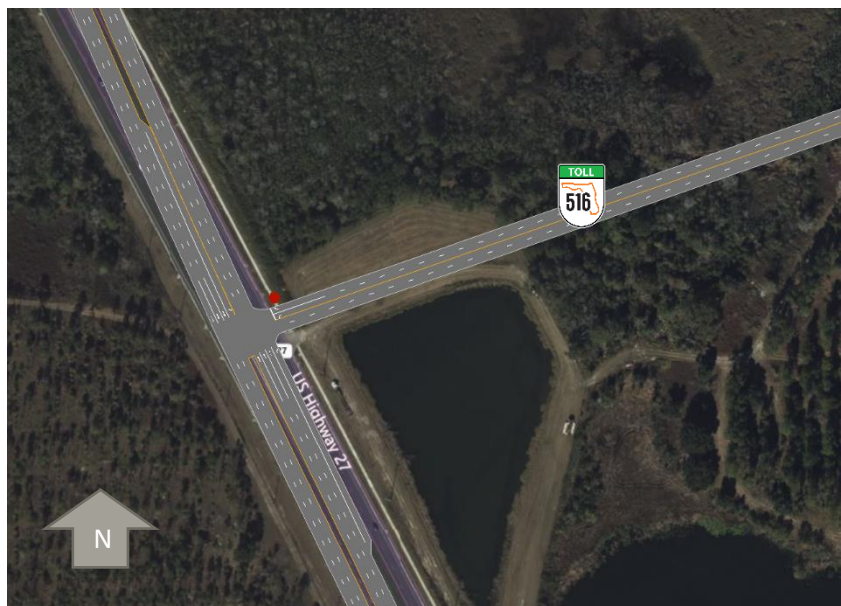


Figure 4: US 27 Interchange Alternative - Stop Condition (2045)

lane and a northbound right-turn lane in 2025 and dual southbound left-turn lanes in 2045. Both analysis years have two lanes in each direction on SR 516, as shown in **Figure 5**.

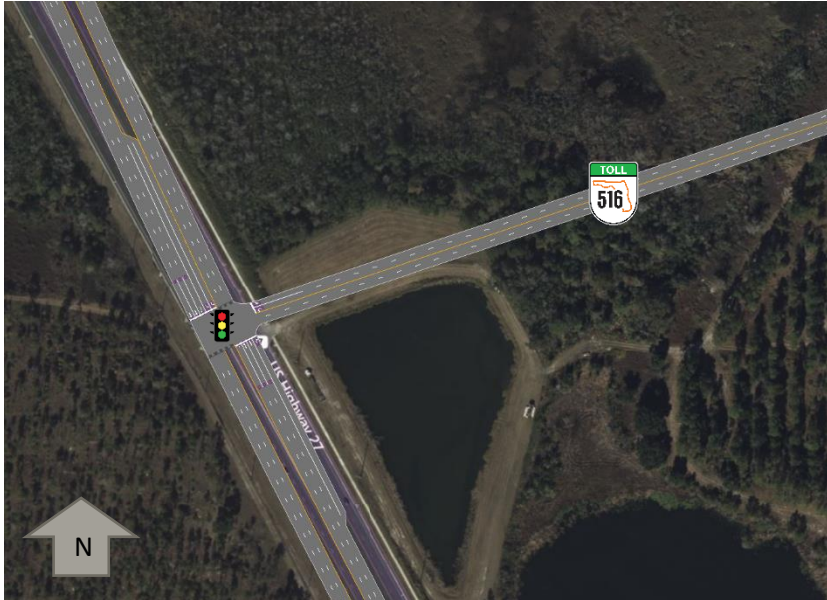


Figure 5: US 27 Interchange Alternative - Signalized (2045)

The grade separated ramp alternative has two one-lane ramps from the east side of US 27 and two one-lane ramps that originate on the west side of US 27 and travel under US 27 to start SR 516 on the west end of the project, as shown in **Figure 6**.

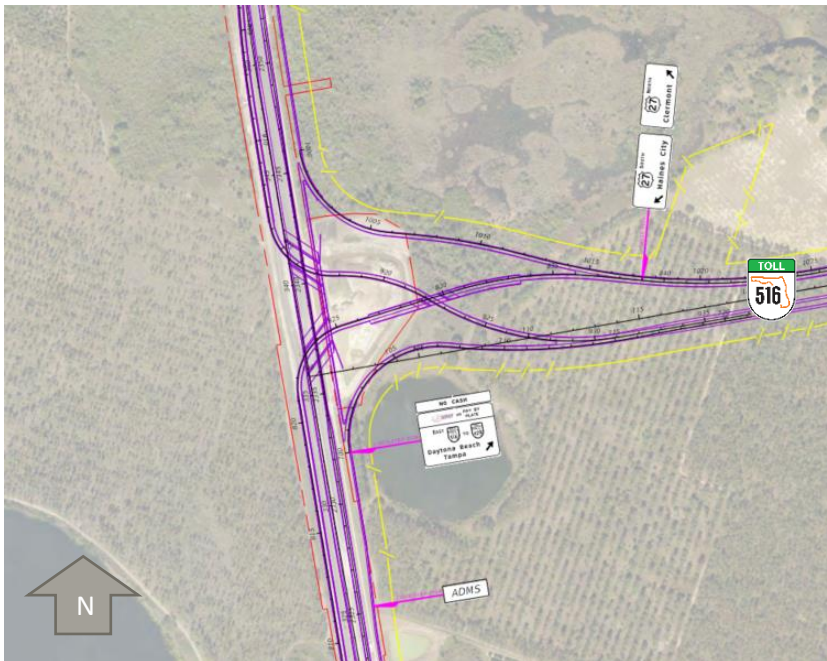


Figure 6: US 27 Interchange Alternative - Grade Separated Ramps (2045)

## 3. Existing Conditions

### 3.1 Existing Roadway Network

The existing network in the study area consists of SR 429, US 27, and Schofield Road. The proposed SR 516 will provide a four-lane tolled expressway with interchanges at US 27, the proposed CR 455 Extension, the proposed Valencia Parkway and SR 429. The facility provides a needed connection between US 27 and SR 429 in this growing area of the region. The following is a description of major roadways within SIMR project area that would be impacted.

#### **SR 429**

SR 429 is a north-south limited access toll facility with a posted speed of 70 mph. SR 429 forms the western beltway around the Orlando Metro area and serves north-south trips in western Orange County. SR 429 connects I-4 on the south to US 441 on the north and becomes the Wekiva Parkway/SR 429 north of US 441. The current terminus is SR 46 but FDOT is still under construction with the sections that will connect Wekiva Parkway/SR 429 to I-4 at SR 417 in Sanford, FL. It is anticipated that the full project will be open by Fall of 2022. The segment of SR 429 from I-4 on the south to Seidel Road is owned by Florida's Turnpike Enterprise, the segment from Seidel Road to SR 46 and Mt. Plymouth Road is owned by CFX, and the segment from SR 46 and Mt. Plymouth Road to I-4 in Sanford is under construction by FDOT, District 5. The proposed SR 516/SR 429 interchange is a system-to-system interchange co-located with the existing Schofield Road interchange and will combine ramps with Schofield Road to/from the North.

#### **US 27**

US 27 is a 6-lane divided north-south principal arterial in the project limits with a posted speed of 55 mph. The SR 516 interchange on US 27 is proposed as a system's interchange with full ramp movements northbound and southbound. US 27 in the project limits is largely undeveloped, with Lake Louisa State Park on the west side and vacant lands on the east side, starting to develop as low density residential with access off US 27. The intersections at Lake Louisa State Park and Sawgrass Bay Blvd will be analyzed to consider influence on these intersections as the next closest intersection.

#### **Schofield Road**

Schofield Road is a two-lane partially paved local access road between Avalon Road and US 27 with a posted speed of 40 mph on the paved section in Orange County. Schofield Road provides access to agricultural properties along the road and is currently a dirt road in Lake County. CEMEX will open a sand mine on a 1,200-acre tract along Schofield Road and agreed to improve 4.5 miles of Schofield Road between U.S. 27 and the Orange County line.

#### **CR 455 Extension**

CR 455 Extension is a proposed 2-lane north-south major collector from Hartwood Marsh Road to SR 516. The SR 516 interchange is proposed as a full diamond interchange with intersections on CR 455 Extension. The CR 455 Extension in the study limits is undeveloped. The only existing land use is the Southern Hills Farm on Schofield Road.

#### **Valencia Parkway**

To provide access to a proposed Valencia College campus, the proposed Valencia Parkway will connect SR 516 to Schofield Road. Valencia Parkway is anticipated as a 4-lane connector facility.



US 27 is surrounded by residential land use and vacant/agricultural/recreation parcels. Other minor roadways in the study area include Lake Louisa Road and Sawgrass Bay Boulevard, both of which intersect with US 27 at signalized locations but do not provide connections to other major roadways in the regional network. Both roadways are currently two-lane facilities within the study area.

## 3.2 Existing Traffic

Existing traffic counts (72-hour volume counts, 72-hour classification counts, and turning movement counts) for the roadways and intersections within the area of influence were collected in May 2018 for the Project Traffic Analysis Report. The data collection efforts used to determine existing traffic volumes are outlined in Section 3 of the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report dated September 2019*. Historical counts were obtained from FDOT Florida Traffic Online (FTO), Orange County, and Lake County. Turning movement volumes at the intersection of US 27 and Lake Louisa State Park/Crestavista Avenue for the Phase 5 Build condition in the *Ridgeview Development Access Analysis report prepared by TMC in June 2020* were used. A 72-hour classification count on US 27 and additional turning movement counts were collected on US 27 and at the intersection of US 27 and Sawgrass Bay Boulevard the week of April 18, 2021. (US 27 was under construction at the time of May 2018 data collection.)

## 3.3 Existing Crash Data

Crash data for US 27 was collected from north of Lake Louisa Road to south of Sawgrass Bay Boulevard using the state’s Crash Analysis Reporting System (CARS) and Signal Four Analytics. The most recent and complete five-year data set available, 2014 through 2018, was processed. The raw crash data is provided in **Appendix B**. To accurately understand the crash results, the details from the crash reports were reviewed based on the long and short forms provided. The following discussion provides the narrative from the results.

A total of 333 crashes were reported during the five-year analysis period from 2014 through 2018. The crash locations are shown by year in **Figure 7** through **Figure 11**. There was no linear trend between the year and the number of crashes at each intersection. Along the study area, 2016 had the highest number of crashes (89) and 2014 had the fewest crashes (37). **Table 2** shows the total crashes in the five-year data set broken down by year.

*Table 2: Number of Crashes Per Year*

Year	Number of Crashes
2014	37
2015	52
2016	89
2017	87
2018	68

Crashes by severity are displayed in **Figure 12**. The results included one fatality reported within the five-year analysis period and another 141 crashes resulting in injury. There were 191 (approximately 57 percent) crashes which resulted in property damage only.



Figure 7: Total Crashes (2014)



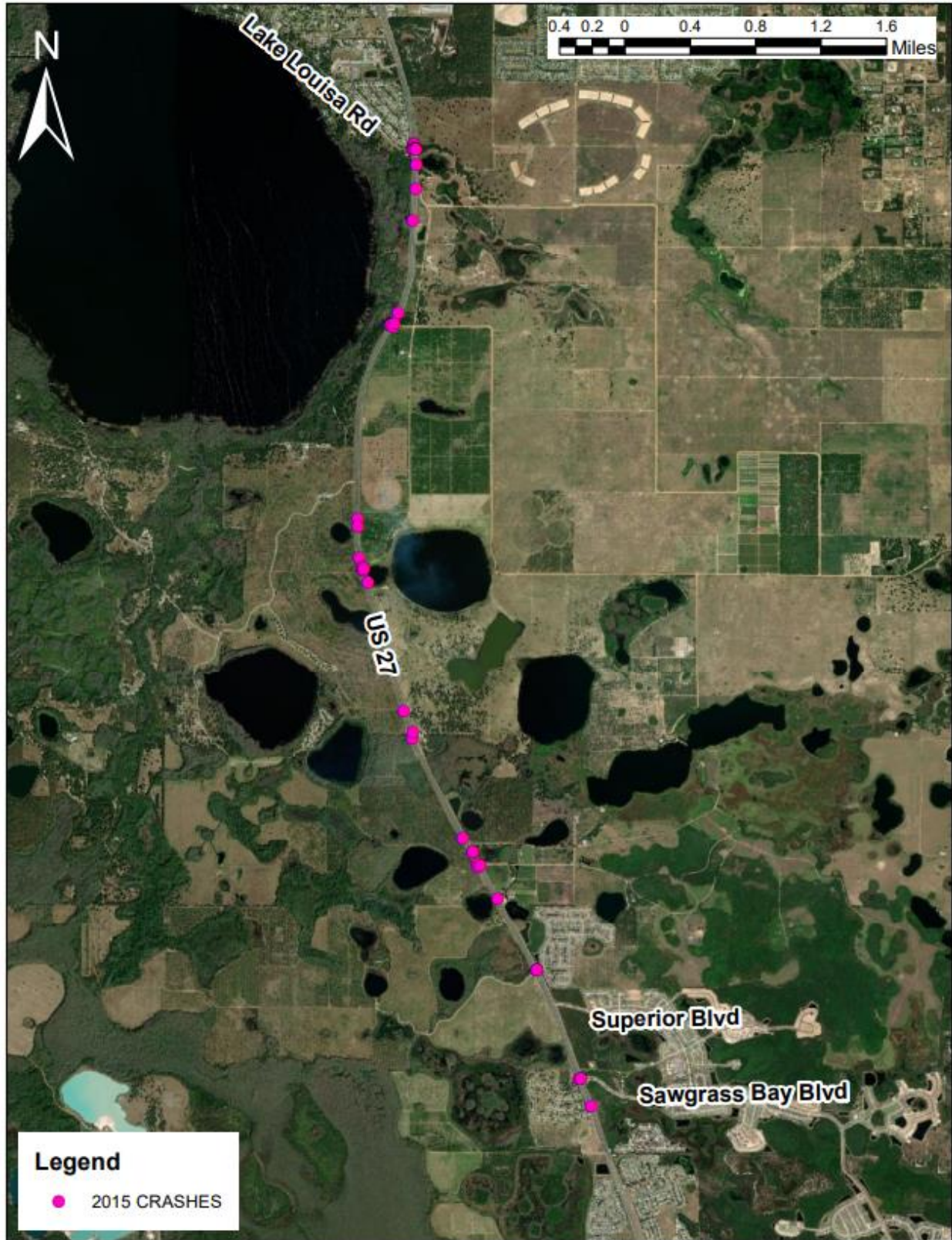


Figure 8: Total Crashes (2015)



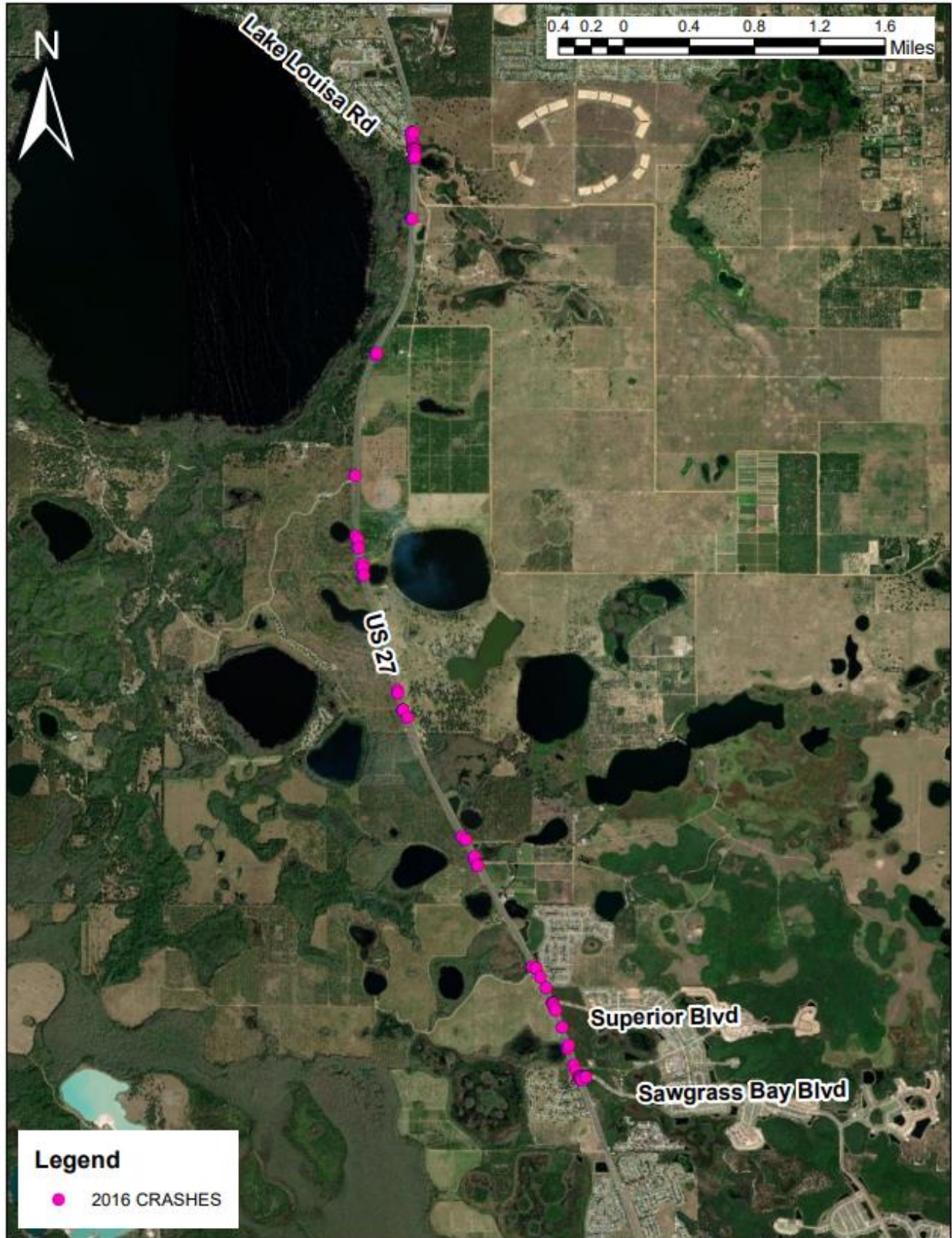


Figure 9: Total Crashes (2016)





Figure 10: Total Crashes (2017)





Figure 11: Total Crashes (2018)





Figure 12: Total Crashes by Crash Severity (2014-2018)

### 3.3.1 Intersection Crashes

Of the 333 crashes, 136 (approximately 41 percent) occurred at the signalized intersections and 197 (approximately 59 percent) occurred at mid-block locations. At the intersections, a 250-foot buffer influence area was used to accurately capture all intersection-related crashes.

The first intersection evaluated for crash details was US 27 and Lake Louisa Road. A total of 76 crashes were reported between 2014 and 2018 at the intersection. Most of the crashes occurred between Friday and Sunday, with an even distribution Monday through Thursday. Generally the crashes occurred in the evening hours between 4:00 PM and 11:00 PM. As shown in **Figure 13**, most of the crashes were rear end (60%), occurred under dry road surface conditions during the day and resulted in property damage only. Due to the location of the study area, approximately 23 percent of the crashes occurred when it was dark and no lighting was present. No fatalities occurred at this intersection during the five-year analysis period.

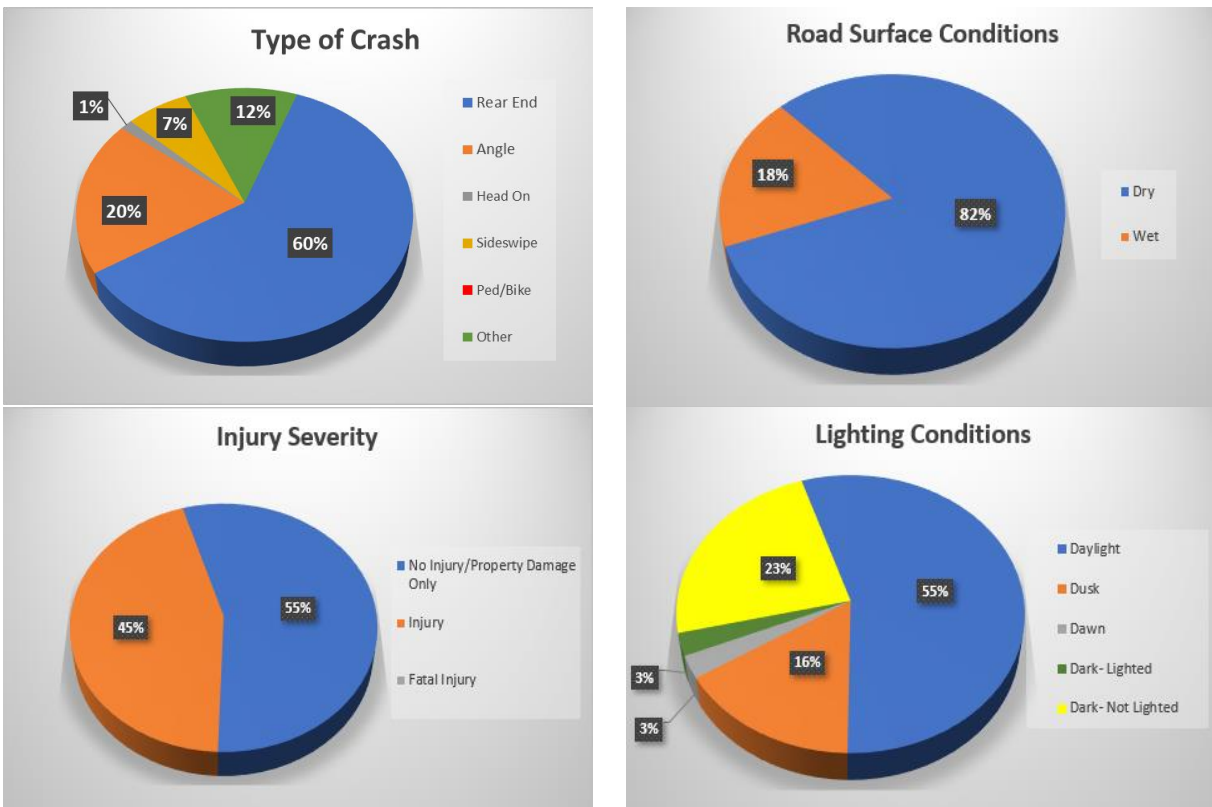


Figure 13: US 27 and Lake Louisa Road Intersection Crash Data Summary (2014-2018)

A total of 60 crashes were reported at the intersection of US 27 and Sawgrass Bay Boulevard between 2014 and 2018, most occurring on Wednesday and Thursday. Rear end crashes resulted in approximately 73 percent of the total crashes. Roughly 32 percent of the total crashes at this intersection resulted in injury and 68 percent resulted in property damage only as shown in **Figure 14**. The road conditions for almost all of the crashes were dry and the lighting conditions were typically daylight. No fatalities occurred at this intersection during the five-year analysis period .

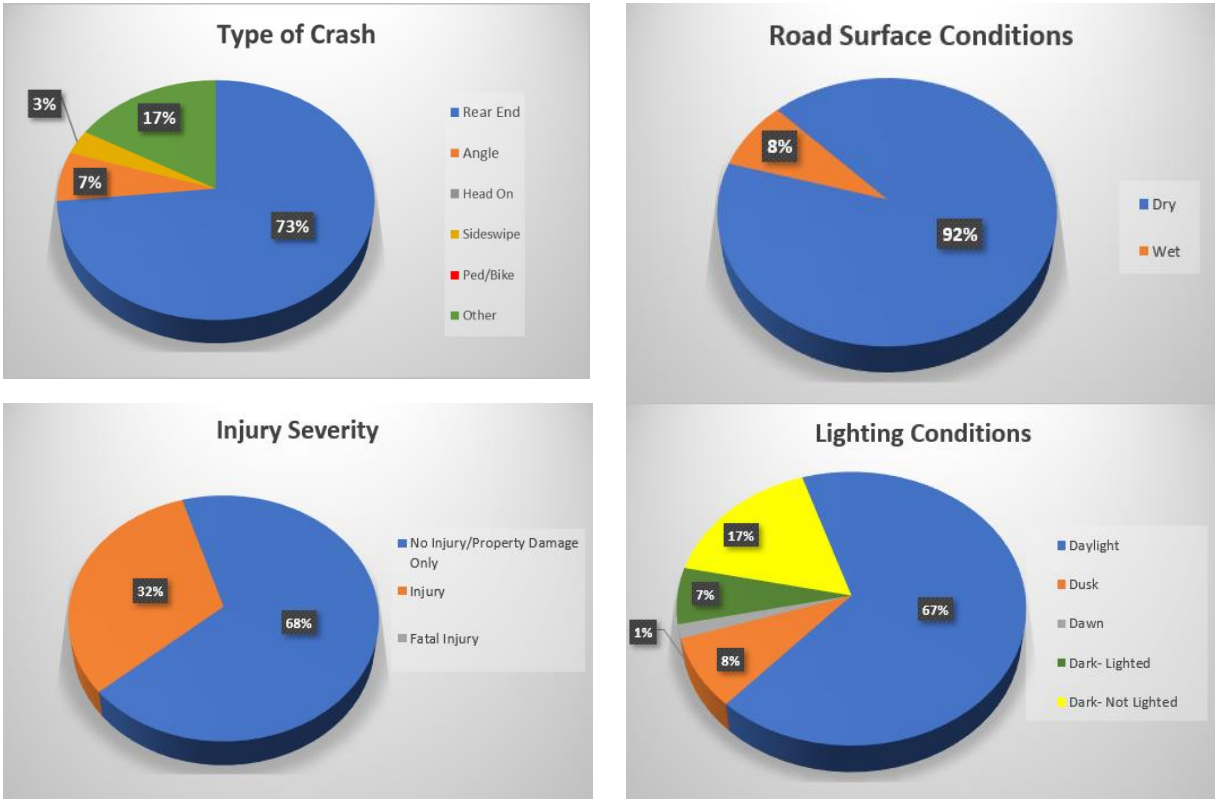


Figure 14: US 27 and Sawgrass Bay Boulevard Intersection Crash Data Summary (2014-2018)

Actual crash rates were computed and compared with average crash rates for similar facilities within Lake County to assess the safety condition within the study area. Critical crash rates were also estimated. Crash rates were estimated as crashes per Million Entering Vehicles (MEV). The critical crash rate is based on the average crash rate for a similar facility adjusted by vehicle exposure and a probability constant. If an intersection has an actual crash rate higher than the critical crash rate, it may have a safety deficiency. The crash rates are listed in **Table 3**. The analysis shows that the intersections of US 27 at Lake Louisa Road and Sawgrass Bay Boulevard have an actual crash rate higher than the critical crash rate, indicating that there may be a safety deficiency at the intersections.

Table 3: Intersection Crash Rates

US 27 Intersection	Total Crashes	Average Crashes <sup>1</sup>	AADT (Approach Volumes) <sup>2</sup>	Actual Crash Rate <sup>3</sup>	Average Crash Rate <sup>4</sup>	Critical Crash Rate
Lake Louisa Road	76	15.2	14,975	2.78	0.39	1.11
Sawgrass Bay Boulevard	60	12	15,050	2.18	0.59	1.45

<sup>1</sup>Crashes/Years of Data Collected

<sup>2</sup><https://tdaappsprod.dot.state.fl.us/fto/>

<sup>3</sup>[https://safety.fhwa.dot.gov/local\\_rural/training/fhwasa1210/s3.cfm](https://safety.fhwa.dot.gov/local_rural/training/fhwasa1210/s3.cfm)

<sup>4</sup>FDOT CARS Lake County, 5-year Average Crash Rate



### 3.3.2 Mid-Block Crashes

The mid-block crashes are depicted in **Figure 15**. The mid-block crash locations are the crashes that occurred outside of the intersection influence area of 250 feet. The mid-block locations accounted for 197 crashes (approximately 59 percent) of the total crashes evaluated from CARS and Signal Four Analytics between 2014 and 2018 for the study area. The crashes were evenly distributed along the study area but with the majority being near median openings. In addition, crashes appeared to occur mostly on Monday, Wednesday or Friday, with those days making up approximately 56 percent of the total mid-block crashes.



Figure 15: Mid-Block Crashes (2014-2018)

Approximately 51 percent of the crashes were rear end, mostly resulting in property damage only (55 percent), occurring during daylight (66 percent) and in dry roadway surface conditions (85 percent) as shown in **Figure 16**. One fatality occurred in mid-block locations. The fatality occurred at 12:12 AM on a Friday when the roadway conditions were dry and the lighting was dark. The driver was under the influence of drugs and alcohol, and as a result lost control of the vehicle near the intersection of South Bradshaw Road and struck a utility pole.

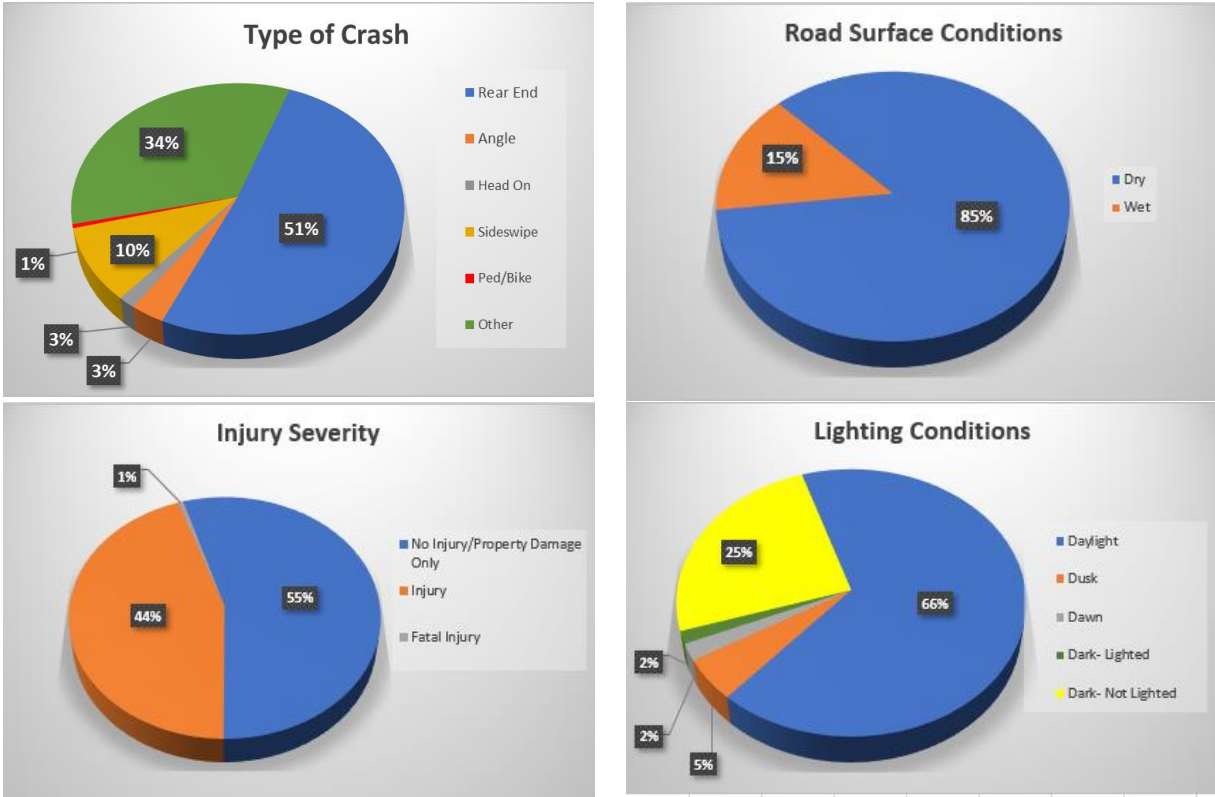


Figure 16: Mid-Block Crash Data Summary (2014-2018)



## 4. Existing Traffic Analysis

The proposed design is a new expressway of SR 516 from US 27 to SR 429. Because the project roadway is not built yet, the existing segment analysis considers the limits of US 27 as a six-lane roadway, as defined in the AOI. The intersection analysis evaluates the existing intersections from the PD&E study, including the SR 429 ramp terminals at New Independence Parkway and Schofield Road and the intersection of Avalon Road at Schofield Road. Additionally, the two signalized intersections along US 27 at Lake Louisa Road and Sawgrass Bay Boulevard were also included. The peak hour volumes used for the 2018 existing analysis are shown in **Figure 17**.

**Appendix C** contains the associated HCS reports for the existing segment analysis. **Appendix D** contains the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report dated September 2019* for reference. **Appendix E** contains the Synchro analysis reports for the intersections along US 27.

### 4.1 Segment Analysis

The Synchro 11 Arterial Level of Service performance metric was used to evaluate the traffic operational analysis based on the existing six-lane geometry of US 27 north and south of the proposed SR 516 interchange at US 27. The northbound mainline results of the operational analysis are shown to be LOS A in the AM and PM peak hours. The southbound mainline results of the operational analysis are also shown to be LOS A in the AM and PM peak hours. The results of the 2021 Existing arterial analysis are displayed in **Table 4**.

Table 4: 2021 Existing Arterial LOS Results

Segment	Distance (mi)	2021 EXISTING					
		AM Peak Hour			PM Peak Hour		
		Travel Time (s)	Speed (mph)	LOS	Travel Time (s)	Speed (mph)	LOS
NB US 27 between Sawgrass Bay Boulevard and Lake Louisa Road	4.26	316.2	48.5	A	318.8	48.1	A
SB US 27 between Lake Louisa Road and Sawgrass Bay Boulevard	4.23	307.8	49.4	A	313.2	48.6	A

### 4.2 Intersection Analysis

An existing intersection analysis was conducted as part of the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report (PTAR) dated September 2019*. The PTAR is provided in **Appendix D** and **Table 5** herein summarizes the 2018 AM and PM peak hour intersection LOS. The Synchro results concluded that the intersections operate at an overall LOS D or better in both the AM and PM peak hours, except for the SR 429 Southbound Ramps at New Independence Parkway, which is LOS F in the PM peak hour. The ramp terminal at New Independence Parkway was unsignalized at the time of the PD&E Study, but since the study, both ramp terminal intersections have been signalized. Similarly, the eastbound left turn movement at Avalon Road and Schofield Road operates at LOS E in the PM peak hour, which is currently an unsignalized intersection.

Table 5: 2018 Existing AM and PM Peak Hour Intersection Level of Service Results

Intersection	Movement	AM Peak			PM Peak		
		v/c	Delay	LOS	v/c	Delay	LOS
SR 429 NB Ramp @ New Independence Parkway	NBL	0.04	14.9	B	0.43	26.4	D
	NBR	0.04	9.8	A	0.23	11.9	B
SR 429 SB Ramp @ New Independence Parkway	SBL	0.63	23.9	C	1.22	147.6	F
	SBR	0.06	8.9	A	0.19	10.3	B
Avalon Rd @ Schofield Road	EBL	0.10	27.8	D	0.50	41.6	E
	EBR	0.26	12.0	B	0.28	11.3	B
SR 429 NB @ Schofield Road	NBL	0.01	10.9	B	0.01	10.6	B
	NBR	0.02	9.3	A	0.05	9.6	A
SR 429 SB @ Schofield Road	SBL	0.22	10.2	B	0.23	10.2	B
	SBR	0.00	8.4	A	0.01	8.5	A

Source: Lake Orange Connector PD&E Study – Project Traffic Analysis Report dated September 2019 (Table 3-7)

Intersection analysis was performed on the two signalized intersections along US 27, which were not part of the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report dated September 2019*. **Figure 17** shows the existing turning movement volumes from the 2018 and 2021 analysis. The Synchro analysis summary is presented in **Table 6**. The results show that the intersection at Lake Louisa Road operates at an overall LOS B in the AM and PM peak hours, with all movements operating at LOS C or better. The Sawgrass Bay Boulevard intersection operates at an overall LOS D in the AM peak hour and LOS B in the PM peak hour. The westbound through movement operates at LOS F in the AM. All other movements operate at LOS D or better. The Synchro reports are provided in **Appendix E**.

Table 6: 2021 Existing AM and PM Peak Hour Intersection Level of Service Results

Movements	US 27 @ Lake Louisa Road						US 27 @ Sawgrass Bay Boulevard					
	AM Peak			PM Peak			AM Peak			PM Peak		
	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
EBL	0.02	29.2	C	0.03	32.6	C	0.15	34.8	C	0.06	34.1	C
EBT	0.00	0.0	A	0.01	0.0	A	0.09	21.1	C	0.09	19.1	B
EBR	-	-	-	-	-	-	-	-	-	-	-	-
WBL	0.14	29.2	C	0.10	32.9	C	-	-	-	-	-	-
WBT	0.13	0.5	A	0.09	0.3	A	1.22	153.8	F	0.77	49.2	D
WBR	-	-	-	-	-	-	0.34	5.1	A	0.14	0.6	A
NBL	0.00	7.0	A	0.01	8.2	A	0.03	10.9	B	0.14	11.6	B
NBT	0.42	11.1	B	0.44	14.1	B	0.49	19.0	B	0.46	18.6	B
NBR	0.01	0.0	A	0.04	0.1	A	0.28	4.0	A	0.31	3.9	A
SBL	0.07	6.7	A	0.22	8.7	A	0.15	11.6	B	0.13	11.5	B
SBT	0.42	9.5	A	0.38	9.8	A	0.33	13.8	B	0.48	18.9	B
SBR	0.01	0.0	A	0.01	0.0	A	0.00	0.0	A	0.02	0.1	A
<b>Overall</b>		<b>10.2</b>	<b>B</b>		<b>11.6</b>	<b>B</b>		<b>36.8</b>	<b>D</b>		<b>19.6</b>	<b>B</b>

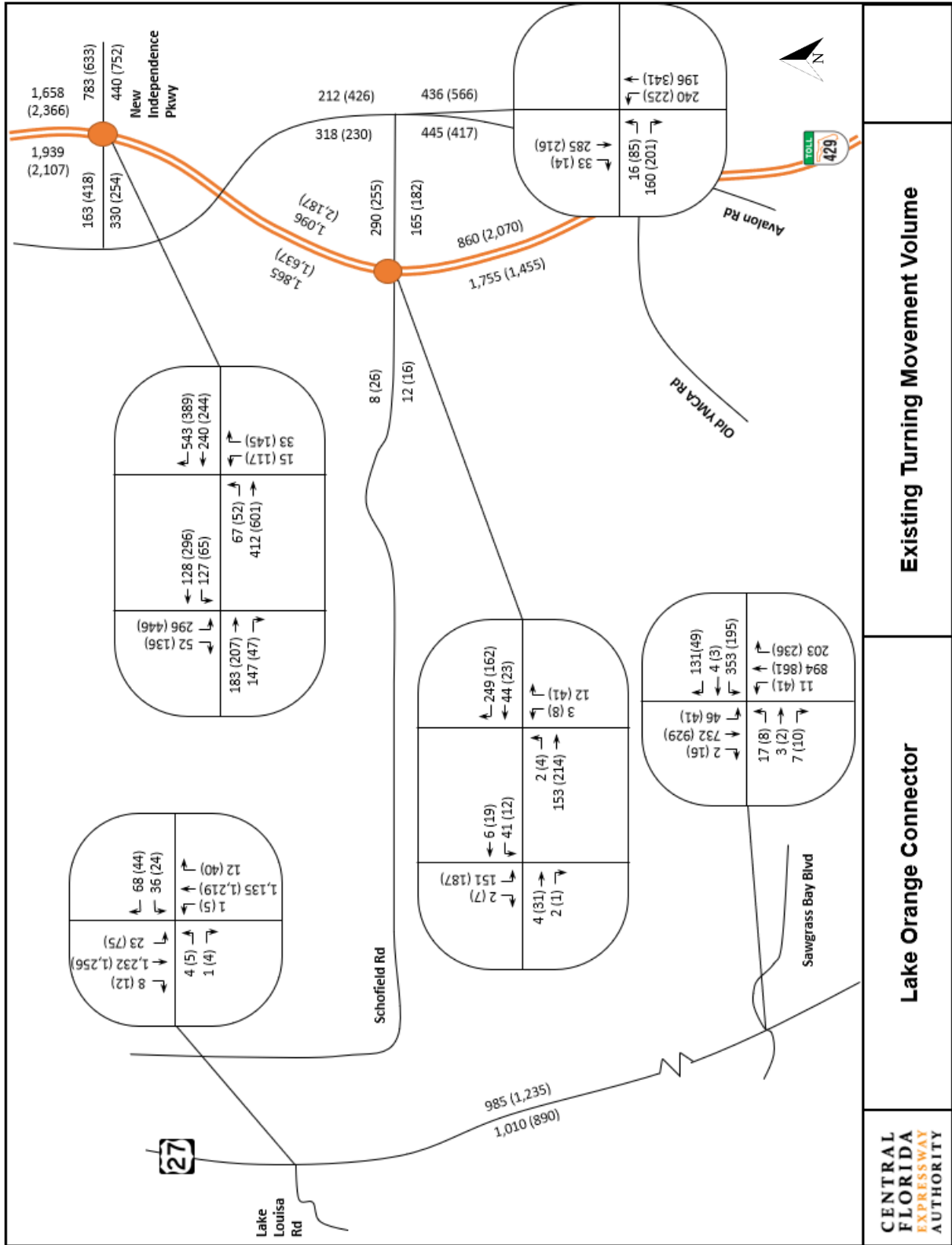


Figure 17: 2018 and 2021 Existing Turning Movements and Peak Hour Volumes

## 5. Future Conditions

### 5.1 Future Year Roadway Network

The interchange and traffic analyses in this report consider future roadway improvements identified in local comprehensive plans, MPO Long Range Transportation Plans (LRTPs) and Transportation Improvement Plans (TIPs). **Table 7** lists the roadway improvement projects in Lake and Orange Counties in proximity to the SR 516-Lake Orange County Connector from US 27 to SR 429 (Projects 1, 2 & 3).

Table 7: Lake and Orange County Area Roadway Improvements Summary

Project Name	Limits		Approx. Length (miles)	Improvement	Jurisdiction	FY Letting	Cost Est Range (Millions)
	From	To					
<b>Lake Orange County Connector</b>	US 27	Cook Road	1.2	New 4-lane Expressway	CFX	2025	\$96.3
<b>Lake Orange County Connector</b>	Cook Road	County Line	1.8	New 4-lane Expressway	CFX	2025	\$108.9
<b>Lake Orange County Connector</b>	County Line	SR 429	0.8	New 4-lane Expressway	CFX	2025	\$114.7
<b>SR 429</b>	N of Tilden Road	Florida's Turnpike	3.5	Widen to 6-lanes	CFX	2025	\$93.3
<b>SR 50</b>	CR 565 (Villa City)	CR 565A (Montevista)	2.1	Widen to 4-lanes	FDOT	2026	\$57.7
<b>SR 429</b>	I-4	Seidel Road	9.88	Widen to 8 lanes	FTE	2030	\$90.0
<b>Hartzog Road/Flamingo Crossing</b>	Avalon Road	Western Way	2.99	Widen to 4-lanes	County	2036	\$33.7
<b>Western Way Ext</b>	Avalon Road	Flamingo Crossing Blvd	1.77	New 4-lane Roadway	County	2036	\$28.0
<b>New Independence Parkway</b>	County line	Valencia Pkwy	0.46	Widen to 4-lanes	County	2036	\$5.2
<b>Avalon Road</b>	New Independence Pkwy	Tilden Road	3.7	Widen to 4-lanes	County	2036	\$41.6
<b>Avalon Road</b>	Tilden Road	Porter Road	0.92	Widen to 4-lanes	County	2036	\$10.3
<b>Tiny Road</b>	Tilden Road	Bridgewater Crossings Blvd	1.79	Widen to 4-lanes	County	2036	\$20.1
<b>SR 19</b>	SR 50	CR 455	9.37	Widen to 4-lanes	State	2036	\$97.4
<b>CR 455/Hartle Road</b>	Hartwood Marsh Road	Lost Lake Road	2.16	New 2 lane Roadway	County	2036	\$17.2
<b>SR 429</b>	Seidel Road	N of Tilden Road	6.7	Widen to 6 lanes	CFX	2040	TBD



## Consistency with Other Plans/Projects

The Lake Orange County Connector (SR 516) facility and associated interchanges were checked for consistency with the following plans:

- CFX 2040 Master Plan
- Metroplan Orlando 2045 Metropolitan Transportation Plan
- Lake Sumter MPO 2045 Long Range Transportation Plan
- Orange County Comprehensive Plan – Destination 2030
- Lake County Comprehensive Plan 2030
- Lake County – Wellness Way Implementation Plan
- SIS First Five Year Plan – Project Catalog FY 2020 – 2024
  - SIS Second Five Year Plan – Project Catalog FY 2025 – 2029
  - SIS Long Range Cost Feasible Plan – FY 2029-2045
  - SIS 2045 Multi-Modal Unfunded Needs Plan

### *CFX 2040 Master Plan*

CFX is responsible for the construction, maintenance, and operation of toll roads within four counties of Greater Orlando: Orange, Seminole, Osceola, and Lake. The CFX Master Plan is updated every five years to blueprint system improvements and highlight the mobility needs of Central Florida. In the CFX 2040 Master Plan, the proposed project is included in the Master Plan as the Lake Orange Connector (*aka* Wellness Way), from US 27 to SR 429, which at the time was under the Concept Development and Feasibility study phase. In the plan it is shown in Figure 5-1 – Potential New Expressway Projects, provided as **Figure 18** below. The Concept Development and Feasibility study recommended alternative met the viability test of revenues covering 50% of the project costs, per the Master Plan Policy Profile, and the CFX Board recommended the project move into the PD&E Phase at their July 2017 Board Meeting. The PD&E Study was adopted by the CFX Board on October 10, 2019, and the project is currently in the Design Phase.

### *MetroPlan Orlando 2045 Metropolitan Transportation Plan*

MetroPlan Orlando is the metropolitan planning organization (MPO) for Central Florida and updates the region's metropolitan transportation plan (MTP) every five years. Included in the MTP is a Cost Feasible Plan highlighting potential new transportation projects. The proposed project is included in the Cost Feasible Plan as toll-funded expressway project 1001, and in the Lake Sumter MPO 2045 Long Range Transportation Plan (LRTP), Table 4-7, as project #57 - the CFX Connector.

### *Orange County Comprehensive Plan*

While the proposed project is not included in the Orange County Comprehensive Plan (OCCP) 2010-2030 – Destination 2030 (adopted in 2009), CFX (formerly OOCEA) is named in several of the policies under Goal FLU 4. Horizon West. The plan states the following in **Policy FLU 4.1.8 Initiation of a Village Specific Area Plan, subsection IV 2.b.:**

“Prior to initiation of any transportation plan, the County shall consult with the Orlando/Orange County Expressway Authority (OOCEA) and the Florida Department of Transportation (FDOT) regarding the methodology for transportation analysis in regard to impacts on the Florida Intrastate Highway System (FIHS). Each specific area plan (SAP) shall analyze the cumulative traffic impact of all previously approved SAPs on the area road network, including the FIHS.”

At the time of adoption, SR 429 was on the FIHS. The Transportation Element of the OCCP has not been updated or amended to include the Lake Orange County Connector Expressway.

#### *Lake County Comprehensive Plan*

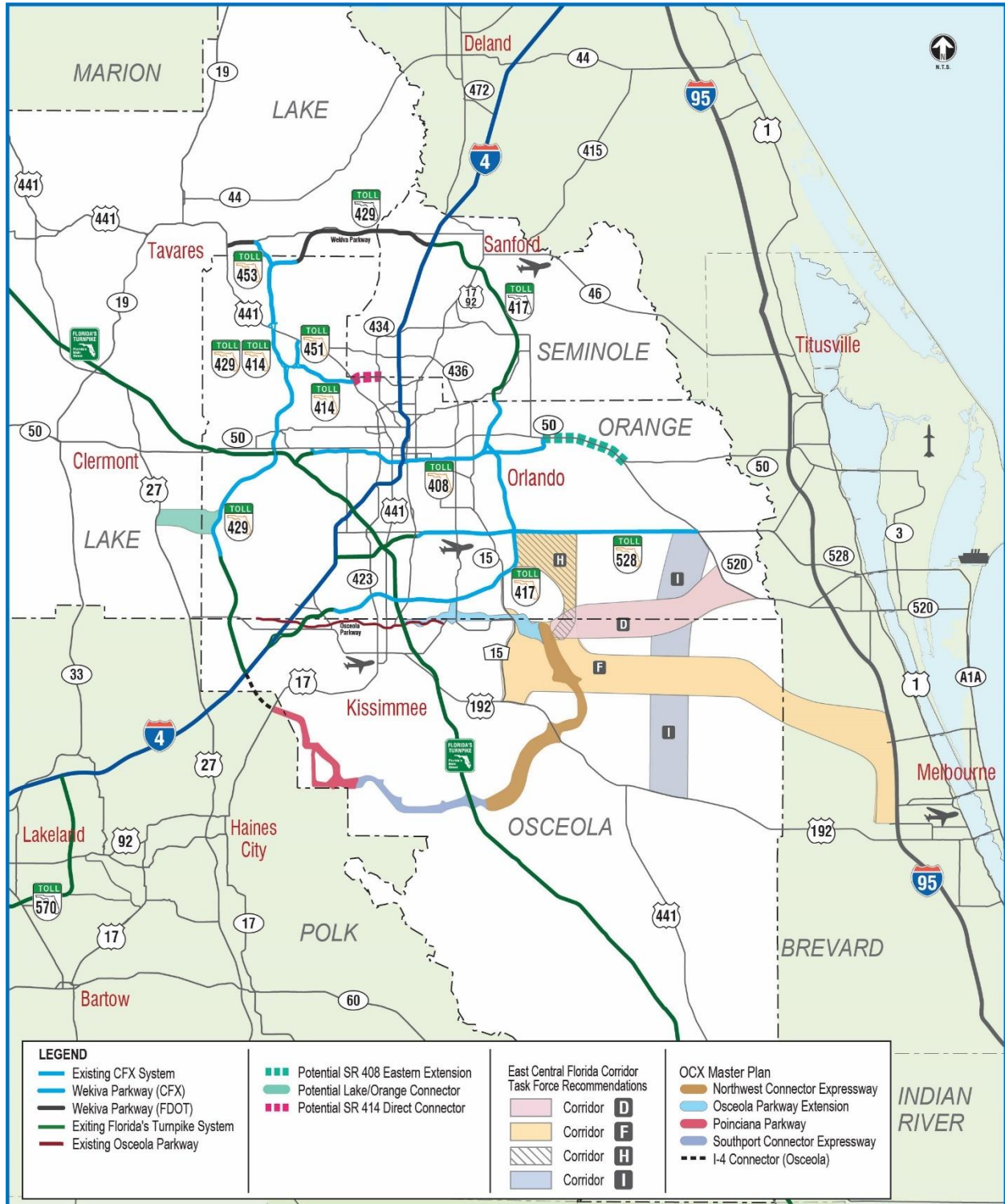
In the Lake County Comprehensive Plan 2030, the Lake Orange County Connector was originally contemplated as a local road in the Wellness Way Sector Plan. The sector plan process contemplated 16,200 acres in Southeast Lake County and was adopted by the Lake County Board of County Commissioners in July 2015. Following the sector plan, the Wellness Way Corridor Feasibility Study was prepared for the FDOT District 5 and the Federal Highway Administration (FHWA) by the Lake/Orange Parkway Partners, LLC. This study proposed a four-lane controlled access toll road connecting US 27 and SR 429, in the vicinity of the preferred alignment corridor of the Lake Orange County Connector PD&E Study.

#### *Lake County Wellness Way Implementation Plan*

The Lake County Wellness Way Implementation Plan was published in November 2020 as a joint effort between the City of Clermont and Lake County. This plan outlines planning initiatives being made to activate +/- 15,000-acre area between US 27 and SR 429 of the Orlando Beltway. One of the highlighted transportation projects in the plan is the Lake Orange Connector in the “Calibrating Programs and Land Allocations” section of the document.

#### *SIS First Five Year Plan*

CFX facilities are traditionally designated as State Intermodal System (SIS) Facilities. The proposed project is identified in the SIS 2045 Multi-Modal Unfunded Needs Plan as a “Potential SIS Facility.” This designation is for projects that will be funded by other agencies, not funded with SIS funding.



**CENTRAL FLORIDA EXPRESSWAY AUTHORITY** **2040 MASTER PLAN** **Potential New Expressway Projects** **FIGURE 5-1**

Figure 18: CFX 2040 Master Plan Map

**Table 8** provides a list of planned improvements and how they are consistent with local plans.

*Table 8: Consistency with Local Plans Summary*

Agency & Plan	Remarks	Page #	Section/Table #	ID/Project #
<b>Central Florida Expressway Authority (CFX)- 2040 Master Plan</b>	Included in the 2040 Master Plan and Five-Year Work Plan (2019-2023).	Pg. 40	Table 5-1	-
<b>MetroPlan Orlando- 2045 MTP</b>	Identified in the Cost Feasible Projects list as a toll-funded CFX project.	Pg. 23	Table 7	1001
<b>Lake-Sumter MPO- 2045 LRTP</b>	Identified the proposed project in the 2045 LRTP Roadway Needs Plan.	Pg. 4-12	Table 4-7	57
<b>Lake County- 2030 Comprehensive Plan</b>	Identified in the 2030 Comprehensive Plan as a project led by the Lake-Sumter MPO. Future transportation map highlights route.	Pg. 378	Future Land Use Map Series- Ex. 2	-
<b>Lake County- Wellness Way Implementation Plan</b>	Identified as a notable transportation project in the Lake County Wellness Way Implementation Plan	Pg. 9	-	-
<b>FDOT SIS 2045 Multi-Modal Unfunded Needs Plan</b>	Identified as a Potential SIS Facility in the unfunded need funded by others	Pg. 121	Highway Imp. District 5	3051

## 5.2 Access Management

The proposed grade separated interchange for SR 516 at US 27 meets the requirements set forth in the FDOT Access Management standards (Rule Chapter 14-97.003(3)(h) Florida Administrative Code).

US 27 is an Access Classification 3 roadway and has a posted speed limit of 55 mph in the area of the proposed SR 516 interchange. On the conceptual signing plans, shown in **Figure 19**, the northbound to eastbound SR 516 on-ramp taper begins approximately 1,100 feet north of the existing full median opening for Frank Jarrell Road, and the westbound to southbound SR 516 off-ramp has a 35' overlap between noses to prevent vehicles from SB SR 516 off ramp from making a left turn on Frank Jarrell Road. The ramp has no impact on the full median opening at Frank Jarrell Road. **Figure 19** is shown in more detail in **Appendix F**.

The westbound to northbound SR 516 off-ramp and southbound to eastbound on-ramp tapers are approximately 3,200 feet south of the existing full median opening for S. Bradshaw Road, which is located 1.5 miles north of the interchange. There are no planned relocations of streets, driveways, or median openings to accommodate this interchange.



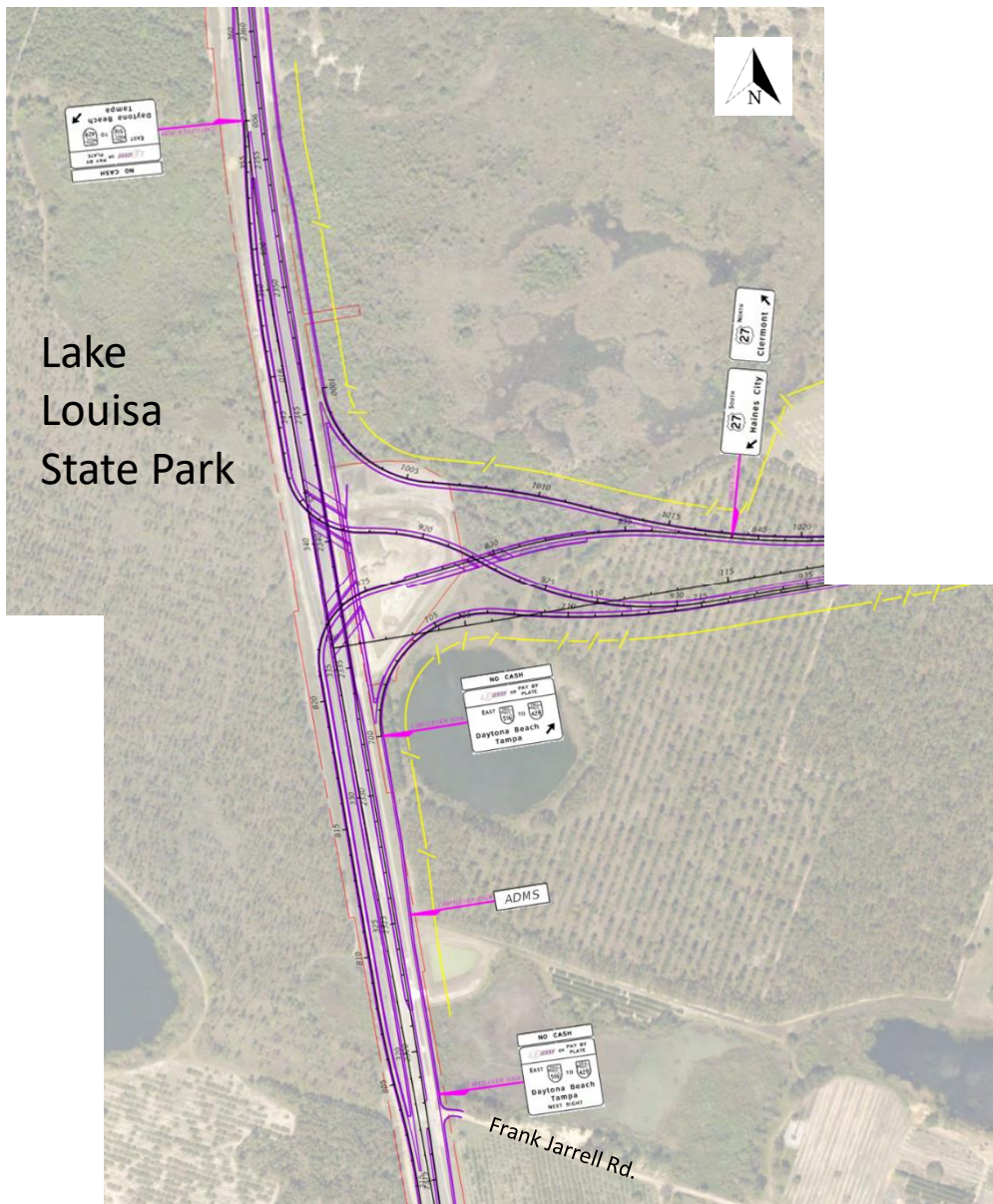


Figure 19: Access Management Plan

The new interchange will require the acquisition of limited access rights of way (shown in yellow hatched line) to protect the ramps and tapers. The interchange design includes deceleration and acceleration lanes parallel to US 27 to allow vehicles to change speeds as needed prior to the initial ramp curves. Based on coordination with FDOT District 5, the limited access right of way has been set at 100' from the end of the deceleration and acceleration tapers, as shown in **Figure 20**. Therefore, all speed changes (between the 30 mph ramp speed and 55 mph US 27 speed) will occur within the limited access right of way. **Figure 20** is shown in more detail in **Appendix F**. There is no right-of-way (ROW) acquisition on the west side of US 27, as this is the Lake Louisa State Park. The US 27 travel lanes are proposed to be shifted to the east to accommodate the ramps and tapers, not to impact the ROW along Lake Louisa State Park. In addition, the ramps are designed to go under US 27 to reduce the sight impacts of a new interchange on the state park.

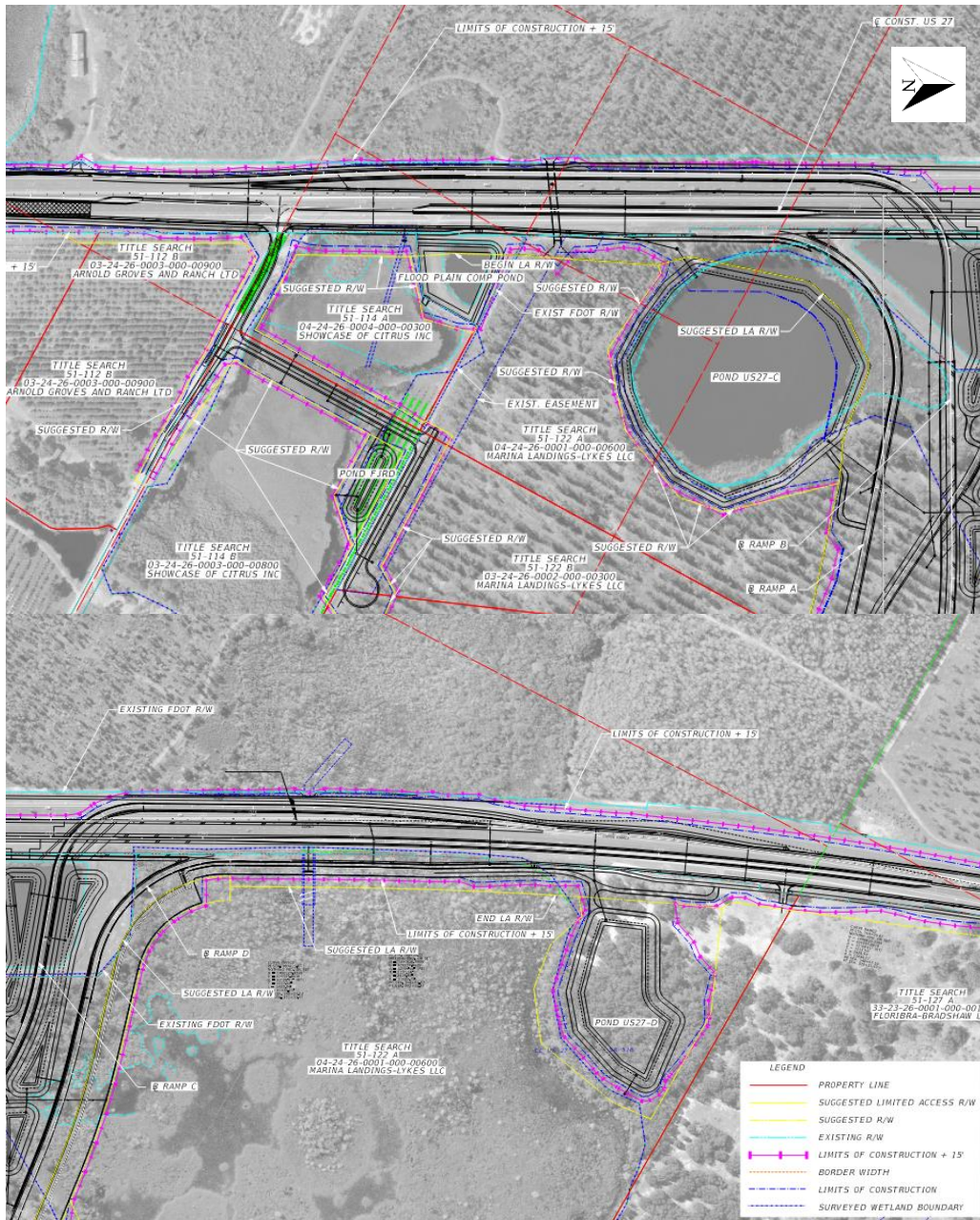


Figure 20: SR 516/US 27 Interchange ROW Map

## 5.3 Future Traffic Forecasts

The design year analysis in the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report (PTAR)* dated September 2019 was used as the basis of the future traffic forecasts along US 27. They include the construction of SR 516 from US 27 to SR 429 and consider the addition of two new local roadways: CR 455 Extension (a Lake County project) and Valencia Parkway (referred to as Valencia Connector in the PTAR). CFX will construct the CR 455 Extension between SR 516 and Schofield Road as part of the SR 516 project. The PTAR report is provided in **Appendix D**.



The traffic forecasts for the *Lake Orange Connector PD&E Study* were developed using the CFX Model 3.5 that was developed for the purpose of evaluating the new expressway, as discussed in Section 2.2. For the analysis, the toll rate was set to \$0.18/mile in 2017 dollars and escalated by 1.5% per year in accordance with the CFX Customer First Toll Rate Policy for traffic forecasting. Model volumes were converted from peak-season average weekday traffic (PSWDT) to annual average daily traffic (AADT) using the model output conversion factor of 0.98.

Linear growth rates were computed using future model year to base model year volumes as well as future model year to existing year volumes. Historical growth rates were also computed for the study area roadway segments based on historical trends analysis and population growth. The different growth rate methods were used to confirm that the model derived Annual Average Daily Traffic (AADTs) were reasonable. Additional adjustments were made to model volumes to produce balanced AADTs along the mainline and crossroads and the established K and D factors were used to produce the Directional Design Hour Volume (DDHV).

## 6. Future Traffic Analysis

### 6.1 Analysis Alternatives

As mentioned in the Methodology section, there were three alternatives considered for the SR 516/US 27 interchange. The first was a stop-controlled intersection, wherein the SR 516 expressway ends at US 27 at a three-leg stop-controlled intersection. The second alternative was a Signalized Intersection, where in the expressway ends at a three-leg signal controlled intersection. The third alternative was a grade separated interchange with four directional access ramps, to and from US 27. A summary of the alternatives analyzed is as follows:

- Opening Year (2025)
  - No-Build – AM and PM peak hours
  - Build – AM and PM peak hours
    - Stop-Controlled Intersection – AM and PM peak hours
    - Signalized Intersection – AM and PM peak hours
    - Grade Separated Ramps – AM and PM peak hours
- Design Year (2045)
  - No-Build – AM and PM peak hours
  - Build – AM and PM peak hours
    - Stop-Controlled Intersection – AM and PM peak hours
    - Signalized Intersection – AM and PM peak hours
    - Grade Separated Ramps – AM and PM peak hours

A Transportation Systems Management and Operations (TSM&O) alternative was not considered as an alternative in this study as this is a new interchange.

### 6.2 Future Segment Analysis (No-Build)

For the No-Build condition, HCS7 for a Six-Lane Roadway was used to evaluate the traffic operational analysis based on the existing six-lane geometry of US 27 north and south of the proposed SR 516 interchange. SR 429 was not analyzed in the No Build condition because the intent of this report is to determine the impacts of SR 516/Lake Orange County Connector on US 27 and to ensure that the systems interchange would operate sufficiently after the new roadway is in operation. CFX regularly monitors their facilities and will improve SR 429 as needed. The segment analysis results are presented in more detail in the following sections. **Appendix G** contains the HCS reports for the future No-Build Alternatives.

#### 6.2.1 2025 No-Build

In 2025, the northbound mainline results of the operational analysis are shown to be LOS A in the AM and PM peak hours. The southbound mainline results are also LOS A in the AM and PM peak hours. The 2025 No-Build Alternative arterial analyses are summarized in **Table 9**. The peak hour volumes for the 2025 No-Build Alternative are shown in **Figure 21**.

Table 9: 2025 No-Build Arterial LOS Results

Segment	Distance (mi)	2025 NO BUILD					
		AM Peak Hour			PM Peak Hour		
		Travel Time (s)	Speed (mph)	LOS	Travel Time (s)	Speed (mph)	LOS
NB US 27 between Sawgrass Bay Boulevard and Lake Louisa Road	4.21	427.3	35.5	A	431.2	35.2	A
SB US 27 between Lake Louisa Road and Sawgrass Bay Boulevard	4.18	310.3	48.5	A	311.7	48.3	A

### 6.2.2 2045 No-Build

In 2045, the northbound mainline results of the operational analysis are shown to be LOS A in the AM and PM peak hours. The southbound mainline results show to be LOS A in the AM and PM peak hours. The 2045 No-Build Alternative arterial analyses are shown in Error! Reference source not found.. The peak hour volumes for the 2045 No-Build Alternative are shown in **Figure 22**.

Table 10: 2045 No-Build Arterial LOS Results

Segment	Distance (mi)	2045 NO BUILD					
		AM Peak Hour			PM Peak Hour		
		Travel Time (s)	Speed (mph)	LOS	Travel Time (s)	Speed (mph)	LOS
NB US 27 between Sawgrass Bay Boulevard and Lake Louisa Road	4.21	453.0	33.5	B	439.4	34.5	B
SB US 27 between Lake Louisa Road and Sawgrass Bay Boulevard	4.18	324.4	46.4	A	314.6	47.9	A



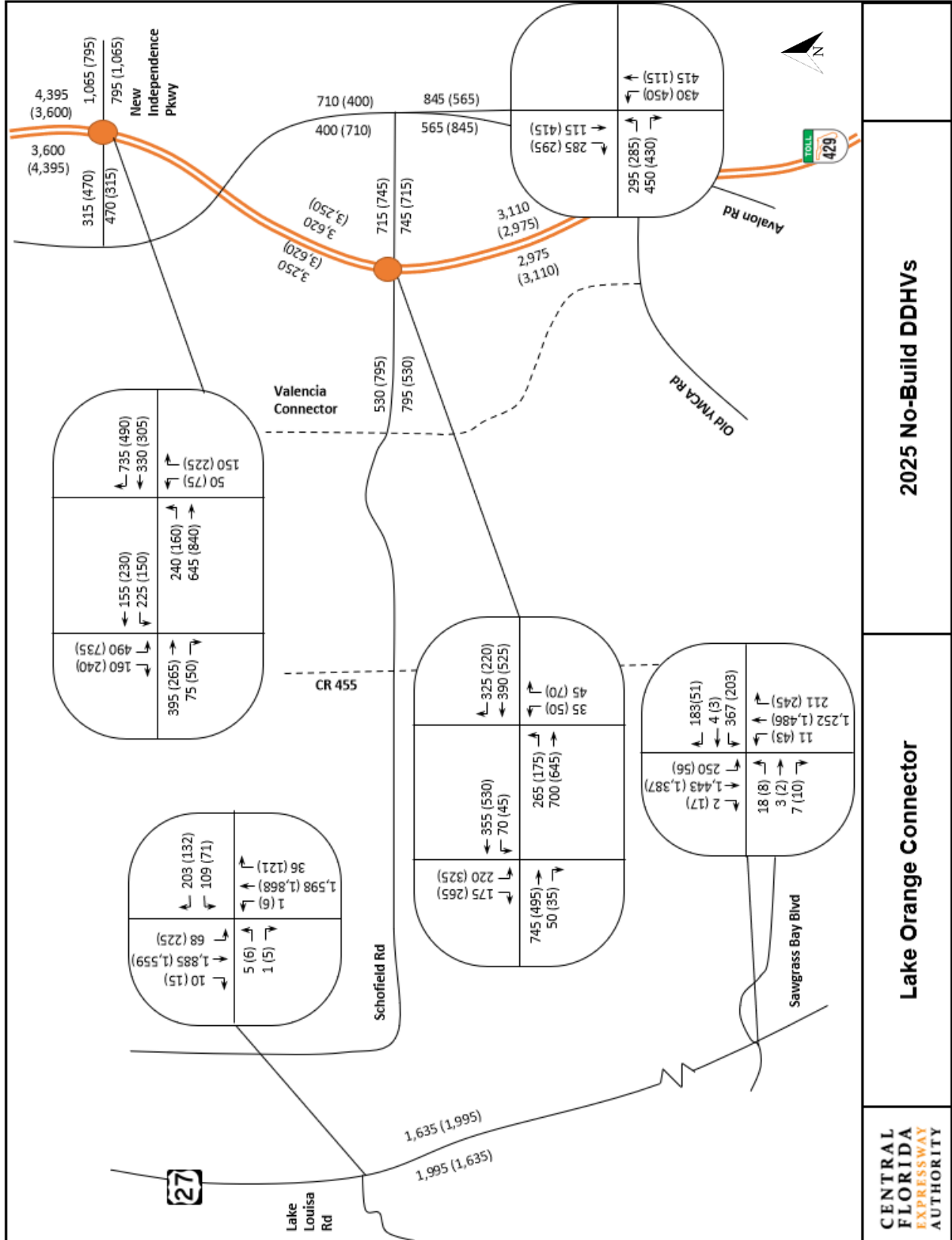


Figure 21: 2025 No-Build Turning Movements and Peak Hour Volumes

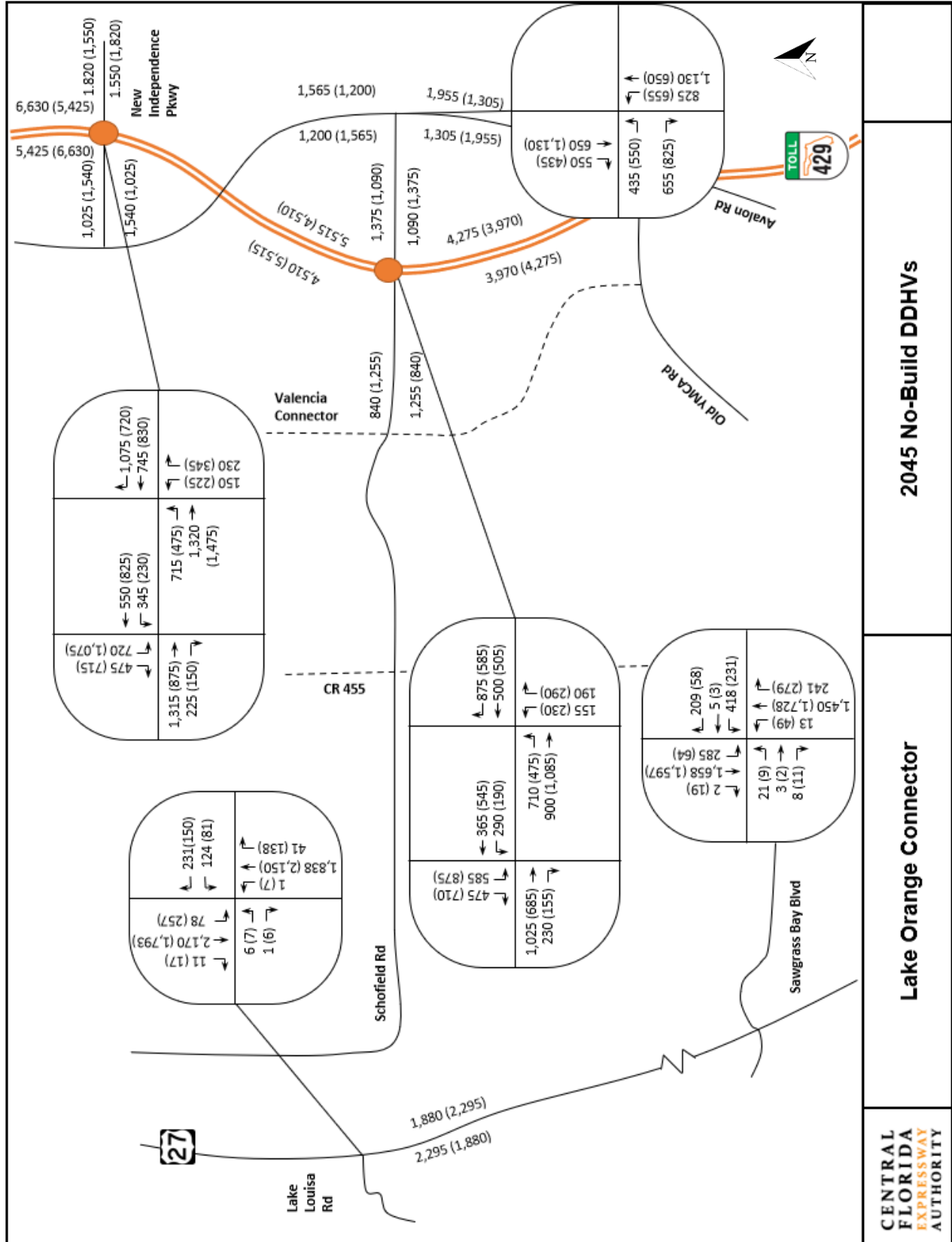


Figure 22: 2045 No-Build Turning Movements and Peak Hour Volumes

## 6.3 Future Segment Analysis (Build)

The analysis shows freeway traffic operation of the Lake Orange County Connector/SR 516 from the US 27 interchange to the SR 429 interchange. For the Build Alternative, HCS7 Freeways was used to evaluate the traffic operations of the mainline, diverge, and merge segments of US 27, SR 516, and SR 429. A four-lane divided freeway facility is the proposed SR 516 cross-section, which would have an ideal capacity of 2,400 passenger cars per mile per lane. The analysis of the ramp roadway segments to/from US 27 and SR 516 are provided in the interchange alternatives analysis in Section 6.5 of this report.

The segment analysis results are presented in more detail in the following sections. **Appendix G** contains the HCS reports for the Build Alternatives.

### 6.3.1 2025 Build

The segment analysis shows that SR 516 and US 27 will have ample capacity in 2025. **Table 11** summarizes the Synchro 11 Arterial LOS analysis for the 2025 build condition with SR 516 terminating at US 27 under stop control. The northbound and southbound arterial LOS is shown to be LOS A in both the AM and PM peak hours. **Table 12** summarizes the build condition with the intersection of SR 516 at US 27 under signal control. In the northbound direction is expected to operate at LOS B in both the AM and PM peak hours. The southbound direction is showing LOS A in the AM and PM peak hours.

*Table 11: 2025 Build (Stop-Control) Arterial LOS Results*

Segment	Distance (mi)	2025 BUILD					
		AM Peak Hour			PM Peak Hour		
		Travel Time (s)	Speed (mph)	LOS	Travel Time (s)	Speed (mph)	LOS
NB US 27 between Sawgrass Bay Boulevard and Lake Louisa Road	4.21	320.1	47.4	A	325.9	46.6	A
SB US 27 between Lake Louisa Road and Sawgrass Bay Boulevard	4.18	318.1	47.3	A	309.7	48.6	A

*Table 12: 2025 Build (Signal) Arterial LOS Results*

Segment	Distance (mi)	2025 BUILD					
		AM Peak Hour			PM Peak Hour		
		Travel Time (s)	Speed (mph)	LOS	Travel Time (s)	Speed (mph)	LOS
NB US 27 between Sawgrass Bay Boulevard and Lake Louisa Road	4.21	455.8	33.3	B	476.8	31.8	B
SB US 27 between Lake Louisa Road and Sawgrass Bay Boulevard	4.18	315.7	47.7	A	318.3	47.3	A

The segment of SR 429 north of the proposed SR 516 interchange is expected to operate at LOS E in the northbound direction during the AM peak hour and in the southbound direction during the PM peak hour. The northbound SR 429 on-ramp merge from SR 516 is shown to operate at LOS E during the AM peak hour as well as the SR 429 off-ramp diverge to SR 516 during the PM peak hour, due to the SR 429 being a 4-lane section. All other mainline, merge, and diverge segments are shown to operate at LOS D or better in 2025.

The 2025 Build Alternative HCS analyses are shown in **Table 13**. The peak hour volumes for the 2025 Build Alternatives are shown in **Figure 23**.

Table 13: 2025 Build HCS Analysis Results

Segment	Analysis Type	2025 BUILD					
		AM Peak Hour			PM Peak Hour		
		Volume	Density <sup>1</sup>	LOS	Volume	Density <sup>1</sup>	LOS
EB SR 516 Between US 27 and Off-Ramp to CR 455	Basic Roadway	1000	7.3	A	670	4.9	A
EB SR 516 Off-Ramp to CR 455	Diverge	130	5.6	A	85	2.5	A
EB SR 516 Between Off- and On-Ramps to CR 455	Basic Roadway	870	7.7	A	585	5.2	A
EB SR 516 On-Ramp from CR 455	Merge	315	11.8	B	210	7.7	A
EB SR 516 Between CR 455 and Off-Ramp to Valencia Connector	Basic Roadway	1185	9.0	A	795	6.0	A
EB SR 516 Off-Ramp to Valencia Connector	Diverge	255	7.3	A	170	3.7	A
EB SR 516 Between Valencia Connector and Off-ramp to SR 429	Basic Roadway	930	8.2	A	625	5.5	A
EB SR 516 Off-Ramp to SB SR 429	Diverge	320	5.9	A	220	4.0	A
NB SR 429 south of SR 516	Basic Roadway	3130	26.5	D	3190	27.1	D
NB SR 429 Off-ramp to WB SR 516	Diverge	220	33.0	D	320	33.6	D
NB SR 429 between Off-ramp to WB SR 516 and Off-ramp to Schofield	Basic Roadway	2910	24.2	C	2870	23.8	C
NB SR 429 Off-Ramp to Schofield Rd	Diverge	75	30.9	D	110	30.5	D
NB SR 429 between Off-Ramp to Schofield Rd and On-Ramp from Schofield Loop Ramp	Basic Roadway	2835	23.5	C	2760	22.8	C
NB SR 429 On-Ramp from Schofield Loop Ramp	Merge	260	24.6	C	140	22.9	C
NB SR 429 between Schofield Loop On-Ramp to On-Ramp from EB SR 516	Basic Roadway	3305	28.5	D	3075	25.9	C
EB SR 516 On-Ramp from Schofield Rd	Merge	210	7.5	A	175	5.4	A
NB SR 429 On-Ramp from EB SR 516	Merge	610	37.0	E	405	30.6	D
NB SR 429 north of SR 516	Basic Roadway	3915	37.2	E	3480	30.7	D
SB SR 429 north of SR 516	Basic Roadway	3480	30.8	D	3915	37.3	E

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Segment	Analysis Type	2025 BUILD					
		AM Peak Hour			PM Peak Hour		
		Volume	Density <sup>1</sup>	LOS	Volume	Density <sup>1</sup>	LOS
SB SR 429 Off-Ramp to Schofield Rd	Diverge	315	36.3	E	470	40.4	E
SB SR 429 between Off-ramp to WB SR 516 and Off-ramp to Schofield	Basic Roadway	3075	27.9	D	3305	28.6	D
SB SR 429 Off-ramp to WB SR 516	Diverge	405	30.8	D	610	37.3	E
SB SR 429 between Off-Ramp to WB SR 516 and On-Ramp from Schofield Rd	Basic Roadway	2760	22.9	C	2835	23.6	C
SB SR 429 On-Ramp from Schofield Rd	Merge	110	24.8	C	75	25.1	C
SB SR 429 between On-ramp from Schofield to On-ramp from EB SR 516	Basic Roadway	2870	23.9	C	2910	24.3	C
EB SR 516 On-Ramp to SB SR 429	Merge	320	27.2	D	220	26.6	D
SB SR 429 south of SR 516	Basic Roadway	3190	27.3	D	3130	26.6	D
WB SR 516 Between SR 429 and On-ramp from Valencia Connector	Basic Roadway	625	5.5	A	930	8.2	A
WB SR 516 On-ramp from Valencia Connector	Merge	170	7.3	A	255	11.3	B
WB SR 516 Between Valencia Connector and Off-ramp to CR 455	Basic Roadway	795	6.0	A	1185	9.0	A
WB SR 516 Off-Ramp to CR 455	Diverge	210	3.7	A	315	7.3	A
WB SR 516 Between Off- and On-Ramps to CR 455	Basic Roadway	585	4.2	A	870	6.2	A
WB SR 516 On-Ramp to CR 455	Merge	85	5.6	A	130	8.7	A
WB SR 516 Between CR 455 and Off-ramp to US 27	Basic Roadway	670	4.9	A	1000	7.3	A

Note: Density unit is passenger car/mile/lane.



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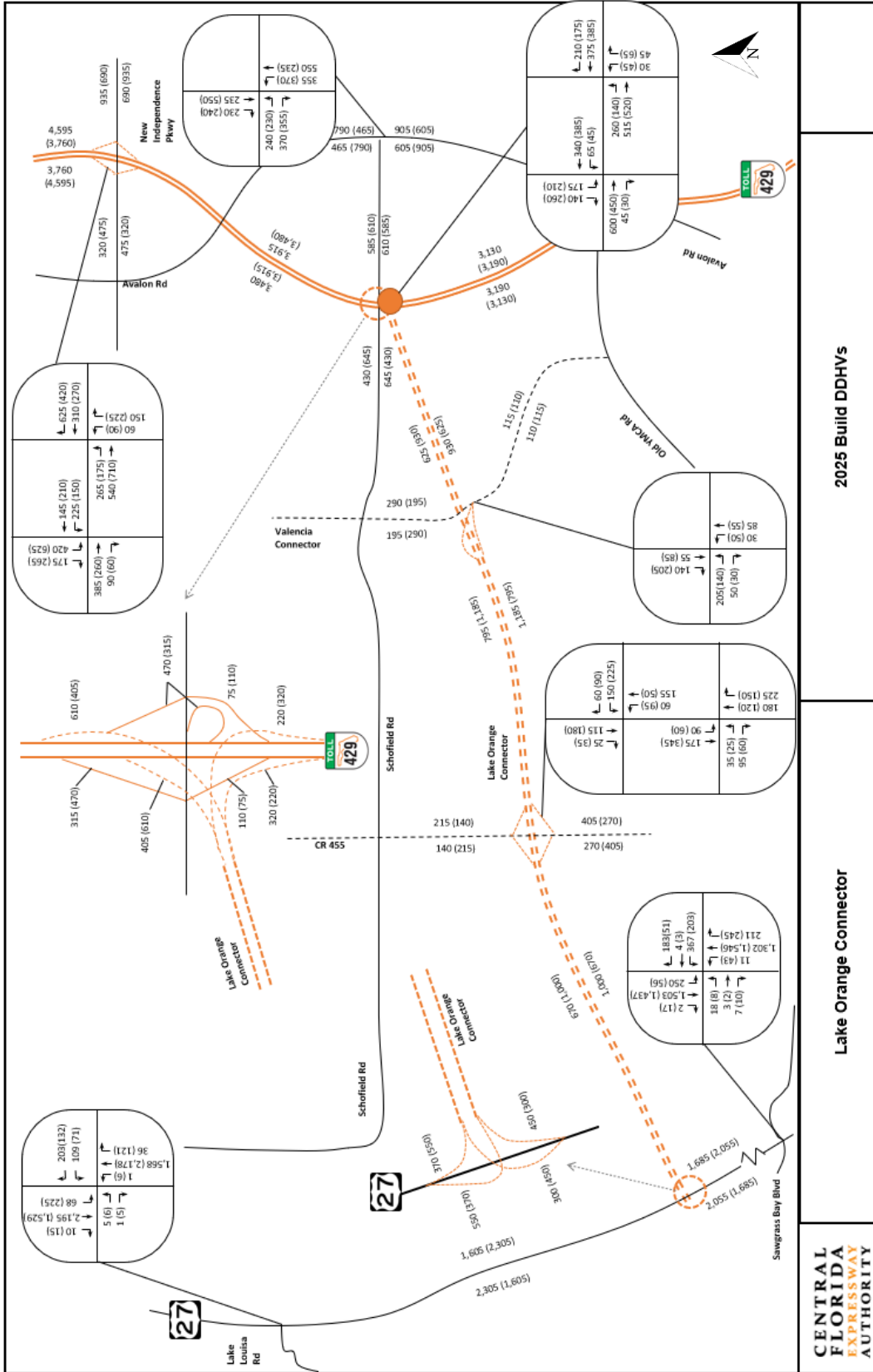


Figure 23: 2025 Build Turning Movements and Peak Hour Volumes

## 6.3.2 2045 Build

The segment analysis shows that all segments of SR 516, US 27, and SR 429 will have sufficient capacity in 2045. **Table 14** summarizes the Synchro 11 Arterial LOS analysis for the 2045 build condition with SR 516 terminating at US 27 under stop control. The northbound arterial LOS is shown to be LOS B in the AM and PM peak hours. The southbound arterial LOS is shown to be LOS A in both the AM and PM peak hours. **Table 15** summarizes the build condition with the intersection of SR 516 at US 27 under signal control. The northbound direction is expected to operate at LOS B in the AM peak hour and LOS C in the PM peak hour. The southbound direction is showing LOS A in the AM and PM peak hours.

Table 14: 2045 Build (Stop-Control) Arterial LOS Results

Segment	Distance (mi)	2045 BUILD					
		AM Peak Hour			PM Peak Hour		
		Travel Time (s)	Speed (mph)	LOS	Travel Time (s)	Speed (mph)	LOS
NB US 27 between Sawgrass Bay Boulevard and Lake Louisa Road	4.21	450.9	33.6	B	452.7	33.5	B
SB US 27 between Lake Louisa Road and Sawgrass Bay Boulevard	4.18	324.0	46.5	A	310.9	48.4	A

Table 15: 2045 Build (Signal) Arterial LOS Results

Segment	Distance (mi)	2045 BUILD					
		AM Peak Hour			PM Peak Hour		
		Travel Time (s)	Speed (mph)	LOS	Travel Time (s)	Speed (mph)	LOS
NB US 27 between Sawgrass Bay Boulevard and Lake Louisa Road	4.21	503.7	30.1	B	491.0	30.9	C
SB US 27 between Lake Louisa Road and Sawgrass Bay Boulevard	4.18	332.8	45.3	A	330.4	45.6	A

The northbound SR 429 on-ramp merge from SR 516 is shown to operate at LOS D during the AM peak hour, which is an improvement over the 2025 condition because it is assumed that SR 429 is widened to a six-lane facility before 2045. All other mainline, merge, and diverge segments are shown to operate at LOS C or better in 2045.

The 2045 Build Alternative HCS analyses are shown in **Table 16**. The peak hour volumes for the 2045 Build Alternatives are shown in **Figure 24**.

Table 16: 2045 Build HCS Analysis Results

Segment	Analysis Type	2045 BUILD					
		AM Peak Hour			PM Peak Hour		
		Volume	Density <sup>1</sup>	LOS	Volume	Density <sup>1</sup>	LOS
EB SR 516 Between US 27 and Off-Ramp to CR 455	Basic Roadway	2040	15.0	B	1360	10.0	A
EB SR 516 Off-Ramp to CR 455	Diverge	430	15.2	B	285	8.9	A
EB SR 516 Between Off- and On-Ramps to CR 455	Basic Roadway	1610	14.2	B	1075	9.5	A
EB SR 516 On-Ramp from CR 455	Merge	805	26.2	C	530	17.1	B

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Segment	Analysis Type	2045 BUILD					
		AM Peak Hour			PM Peak Hour		
		Volume	Density <sup>1</sup>	LOS	Volume	Density <sup>1</sup>	LOS
EB SR 516 Between CR 455 and Off-Ramp to Valencia Connector	Basic Roadway	2415	18.4	C	1605	12.2	B
EB SR 516 Off-Ramp to Valencia Connector	Diverge	595	18.6	B	400	11.2	B
EB SR 516 Between Valencia Connector and Off-ramp to SR 429	Basic Roadway	1820	16.1	B	1205	10.6	A
EB SR 516 Off-Ramp to SB SR 429	Diverge	430	11.5	B	280	7.6	A
NB SR 429 south of SR 516	Basic Roadway	4140	17.2	B	4230	17.6	B
NB SR 429 Off-ramp to WB SR 516	Diverge	280	23.9	C	430	24.6	C
NB SR 429 between Off-ramp to WB SR 516 and Off-ramp to Schofield	Basic Roadway	3860	15.6	B	3650	15.6	B
NB SR 429 Off-Ramp to Schofield Rd	Diverge	395	27.9	C	590	28.0	C
NB SR 429 between Off-Ramp to Schofield Rd and On-Ramp from Schofield Loop Ramp	Basic Roadway	3495	14.2	B	3060	12.6	B
NB SR 429 On-Ramp from Schofield Loop Ramp	Merge	475	20.2	C	320	17.6	B
NB SR 429 between Schofield Loop On-Ramp to On-Ramp from EB SR 516	Basic Roadway	4525	18.7	C	3915	15.9	B
EB SR 516 On-Ramp from Schofield Rd	Merge	585	17.2	B	390	11.6	B
NB SR 429 On-Ramp from EB SR 516	Merge	1390	27.2	D	925	20.9	C
NB SR 429 north of SR 516	Basic Roadway	5915	25.9	C	4840	19.9	C
SB SR 429 north of SR 516	Basic Roadway	4840	20.0	C	5915	24.7	C
SB SR 429 Off-Ramp to Schofield Rd	Diverge	705	33.2	D	1060	38.4	E
SB SR 429 between Off-ramp to WB SR 516 and Off-ramp to Schofield	Basic Roadway	3915	16.0	B	4525	18.8	C
SB SR 429 Off-ramp to WB SR 516	Diverge	925	20.0	C	1390	24.7	C
SB SR 429 between Off-Ramp to WB SR 516 and On-Ramp from Schofield Rd	Basic Roadway	3210	13.2	B	3495	14.3	B

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Segment	Analysis Type	2045 BUILD					
		AM Peak Hour			PM Peak Hour		
		Volume	Density <sup>1</sup>	LOS	Volume	Density <sup>1</sup>	LOS
SB SR 429 On-Ramp from Schofield Rd	Merge	590	21.7	C	395	21.4	C
SB SR 429 between On-ramp from Schofield to On-ramp from EB SR 516	Basic Roadway	3800	15.6	B	3860	15.7	B
EB SR 516 On-Ramp to SB SR 429	Merge	430	17.7	B	280	17.2	B
SB SR 429 south of SR 516	Basic Roadway	4230	17.3	B	4140	17.3	B
WB SR 516 Between SR 429 and On-ramp from Valencia Connector	Basic Roadway	1205	10.6	A	1820	16.1	B
WB SR 516 On-ramp from Valencia Connector	Merge	400	16.0	B	595	24.5	C
WB SR 516 Between Valencia Connector and Off-ramp to CR 455	Basic Roadway	1605	12.2	B	2415	18.4	C
WB SR 516 Off-Ramp to CR 455	Diverge	530	11.2	B	805	18.6	B
WB SR 516 Between Off- and On-Ramps to CR 455	Basic Roadway	1075	7.7	A	1610	11.5	B
WB SR 516 On-Ramp to CR 455	Merge	285	13.0	B	430	19.9	B
WB SR 516 Between CR 455 and Off-ramp to US 27	Basic Roadway	1360	10.0	A	2040	15.0	B

Note: Density unit is passenger car/mile/lane.



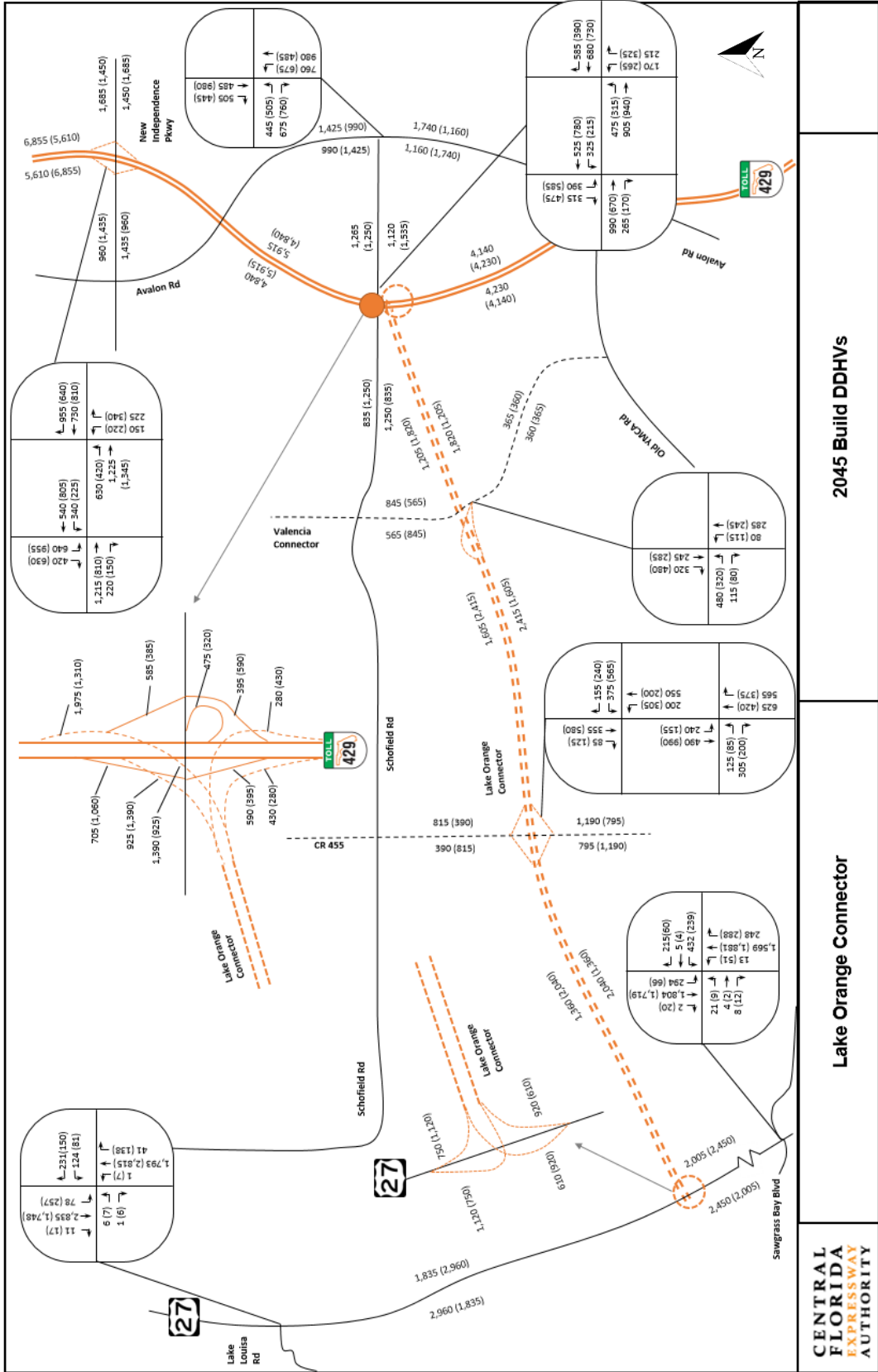


Figure 24: 2045 Build Turning Movements and Peak Hour Volumes

## 6.4 Future Intersection Analysis

The future intersection analysis results from the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report (PTAR) dated September 2019* are referenced in the following sections. Additional intersection analysis was performed for the two intersections along US 27 that were not considered in the PTAR. The design hour volumes were presented in **Figures 21** through **24**. Synchro 11 was used for the signalized intersection analysis and traffic signal optimization.

### 6.4.1 2025 No-Build

As discussed in the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report (PTAR) dated September 2019*, all the intersections were assumed to be signalized with optimized signal timings. The PTAR is provided in **Appendix D** and **Table 17** and **Table 18** herein summarize the 2025 No-Build AM and PM peak hour intersection LOS. The study intersections are expected to operate at an overall LOS D or better during the AM and PM peak hours in the 2025 No-Build condition. The westbound left movement at the SR 429 southbound ramps at New Independence is showing LOS F in the AM and PM peak hours in order to give priority to the higher volume southbound movements along the off-ramp, but the overall intersection will operate at LOS D.

Table 17: 2025 No Build AM Peak Hour Intersection Level of Service Results

Movements	SR 429 SB Ramps @ Schofield Rd		SR 429 NB Ramps @ Schofield Rd		Avalon Rd @ Schofield Rd		SR 429 SB Ramps @ New Independence		SR 429 NB Ramps @ New Independence	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
EBL	-	-	-	-	31.9	C	-	-	64.5	E
EBT	59.6	E	4.4	A	-	-	42.6	D	21.2	C
EBR	9.0	A	-	-	5.6	A	8.1	A	-	-
WBL	28.9	C	-	-	-	-	114.7	F	-	-
WBT	28.5	C	1.6	A	-	-	18.6	B	28.8	C
WBR	-	-	0.9	A	-	-	-	-	7.2	A
NBL	-	-	57.1	E	55.8	E	-	-	40.6	D
NBT	-	-	-	-	12.4	B	-	-	-	-
NBR	-	-	16.4	B	-	-	-	-	6.9	A
SBL	20.1	C	-	-	-	-	23.0	C	-	-
SBT	-	-	-	-	31.8	C	-	-	-	-
SBR	3.1	A	-	-	4.9	A	3.2	A	-	-
<b>Overall</b>	<b>38.3</b>	<b>D</b>	<b>4.5</b>	<b>A</b>	<b>26.0</b>	<b>C</b>	<b>38.6</b>	<b>D</b>	<b>21.9</b>	<b>C</b>

Source: Lake Orange County Connector PD&E Study – Project Traffic Analysis Report dated September 2019 (Table 5-10)

Table 18: 2025 No-Build PM Peak Hour Intersection Level of Service Results

Movements	SR 429 SB Ramps @ Schofield Rd		SR 429 NB Ramps @ Schofield Rd		Avalon Rd @ Schofield Rd		SR 429 SB Ramps @ New Independence		SR 429 NB Ramps @ New Independence	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
EBL	-	-	-	-	31.3	C	-	-	49.8	D
EBT	49.4	D	4.3	A	-	-	40.3	D	30.8	C
EBR	4.0	A	-	-	5.5	A	8.1	A	-	-
WBL	26.6	C	-	-	-	-	99.6	F	-	-
WBT	30.5	C	1.7	A	-	-	20.7	C	28.6	C
WBR	-	-	0.3	A	-	-	-	-	4.4	A
NBL	-	-	57.6	E	56.6	E	-	-	41.4	D
NBT	-	-	-	-	11.1	B	-	-	-	-
NBR	-	-	14.1	B	-	-	-	-	13.7	B
SBL	20.9	C	-	-	35.6	D	25.6	C	-	-
SBT	-	-	-	-	4.8	A	-	-	-	-
SBR	7.5	A	-	-	-	-	3.0	A	-	-
<b>Overall</b>	<b>29.9</b>	<b>C</b>	<b>5.0</b>	<b>A</b>	<b>29.9</b>	<b>C</b>	<b>30.1</b>	<b>C</b>	<b>24.3</b>	<b>C</b>

Source: Lake Orange County Connector PD&E Study – Project Traffic Analysis Report dated September 2019 (Table 5-11)

The 95th percentile queue lengths obtained from the Synchro analyses for the 2025 No-Build condition are provided in **Tables 19** and **21**. These tables also provide the storage lengths from Synchro and the ramp lengths from existing conditions or design plans. The queues do not exceed storage or ramp lengths.

Table 19: 2025 No-Build Intersection Queue Summary

Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
SR 429 SB Ramps @ Schofield Rd	EBT			463	292
	EBR	300		32	14
	WBL	300		78	54
	WBT			162	244
	SBL	500	2700	86	124
	SBR	500	2700	40	101
SR 429 NB Ramps @ Schofield Rd	EBT			106	96
	WBT			24	32
	WBR	300		14	0
	NBL	500	3000	35	45
	NBR	500	3000	40	49
Avalon Rd @ Schofield Rd	EBL			180	170
	EBR	500		57	53
	NBL	500		266	278
	NBT			118	36
	SBT			65	210
	SBR	300		64	64
SR 429 SB Ramps @ New Independence	EBT			220	150
	EBR	300		41	30
	WBL	300		#184	125
	WBT			40	65
	SBL	500	2450	191	302
	SBR	500	2450	39	46
SR 429 NB Ramps @ New Independence	EBL	300		174	119
	EBT			224	407
	WBT			152	141
	WBR	300		151	71
	NBL	500	2150	76	104
	NBR		2150	56	119

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longerm indicates volume for 95<sup>th</sup> percentile queue is metered by upstream signal

Source: Lake Orange County Connector PD&amp;E Study – Project Traffic Analysis Report dated September 2019

The results of the intersection analysis of the two intersections along US 27 are summarized in **Table 20**. The intersection at Lake Louisa Road is expected to continue operating at an overall LOS B in the AM and PM peak hours. The Sawgrass Bay Boulevard intersection will operate at an overall LOS C in the AM peak hour and LOS B in the PM peak hour. The westbound through movement operates at LOS F in the AM. The Synchro reports are provided in **Appendix H**.



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Table 20: 2025 No-Build AM and PM Peak Hour Intersection Level of Service Results

Movements	US 27 @ Lake Louisa Road						US 27 @ Sawgrass Bay Boulevard					
	AM Peak			PM Peak			AM Peak			PM Peak		
	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
EBL	0.02	30.2	C	0.02	30.2	C	0.08	33.0	C	0.03	32.6	C
EBT	0.00	0.0	A	0.01	0.0	A	0.04	23.0	C	0.05	20.1	C
EBR	-	-	-	-	-	-	-	-	-	-	-	-
WBL	0.45	36.3	D	0.30	33.4	C	-	-	-	-	-	-
WBT	0.40	2.2	A	0.27	1.2	A	1.17	136.4	F	0.67	42.4	D
WBR	-	-	-	-	-	-	0.43	8.4	A	0.12	0.5	A
NBL	0.00	7.0	A	0.02	6.7	A	0.05	10.3	B	0.16	10.4	B
NBT	0.70	17.4	B	0.86	22.9	C	0.68	21.8	C	0.70	20.2	C
NBR	0.04	0.1	A	0.15	1.1	A	0.29	4.0	A	0.30	3.7	A
SBL	0.26	8.7	A	0.90	55.1	E	1.00	76.7	E	0.21	10.9	B
SBT	0.67	13.4	B	0.54	11.0	B	0.57	15.3	B	0.65	19.1	B
SBR	0.01	0.0	A	0.02	0.0	A	0.00	0.0	A	0.02	0.1	A
<b>Overall</b>		<b>14.9</b>	<b>B</b>		<b>18.8</b>	<b>B</b>		<b>32.6</b>	<b>C</b>		<b>19.3</b>	<b>B</b>

Table 21: 2025 No-Build Intersection Queue Summary (US 27)

Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
US 27 @ Lake Louisa Rd	EBL			13	14
	EBT/R			0	0
	WBL			112	79
	WBT/R			0	0
	NBL	290		2	7
	NBT			360	#506
	NBR	325		0	10
	SBL	290		36	#253
	SBT			#513	347
	SBR	225		0	0
US 27 @ Sawgrass Bay Blvd	EBL			29	17
	EBT/R			16	18
	WBL/T			#445	#228
	WBR			56	0
	NBL	270		11	27
	NBT			280	#352
	NBR	435		45	47
	SBL	270		#280	33
	SBT			#348	314
	SBR	200		0	0

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer  
m indicates volume for 95<sup>th</sup> percentile queue is metered by upstream signal

## 6.4.2 2045 No-Build

The 2045 No-Build analysis shows that the intersections of the SR 429 ramp terminals and the intersection of Avalon Road at Schofield Road will continue to operate at an overall LOS D or better in both the AM and PM peak hours. The SR 429 SB Ramps at Schofield Rd EBT and WBT improve slightly with the balancing of the through movements in 2045, as additional network is provided in the area. **Table 22** and **Table 23** display the 2045 No-Build AM and PM peak hour intersection LOS summaries, respectively.

Table 22: 2045 No-Build AM Peak Hour Intersection Level of Service Results

Movements	SR 429 SB Ramps @ Schofield Rd		SR 429 NB Ramps @ Schofield Rd		Avalon Rd @ Schofield Rd		SR 429 SB Ramps @ New Independence		SR 429 NB Ramps @ New Independence	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
EBL	-	-	-	-	42.5	D	-	-	81.4	F
EBT	40.3	D	6.1	A	-	-	47.9	D	7.5	A
EBR	5.1	A	-	-	5.7	A	8.1	A	-	-
WBL	33.5	C	-	-	-	-	77.6	E	-	-
WBT	9.7	A	2.9	A	-	-	9.6	A	19.7	B
WBR	-	-	13.7	B	-	-	-	-	76.6	E
NBL	-	-	56.7	E	53.5	D	-	-	95.1	F
NBT	-	-	-	-	15.4	B	-	-	-	-
NBR	-	-	10.6	B	-	-	-	-	64.1	F
SBL	54.1	D	-	-	-	-	57.8	E	-	-
SBT	-	-	-	-	50.6	D	-	-	-	-
SBR	7.5	A	-	-	10.3	B	21.6	C	-	-
<b>Overall</b>	<b>30.6</b>	<b>C</b>	<b>11.4</b>	<b>B</b>	<b>31.5</b>	<b>C</b>	<b>41.0</b>	<b>D</b>	<b>45.8</b>	<b>D</b>

Source: Lake Orange County Connector PD&E Study – Project Traffic Analysis Report dated September 2019 (Table 5-14)

Table 23: 2045 No-Build PM Peak Hour Intersection Level of Service Results

Movements	SR 429 SB Ramps @ Schofield Rd		SR 429 NB Ramps @ Schofield Rd		Avalon Rd @ Schofield Rd		SR 429 SB Ramps @ New Independence		SR 429 NB Ramps @ New Independence	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
EBL	-	-	-	-	54.9	D	-	-	66.6	E
EBT	56.1	E	21.1	C	-	-	58.4	E	24.5	C
EBR	7.2	A	-	-	11.1	B	8.3	A	-	-
WBL	43.4	D	-	-	-	-	103.2	F	-	-
WBT	30.7	C	2.3	A	-	-	24.8	C	36.0	D
WBR	-	-	4.8	A	-	-	-	-	9.1	A
NBL	-	-	64.5	E	72.2	E	-	-	48.3	D
NBT	-	-	-	-	13.7	B	-	-	-	-
NBR	-	-	51.3	D	-	-	-	-	51.1	D
SBL	26.7	C	-	-	58.5	E	30.7	C	-	-
SBT	-	-	-	-	11.1	B	-	-	-	-
SBR	33.8	C	-	-	-	-	48.3	D	-	-
<b>Overall</b>	<b>35.4</b>	<b>D</b>	<b>21.0</b>	<b>C</b>	<b>43.2</b>	<b>D</b>	<b>42.4</b>	<b>D</b>	<b>32.6</b>	<b>C</b>

Source: Lake Orange County Connector PD&E Study – Project Traffic Analysis Report dated September 2019 (Table 5-15)

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The 95th percentile queue lengths obtained from the Synchro analyses for the 2045 No-Build condition are provided in **Tables 24** and **26**. These tables also provide the storage lengths from Synchro and the ramp lengths from existing conditions or design plans. The queues do not exceed ramp lengths but do exceed storage lengths in a few locations (shown in red). Intersection operation may be affected at the SR 429 NB Ramps @ New Independence for the eastbound left and westbound right in AM peak, as well as the southbound left on US 27 at Lake Louisa Road in the PM peak and southbound left on US 27 at Sawgrass Bay Boulevard in the AM peak.

Table 24: 2045 No-Build Intersection Queue Summary

Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
SR 429 SB Ramps @ Schofield Rd	EBT			547	418
	EBR	300		62	57
	WBL	300		282	199
	WBT			92	252
	SBL	500	2700	349	370
	SBR			2700	99
SR 429 NB Ramps @ Schofield Rd	EBT			166	682
	WBT			61	m49
	WBR	300		431	m119
	NBL	500	3000	109	161
	NBR	500	3000	74	#306
Avalon Rd @ Schofield Rd	EBL			277	m#476
	EBR	500		54	m108
	NBL	500		484	#447
	NBT			365	192
	SBT			383	#723
	SBR	300		169	178
SR 429 SB Ramps @ New Independence	EBT			761	536
	EBR	300		90	63
	WBL	300		m248	#189
	WBT			131	241
	SBL	500	2450	435	497
	SBR	500	2450	288	#906
SR 429 NB Ramps @ New Independence	EBL	300		m#504	m317
	EBT			295	509
	WBT			270	416
	WBR	300		#1340	215
	NBL	500	2150	#275	281
	NBR			2150	#284

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longerm indicates volume for 95<sup>th</sup> percentile queue is metered by upstream signal

Source: Lake Orange County Connector PD&amp;E Study – Project Traffic Analysis Report dated September 2019

The results of the intersection analysis of the two intersections on US 27 are summarized in **Table 25**. The Lake Louisa Road intersection is expected to continue operating at an overall LOS B in the AM peak hour but will experience an overall LOS C during the PM peak hour. The southbound left turn movement operates at LOS F in the PM. The Sawgrass Bay Boulevard intersection will operate at an overall LOS D in

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the AM peak hour and LOS C in the PM peak hour. The southbound left turn movement operates at LOS F in the AM. The Synchro reports are provided in **Appendix H**.

Table 25: 2045 No-Build AM and PM Peak Hour Intersection Level of Service Results

Movements	US 27 @ Lake Louisa Road						US 27 @ Sawgrass Bay Boulevard					
	AM Peak			PM Peak			AM Peak			PM Peak		
	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
EBL	0.02	30.2	C	0.03	37.7	D	0.12	45.0	D	0.03	32.7	C
EBT	0.00	0.0	A	0.02	0.2	A	0.06	28.9	C	0.06	19.8	B
EBR	-	-	-	-	-	-	-	-	-	-	-	-
WBL	0.51	38.4	D	0.41	43.7	D	-	-	-	-	-	-
WBT	0.46	3.5	A	0.35	2.2	A	0.94	68.1	E	0.78	51.8	D
WBR	-	-	-	-	-	-	0.38	6.5	A	0.14	0.7	A
NBL	0.00	7.0	A	0.03	7.6	A	0.07	15.4	B	0.19	10.3	B
NBT	0.80	20.3	C	0.92	28.6	C	0.93	44.6	D	0.80	22.7	C
NBR	0.05	0.1	A	0.16	2.1	A	0.36	5.0	A	0.33	3.5	A
SBL	0.30	9.9	A	1.11	113.9	F	1.06	97.2	F	0.24	10.9	B
SBT	0.77	15.4	B	0.60	12.3	B	0.76	27.4	C	0.73	20.7	C
SBR	0.01	0.0	A	0.02	0.0	A	0.00	0.0	A	0.02	0.1	A
<b>Overall</b>		<b>17.2</b>	<b>B</b>		<b>25.5</b>	<b>C</b>		<b>39.6</b>	<b>D</b>		<b>21.5</b>	<b>C</b>

Table 26: 2045 No-Build Intersection Queue Summary (US 27)

Intersection	Movement	Signal Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
US 27 @ Lake Louisa Rd	EBL			14	17
	EBT/R			0	0
	WBL			#141	97
	WBT/R			9	0
	NBL	290		2	7
	NBT			#493	#636
	NBR	325		0	23
	SBL	290		43	#326
	SBT			#637	421
SBR	225		0	0	
US 27 @ Sawgrass Bay Blvd	EBL			38	18
	EBT/R			20	18
	WBL/T			#510	#279
	WBR			58	0
	NBL	270		15	29
	NBT			#488	#468
	NBR	435		56	49
	SBL	270		#362	36
	SBT			#542	#410
SBR	200		0	0	

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer

m indicates volume for 95<sup>th</sup> percentile queue is metered by upstream signal



### 6.4.3 2025 Build

The 2025 Build analysis shows that the intersections of the SR 429 ramp terminals and the intersection of Avalon Road at Schofield Road will operate better than in the No-Build condition in the AM and PM peak hours. All the intersections will operate at an overall LOS C or better in both the AM and PM peak hours. The westbound left turn movement at the SR 429 southbound ramps no longer shows LOS F in the AM or PM peak hours. **Table 27** displays the 2025 Build AM peak hour intersection LOS summaries and **Table 28** displays the 2025 Build PM peak hour intersection LOS summaries for the intersections included in the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report (PTAR) dated September 2019* analysis, attached as **Appendix D**.

For the Build scenario, the new SR 516 interchange ramp terminal intersections were also evaluated in the PTAR. These intersections were assumed to be signalized with optimized signal timings. As shown in **Table 29** and **Table 30**, all the new intersections will experience an overall LOS C or better in the AM and PM peak hours.

Table 27: 2025 Build AM Peak Hour Intersection Level of Service Results (Existing Intersections)

Movements	SR 429 SB Ramps @ Schofield Rd		SR 429 NB Ramps @ Schofield Rd		Avalon Rd @ Schofield Rd		SR 429 SB Ramps @ New Independence		SR 429 NB Ramps @ New Independence	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
EBL	-	-	-	-	28.1	C	-	-	10.6	B
EBT	30.0	C	3.1	A	-	-	27.5	C	9.6	A
EBR	4.2	A	-	-	5.6	A	4.8	A	-	-
WBL	6.3	A	-	-	-	-	12.1	B	-	-
WBT	6.5	A	1.8	A	-	-	6.8	A	18.5	B
WBR	-	-	0.6	A	-	-	-	-	3.4	A
NBL	-	-	60.7	E	41.2	D	-	-	66.7	E
NBT	-	-	-	-	13.6	B	-	-	-	-
NBR	-	-	18.1	B	-	-	-	-	14.4	B
SBL	51.5	D	-	-	-	-	54.2	D	-	-
SBT	-	-	-	-	43.9	D	-	-	-	-
SBR	9.3	A	-	-	6.8	A	8.1	A	-	-
<b>Overall</b>	<b>22.8</b>	<b>C</b>	<b>4.3</b>	<b>A</b>	<b>23.6</b>	<b>C</b>	<b>27.0</b>	<b>C</b>	<b>11.3</b>	<b>B</b>

Source: Lake Orange County Connector PD&E Study – Project Traffic Analysis Report dated September 2019 (Table 5-12)

Table 28: 2025 Build PM Peak Hour Intersection Level of Service Results (Existing Intersections)

Movements	SR 429 SB Ramps @ Schofield Rd		SR 429 NB Ramps @ Schofield Rd		Avalon Rd @ Schofield Rd		SR 429 SB Ramps @ New Independence		SR 429 NB Ramps @ New Independence	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
EBL	-	-	-	-	27.2	C	-	-	9.8	A
EBT	28.2	C	3.1	A	-	-	26.2	C	13.6	B
EBR	1.6	A	-	-	5.4	A	5.7	A	-	-
WBL	6.1	A	-	-	-	-	8.7	A	-	-
WBT	6.6	A	1.8	A	-	-	7.2	A	18.3	B
WBR	-	-	0.6	A	-	-	-	-	2.8	A
NBL	-	-	61.2	E	41.5	D	-	-	72.1	E
NBT	-	-	-	-	12.0	B	-	-	-	-
NBR	-	-	16.2	B	-	-	-	-	14.5	B
SBL	52.4	D	-	-	-	-	65.4	E	-	-
SBT	-	-	-	-	51.0	D	-	-	-	-
SBR	8.8	A	-	-	6.8	A	7.9	A	-	-
<b>Overall</b>	<b>20.9</b>	<b>C</b>	<b>5.2</b>	<b>A</b>	<b>30.1</b>	<b>C</b>	<b>33.7</b>	<b>C</b>	<b>14.4</b>	<b>B</b>

Source: Lake Orange County Connector PD&amp;E Study – Project Traffic Analysis Report dated September 2019 (Table 5-13)

Table 29: 2025 Build AM Peak Hour Intersection Level of Service Results (New Intersections)

Movements	CR 455 @ SR 516 EB Ramps		CR 455 @ SR 516 WB Ramps		Future Valencia Rd @ SR 516 Ramps	
	Delay	LOS	Delay	LOS	Delay	LOS
EBL	41.4	D	-	-	19.1	B
EBT	-	-	-	-	-	-
EBR	8.5	A	-	-	4.2	A
WBL	-	-	34.3	C	-	-
WBT	-	-	-	-	-	-
WBR	-	-	7.8	A	-	-
NBL	-	-	72.1	E	28.9	C
NBT	21.4	C	12.2	B	28.9	C
NBR	3.2	A	-	-	-	-
SBL	72.4	E	-	-	-	-
SBT	8.3	A	35.2	D	37.3	D
SBR	-	-	0.2	A	6.6	A
<b>Overall</b>	<b>18.5</b>	<b>B</b>	<b>28.1</b>	<b>C</b>	<b>18.5</b>	<b>B</b>

Source: Lake Orange County Connector PD&amp;E Study – Project Traffic Analysis Report dated September 2019 (Table 5-12)

Table 30: 2025 Build PM Peak Hour Intersection Level of Service Results (New Intersections)

Movements	CR 455 @ SR 516 EB Ramps		CR 455 @ SR 516 WB Ramps		Future Valencia Rd @ SR 516 Ramps	
	Delay	LOS	Delay	LOS	Delay	LOS
EBL	41.2	D	-	-	18.1	B
EBT	-	-	-	-	-	-
EBR	9.9	A	-	-	5.2	A
WBL	-	-	35.3	D	-	-
WBT	-	-	-	-	-	-
WBR	-	-	6.6	A	-	-
NBL	-	-	72.6	E	29.5	C
NBT	20.9	C	12.0	B	28.6	C
NBR	3.4	A	-	-	-	-
SBL	71.4	E	-	-	-	-
SBT	12.5	B	36.0	D	37.7	D
SBR	-	-	3.3	A	6.1	A
<b>Overall</b>	<b>17.4</b>	<b>B</b>	<b>33.5</b>	<b>C</b>	<b>18.0</b>	<b>B</b>

Source: Lake Orange County Connector PD&E Study – Project Traffic Analysis Report dated September 2019 (Table 5-13)

The 95th percentile queue lengths obtained from the Synchro analyses for the 2025 Build condition are provided in **Tables 31** and **33**. These tables also provide the storage lengths from Synchro and the ramp lengths from existing conditions or design plans. The queues do not exceed ramp lengths but slightly exceed the storage length and result in LOS E for the southbound left movement at the US 27 @ Lake Louisa Road in the PM peak.

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Table 31: 2025 Build Intersection Queue Summary

Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
SR 429 SB Ramps @ Schofield Rd	EBT			274	200
	EBR	300		19	7
	WBL	300		32	24
	WBT			68	77
	SBL	500	2700	115	137
	SBR	500	2700	61	80
SR 429 NB Ramps @ Schofield Rd	EBT			63	64
	WBT			39	40
	WBR	300		8	7
	NBL	500	3000	32	43
	NBR	500	3000	41	49
Avalon Rd @ Schofield Rd	EBL			141	130
	EBR	500		54	50
	NBL	500		193	201
	NBT			163	70
	SBT			141	327
	SBR	300		67	69
SR 429 SB Ramps @ New Independence	EBT			171	117
	EBR	300		35	29
	WBL	300		107	94
	WBT			38	58
	SBL	500	2450	256	395
	SBR	500	2450	64	78
SR 429 NB Ramps @ New Independence	EBL	300		200	m138
	EBT			191	336
	WBT			114	100
	WBR	300		59	52
	NBL	500	2150	108	153
	NBR		2150	70	86
CR 455 @ SR 526 EB Ramps	EBL	500	750	29	22
	EBR	500	750	48	38
	NBT			76	53
	NBR	300		46	39
	SBL	300		84	61
	SBT			46	98
CR 455 @ SR 526 WB Ramps	WBL	500	1650	82	119
	WBR	500	1650	34	42
	NBL	300		60	85
	NBT			44	19
	SBT			68	101
	SBR	300		1	13



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Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
Future Valencia Rd @ SR 516 Ramps	EBL		2000	160	112
	EBR	500	2000	22	17
	NBL	500		43	64
	NBT			48	34
	SBT			40	55
	SBR	300		53	62

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longerm indicates volume for 95<sup>th</sup> percentile queue is metered by upstream signal

Source: Lake Orange County Connector PD&amp;E Study – Project Traffic Analysis Report dated September 2019

The results of the intersection analysis of the two intersections along US 27 are summarized in **Table 32**. The intersection at Lake Louisa Road is expected to continue operating at an overall LOS B in the AM peak hour and will operate at an overall LOS B during the PM peak hour. At the Sawgrass Bay Boulevard intersection in the build condition, it is recommended that the existing westbound through/left be replaced with dual westbound left turn lanes and a shared through/right, which will result in the intersection operating at an overall LOS C in the AM peak hour and LOS B in the PM peak hour. The Synchro reports for the US 27 intersections at Lake Louisa Road and Sawgrass Bay Boulevard are provided in **Appendix H**.

Table 32: 2025 Build AM and PM Peak Hour Intersection Level of Service Results (US 27 Intersections)

Movements	US 27 @ Lake Louisa Road						US 27 @ Sawgrass Bay Boulevard					
	AM Peak			PM Peak			AM Peak			PM Peak		
	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
EBL	0.02	27.8	C	0.02	30.3	C	0.08	33.0	C	0.03	32.6	C
EBT	0.00	0.0	A	0.01	0.0	A	0.04	23.0	C	0.05	20.1	C
EBR	-	-	-	-	-	-	-	-	-	-	-	-
WBL	0.48	37.4	D	0.34	36.8	D	0.84	51.8	D	0.42	33.4	C
WBT	0.46	4.1	A	0.32	2.0	A	0.52	11.5	B	0.20	13.3	B
WBR	-	-	-	-	-	-	-	-	-	-	-	-
NBL	0.00	6.0	A	0.02	5.8	A	0.04	8.7	A	0.16	9.1	A
NBT	0.61	14.5	B	0.86	21.7	C	0.68	21.2	C	0.67	17.8	B
NBR	0.04	0.1	A	0.13	1.4	A	0.28	3.9	A	0.28	3.3	A
SBL	0.28	8.5	A	0.98	79.3	E	0.80	36.4	D	0.21	9.6	A
SBT	0.72	13.3	B	0.48	8.9	A	0.54	12.4	B	0.62	16.9	B
SBR	0.01	0.0	A	0.01	0.0	A	0.00	0.0	A	0.02	0.1	A
<b>Overall</b>		<b>13.7</b>	<b>B</b>		<b>19.1</b>	<b>B</b>		<b>20.3</b>	<b>C</b>		<b>17.0</b>	<b>B</b>

Table 33: 2025 Build Intersection Queue Summary (US 27)

Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
US 27 @ Lake Louisa Rd	EBL			11	13
	EBT/R			0	0
	WBL			100	74
	WBT/R			12	0
	NBL	290		2	6
	NBT			344	#647
	NBR	325		0	16
	SBL	290		34	#292
	SBT			#646	329
	SBR	225		0	0
US 27 @ Sawgrass Bay Blvd	EBL			29	17
	EBT/R			16	18
	WBL			#193	91
	WBT/R			62	35
	NBL	270		10	25
	NBT			289	343
	NBR	435		44	44
	SBL	270		#238	30
	SBT			330	309
	SBR	200		0	0

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer  
m indicates volume for 95<sup>th</sup> percentile queue is metered by upstream signal

#### 6.4.4 2045 Build

The 2045 Build analysis shows that the intersections of the SR 429 ramp terminals and the intersection of Avalon Road at Schofield Road will operate similarly to the No-Build condition in the AM and PM peak hours. All the intersections will operate at an overall LOS D or better in both the AM and PM peak hours. The westbound left turn movement at the SR 429 southbound ramps no longer shows LOS F in the AM or PM peak hours. The eastbound left and northbound right turn movements are no longer F at the SR 429 northbound ramps. Also of note is that the Future Valencia Road at SR 516 Ramps condition was improved from a single eastbound left-turn lane in 2025 to dual left-turn lanes between 2025 and 2045, which improved operations.

**Table 34** displays the 2045 Build AM peak hour intersection LOS summaries and **Table 35** displays the 2045 Build PM peak hour intersection LOS summaries for the intersections included in the *Lake Orange Connector PD&E Study – Project Traffic Analysis Report dated September 2019* analysis, attached as **Appendix D**. The northbound left turn movement at the SR 429 Northbound Ramps and New Independence intersection operates at LOS F in the AM, and an improvement of dual lefts is recommended by 2045.

**Table 36** and **Table 37** summarize the intersection LOS for the new SR 516 interchange ramp terminals for the AM and PM peak hours, respectively. This analysis shows that the intersections will operate at an overall LOS D or better in the AM and PM peak hours.

*Table 34: 2045 Build AM Peak Hour Intersection Level of Service Results (Existing Intersections)*

Movements	SR 429 SB Ramps @ Schofield Rd		SR 429 NB Ramps @ Schofield Rd		Avalon Rd @ Schofield Rd		SR 429 SB Ramps @ New Independence		SR 429 NB Ramps @ New Independence	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
EBL	-	-	-	-	34.5	C	-	-	73.7	E
EBT	37.4	D	12.3	B	-	-	41.7	D	7.5	A
EBR	3.8	A	-	-	4.1	A	6.3	A	-	-
WBL	27.3	C	-	-	-	-	75.3	E	-	-
WBT	7.7	A	12.5	B	-	-	8.9	A	19.0	B
WBR	-	-	8.0	A	-	-	-	-	37.6	D
NBL	-	-	43.7	D	50.5	D	-	-	95.1	F
NBT	-	-	-	-	16.4	B	-	-	-	-
NBR	-	-	15.6	B	-	-	-	-	47.9	D
SBL	55.6	E	-	-	-	-	56.6	E	-	-
SBT	-	-	-	-	50.2	D	-	-	-	-
SBR	8.4	A	-	-	7.7	A	14.5	B	-	-
<b>Overall</b>	<b>26.8</b>	<b>C</b>	<b>13.7</b>	<b>B</b>	<b>28.7</b>	<b>C</b>	<b>37.0</b>	<b>D</b>	<b>33.3</b>	<b>C</b>

Source: Lake Orange County Connector PD&E Study – Project Traffic Analysis Report dated September 2019 (Table 5-16)

*Table 35: 2045 Build PM Peak Hour Intersection Level of Service Results (Existing Intersections)*

Movements	SR 429 SB Ramps @ Schofield Rd		SR 429 NB Ramps @ Schofield Rd		Avalon Rd @ Schofield Rd		SR 429 SB Ramps @ New Independence		SR 429 NB Ramps @ New Independence	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
EBL	-	-	-	-	38.4	D	-	-	73.1	E
EBT	46.8	D	25.0	C	-	-	68.7	E	26.9	C
EBR	6.0	A	-	-	6.3	A	8.9	A	-	-
WBL	26.5	C	-	-	-	-	76.9	E	-	-
WBT	24.5	C	46.2	D	-	-	25.6	C	37.3	D
WBR	-	-	22.1	C	-	-	-	-	5.3	A
NBL	-	-	29.6	C	65.1	E	-	-	44.0	D
NBT	-	-	-	-	13.2	B	-	-	-	-
NBR	-	-	26.9	C	-	-	-	-	44.8	D
SBL	32.3	C	-	-	-	-	35.5	D	-	-
SBT	-	-	-	-	55.5	E	-	-	-	-
SBR	31.2	C	-	-	9.4	A	45.1	D	-	-
<b>Overall</b>	<b>31.4</b>	<b>C</b>	<b>31.1</b>	<b>C</b>	<b>37.6</b>	<b>D</b>	<b>44.0</b>	<b>D</b>	<b>33.2</b>	<b>C</b>

Source: Lake Orange County Connector PD&E Study – Project Traffic Analysis Report dated September 2019 (Table 5-17)

Table 36: 2045 Build AM Peak Hour Intersection Level of Service Results (New Intersections)

Movements	CR 455 @ SR 516 EB Ramps		CR 455 @ SR 516 WB Ramps		Future Valencia Rd @ SR 516 Ramps	
	Delay	LOS	Delay	LOS	Delay	LOS
EBL	43.7	D	-	-	36.9	D
EBT	-	-	-	-	-	-
EBR	7.2	A	-	-	5.7	A
WBL	-	-	38.3	D	-	-
WBT	-	-	-	-	-	-
WBR	-	-	5.8	A	-	-
NBL	-	-	72.2	E	15.6	B
NBT	25.4	C	13.0	B	15.9	B
NBR	3.7	A	-	-	-	-
SBL	76.5	E	-	-	-	-
SBT	17.3	B	37.8	D	26.0	C
SBR	-	-	6.9	A	3.7	A
<b>Overall</b>	<b>22.4</b>	<b>C</b>	<b>29.6</b>	<b>C</b>	<b>20.8</b>	<b>C</b>

Source: Lake Orange County Connector PD&amp;E Study – Project Traffic Analysis Report dated July 2019 (Tables 5-16)

Table 37: 2045 Build PM Peak Hour Intersection Level of Service Results (New Intersections)

Movements	CR 455 @ SR 516 EB Ramps		CR 455 @ SR 516 WB Ramps		Future Valencia Rd @ SR 516 Ramps	
	Delay	LOS	Delay	LOS	Delay	LOS
EBL	40.7	D	-	-	50.3	D
EBT	-	-	-	-	-	-
EBR	18.8	B	-	-	9.8	A
WBL	-	-	41.9	D	-	-
WBT	-	-	-	-	-	-
WBR	-	-	5.4	A	-	-
NBL	-	-	79.7	E	8.3	A
NBT	24.0	C	11.8	B	7.9	A
NBR	3.3	A	-	-	-	-
SBL	72.0	E	-	-	-	-
SBT	23.8	C	40.0	D	15.9	B
SBR	-	-	5.8	A	2.6	A
<b>Overall</b>	<b>23.9</b>	<b>C</b>	<b>37.5</b>	<b>D</b>	<b>16.8</b>	<b>B</b>

Source: Poinciana Parkway Extension PD&amp;E Study – Project Traffic Analysis Report dated July 2019 (Tables 5-17)

The 95th percentile queue lengths obtained from the Synchro analyses for the 2045 Build condition are provided in **Tables 38** and **40**. These tables also provide the storage lengths from Synchro and the ramp lengths from existing conditions or design plans. The queues do not exceed ramp lengths but do exceed storage lengths in a few locations (shown in red). Intersection operation may be affected at the SR 429 NB Ramps @ New Independence for the eastbound left movement in AM peak, as well as the southbound left on US 27 at Lake Louisa Road in the PM peak and southbound left on US 27 at Sawgrass Bay Boulevard in the AM peak.



The results of the intersection analysis of the two intersections along US 27 are summarized in **Table 39**. The intersection at Lake Louisa Road is expected to continue operating at an overall LOS B in the AM peak hour and will operate at an overall LOS C during the PM peak hour. As currently configured, the westbound left turn movement is expected to operate at LOS F in both the AM and PM; however, adding a second westbound left turn lane will result in this movement operating at LOS D in the AM peak hour and LOS E in the PM peak hour, as shown in Table 39. The Sawgrass Bay Boulevard intersection will operate at an overall LOS C in the AM and PM peak hours. As mentioned in the 2025 Build analysis, this assumes a dual westbound left turn lane and shared through/right. The Synchro reports for the US 27 intersections at Lake Louisa Road and Sawgrass Bay Boulevard are provided in **Appendix H**.

Table 38: 2045 Build Intersection Queue Summary

Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
SR 429 SB Ramps @ Schofield Rd	EBT			509	380
	EBR	300		55	56
	WBL	300		286	178
	WBT			113	318
	SBL	500	2700	243	272
	SBR	500	2700	86	436
SR 429 NB Ramps @ Schofield Rd	EBT			253	391
	WBT			202	401
	WBR	300		196	m253
	NBL	500	3000	104	125
	NBR	500	3000	124	279
Avalon Rd @ Schofield Rd	EBL			237	298
	EBR	500		31	62
	NBL	500		437	423
	NBT			325	142
	SBT			289	591
	SBR	300		103	151
SR 429 SB Ramps @ New Independence	EBT			664	#547
	EBR	300		76	64
	WBL	300		m245	174
	WBT			130	286
	SBL	500	2450	387	470
	SBR	500	2450	188	#757
SR 429 NB Ramps @ New Independence	EBL	300		#442	m278
	EBT			268	442
	WBT			259	413
	WBR	300		#1059	85
	NBL	500	2150	#275	265
	NBR		2150	#235	379
CR 455 @ SR 526 EB Ramps	EBL	500	750	81	57
	EBR	500	750	80	136
	NBT			261	172

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Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
CR 455 @ SR 526 EB Ramps (Con't)	NBR	300		63	57
	SBL	300		184	128
	SBT			150	312
CR 455 @ SR 526 WB Ramps	WBL	500	1650	195	301
	WBR	500	1650	52	62
	NBL	300		156	223
	NBT			132	52
	SBT			188	306
	SBR	300		40	47
Future Valencia Rd @ SR 516 Ramps	EBL		2000	241	194
	EBR	500	2000	44	45
	NBL	500		64	60
	NBT			96	57
	SBT			111	96
	SBR	300		58	50

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longerm indicates volume for 95<sup>th</sup> percentile queue is metered by upstream signal

Source: Lake Orange County Connector PD&amp;E Study – Project Traffic Analysis Report dated September 2019 (Table 5-18)

Table 39: 2045 Build AM and PM Peak Hour Intersection Level of Service Results (US 27 Intersections)

Movements	US 27 @ Lake Louisa Road						US 27 @ Sawgrass Bay Boulevard					
	AM Peak			PM Peak			AM Peak			PM Peak		
	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
EBL	0.04	50.3	D	0.05	63.0	E	0.10	34.5	C	0.04	32.7	C
EBT	0.00	0.0	A	0.02	0.2	A	0.05	23.6	C	0.06	19.4	B
EBR	-	-	-	-	-	-	-	-	-	-	-	-
WBL	0.42	53.4	D	0.33	65.1	E	0.94	65.0	E	0.52	36.0	D
WBT	0.74	25.6	C	0.48	5.9	A	0.55	11.1	B	0.24	13.1	B
WBR	-	-	-	-	-	-	-	-	-	-	-	-
NBL	0.01	5.0	A	0.03	6.0	A	0.06	10.2	B	0.20	9.5	A
NBT	0.57	11.3	B	1.00	44.3	D	0.88	31.3	C	0.85	24.7	C
NBR	0.04	0.1	A	0.14	1.9	A	0.34	4.1	A	0.33	3.3	A
SBL	0.39	11.3	B	0.91	75.1	E	1.00	76.2	E	0.26	10.2	B
SBT	0.82	13.5	B	0.49	7.5	A	0.70	17.4	B	0.72	19.3	B
SBR	0.01	0.0	A	0.01	0.0	A	0.00	0.0	A	0.02	0.1	A
<b>Overall</b>		<b>14.1</b>	<b>B</b>		<b>31.4</b>	<b>C</b>		<b>29.4</b>	<b>C</b>		<b>21.1</b>	<b>C</b>

Table 40: 2045 Build Intersection Queue Summary (US 27)

Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
US 27 @ Lake Louisa Rd	EBL			19	24
	EBT/R			0	0
	WBL	150		86	70
	WBT/R			#150	7

Intersection	Movement	Storage Length	Ramp Length	95th Percentile Queue Length (ft)	
				AM Peak	PM Peak
US 27 @ Lake Louisa Rd (Con't)	NBL	290		2	6
	NBT			404	#1217
	NBR	325		0	26
	SBL	290		44	#394
	SBT			#1036	380
	SBR	225		0	0
US 27 @ Sawgrass Bay Blvd	EBL			32	18
	EBT/R			18	18
	WBL			#227	105
	WBT/R			66	39
	NBL	270		12	29
	NBT			#421	#511
	NBR	435		48	47
	SBL	270		#310	34
	SBT			#489	#440
SBR	200		0	0	

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer  
m indicates volume for 95<sup>th</sup> percentile queue is metered by upstream signal

## 6.5 Future Interchange Analysis

The focus of this Systems Interchange Modification Report is the new interchange of SR 516 with US 27. Three alternatives were evaluated: stop-control intersection, signalized intersection, and grade-separated ramp. The results of the analysis are provided in the following sections. The PD&E study considered a stop control and signalized intersection at US 27, but with the future volumes on SR 516, the PD&E study recommended a grade separated interchange.

### 6.5.1 Stop Control – 2025

The 2025 stop-control intersection analysis is summarized in **Table 41**. The results show that the westbound left and southbound left turn movements are expected to experience long delays and operate at LOS F in the AM and PM peak hours under unsignalized conditions. The detailed Synchro reports are provided in **Appendix I**.

Table 41: 2025 Stop Control AM and PM Peak Hour Intersection Level of Service Results

Intersection	Movement	Storage Length	AM Peak			PM Peak		
			Delay	LOS	Queue (veh)	Delay	LOS	Queue (veh)
SR 516 @ US 27	WBL		118.0	F	14.9	728.4	F	48.1
	SBL	400	1205.4	F	55.9	1337.4	F	39.5

### 6.5.2 Signalized – 2025

For the 2025 analysis, the proposed intersection of SR 516 at US 27 was assumed to have separate westbound left and right turn lanes, a southbound left turn lane, and a northbound right turn lane. The 2025 signalized intersection analysis is summarized in **Table 42**. The overall intersection is expected to

operate at LOS C during the AM peak hour and LOS D during the PM peak hour. The westbound left turn movement will operate at LOS F during the AM and PM peak hours. The southbound left turn movement will operate at LOS F in the PM. The detailed Synchro reports are provided in **Appendix I**.

Table 42: 2025 Signalized AM and PM Peak Hour Intersection Level of Service Results

Movements	Storage Length	SR 516 @ US 27							
		AM Peak				PM Peak			
		v/c	Delay	LOS	Queue (ft)	v/c	Delay	LOS	Queue (ft)
WBL		0.97	80.4	F	#343	1.03	85.2	F	#530
WBR		0.64	9.0	A	79	0.89	32.0	C	#388
NBT		0.80	32.0	C	300	0.99	49.2	D	#556
NBR	400	0.56	5.1	A	65	0.41	4.1	A	54
SBL	400	1.01	65.6	E	#501	1.07	95.8	F	#422
SBT		0.56	8.4	A	210	0.43	10.9	B	184
<b>Overall</b>			<b>25.8</b>	<b>C</b>			<b>41.3</b>	<b>D</b>	

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer

### 6.5.3 Grade Separated Ramps – 2025

For analysis purposes, the ramp roadway was assumed to have an ideal capacity of 2,100 passenger cars per mile per lane to evaluate the LOS based on the Highway Capacity Manual (HCM) Two-lane Methodology. **Table 43** summarizes the ramp analysis for the 2025 Build scenario. The traffic operations along a single lane ramp are subject to the lead vehicle driving characteristics and are reported based on the follower density. All ramp roadways will operate at LOS D or better in both the AM and PM peak hours with a follower density of less than 12 followers/mile/lane. The volume to capacity (v/c) ratios for the ramps indicate that there is ample capacity along the ramps in 2025. While there may be LOS D along the segment of the ramp roadway due to the inability to pass, the merge and diverge segments at US 27 are shown to operate at LOS B or better. There is no merge or diverge condition at SR 516 since the four-lane divided highway splits off into the single lane ramps in each direction. The detailed HCS reports are provided in **Appendix I**.



Table 43: 2025 Grade Separated Interchange HCS Analysis Results

Segment	Analysis Type	2025 OPENING YEAR							
		AM Peak Hour				PM Peak Hour			
		Volume	V/C	Density	LOS	Volume	V/C	Density	LOS
NB US 27 between Sawgrass Blvd and Off-Ramp to SR 516	Basic Roadway	1685	0.28	8.5	A	2055	0.34	10.4	A
NB US 27 Off-Ramp to SR 516	Diverge	450	0.23	8.5	A	300	0.15	10.5	B
NB US 27 Off-Ramp to SR 516	Ramp Roadway	450	0.214 <sup>1</sup>	9.0 <sup>2</sup>	C	300	0.143 <sup>1</sup>	5.0 <sup>2</sup>	B
NB US 27 between Off- and On-Ramps to SR 516	Basic Roadway	1235	0.21	7.4	A	1755	0.30	10.5	A
NB US 27 On-Ramp from SR 516	Ramp Roadway	370	0.176 <sup>1</sup>	6.7 <sup>2</sup>	C	550	0.262 <sup>1</sup>	11.8 <sup>2</sup>	D
NB US 27 On-Ramp from SR 516	Merge	370	0.19	8.6	A	550	0.28	12.7	B
NB US 27 between On-Ramp from SR 516 and Lake Louisa Road	Basic Roadway	1605	0.26	8.1	A	2305	0.38	11.6	B
SB US 27 between Lake Louisa Road and Off-Ramp to SR 516	Basic Roadway	2305	0.38	11.6	B	1605	0.26	8.1	A
SB US 27 Off-Ramp to SR 516	Diverge	550	0.28	14.1	B	370	0.19	9.5	A
SB US 27 Off-Ramp to SR 516	Ramp Roadway	550	0.262 <sup>1</sup>	11.7 <sup>2</sup>	D	370	0.176 <sup>1</sup>	6.6 <sup>2</sup>	C
SB US 27 between Off- and On-Ramps to SR 516	Basic Roadway	1755	0.29	9.3	A	1235	0.21	6.6	A
SB US 27 On-Ramp from SR 516	Ramp Roadway	300	0.143 <sup>1</sup>	4.8 <sup>2</sup>	B	450	0.214 <sup>1</sup>	8.7 <sup>2</sup>	C
SB US 27 On-Ramp from SR 516	Merge	300	0.15	12.0	B	450	0.23	10.5	B
SB US 27 between On-Ramp from SR 516 and Sawgrass Blvd	Basic Roadway	2055	0.34	12.0	B	1685	0.28	8.6	A

Note: <sup>1</sup>V/C based on Two-Lane Ramp capacity in Exhibit 14-12 of the Highway Capacity Manual (2100 vehicles/hour)<sup>2</sup>Density is follower density (followers/mile)

### 6.5.4 Stop Control – 2045

The 2045 stop-control intersection analysis is summarized in **Table 44**. The westbound left turn and southbound left turn movements are expected to experience long delays and operate at LOS F in the AM and PM peak hours under unsignalized conditions. The detailed Synchro reports are provided in **Appendix I**.

Table 44: 2045 Stop Control AM and PM Peak Hour Intersection Level of Service Results

Intersection	Movement	Storage Length	AM Peak			PM Peak		
			Delay	LOS	Queue (veh)	Delay	LOS	Queue (veh)
SR 516 @ US 27	WBL		485.7	F	54.9	2059.6	F	124.1
	SBL	400	4446.5	F	136.8	5312.6	F	94.0

### 6.5.5 Signalized – 2045

For the 2045 analysis, the proposed intersection of SR 516 at US 27 was assumed to have separate westbound left and right turn lanes, dual southbound left turn lanes, and a northbound right turn lane. The 2045 signalized intersection analysis is summarized in **Table 45**. The overall intersection is expected to operate at LOS E during the AM peak hour and LOS F during the PM peak hour. The westbound left turn and southbound left turn movements will operate at LOS F during the AM and PM peak hours. The westbound right turn and northbound through movements will operate at LOS F in the PM peak hour. The detailed Synchro reports are provided in **Appendix I**.

Table 45: 2045 Signalized AM and PM Peak Hour Intersection Level of Service Results

Movements	Storage Length	SR 516 @ US 27							
		AM Peak				PM Peak			
		v/c	Delay	LOS	Queue (ft)	v/c	Delay	LOS	Queue (ft)
WBL		1.15	125.5	F	#866	1.44	242.4	F	#1544
WBR		0.76	20.5	C	594	1.29	169.6	F	#1733
NBT		0.99	73.0	E	#457	1.20	138.8	F	#932
NBR	400	1.01	56.2	E	#1107	0.53	9.2	A	305
SBL	400	1.15	118.5	F	#733	1.44	250.1	F	#668
SBT		0.68	20.3	C	447	0.44	22.0	C	281
<b>Overall</b>			<b>62.1</b>	<b>E</b>			<b>140.0</b>	<b>F</b>	

# indicates 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer

~ indicates volume exceeds capacity, queue is theoretically infinite

### 6.5.6 Grade Separated Ramps – 2045

As stated in the description of the 2025 conditions, the ramp roadway was analyzed assuming an ideal capacity of 2,100 passenger cars per mile per lane. **Table 46** summarizes the ramp analysis for the 2045 Build scenario. The southbound US 27 on-ramp from SR 516 will operate at LOS D in the AM peak hour. The northbound US 27 off-ramp to SR 516 will operate at LOS D in the PM peak hour. All other ramp roadways will operate at LOS E in both the AM and PM peak hours. The volume to capacity (v/c) ratios for the ramps indicate that there will be ample capacity along the ramps in 2045. While there may be LOS D and E along the segment of the ramp roadway due to the inability to pass, the merge and diverge segments at US 27 are shown to operate at LOS B or better. This indicates that the LOS E condition is limited to the ramp roadway and will dissipate once vehicles are free to pass on the multi-lane facility.

The detailed HCS reports are provided in **Appendix I**.

*Table 46: 2045 Grade Separated Interchange HCS Analysis Results*

Segment	Analysis Type	2045 DESIGN YEAR							
		AM Peak Hour				PM Peak Hour			
		Volume	V/C	Density	LOS	Volume	V/C	Density	LOS
NB US 27 between Sawgrass Blvd and Off-Ramp to SR 516	Basic Roadway	2005	0.33	10.2	A	2450	0.40	12.4	B
NB US 27 Off-Ramp to SR 516	Diverge	920	0.47	11.6	B	610	0.31	13.5	B
NB US 27 Off-Ramp to SR 516	Ramp Roadway	920	0.44 <sup>1</sup>	24.1 <sup>2</sup>	E	610	0.29 <sup>1</sup>	13.8 <sup>2</sup>	D
NB US 27 between Off- and On-Ramps to SR 516	Basic Roadway	1085	0.19	6.5	A	1840	0.32	11.0	A
NB US 27 On-Ramp from SR 516	Ramp Roadway	750	0.36 <sup>1</sup>	18.1 <sup>2</sup>	E	1120	0.53 <sup>1</sup>	31.0 <sup>2</sup>	E
NB US 27 On-Ramp from SR 516	Merge	750	0.38	10.8	B	1120	0.57	17.5	B
NB US 27 between On-Ramp from SR 516 and Lake Louisa Road	Basic Roadway	1835	0.30	9.2	A	2960	0.49	15.0	B
SB US 27 between Lake Louisa Road and Off-Ramp to SR 516	Basic Roadway	2960	0.49	15.0	B	1835	0.30	9.3	A
SB US 27 Off-Ramp to SR 516	Diverge	1120	0.57	19.2	B	750	0.38	11.8	B
SB US 27 Off-Ramp to SR 516	Ramp Roadway	1120	0.53 <sup>1</sup>	30.8 <sup>2</sup>	E	750	0.36 <sup>1</sup>	18.0 <sup>2</sup>	E
SB US 27 between Off- and On-Ramps to SR 516	Basic Roadway	1840	0.31	9.8	A	1085	0.18	5.8	A
SB US 27 On-Ramp from SR 516	Ramp Roadway	610	0.29 <sup>1</sup>	13.4 <sup>2</sup>	D	920	0.44 <sup>1</sup>	23.6 <sup>2</sup>	E
SB US 27 On-Ramp from SR 516	Merge	610	0.31	14.9	B	920	0.47	13.5	B
SB US 27 between On-Ramp from SR 516 and Sawgrass Blvd	Basic Roadway	2450	0.40	12.5	B	2005	0.33	10.2	A

Note: <sup>1</sup>V/C based on Two-Lane Ramp capacity in Exhibit 14-12 of the Highway Capacity Manual (2100 vehicles/hour)

<sup>2</sup>Density is follower density (followers/mile)

The analysis shows that the grade-separated ramps will provide the best operations for the interchange at SR 516 and US 27 compared to the stop-control and signalized options; therefore, it was chosen as the

preferred alternative. Both the stop-control and signalized options are unsuccessful in reducing congestion to an acceptable level of service even after other improvements such as signal optimization or additional turn lanes have been considered. For example, the stop-control configuration results in LOS F for all movements in both the 2025 and 2045 scenarios. While the signalized intersection configuration may operate sufficiently in 2025, it will degrade to LOS F in both peak hours by 2045. The grade-separated configuration provides free-flow along US 27, increases capacity, and reduces conflict/delay. Although the ramp roadways are showing LOS D and E, this is a result of the follower density. There is ample capacity along the ramp roadways and the merge condition onto US 27 will operate at LOS B in 2045. The grade separated ramps, with the directional access, are also much less likely to contribute to wrong-way driving on expressway facilities, than intersection style (Stop-controlled and Signalized intersections) interchange entrances.

## 7. Safety Analysis

A quantitative safety analysis was conducted to determine the future impacts of the proposed SR 516/Lake Orange County Connector on the existing arterial section of US 27 within the AOI, per the executed MLOU. The future safety analysis was conducted using the FDOT Manual on Uniform Traffic Studies (MUTS) Form No. 750-020-21d, *Present Worth Analysis for Urban and Suburban Arterials (6 to 8 Lanes and One-Way Streets)*, revised in September 2020. The spreadsheet applies the predictive methods in Chapter 12 of the Highway Safety Manual. A combination of Safety Performance Functions (SPFs), Crash Modification Factors (CMFs), and calibration factors is applied to estimate frequency of predicted crashes for each segment and intersection along an arterial. The spreadsheet was updated with the 2021 FDOT Design Manual (FDM) KABCO crash costs. The No-Build and Build (grade separated) conditions on US 27 were evaluated and the predicted number of crashes and associated costs from 2025 to 2045 are summarized in **Table 47**. Detailed safety analysis tables are provided in **Appendix J**.

The 20-year totals in **Table 47** show that predicted crashes and costs for the Build SR 516 project will be about three percent higher compared to No-Build, along the existing US 27 section within the AOI. This is mainly due to the expected increase in projected traffic along US 27 for the Build alternative. However, the grade-separated Build alternative reduces congestion compared to No-Build and the safety benefit would have been higher if the safety analysis tools could consider queuing impacts in estimating potential crashes. Also, grade separating the intersection movements reduces vehicle conflicts, which is expected to improve safety. It is important to note that there are facilities in the region that will benefit from the Build project but are not included in the safety analysis. SR 516 will provide a much-needed and shorter east-west connection between US 27 and SR 429. Trips currently using long and, in some cases, circuitous routes to travel from south Lake County to west Orange County will have the option to use a direct and faster connection. The Lake Orange Connector will also include north/south connections at CR 455 and Valencia Parkway, enhancing travel throughout the region. As a result, the Build alternative is expected to reduce Vehicle Hours of Travel (VHT) by approximately 9,900 hours in 2025 and 9,000 hours in 2045, within the travel demand model subarea for facilities impacted by SR 516, as presented in **Table 48**. The reduction in VHT (*aka*, travel time savings) translated to a 20-year user benefit of \$645 Million (**Table 48**) for the Build alternative compared to the No-Build. Reduction in regional travel time (i.e. reduction in congestion) for the Build alternative will inherently reduce potential crashes in the region that are related to congestion, such as rear-end, side-swipe, and angle crashes and improve safety. In addition, the design of the project follows FDOT standards to provide features that mitigate potential crashes such as long auxiliary lanes, adequate sight distances, gentle cross-slopes, super elevation, wide curve radii, wide shoulders, signing and lighting among others. Overall, it is expected that the Lake Orange Connector will significantly improve traffic operations and safety in the area. The value of time used in estimating the user benefit was obtained from the 2019 *Urban Mobility Report* published by the Texas Transportation Institute, and adjusted for local car and truck proportions. The table used to estimate the user benefit is presented in **Appendix J**.



Systems Interchange Modification  
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FPID: CFX Project No. 516-236; 516-237; 516-238

Table 47: Predicted Number of Crashes and Costs from 2025 to 2045

Site	No-Build		Build	
	N <sub>predicted*</sub>	2021 Present Value	N <sub>predicted*</sub>	2021 Present Value
<b>US 27</b>				
Lake Louisa State Park to Sawgrass Bay Boulevard	916.5	\$93,852,972	-	-
Lake Louisa State Park to SR 516 Interchange	-	-	485.2	\$49,673,997
SR 516 Interchange to Sawgrass Bay Boulevard	-	-	471.3	\$48,264,589
<b>Intersections</b>				
US 27 and Lake Louisa State Park	295.2	\$22,825,761	300.9	\$23,249,942
US 27 and Sawgrass Bay Blvd	246.3	\$19,043,616	248.5	\$19,208,829
<b>20-YEAR TOTAL</b>	<b>1,458</b>	<b>\$135,722,348</b>	<b>1,506</b>	<b>\$140,397,357</b>
<b>20-YEAR DIFFERENCE (BUILD VS NO-BUILD)</b>			<b>48</b>	<b>\$4,675,008</b>

\*Predicted Crashes

Table 48: Subarea Vehicle Hours of Travel and User Benefit

Year	No-Build	Build	Difference
2025	202,132	192,207	-9,925
2045	319,730	310,674	-9,056
<b>20-YEAR USER BENEFIT (BUILD)</b>			<b>\$645,000,000</b>

## 8. Environmental Considerations

The PD&E Study was completed and approved by the CFX Board in October 2019, as documented in the Project Environmental Impact Report (PEIR) (September 2019). The PEIR documented that there were no significant impacts of this project to the neighboring Social, Cultural, Natural, or Physical environments. Permits will be obtained as part of the Design phase of this project with Florida Department of Environmental Protection, St Johns River Water Management District and/or South Florida Water Management District, for stormwater, dredge and fill activities, and potential dewatering permitting. The Florida State Historic Preservation Office provided concurrence of no impacts to any cultural resources. The National Forest Service and Federal Aviation Administration provided concurrence as there are no US forests holdings in the study area and tall, permanent structures near airports conform to FAR Part 77. The US Environmental Protection Agency requested wetlands and jurisdictional waters be avoided and minimized. No significant impacts are expected as a result of the SIMR.

The following environmental commitments were identified during the PD&E Study and included in *Section 5. Commitments of the PIER*.

- To minimize adverse impacts to the eastern indigo snake, during construction, CFX will adhere to the *USFWS Standard Protection Measures for the Eastern Indigo Snake*.
- CFX will mitigate for any unavoidable impacts to the wood stork. Suitable Foraging Habitat (SFH) at an approved mitigation bank and in accordance with the USFWS Wood Stork Effect Determination Key (U.S. Army Corps of Engineers and USFWS 2008).
- A preconstruction gopher tortoise burrow survey and any resultant permitting will be conducted in accordance with Florida Fish and Wildlife Conservation Commission (FWC) protocols.
- CFX will mitigate for unavoidable impact to wetlands consistent with state and Federal standards.
- CFX will continue to coordinate with stakeholders and impacted property owners during final design regarding pond locations and potential design modifications.
- CFX will continue to coordinate with Lake and Orange Counties regarding final location and design of the future CR 455 and Valencia Parkway.
- CFX will coordinate with the Florida Department of Transportation (FDOT) in final design regarding joint use ponds for impacts to existing FDOT stormwater ponds located along US 27 in the project study area.
- CFX will maintain the proposed alignment as south as possible to minimize impacts to the future mining operations of the CEMEX Four Corners Sand Mine.
- CFX will maintain previous access agreements for private property owners that were put into place when the SR 429 was constructed.

## 9. Funding Plan and Schedule

The Project Development and Environment (PD&E) Study for SR 516 Lake Orange County Connector was completed in 2019. The SR 516/Lake Orange Expressway from US 27 to SR 429 is listed in Metroplan Orlando's Long Range Transportation Plan as MTP ID# 1001; with all of the project phases including Preliminary Engineering (PE), Right-of-Way (ROW) and Construction (CST) include listed in the Cost Feasible Plan. **Table 49** lists the CFX's FY 2022-2026 Five-Year Work Plan, which is consistent with the Metroplan Orlando Transportation Improvement Program (TIP) FY 2022-2026.

*Table 49: CFX's Five-Year Work Plan FY 2022 –2026 (in thousands)*

Project Number	Facility	Location		Miles	Improvement	Phase	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	2025/ 2026	Fund	\$ (000s)
516-236	SR 516	US 27	Cook Road	1.2	New Expressway	PE, CST	\$2,888	\$14,484	\$38,348	\$38,559	\$2,034	CF	\$96,313
516-237	SR 516	Cook Road	Lake/Orange County Line	1.8	New Expressway	PE, CST	\$2,324	\$17,019	\$49,165	\$39,141	\$1,206	CF	\$108,855
516-238	SR 516	Lake/Orange County Line	SR 429	0.8	New Expressway	PE, CST	\$4,344	\$12,937	\$45,700	\$49,249	\$2,428	CF	\$114,658
-	SR 516	US 27	SR 429	3.8	New Expressway	ROW	\$20,912	\$53,148	\$24,384	\$6,117	\$0	CF	\$104,561

## 10. Conceptual Signing Plan

A conceptual signing plan was developed for the preferred design concept in accordance with the FDOT Design Manual (FDM) and the Manual on Uniform Traffic Control Devices (MUTCD, 2009).

The SR 516 alignment, which is based on the current design plans, and the Conceptual Signing Plan and the ROW Plan are included in **Appendix F**.

## 11. Compliance with FHWA Policy Points

SR 516/Lake Orange County Connector is a proposed limited access tollway connecting US 27 to SR 429. A new alignment, SR 516 will be a 4-lane divided freeway facility with an interchange at US 27, CR 455 Extension (proposed), Valencia Parkway (proposed) and ending at SR 429. The two FHWA Policy Points were evaluated regarding this new interchange and responses are provided below that support and provide justification for the new alignment with a grade separated interchange based on the traffic analysis performed to date.

### 11.1 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, 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 (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroad 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 crossroads and local street network (23 CFR 625.2(a) and 655.603(d)). Each request should include a conceptual plan of the type and location of signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).*

#### Summary Findings

Operational and safety analyses were performed to evaluate the impacts of the proposed Lake Orange County Connector Expressway (SR 516) including a new interchange access at US 27. A traffic operations and safety analysis of the existing, future No-Build, and three alternative Build conditions for the US 27 interchange have been conducted within this study using several performance measures. The first intersections on either side of the proposed access location on US 27 were evaluated in addition to the analysis completed as part of the Lake Orange County Connector Project Traffic Analysis Report (PTAR). These measures of effectiveness are based on freeway density, freeway speeds, following density, levels of service, intersection delay, stop queues, safety benefits, and user benefits. Overall, the network will be improved with the SR 516 Expressway, and it will become an integral part of the toll road system, the regional highway network and supplement other CFX roadway improvement projects along SR 429.

As the proposed four-lane divided facility, the SR 516 freeway density would be LOS C or better. The new expressway is driven by regional mobility needs in this rapidly growing area of Central Florida. The ramp terminals for all interchanges along the SR 516 corridor will operate at LOS D or better. The merge and diverge operations are LOS C or better for all freeway movements, except the on-ramp merge condition along northbound SR 429 from eastbound SR 516 which operates at LOS D in the AM peak hour. The intersections of US 27 at Lake Louisa State Park and Sawgrass Bay Boulevard were degraded slightly by the increased traffic volumes, but still operate at LOS D or better in the 2045 Build condition in both the



AM and PM peak hours. The traffic operations analysis showed that the grade separated alternative performed better than the stop-control and signalized intersection conditions related to LOS, delay, and queue lengths.

Trips currently using long and, in some cases, circuitous routes to travel from south Lake County to west Orange County will have the option to use a direct and faster connection. SR 516 will also include north/south connections at CR 455 and Valencia Parkway, enhancing travel throughout the region. As a result, the Build alternative is expected to reduce Vehicle Hours of Travel (VHT) by approximately 9,900 hours in 2025 and 9,000 hours in 2045, within the travel demand model subarea for facilities impacted by SR 516. The reduction in VHT (*aka*, travel time savings) translated to a 20-year user benefit of \$645 Million for the Build alternative compared to the No-Build. As a new facility introducing access points, there is expected to be an increase in crashes along US 27, with an estimated crash cost of \$4.6 Million. However, the reduction in regional travel time/congestion for the Build alternative will inherently reduce potential crashes in the region that are related to congestion, such as rear-end, side-swipe, and angle crashes and improve safety. In addition, the design of the project follows FDOT standards to provide features that mitigate potential crashes such as long auxiliary lanes, adequate sight distances, gentle cross-slopes, super elevation, wide curve radii, wide shoulders, signing and lighting among others. Overall, it is expected that SR 516 will significantly improve traffic operations, safety in the study area, and regional connectivity and mobility in the area. The conceptual signing plan for the project is provided in Appendix F.

## 11.2 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, HOVs, HOT 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 analysis to the partial-interchange options. 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.*

### Summary Findings

The proposed new SR 516 expressway with a grade separated interchange at US 27 will provide full access and facilitate all traffic movements from the SR 516 expressway to US 27. There will be a full access interchange at the proposed CR 455 Extension, a half an interchange at the proposed Valencia Parkway, providing access to and from the west, and a full access, grade-separated interchange at SR 429. A half interchange at Valencia Parkway is proposed due to its proximity to the SR 429 grade-separated interchange. The proposed alignment meets current design standards and conforms to American Association of State and Highway Transportation Officials (AASHTO) and the FDOT design standards.

## 12. Conclusion and Recommendation

CFX has performed several studies on the SR 516/Lake Orange Connector, as referenced in this SIMR, to evaluate the need, preferred alignment, cross-section, interchange type and local road improvements along US 27, CR 455 Extension, Valencia Parkway and SR 429. The SR 516/Lake Orange Connector, which is an expansion project, is a new four-lane tolled expressway alignment connecting US 27 to SR 429. The alignment is midway between SR 50 to the north and US 192 to the south and provides the only regionally significant connection between these roadways for 19 miles. This expressway provides a much-needed east-west facility in this area of the Orlando metropolitan area, connecting two principal arterials, and significantly improving regional mobility. The new expressway will include an interchange with US 27 and realignment of US 27 to accommodate the improvements while avoiding impacts to Lake Louisa State Park. The project corridor is expected to improve connectivity between Lake and Orange counties, as well as meet future traffic needs.

Freeway analysis of the segments, and merge/diverge movements show acceptable LOS for 2025 and 2045 conditions. Interchange alternative evaluations confirm that the grade separated interchange at US 27 will perform with shorter delays, better LOS, and shorter queue lengths over the traditional T-intersection with either a signal or stop condition. The Build alternative has new access points and higher traffic along US 27 when compared to the No-Build, which results in a slightly higher prediction of potential crashes of approximately three percent. However, the Build will reduce travel time within the network by providing a direct and shorter east-west connection between US 27 and SR 429. Reduction in regional travel time/congestion for the Build alternative is expected to reduce potential crashes in the area and improve safety. The Build alternative is predicted to have a 20-year travel time savings of approximately \$645 Million compared to the No-Build alternative.

This study concludes that the grade separated ramps at SR 516 and US 27 will provide the best traffic operations for the interchange. This alternative contributes less to wrong-way driving on expressways, provides a free-flow transition from the state highway to tolled expressway and will also provide an improved experience for public roadway and tollway users.

## APPENDICES

- Appendix A: MLOU
- Appendix B: CRASH DATA 2014-2018
- Appendix C: EXISTING CONDITIONS ARTERIAL ANALYSIS REPORTS
- Appendix D: LAKE ORANGE COUNTY CONNECTOR PD&E STUDY – PROJECT TRAFFIC ANALYSIS REPORT (SEPTEMBER 2019)
- Appendix E: EXISTING CONDITIONS INTERSECTION (SYNCHRO) ANALYSIS REPORTS FOR SAWGRASS BAY BLVD AT US 27 & LAKE LOUISA AT US 27
- Appendix F: ACCESS MANAGEMENT AND CONCEPTUAL SIGNING PLAN
- Appendix G: FUTURE CONDITIONS ARTERIAL AND SEGMENT ANALYSIS REPORTS
- Appendix H: FUTURE CONDITIONS INTERSECTION (SYNCHRO) ANALYSIS REPORTS FOR SAWGRASS BAY BLVD AT US 27 & LAKE LOUISA AT US 27
- Appendix I: FUTURE CONDITIONS INTERSECTION (SYNCHRO) AND SEGMENT (HCS) ANALYSIS REPORTS FOR INTERCHANGE ALTERNATIVES
- Appendix J: SAFETY ANALYSIS TABLES