Draft Final Roadway Conceptual Analysis and Draft Final Intersection Control Evaluation (ICE) Study Addendum for Chuluota Road (CR 419) From SR 50 to Lake Pickett Road

Prepared for

Orange County Government Florida

Orange County Public Works

Prepared by

JMT

March, 2025

Draft Final Roadway Conceptual Analysis and Draft Final Intersection Control Evaluation (ICE) Study Addendum

FOR

Chuluota Road (CR 419)

FROM SR 50 TO LAKE PICKETT ROAD

PREPARED FOR

ORANGE COUNTY GOVERNMENT FLORIDA

ORANGE COUNTY PUBLIC WORKS

PREPARED BY

JMT

March, 2025

Orange County Project Number: Y20-830

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I am a registered professional engineer in the State of Florida practicing with JMT, Inc., and that I have supervised the preparation of and approved the analysis, findings, opinions, conclusions, and technical advice reported in:

REPORT: Roadway Conceptual Analysis Report

PROJECT LOCATION: Chuluota Road From SR 50 to Lake Pickett Road

CLIENT: Orange County, Florida

The following duly authorized engineering business performed the engineering work represented by this report:

JMT, Inc.
400 Colonial Center Parkway, Suite 100
Lake Mary, FL 32746
Florida Certificate of Authorization: 5917

This report includes a summary of data collection efforts, corridor analysis, and conceptual design analysis for Chuluota Road from SR 50 to Lake Pickett Road in Orange County, Florida.

I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through design standards and criteria set forth by the federal, state, and local regulatory agencies as well as professional judgment and experience.

Signature:

Name: Greg T. Smith, PE
FL PE 39087

Date: _____

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EXECUTIVE SUMMARY

ES.1 Introduction

Orange County has prepared a Roadway Conceptual Analysis (RCA) for the Chuluota Road (CR 419) corridor from SR 50 to Lake Pickett Road in northeast Orange County. The project location is shown on Figure 1-1. The objective of the RCA is to identify the preferred improvements needed to address current and future transportation needs along the corridor.

At the Public Hearing on March 7, 2023, the Orange County Board of County Commissioners (BCC) concluded that additional studies were needed to consider and investigate alternative intersection controls and configurations such as roundabouts and other options. Later in 2023, the Board authorized further investigations to more fully explore various options by conducting an Intersection Control Evaluation (ICE) process using FDOT procedures.

This RCA report summarizes the essential components of the initial study, including public involvement, data collection, traffic analysis, roadway design, drainage design, and environmental impacts. The ICE Study Addendum has been prepared as a separate, stand-along document to summarize the finding of the ICE process which included identification and consideration of alternative intersection concepts, and recommendations.

The reader is advised to consult with the ICE Study Addendum at the end of this report for all information pertaining to the ICE Study which includes the current estimated costs for the anticipated improvements. This RCA document has not been updated with information from the ICE Study, except for the RCA Executive Summary which describes the ICE recommendation for a roundabout at Long Boat Lane. Accordingly, RCA Appendices A and B have been updated to reflect this roundabout. All other improvements as identified in the RCA remain the same and no other sections in this RCA have been adjusted to reflect the Long Boat Lane roundabout.

ES.2 Purpose and Need for Improvement

The purpose and need for this project are based on several factors including forecasted traffic demands, the need for multi-modal improvements to accommodate pedestrians and bicyclists, provisions for safety enhancements, and consistency with the County's long range transportation plans. The proposed Chuluota Road improvements are expected to thoroughly address all of these factors.

Crash reports for the five-year time period between January, 2016 and December, 2020 were obtained and reviewed. One hundred and thirteen crashes occurred at the study intersections and road segments over the five-year period. There were 36 injury crashes, 77 property damage crashes, and no fatalities. The heat map to the right depicts the concentration of the crashes along the study corridor.

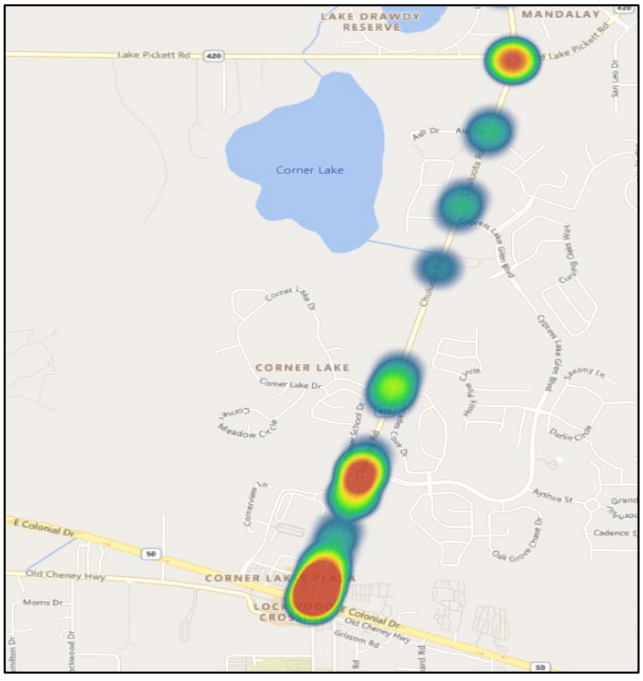


Figure ES- 1 ICE Concentration of Crashes

The need to improve Chuluota Road is also based on anticipated future traffic demands. Chuluota Road is located in northeast Orange County and serves two schools and several existing housing developments in the area. Land use along the corridor consists of residential, institutional, commercial, wetlands, and open land. The existing year 2021 traffic volumes along Chuluota Road range from approximately 11,500 AADT to 15,400 AADT. Future traffic demands are expected to exceed the available traffic carrying capacity of Chuluota Road, thus necessitating the need for widening the existing two-lane configuration.

Portions of Chuluota Road within the project limits are currently operating at an unacceptable Level of Service (LOS) F and roadway widening is needed to provide an acceptable level of service. This expansion of Chuluota Road is also consistent with the Orange County Comprehensive Plan.

ES.3 Existing Conditions

Within the project limits, Chuluota Road is a two-lane urban minor arterial roadway constructed as a rural section with shoulders, drainage ditches, and right/left turn lanes at selected intersections. At the north end of the project limits, Lake Pickett Road (CR 420) is designated as an urban minor collector to the east, and an urban major collector to the west. At the south end of the corridor, Colonial Drive (SR 50) is designated as an urban principal arterial. The speed limit throughout the Chuluota Road corridor is 50 miles per hour (mph).

Along the west side of Chuluota Road, there is a five-foot sidewalk from SR 50 to the north end of Country Lake Estates subdivision. Crosswalks and pedestrian signals are located at the SR 50 and at Cypress Lake Glen Boulevard (South) intersections. Chuluota Road has limited bicycle facilities except for the four-foot paved shoulders and a sidewalk spanning most of the corridor.

The existing right-of-way varies throughout the project corridor from 100-130 feet in width. The tightest area is at the beginning of the project from SR 50 to north of the Corner Lake Plaza where the right-of-way is 100 feet wide. With the exception of the beginning of the project, the remainder of the project has available right-of-way to accommodate the proposed improvement options which have been developed during the course of this study.

Chuluota Road's horizontal alignment is relatively straight throughout the project limits from SR 50 to Lake Pickett Drive. The vertical profile of Chuluota Road is relatively flat with a low point north of Corner Lake Estates. The project corridor has three signalized intersections at SR 50, Cypress Lake Glen Boulevard (South), and Lake Pickett Road. Pedestrian signals are present at the first two intersections.

Chuluota Road is designated as an urban minor arterial and is a critical roadway in east Orange County's existing transportation network since it provides for north-south connections to SR 50, Lake Pickett Road, as well as access to neighboring Seminole County.

The only nearby transit facility is LYNX Bus Route 621 which serves SR 50 at the south end of the project. LYNX does not provide service along Chuluota Road and the LYNX Vision 2030 Plan does not include any future routes in the vicinity of Chuluota Road.

Improvements to Chuluota Road are consistent with the goals, objectives, and policies of the adopted 2010-2030 Orange County Comprehensive Plan. Improvements to Chuluota Road

from Colonial Drive to Seminole County are included in the Orange County's long term 10-year schedule of capital improvements. The County's Transportation Element Future Conditions Number of Lanes 2030 Map indicates Chuluota Road is to be improved to a four-lane section.

There is existing LED street lighting along Chuluota Road. In the section from SR 50 to Cypress Lake Glen Boulevard, luminaires have placed along both sides of Chuluota Road. North of Cypress Lake Glen Boulevard, luminaires have been installed along the west side of Chuluota Road only for the remainder of the project corridor.

Eleven Utility Agency/Owners (UAO) have been identified within the project area through the Sunshine 811 Design Ticket and utility coordination efforts. There are numerous existing utilities within the project corridor including overhead and underground electric, water and wastewater mains, and communication lines.

The Chuluota Road project area is located within the jurisdiction of the St. Johns River Water Management District (SJRWMD). Stormwater runoff from the existing roadway is collected in roadside swales and then discharged into adjacent wetlands and drainage systems. As part of the proposed improvements, a storm sewer system will be installed with dedicated ponds which is expected to reduce maintenance issues along the corridor and improve overall treatment.

ES.4 Traffic Analysis

Detailed project traffic analyses are provided in the Design Traffic Technical Memorandum (see Appendix G) and the Design Traffic Engineering Report. These documents include an analysis of the existing traffic conditions of the area as well as Year 2048 forecasts of future traffic demands. Based on these demands, four-lane roadway improvements are recommended by these traffic reports to provide improved traffic operations by providing an acceptable level of service along the corridor. A summary of the traffic analyses is included in Section 5 of this report and the DTTM has been included in the appendices.

ES.5 Alternatives

To satisfy the forecasted traffic demands and provide multimodal accommodations for Chuluota Road, the proposed typical section is recommended to include the full reconstruction of Chuluota Road and replaced with an urban section consisting of two 11-foot travel lanes in each direction separated by a 22-foot raised median. Type E curb and gutter will be used along the median and Type F curb and gutter is proposed along the outside lanes.

A six-foot sidewalk will be located on one side of the roadway while a 10-foot path will generally occupy the opposite side of the Chuluota Road. North of Cypress Lakes development, the path will be widened to 14 feet to accommodate future plans by the County to construct the proposed Chuluota Trail system.

The proposed typical section requires a preferred right-of-way width of 120 feet, and most of the existing right-of-way is already available to accommodate the proposed improvements without additional acquisition except for the required stormwater ponds. At the south end of the project, only 100 feet of right-of-way is available, and two alignment alternatives were evaluated to determine the preferred alignment. The East Alignment Alternative would hold the existing west right-of-way line and shift all of the needed widening to the east onto the old Circle K site in the NE quadrant of Chuluota Road and SR 50. This parcel has had petroleum leaks in the past, though has completed the necessary remediation requirements by the County. While the Contamination Screening

Evaluation Report (CSER) rated this site as low risk, there is a concern that some contamination may still linger on the property.

Consequently, the West Alignment Alternative would hold the existing east right-of-way line and shift the proposed widening entirely to the west to avoid the old Circle K property. As a result, right-of-way acquisition will be needed along the west side of Chuluota Road to accommodate this alignment and the proposed improvements. Based on concerns over potential contamination remaining on the old Circle K site, the preferred alternative is the West Alignment.

A total of eight stormwater and two floodplain compensation ponds were identified and received detailed drainage analysis including field borings. Towards the latter stages of the study, two other stormwater ponds surfaced for consideration and were found to have certain advantages. Pond 3C on the Cross Life Church property was estimated to be able to support most of the drainage needs along the project thus eliminating the need for Pond 2A on the Corner Lake Middle School property. Also, since the proposed and future improvements at Lake Pickett Road are expected to require taking the current residence in the NE quadrant of this intersection, the County intends to proceed with a full taking of the entire parcel for pond purposes. Together, Ponds 3C and 4C are recommended as the preferred stormwater treatment ponds for this project.

As part of the ICE Study, an updated evaluation matrix was prepared to compare the RCA recommended improvements with the ICE alternatives using current 2024 unit cost prices (see Table ES-1).

Table ES-1 Alternatives Evaluation Matrix

EVALUATION CRITERIA	Four-Lane Widening with Existing Intersection Controls (ETC)	Four-Lane Widening with Roundabout at Long Boat Lane, ETC at Other Intersections	Four-Lane Widening with Roundabouts at All Intersections	Recommended Four-Lane Widening with Bow Tie at Lake Pickett Road and Roundabouts at Other Intersections
RELOCATIONS				
Number of Residential Acquisitions	1	1	1	1
Number of Business Acquisitions	None	None	None	None
Number of Parcels Impacted	10	14	39	40
Social, Natural and Physical Impacts				
Social and Neighborhood	Low	Low	Medium	Medium
Archeological/Historic Sites	None	None	None	None
Threatened and Endangered Species	No Adverse Impacts	No Adverse Impacts	No Adverse Impacts	No Adverse Impacts
Wetland Impacts (Acres)	Low	Low	Low	Low
RHPZ Uplands Impacts (Acres)	Low	Low	Low	Low
Floodplain Impacts (Acre-Feet)	1.9	2.16	2.16	2.16
Potential High or Medium Ranked Contamination Sites	None	None	None	None
Estimated Costs (Present Day)				
Estimated Construction Costs	$ 40,968,339	$ 44,102,180	$ 48,811,549	$ 48,977,856
Estimated Design/Adm Costs (12%)	$ 4,916,201	$ 5,292,262	$ 5,857,386	$ 5,877,343
Preliminary Estimated CEI Costs (15%)	$ 6,145,251	$ 6,615,327	$ 7,321,732	$ 7,346,678
Preliminary Estimated Right-of-Way Impacts	11.864	12.453	17.466	19.115
Preliminary Estimated Right-of-Way Costs	$ 2,196,355	$ 2,305,449	$ 3,233,481	$ 3,538,760
Mitigation/RHPZ	$ 103,000	$ 103,000	$ 103,000	$ 103,000
Subtotal	$ 54,329,146	$ 58,418,218	$ 65,327,148	$ 65,843,637
Contingency (20%)	$ 10,865,829	$ 11,683,644	$ 13,065,430	$ 13,168,727
TOTAL PRELIMINARY ESTIMATED PROJECT COSTS	***$ 65,194,975***	***$ 70,101,862***	***$ 78,392,578***	***$ 79,012,364***

ES.6 Preferred Alternative

The preferred typical section is shown in Figure ES-1-2 and contains the following roadway design elements:

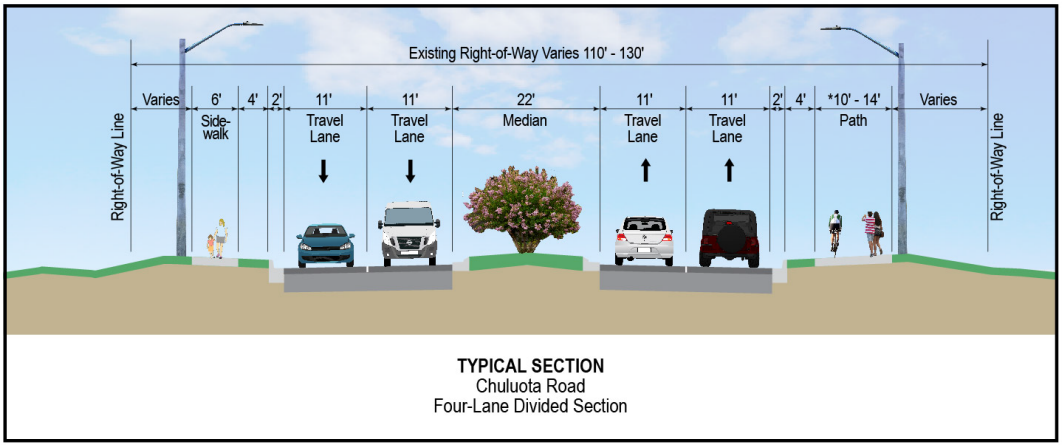
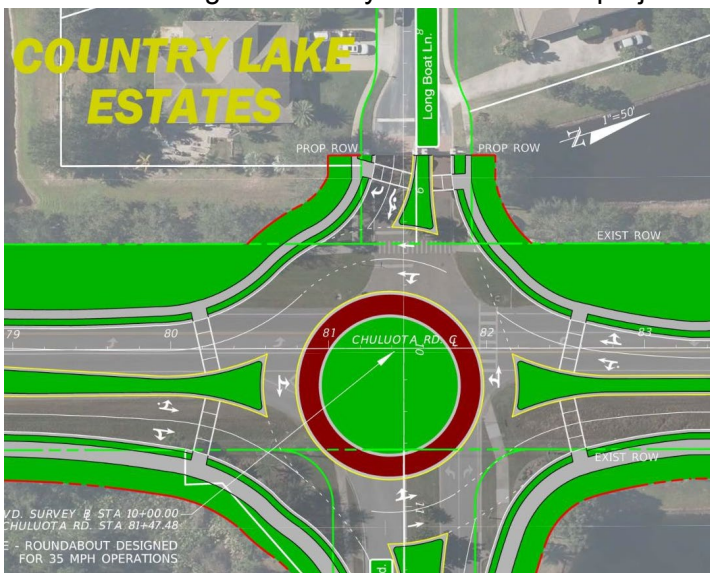


Figure ES 2-2 Chuluota Road Proposed Typical Section

- An urban section with four 11-foot travel lanes and a 22-foot median
- Landscaping consisting of trees in the median
- Type E curb and gutter along the inside lanes, Type F curb and gutter along the outside lanes
- A six-foot sidewalk on the east side of Chuluota Road from SR 50 to Cypress Lake Glen Boulevard, and on the west side of Chuluota Road from Cypress Lake Glen Boulevard to Lake Pickett Road.
- A 10-path on the west side of Chuluota Road from SR 50 to Cypress Lake Glen Boulevard, and on the east side of Chuluota Road from Cypress Lake Glen Boulevard to north of Cypress Lakes development. To the north of Cypress Lakes, a 14-foot path will be provided.
- Four-foot utility strips between the Type Of curb and the sidewalk or path
- A proposed right-of-way of 120 feet, most of which is existing and already available on this project
- The ICE Study recommended a roundabout at the intersection of Long Boat Lane and Cypress Lake Glen Boulevard (North) which is shown to the right.
- The ICE Study also recommended lowering the posted speed limit to 40 mph along the entire corridor.



For the most part, the preferred alignment alternative minimizes right-of-way acquisition, environmental impacts, and social impacts as measured by relocations. With the ICE Study recommendations for the roundabout at Long Boat Lane, additional right-of-way acquisition will be needed for the overall improvements.

The Preferred Alternative is shown on the concept plans contained in Appendix A as well as described in more detail in Section 7 Preferred Alternative. The Concept Plans in Appendix A have been updated to reflect the ICE Study recommendation for a roundabout at Long Boat Lane. The right-of-way identification maps are contained in Appendix B and have also been updated to reflect the proposed roundabout improvements.

To establish need for project, two sources were used to assess Level of Service resulting from the proposed traffic forecasts. Referring to Figures 5-4 and 5-5, the existing 2021 traffic volumes for segments along the Chuluota Road range from 15,400 ADT to 11,500 ADT with the segment from SR 50 to Cypress Lake Glen Boulevard having the highest traffic count of 15,400 ADT. The DTTM determined that under no-build existing conditions, this segment of Chuluota is expected to operate at LOS D (see Fig 5-3 in RCA).

However, by opening year 2028, under no-build conditions, the project corridor rapidly deteriorates with the south end of the project operating at LOS F, and the remainder of the project operating at LOS C/D (see Figure 5-6). ***By mid-year 2038 and design year 2048, under no build conditions, the entire Chuluota Road corridor can be expected to operate at LOS F (see Figures 5-7 and 5-8).***

To provide another source of LOS information, *FDOT's Quality/Level of Service Handbook* was also consulted which provides general guidance for LOS thresholds for state highways as well as adjustments for non-state highways. Table 2 in this handbook provides Generalized Annual Average Daily volumes for Florida's Transitioning Areas and Areas Over 5,000 Not in Urbanized Areas – this table indicates that non-state roads with volumes over 14,580 ADT can be expected to operate at LOS F or capacity. Using this guide, Chuluota Road is already at capacity.

Thus, using two sources, portions of Chuluota Road can be expected to operate at LOS F by the Year 2028, with all of the Chuluota project limits reaching LOS F by the Year 2038 for the No Build condition. It is important to recognize that w*hile congestion at the moment may not be overly severe, traffic demands can be expected to intensify in the corridor, depending on the growth of two nearby major developments (The Grow and potentially, Sustany).*

As noted previously, an ICE Study Addendum has been prepared to investigate various intersection alternatives including roundabouts. The ICE Study analyzed not only the operations for various intersection options, but also safety and cost issues as well. The ICE Study recommended a roundabout at the Long Boat Lane/Cypress Lake Glen Boulevard intersection as well as lowering the posted speed limit to 40 mph along the entire Chuluota Road corridor. *A full discussion of the ICE alternatives and recommendations are included at the end of the RCA discussion.*

ES.7 Public Involvement

Critical to the success of this project is the feedback received from the local community. Thus far, two community meetings have been held to present alternatives and recommendations. RCA meeting summaries, along with input received regarding the project have been included with the Public Involvement Documents in Appendix C.

ES.8 Conclusions and Recommendations

The objective of the Chuluota Road RCA is to develop and evaluate alternatives for improvement of Chuluota Road from SR 50 to Lake Pickett Road. This process incorporates the insights from planning, engineering, and the public involvement activities to refine the alternatives, and ultimately advance a preferred alternative into the design phase.

The preferred four-lane widening alternative as detailed in Section 7 of this report along with a roundabout at Long Boat Lane as indicated in the ICE Study Addendum, are recommended to be advanced by Orange County into the design phase

1 INTRODUCTION

1.1 Introduction and Study Area

Orange County is conducting a Roadway Conceptual Analysis (RCA) for Chuluota Road (CR 419) from SR 50 to Lake Pickett Road which is located in northeast Orange County (Figure 1-1), a distance of 1.9 miles in length. Existing Chuluota Road is a two-lane, minor arterial roadway located in a suburban area of northeast Orange County Commission District Five. The roadway alignment is generally straight, and the corridor is surrounded by a mix of housing developments, wetlands, conservation areas, and some commercial development near the southern end of the project at SR 50.

Figure 1-1 Location Map

Orange County's RCA process applies a comprehensive interdisciplinary approach, combining the strengths of engineering and transportation planning disciplines in the initial development phases of Orange County's major roadway improvement projects. The interdisciplinary approach also seeks to assure early and systematic coordination with all affected County Departments and Divisions, the appropriate state and local entities, and the citizenry.

The resulting effort is to accurately gather and convey information pertinent to the development of the project, thereby identifying viable opportunities to expedite or advance the project design and construction phases. This contract also includes a commensurate public involvement effort to provide citizens with clear and concise information regarding the overall improvements including roadway and drainage alternatives.

This RCA documents the existing conditions along the Chuluota Road and identifies various

characteristics within the study area that may influence the development of the alternatives and proposed improvements. The corridor analysis activities include an examination of existing traffic demands, land use and development patterns, and the presence of any environmental, cultural, archaeological/historical, hydrologic, and natural sensitive areas within the corridor.

The existing traffic volume along Chuluota Road ranges from approximately 11,500 AADT to 15,400 AADT, and operates at LOS C to D. Traffic is expected to increase substantially in the future influenced in part by new developments including The Grow and Sustanee to the west of Chuluota Road. By the Design Year 2048, traffic is forecasted to reach 17,800-21,600 AADT and operate at LOS F (see Figure 2-1 on page 10). These traffic demands on Chuluota Road will exceed the capacity of the current two-lane facility.

1.2 Purpose of Report

The purpose of this RCA Report is to present an overview of existing conditions, document the findings of the engineering and environmental studies conducted for this project, summarize the results of the alternatives evaluation, and provide the identification of and the justification for the recommended improvements. Additional information will be provided regarding the determinations made regarding typical roadway cross sections, a summary of existing and future traffic conditions and a comparative analysis of improvement alternatives that would satisfy existing and future transportation demands.

Potential typical section and alignment alternatives were developed based upon the engineering and environmental data collected, a review of Orange County Comprehensive Plan 2010-2030 Goals and the application of current roadway design standards. The alternatives were evaluated based on impacts resulting from the alignment locations and configurations. Each alternative was assessed using evaluation criteria developed for that purpose. From that comparative evaluation, the preferred typical section, roadway alignment, and stormwater management system were identified.

This RCA Study includes an analysis of existing and projected traffic conditions, development of alignment and typical section alternatives, an evaluation of impacts to the social, natural, and physical environment, and a public involvement program. This report has been prepared to assist Orange County in identifying a recommended design concept alternative and will serve as the document of record for support of subsequent engineering decisions for the final design, right-of-way acquisition, and construction phases that follow.

The recommended conceptual roadway alignment plans, included in Appendix A, and the right-of-way identification maps, included in Appendix B, are an integral part of this document and should be reviewed in concert with this document. The plans reflect specific details concerning each area of the project and will supplement information that is contained in this report.

2 PURPOSE AND NEED FOR PROJECT

The purpose and need for the proposed project improvements are determined based on several factors including traffic capacity, land use, demographics, social/economic demands, consistency with transportation plans, and safety considerations. Each of these factors are discussed below.

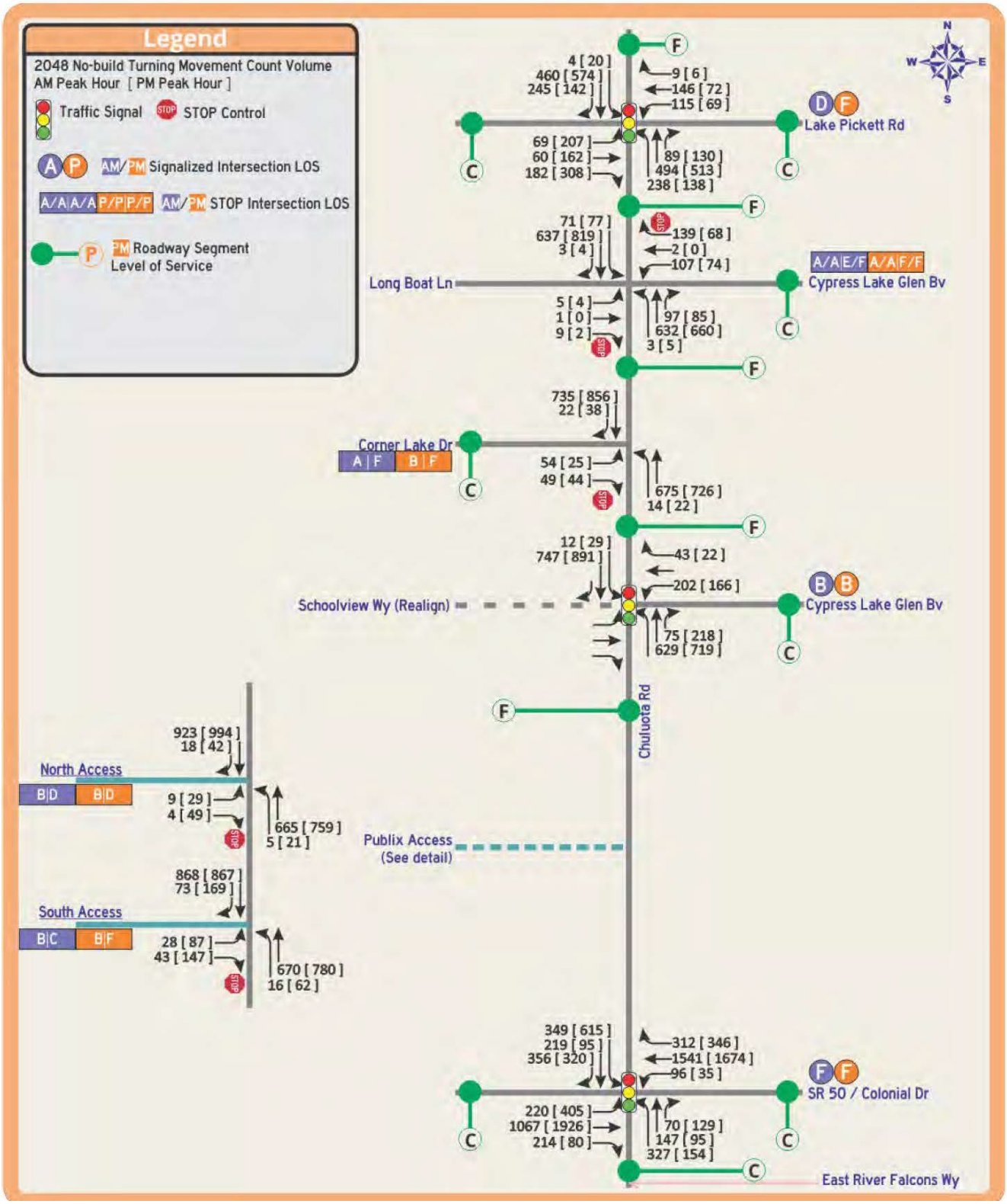
2.1 Traffic Capacity

A Design Traffic Technical Memorandum (DTTM)(see Appendix G) was developed to estimate future traffic demands under certain conditions. Several scenarios were prepared for the No Build and Build conditions for the years 2028, 2038, and 2048.

Without improvements, Chuluota Road will operate at an unacceptable LOS F by the design year 2048 (see Figure 2-1, next page). The roadway segments were analyzed using the procedures of the Highway Capacity Manual for signalized and unsignalized intersections. The No Build analysis used forecasted traffic volumes applied against the existing travel lane conditions.

In the design year 2048 and without capacity improvements, only the Cypress Lake Glen Boulevard (South) intersection is projected to operate at an acceptable level of service (LOS B). Therefore, capacity improvements are needed to achieve an acceptable level of service along Chuluota Road.

Figure 2-1 Year 2048 No Build Segment and Intersection Analysis



2.2 Land Use

Figure 2-2: 2030 Orange County Comprehensive Plan Future Land Use

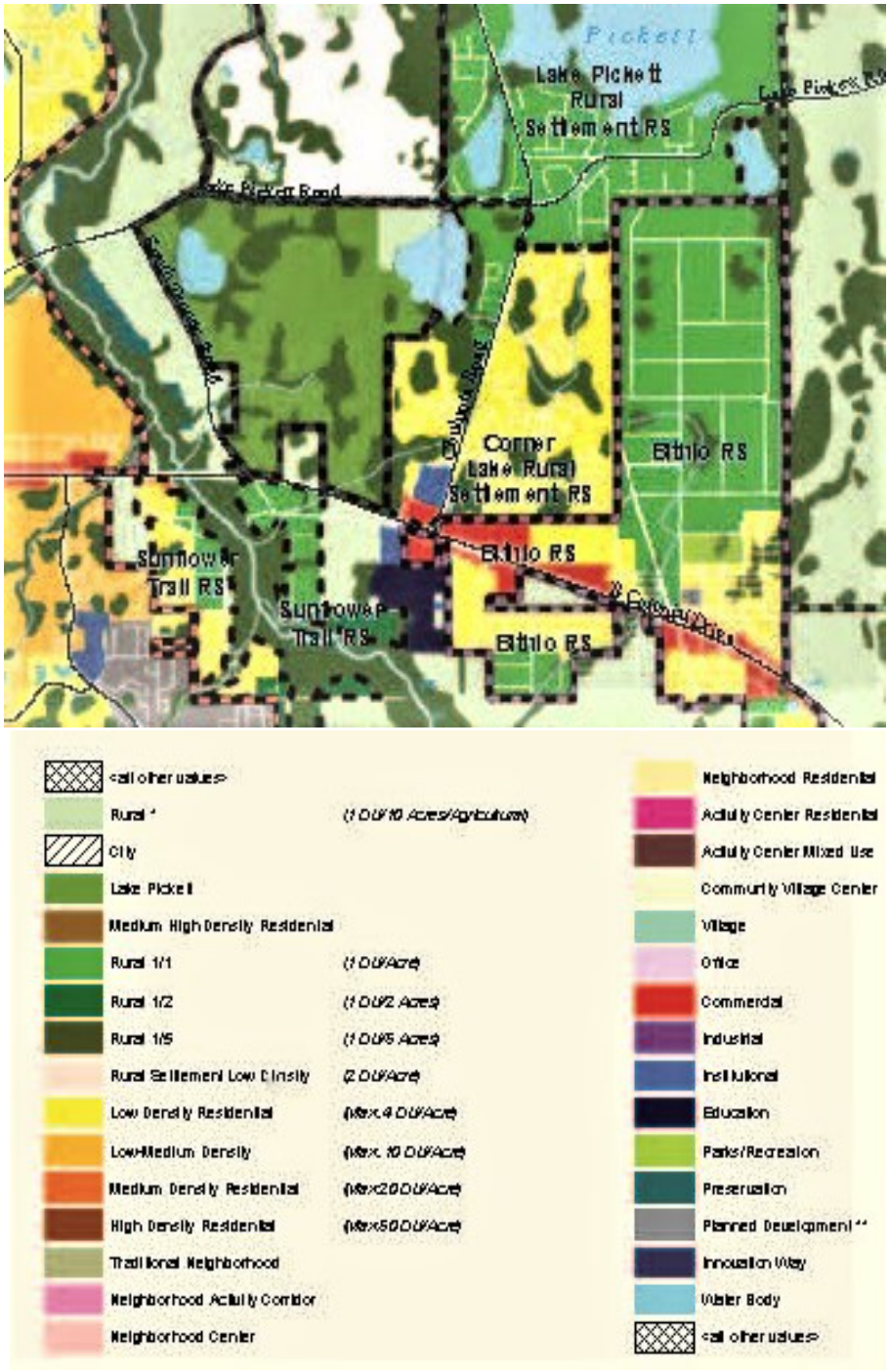
The 2010-2030 Orange County Comprehensive Plan Future Land Use Map to the right indicates that land use along most of the Chuluota Road corridor is designated as predominantly Low Density Residential or Rural (1/1 or One DU per Acre).

At the southern end of the corridor, the land use is primarily commercial property related to development along SR 50. Currently, the County is undertaking the Vision 2050 initiative which will guide how and where growth will occur beyond 2030.

Approximately one mile west of Chuluota Road, two major developments are planned adjacent to Lake Pickett Road which are likely to also affect and add traffic to Chuluota Road.

The Grow, to the south of Lake Pickett Road and west of Chuluota Road, has been approved and is expected to include 2,078 dwelling units (DU), 165,000 SF of retail, and 7,000 SF of offices.

To the north of Lake Pickett Road and The Grow, the Sustanee development is being planned, though has not yet been approved. Their buildout is



expected to include 2,500 DU. Recently, the owners of this property have withdrawn their development application for Sustanee.

2.3 Demographics

Demographic data from the most recent US Census 5-year American Community Survey (ACS 2011-2015) was used to analyze the demographic conditions of the study area. The Chuluota Road corridor passes through three US Census Block Groups within the study area. The total population of these block groups is 27,832 people. Approximately 71% of this population identifies themselves as 'White Alone'. The remainder of the population identifies themselves as 'Asian Alone' (13%), 'Black African American Alone' (7%), 'Some Other Race Alone' (7%), 'Two or More Races' (2%), and American Indian and Alaska Native Alone' (0.2%). Approximately 18% of the population identifies as having Hispanic or Latino origins.

Within the project block groups there are 9,524 total households. Of these, there are 1,000 households that fall below the poverty line, approximately 10.5%. The average median household income within the project block groups is $69,072, however, individual median household incomes of block groups range from $47,326 to $97,726. The average median age within the project block groups is 31.6 and approximately 3% of the population is over the age of 65.

Socioeconomic Data

Socioeconomic data for the project area were derived using census tract-level data. The most recent data were used for each socioeconomic indicator. In 2019 data, the project was entirely within Census Tract 166.01 in Orange County, Florida (Figure 2-7).

In 2020 data, the project is now split between two census tracts: Census Tract 166.03 on the east side of Chuluota Road and Census Tract 166.04 on the west, both in Orange County, Florida. The area covered by 166.03 and 166.04 is equivalent to that formerly covered by 166.01 (Figure 2-8). The project is located approximately 15 miles east of downtown Orlando. The data pulled include general population, demographics, environmental justice, limited English proficiency, and access to personal vehicle data.

Figure 2-3
Census Tract 166.01 (2019) from
https://censusreporter.org/profiles/
14000US12095016601-census-tract-16601-orange-fl/

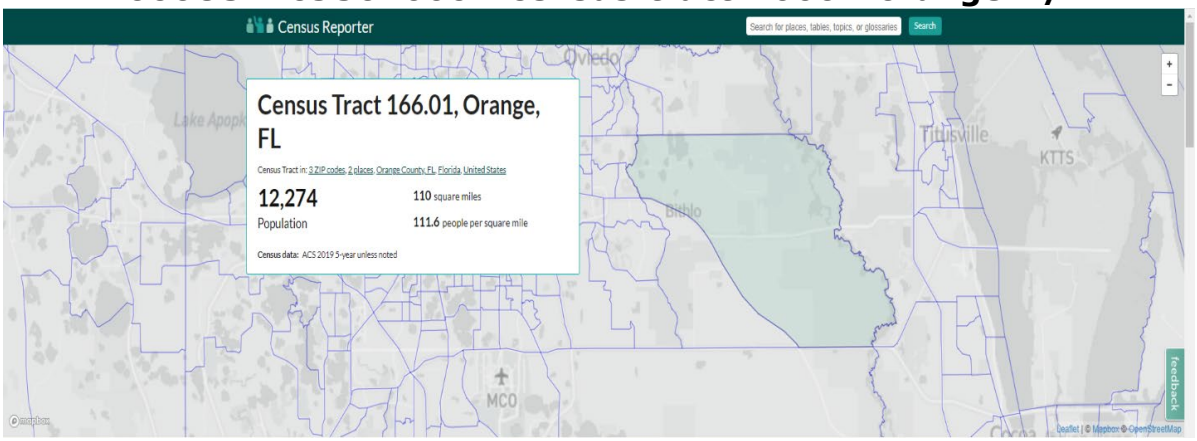
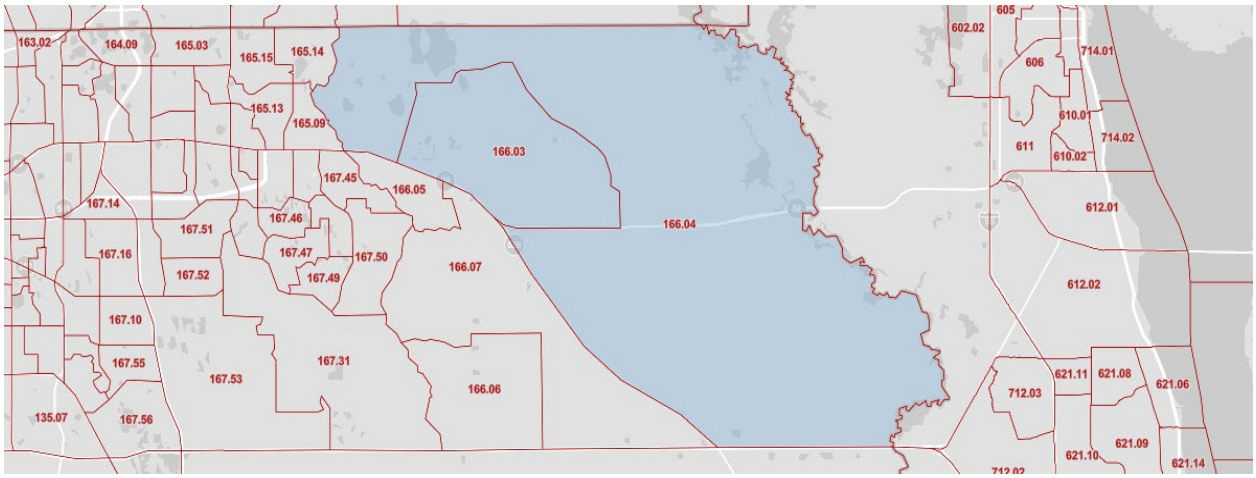


Figure 2-4

Census Tracts 166.03 and 166.04 (2020) from https://data.census.gov/cedsci/map?vintage=2020



General Population, Economics, and Housing Data

These data were pulled from the 2019 American Community Survey (ACS) 5-year estimates for Census Tract 166.01, via Census Reporter. The data include information such as the median age, percentage of population below the poverty line, median household income, number of persons per household, occupation of housing units, and percentage of population born outside of the United States:

- The median age is 36.6 years old.
- 10.1% of the population is below the poverty line.
- The median household income is $90,074.
- There are an average of 3.3 persons per household.
- 93% of households are occupied.
- 12.2% of the population was born outside of the United States.

Environmental Justice (EJ) Community Status

These data were pulled mainly from the 2019 American Community Survey (ACS) 5-year estimates for Census Tract 166.01 and include information such as the percentage of the population who are people of color, below poverty level, limited English-speaking, or who have less than a high school education:

- 45.2% of the population is a person of color (from the 2020 census redistricting data for census tracts 166.03 and 166.04).
- 10.1% of the population is below poverty level (Table S1701).
- 4.6% of households are limited English-speaking households (Table S1602).
- 7.7% of population 25 years and over with less than a high school education.

Limited English Proficiency (LEP)

These data were pulled from the 2019 American Community Survey (ACS) 5-year estimates, Table S1601, for Census Tract 166.01. These data indicate that 10.0% of adults have limited English proficiency (LEP), that is, who speak English less than “very well.” Of those adults with LEP, 86.1% speak Spanish and 13.9% speak other languages.

Personal Vehicle Access

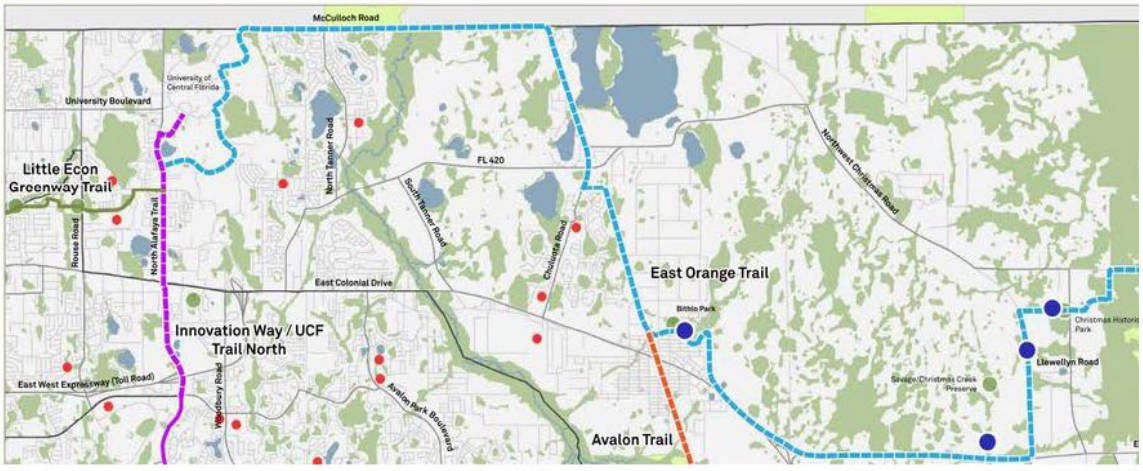
These data were pulled from the 2019 American Community Survey (ACS) 5-year estimates, Table S2504, for Census Tract 166.01. These data indicate that 2.3% of households have no access to a personal vehicle, 20.9% have access to one personal vehicle, 39.8% have access to two personal vehicles, and 36.9% have access to three or more personal vehicles.

2.4 Consistency with Transportation Plans

The widening of Chuluota Road, from SR 50 to Lake Pickett Road, is included in the County’s Long Range Transportation Plan. These improvements to Chuluota Road are consistent with the goals, objectives, and policies of the adopted 2010-2030 Orange County Comprehensive Plan. Improvements to Chuluota Road from SR 50 to Seminole County are included in the Orange County’s long-term 10-year schedule of capital improvements.

The County’s Transportation Element Future Conditions Number of Lanes 2030 Map indicates Chuluota Road is to be improved to a four-lane section. Other planned transportation improvements in the vicinity of Chuluota Road include:

- Lake Pickett Road - Widening to four lanes (note, these improvements are under further consideration by the County)
- SR 50 – Widening to six lanes by FDOT
- East Orange Trail (see below) – This trail is planned to coincide with northern portions of the Chuluota Road improvements and be constructed in the Chuluota Road right-of-way for that portion.



2.5 Safety

Crash reports for the five-year time period between January 2016 and December 2020 were obtained and reviewed. Intersection and segment crashes, classified as those which occurred along the roadway corridor within the 500-foot intersection radius, are detailed in the Existing

Conditions Report.

Table 2-1 summarizes the total number of crashes as well as fatalities and injuries. Crashes are also summarized by crash type and include a tabulation of DUI or failure to yield right-of-way crashes as well. One hundred and three (103) crashes occurred at the study intersections over the five-year period. In addition, ten crashes occurred along the roadway segments within the study limits, seven of which were located between SR 50/Colonial Drive and Cypress Lake Glen Boulevard/Schoolview Drive, and three of which were located between Corner Lake Drive and Cypress Lake Glen Boulevard/Long Boat Lane.

Table 2-1
Chuluota Road Corridor Crash Summary

Major Route:	Chuluota Road											
Segment:	SR 50/Colonial Road to Lake Pickett Road								**County:**	Orange		
Study Period:	1/1/2016	To	12/31/2020						**Engineer:**	JMT		
CRASH REF. NO.	**CRASH REF. NO.**	**DATE**	**DAY**	**TIME**	**CRASH TYPE**	**FATAL**	**INJURY**	**PROPERTY DAMAGE**	**DAY/NIGHT**	**WET/DRY**	**CONTRIBUTING CAUSE**	
Total Crashes	**Fatal**	**Injury**	**Property Damage**	**Ped/Bike**	**Angle**	**Left Turn**	**Right Turn**	**Rear End**	**Sideswipe**	**Ran Off Road**	**Backed Into**	**Rollover**
113	0	36	77	4	21	17	5	33	17	8	2	1
100%	0%	32%	68%	4%	19%	15%	4%	29%	15%	7%	2%	1%
						CONTRIBUTING CAUSE						
Animal	**Head On**	**Time of Day**		**Road Condition**		**Improper Passing**	**Improper Backing**	**DUI**	**Ran Red Light**	**Ran Stop Sign**	**Followed Too Closely**	**Operated MV in Careless or Neglignt Manner**
		Day	**Night**	**Wet**	**Dry**							
1	4	96	17	10	103	3	2	0	4	3	5	35
1%	4%	85%	15%	9%	91%	3%	2%	0%	4%	3%	4%	31%
Failed to Yield Right-of-Way		**Ran Off Roadway**	**Swerved or Avoided**		**Failed to Keep in Proper Lane**		**Other Contributing Action**					
37		2	2		14		6					
33%		2%	2%		12%		5%					

A heat map at the right depicts the concentration of the crashes along the study corridor. The locations with the highest concentration of crashes are at:

- Chuluota Road at SR 50/Colonial Drive – 60 crashes
- Chuluota Road at Cypress Lake Glen Boulevard (South)/Schoolview Way Intersections – 24 crashes
- Chuluota Road at CR 420/Lake Pickett Road – 13 crashes

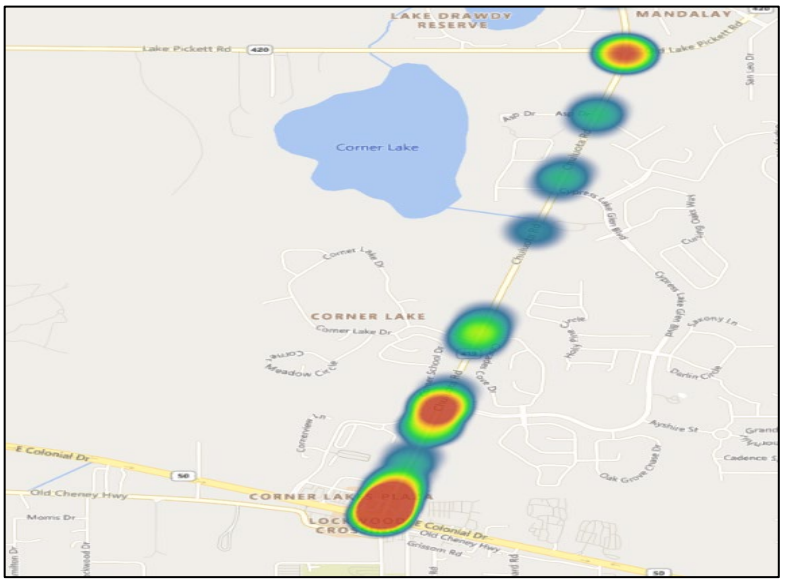


Figure 2-5
Concentration of Crashes Along Chuluota Road

3 EXISTING CONDITIONS

This section of the RCA presents an overview of the existing physical characteristics and conditions of the Chuluota Road study corridor.

3.1 Roadway Characteristics

3.1.1 Functional Classification and Context Classification

Within the project limits, Chuluota Road is classified as a rural two-lane minor arterial roadway. At the north end of the corridor, Lake Pickett Road is classified as an urban minor collector to the east of the project end, and an urban major collector to the west. At the south end of the corridor, SR 50 or Colonial Drive is an urban principal arterial. The Chuluota Road speed limit throughout the corridor is 50 miles per hour (mph).

This study also evaluated the Context Classification for this project using *FDOT's Context Classification Guide*, July, 2020 for complete streets. Based on the existing characteristics of the corridor, a ***C3R – Suburban Residential*** classification was assigned to Chuluota Road north of Corner Lakes Plaza since the area consists primarily of single family residential housing on relatively large lots with an existing road network that is not well connected. The context classification for Chuluota Road near the Corner Lakes Plaza is ***C3C – Suburban Residential*** which reflects the retail and commercial development in this area.

The expected user type for the C3R and C3C designations consist of cars, some trucks and buses, pedestrians, and bicyclists. For the C3 Suburban classifications, FDOT allows design speeds from 35 to 55 mph, which brackets the existing speed limit of 50 mph along Chuluota Road.

3.1.2 Typical Section

Chuluota Road is generally a two-lane, undivided rural roadway with roadside swales that collect stormwater, though to the south of Cypress Lake Glen Boulevard (South), the roadway has been widened to four lanes to provide for turn lanes. Figure 3-1 depicts the existing, nominal typical section.

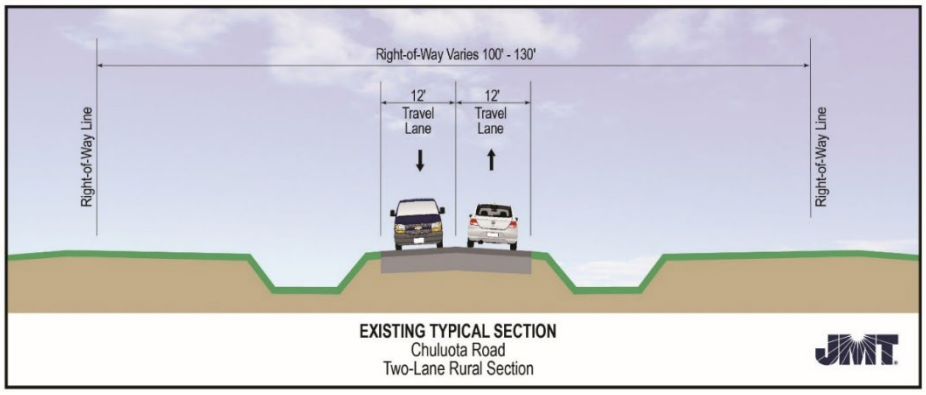


Figure 3-1 Chuluota Road Existing Typical Section

3.1.3 Pedestrian and Bicycle Facilities

Along the west side of Chuluota Road, there is a five-foot sidewalk from SR 50 to the north end of Country Lake Estates subdivision. Crosswalks and pedestrian signals are located at the SR 50 and at Cypress Lake Glen Boulevard (South) intersections. Chuluota Road has limited bicycle facilities except for the four-foot paved shoulders and a five-foot sidewalk that is present for most of the corridor.

3.1.4 Existing Right-of-Way

The existing right-of-way along Chuluota Road varies from 100-130 feet throughout the project corridor. Table 3-1 summarizes the existing right-of-way along the corridor.

Table 3-1
Chuluota Road Existing Right-of-Way Widths

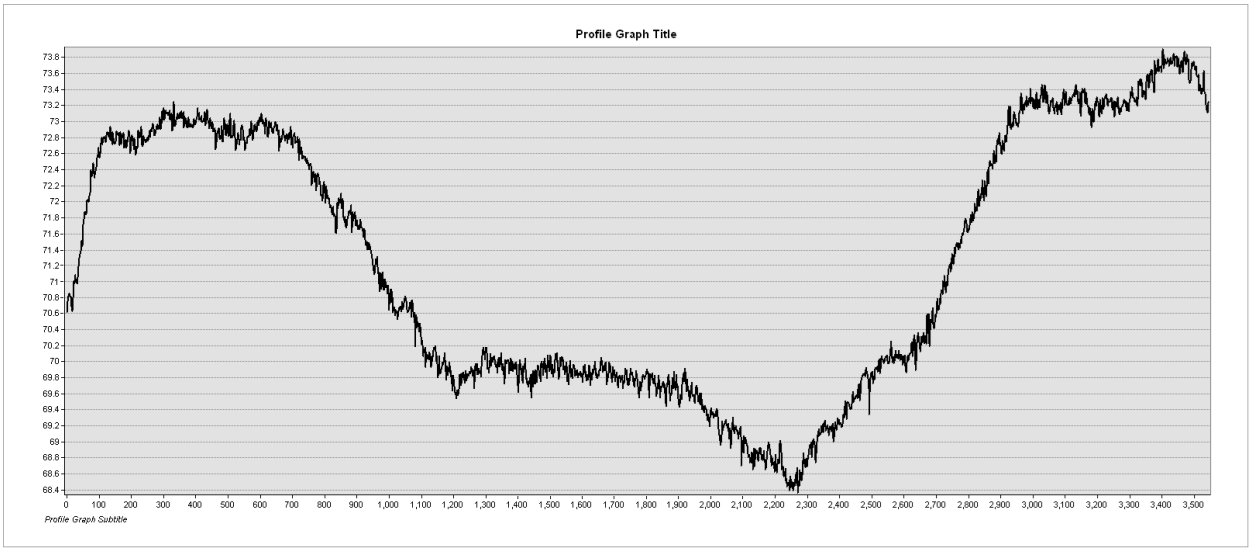
BEGIN	END	SEGMENT LENGTH (FT)	TYPICAL WIDTH (FT)
SR 50	Corner Lake Plaza (North Driveway)	650	100
Corner Lake Plaza (North Driveway)	Schoolview Way	1,200	110
Schoolview Way	3,400' North of Schoolview Way	3,400	120
3,400' North of Schoolview Way	Long Boat Lane/Cypress Lake Glenn Boulevard	1,400	110
Long Boat Lane/Cypress Lake Glenn Blvd	1,900' North of Long Boat Lane	1,900	130
1,900' North of Long Boat Lane	2,120' North of Long Boat Lane	220	110
1,700' North of Long Boat Lane	Lake Pickett Road	1,300	130
	Total Project Length	1.9 Mi	

3.1.5 Existing Horizontal and Vertical Alignment

Chuluota Road's horizontal alignment is relatively straight throughout the project limits from SR 50 to south of Lake Pickett Drive. There is one horizontal curve located at the northern project limits consisting of a two-degree curve to the left.

The existing ground profile of Chuluota Road is reflected below on Figure 2-2 which indicates a starting elevation of approximately 70 feet at SR 50. The existing profile then rises to an elevation of approximately 73 feet just south of Schoolview Way. The roadway then steadily drops between Cypress Lake Glen Boulevard to the north of Corner Lake Drive before reaching an elevation of approximately 69 feet. The Chuluota Road grade then rises to an elevation of approximately 73.5 feet at Lake Pickett Road. It is noted that the information presented in the section is based on Orange County LiDAR information which utilizes the NAVD88 datum.

Figure 3-2 Existing Roadway Profile
from LiDAR
SR 50 to Lake Pickett Road



3.1.6 Signalized Intersections

The project corridor has three signalized intersections at SR 50, Cypress Lake Glen Boulevard (South), and Lake Pickett Road. Pedestrian signals are provided at the first two intersections.

Traffic signal warrant analyses were conducted for the unsignalized intersections along the roadway corridor and no signals were found to be warranted at these intersections.

3.2 Crash Data

Crash reports for the five-year time period between January 2016 and December 2020 were obtained and reviewed. Intersection and segment crashes are discussed below.

One hundred and three (103) crashes occurred at the study intersections over the five-year period. In addition, ten crashes occurred along the segments within the study limits, seven of which were located between SR 50/Colonial Drive and Cypress Lake Glen Boulevard/Schoolview Drive, and three of which were located between Corner Lake Drive and Cypress Lake Glen Boulevard/Long Boat Lane.

Sixty-one (61) crashes occurred at the intersection of Chuluota Road at SR 50/Colonial Drive (Table 2-2) over the five-year period with eleven occurring in 2016, twelve occurring in 2017, sixteen occurring in 2018, twelve occurring in 2019, and ten occurring in 2020. There were twenty-five injuries in seventeen crashes, no fatalities, and property damage was estimated at $254,751. None of the crashes involved a DUI and twenty-one were failure to yield right-of-way.

Twenty-four (24) crashes occurred at the intersections of Chuluota Road and Cypress Lake Glen Boulevard (South), and Chuluota Road and Schoolview Way (Table 2-3) over the five-year period with two occurring in 2016, three occurring in 2017, four occurring in 2018, seven occurring in 2019, and

eight occurring in 2020. There were fifteen injuries in nine crashes, no fatalities, and property damage was estimated at $115,270. None of the crashes involved a DUI, although nine involved failure to yield right-of-way.

Three crashes occurred at the intersection of Chuluota Road at Corner Lake Drive (Table 2-4) over the five-year period with one occurring in 2016, none occurring in 2017, one occurring in 2018, one occurring in 2019, and none occurring in 2020. There was one injury in one crash, no fatalities, and property damage was estimated at $21,500. None of the crashes involved a DUI and one was failure to yield right-of-way.

Two crashes occurred at the intersection of Chuluota Road at Cypress Lake Glen Boulevard/Long Boat Lane (Table 2-5) over the five-year period with none occurring in 2016, one occurring in 2017, one occurring in 2018, none occurring in 2019, and none occurring in 2020. There were no injuries, no fatalities, and property damage was estimated at $9,500. None of the crashes involved a DUI and none were failure to yield right-of-way.

Thirteen crashes occurred at the intersection of Chuluota Road at Lake Pickett Road (Table 2-6) over the five-year period with five occurring in 2016, five occurring in 2017, none occurring in 2018, two occurring in 2019, and one occurring in 2020. There were seventeen injuries in five crashes, no fatalities, and property damage was estimated at $125,350. None of the crashes involved a DUI and three were failure to yield right-of-way.

Seven crashes occurred along the segment of Chuluota Road between SR 50/Colonial Drive and Cypress Lake Glen Boulevard/Schoolview Way (Table 2-7) over the five-year period with one occurring in 2016, one occurring in 2017, two occurring in 2018, none occurring in 2019, and three occurring in 2020. There were three injuries in one crash, no fatalities, and property damage was estimated at $55,900. None of the crashes involved a DUI and three were failure to yield right-of-way.

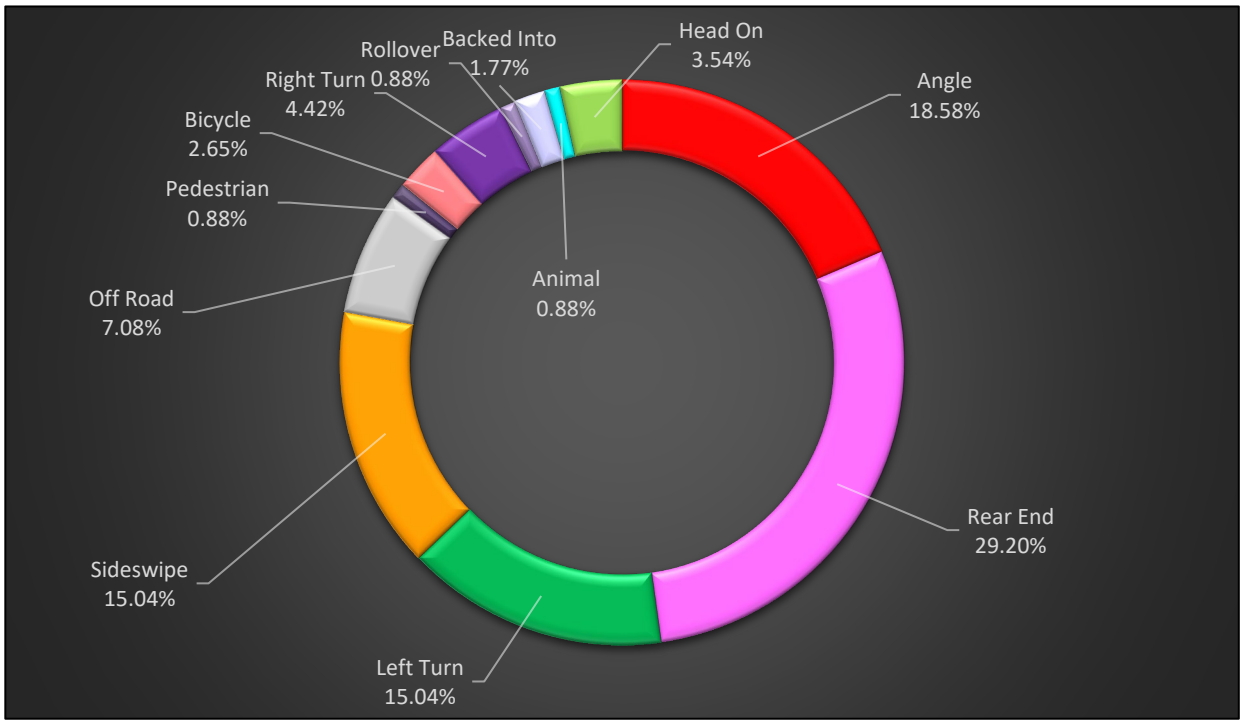
Three crashes occurred along the segment of Chuluota Road between Corner Lake Drive and Cypress Lake Glen Boulevard/Long Boat Lane (Table 2-8) over the five-year period with one occurring in 2016, none occurring in 2017, one occurring in 2018, none occurring in 2019, and one occurring in 2020. There were three injuries in three crashes, no fatalities, and property damage was estimated at $23,000. None of the crashes involved a DUI and none were failure to yield right-of-way.

Crash Summary

One hundred and thirteen crashes (113) occurred along the study segment of Chuluota Road from SR 50 (Colonial Drive) to Lake Pickett Road during the five-year time period with twenty-one occurring in 2016, twenty-two occurring in 2017, twenty-five occurring in 2018, twenty-two occurring in 2019, and twenty-three occurring in 2020.

Thirty-three (29%) of the crashes were rear end, twenty-one (19%) of the crashes were angle, seventeen (15%) of the crashes were left turn, seventeen (15%) of the crashes were sideswipe, eight (7%) of the crashes were off-road, five (4%) of the crashes were right turn, four (4%) of the crashes were head-on, three (3%) of the crashes were bicycle, two (2%) of the crashes were backed-into, one (1%) of the crashes was a rollover, one (1%) of the crashes was a pedestrian, and one (1%) of the crashes was an animal. A breakdown of the collision type is shown in the graphic below.

Seventy-seven (68%) of the crashes resulted in property damage, thirty-six (32%) resulted in injury, and there were no (0%) fatal crashes. Seventeen (15%) of the crashes occurred at night and ten (9%) of the crashes occurred on wet pavement. None of the crashes involved a DUI and thirty-seven were failure to yield right-of-way.



The average crash rate for the segment was calculated based on the number of crashes per million vehicle miles traveled (MVMT) through the segment and was found to be 2.102 crashes per million vehicle miles traveled (MVMT) for this urban minor arterial. This rate is below the statewide average of 3.849 crashes/MVMT for similar urban 2-3 lane undivided roadways from 2014 to 2018.

3.3 Existing Transportation Network

The existing transportation network within the study corridor is comprised mainly of the current roadway system. Chuluota Road (CR 419) connects to SR 50 at the southern project limit and extends northerly to Seminole County and the City of Oviedo. Chuluota Road is a major part of the existing regional transportation network since it provides for north-south continuity between the two counties. Within the project limits, Chuluota Road is a two-lane minor arterial roadway constructed as a rural section with shoulders and drainage ditches.

The only nearby transit facility is LYNX Bus Route 621 which serves SR 50 at the south end of the project. LYNX does not provide service along Chuluota Road and the LYNX Vision 2030 Plan does not include any future transit routes in the vicinity of Chuluota Road.

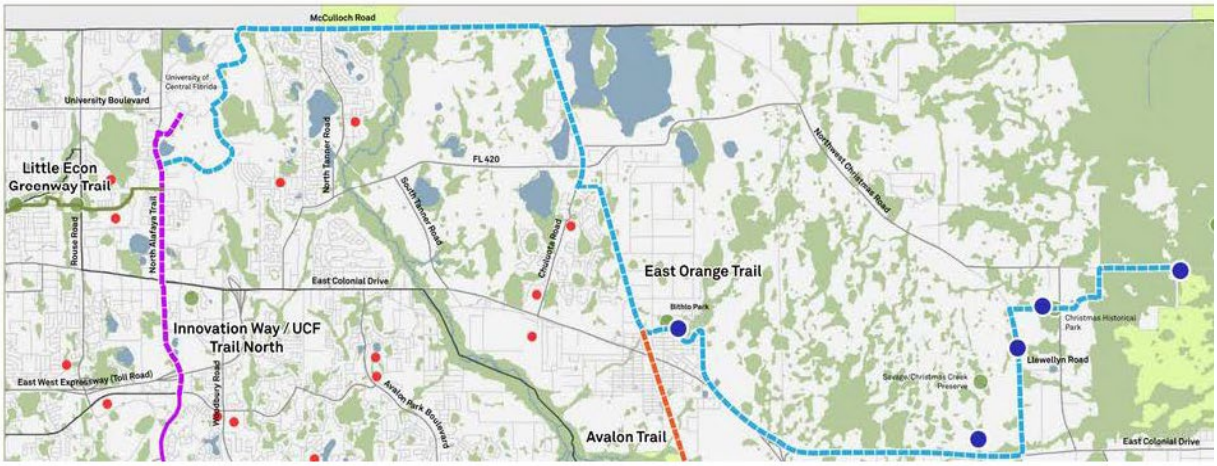
3.4 Long Range Transportation Improvements

Improvements to Chuluota Road are consistent with the goals, objectives, and policies of the adopted 2010-2030 Orange County Comprehensive Plan. Improvements to Chuluota Road from Colonial Drive to Seminole County are included in the Orange County's long term 10-year schedule of capital

improvements.

The County's Transportation Element Future Conditions Number of Lanes 2030 Map indicates Chuluota Road is to be improved to a four-lane section. Other planned transportation improvements in the vicinity of Chuluota Road include:

- Lake Pickett Road - Widening to four lanes (These improvements are under further consideration by the County
- SR 50 – Widening to six lanes by FDOT
- East Orange Trail (see below) – Future new trail which will coincide with northern portions of the Chuluota Road improvements



3.5 Lighting

There is existing LED street lighting along Chuluota Road. In the section from SR 50 to Cypress Lake Glen Boulevard (South), luminaires have placed along both sides of Chuluota Road. North of Cypress Lake Glen Boulevard (South), luminaires have been installed only along the west side of Chuluota Road for the remainder of the project corridor.

3.6 Existing Utilities

Eleven Utility Agency/Owners (UAO) have been identified within the project area through the Sunshine 811 Design Ticket and utility coordination efforts. There are numerous existing utilities within the project corridor including overhead and underground electric, water and wastewater mains, and communication lines. Details of the UAOs contacted on the project and a description of the facilities identified within the corridor is summarized in Table 3-2.

Table 3-2
Existing Utilities Summary

Utility Company	Facility Type	Description
AT&T Distribution	Phone	• Underground lines primarily on east side • Aerial lines for approximately a mile towards the middle south of the corridor. • Small segment of aerial on both sides near Corner Lake

		Drive
American Traffic Solutions	Communications	• Conduits running north to south across SR 50 • Existing conduit on north side of SR 50 • Existing fiber optic on south side of SR 50 • Utilities withing the Right of Way • Traffic Controller Power Service Panel accommodates single phase 120/240V
Charter Communications	CATV	• Overhead power on East side of road • Underground near intersections and a few feet just north of Cypress Lake Glen Blvd. • Underground on west side of road near E Colonial Dr • 30-36″ minimum depth • 1-1/4″ to 2″ Orange conduit
City of Orlando	Waste, Wastewater	• Nearest facility north of project corridor at Old Lake Pickett Road.
Comcast	Communications	• Underground facilities on the west side from Schoolview Way to the north end of the Country Lake Estates and Cypress Lakes residential developments (1.3 miles). • Overhead facilities on the East side from the north end of the residential subdivisions to Lady Pickett Road.
Duke Energy-Dist.	Electric	• East side of Chuluota Road 12.47 kV overhead 12.47 kV, occasional overhead and underground crossings of 7.2 kV or 12.47 kV. • Both sides of the road aluminum light poles fed by 120/240 V underground circuit (streetlight agreement). • All facilities in R/W limits. Spectrum, AT&T, and Comcast are attached provider's overhead poles
FP&L	Electric	• FP&L lines cross Chuluota Road north of Schoolview Way in a 110-foot easement.
MCI	Communications	• Line on the South side of E Colonial Drive at intersection of Chuluota and E Colonial Drive. Abandoned (ABN) West of Story Partin Rd.
Orange County Utilities	Water, Wastewater	• 16″ Water Main on West side of Chuluota Road • 4″ Wastewater on West side of Chuluota Road (South of Long Boat Lane) • 16″ Water Main at the intersection of E Colonial Drive and Chuluota Road along the South side of East Colonial
Summit Broadband	Fiber, Telephone	• Fiber/Telephone on east side of Chuluota Road.
Zayo	Fiber	• Along the west side of Chuluota Road

3.7 Geotechnical Exploration

This section presents a summary of the preliminary geotechnical evaluation for the Chuluota Road RCA study. Additional information can be found in Appendix D, Soils Report for Chuluota Road.

3.7.1 Soil Exploration

The “Oviedo, SW and Bithlo, FL” USGS topographic map issued in 2021, in the vicinity of the Chuluota Road shows the ground surface elevation in the project vicinity to range from approximately +68 to +74 feet, North American Vertical Datum of 1988 (NAVD-88).

The Orange County Soil Survey published by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) is a comprehensive publishes source of information regarding near-surface soil and surficial groundwater depth. The NRCS Orange County Soil Survey was reviewed for information regarding near-surface soil conditions within the study corridor and identified the following six (6) primary mapping soil units within the limits of the project corridor as noted in Table 3-3.

Table 3-3
USDA/NRCS Soil Survey Summary

Map Unit Symbol	USDA Soil Name	AASHTO Group	Seasonal High Groundwater Depth in Natural Conditions (feet)	Hydrologic Soil Group
2	Archbold	A-3	3.5 – 6.0	A
3	Basinger fine sand, depressional, 0 to 1 percent slopes	A-3, A-2-4	Ponded	A/D
34	Pomello fine sand, 0 to5 percent slope	A-3, A-2-4	2.0-3.5	A
37	St. Johns fine sand	A-3, A-2-4	0-1.0	B/D
44	Smyrna-Smyrna, wet, fine sand, 0 to 2 percent slopes	A-3, A-2-4	0-1.0	A/D
54	Zolfo fine sand, 0 to 2 percent slopes	A-3, A-2-4	2.0-3.5	A

*AASHTO: American Association of State Highway and Transportation Officials.
**SHGWT: Seasonal High Groundwater Table

Additional information in Appendix D has been provided including a reproduction of the USDA NRCS Orange County Soil Survey map for the project area. The NCRS Soil Survey generally identifies these soil types with poorly to moderately well drained soil, with permeability ranging from poorly to very high. The NRCS Soil Survey predicts the groundwater levels for these soil types to range from the natural ground surface to 72 inches below the natural ground surface.

Information from the NRCS Soil Survey is very general and may be outdated due to recent developments in the project site vicinity. Therefore, it may not reflect the actual soil and groundwater conditions, particularly where development has modified the natural soil conditions or surface and near surface drainage.

Field Exploration Program

The subsurface exploration for this preliminary evaluation consisted of 34 auger borings to a depth of five (5) feet each and 17 Standard Penetration Test (SPT) borings to a depth of 20 feet, at 200-foot interval as requested by Orange County. The borings were established in the unpaved areas along the northbound and southbound shoulders of Chuluota Road. All borings were staked in the field by a representative of NADIC with the aid of a Global Positioning System (GPS) device.

Approximate boring locations are shown on Figures 4A and 4B in the Appendix D. The results of the exploration program in the form of soil profiles are shown on Sheets A2 through A4 in Appendix D.

Hand Auger Borings

Hand auger borings were performed to a general depth of five (5) feet below the existing grade by manually twisting and advancing a bucket auger, three-inch diameter, six-inch long into the ground in four (4) to six (6) inch increments. These borings were performed in general accordance with the American Society of Testing and Materials (ASTM) Test Designation D-1452. Groundwater levels were measured in the borings upon completion and 24 hours later; each borehole was sealed with native soils.

Standard Penetration Test Borings (SPT)

The SPT borings performed were conducted in general conformance with the American Standard Testing Method (ASTM) test designation D-1586. The borings were advanced by the rotary wash method with bentonite-based mud as the circulating fluid to stabilize the borehole. The SPT borings were generally performed continuously from the ground surface to 10.5 feet and at 5-foot depth intervals thereafter.

After seating the sampler six inches, the number of successive blows required to drive the sampler 12 inches into the soil constitutes the test result commonly referred to as the “N” value. Adjacent to the SPT boring profiles are the “N” values. The “N” value has been empirically correlated with various soil properties and is considered indicative of the relative density of cohesionless soils and the consistency of cohesive soils. All recovered samples were visually classified in the field with representative portions of the samples placed in airtight jars and transported to our office for review by a Geotechnical Engineer for confirmation of the field classification and laboratory testing. Groundwater levels were measured in the borings and upon completion, each borehole was sealed with native soils.

3.7.2 General Subsurface Conditions

The soils encountered along the project alignment are shown on Sheets A2 through A4 in the Appendix D. The soil survey encountered three (3) generalized soil strata within the project limits to the maximum depth explored in the borings. The soils encountered in the borings are classified using the AASHTO Soil Classification System (i.e. A-3, A-2-4, etc.). Soil classification and stratification are based on visual examination, interpretation of the boring logs by a geotechnical engineer and laboratory results of selected soil samples. The soil profiles indicate subsurface conditions encountered only at the specific boring locations at the time of the field exploration.

The soil borings along the roadway alignment encountered two (2) generalized soil strata within the project limits to the maximum depth explored in the borings. The soil strata encountered as well as soil descriptions, AASHTO classifications and FDOT 505 Embankment Soil Utilization designations are summarized in Table 3-3 on the next page:

Table 3-4
General Subsurface Conditions

Stratum	Soil Description	AASHTO Soil Classification	Embankment Soil Utilization Classification (FDOT Index 505)
1	Brown to gray fine SAND, with silt/clay, occasionally with roots, limerock and shell fragments	A-3	Select (S)
2	Brown to gray silty SAND, occasionally with roots and organics	A-2-6	Select (S)
3	Dark brown to dark gray organic silty SAND to organic sandy SILT, occasionally with roots	A-8	Muck (M)

The above table provides only general subsurface conditions descriptions. For further details, refer to the Report of Roadway Borings on Sheet A2 through A4 in the Appendix D.

Groundwater

Groundwater levels measured in the open borings during our roadway exploration indicate that the groundwater table ranged from about one (1) foot to 5.4 feet below existing grade at the time of our exploration September 2021. Both encountered and estimated seasonal groundwater levels are shown adjacent to the boring profiles where applicable (see Sheets A2 through A4 in Appendix D.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences, such as swales, drainage ponds, underdrains, and areas of covered soil (roadways, sidewalks, etc.).

For the purposes of this report, estimated seasonal high groundwater levels are defined as groundwater levels that are anticipated at the end of the wet season of a “normal rainfall year” under current site conditions. “Normal rainfall year’ is defined as a year in which rainfall quantity and distribution were at or near historical rainfall averages.

The estimated seasonal high groundwater levels presented next to the boring profiles are based on the soil stratigraphy, measured groundwater levels, USDA/NRCS information, review of roadway plans, and past experience with similar soil conditions. In general, the estimated seasonal high groundwater level is not intended to define a limit or ensure future seasonal fluctuations in groundwater levels will not exceed the estimated levels.

Post-development groundwater levels could exceed the seasonal high groundwater level estimates as a result of a series of rainfall events, changed conditions at the site which alter surface water drainage characteristics, or variations in the duration, intensity, or total volume of rainfall.

3.8 Potential Contamination Issues

A preliminary evaluation was conducted for the Chuluota Road study corridor to determine the risk of encountering petroleum or hazardous substance contamination of soil, groundwater, surface water, or sediment that could adversely affect property acquisition, permitting, and construction of this project.

The preliminary data collection activities included a review of publicly available regulatory files and a review of available historical data sources. See Appendix F for the Contamination Screening Evaluation Report.

Eight (8) potential contaminated sites were identified within the study corridor and were assigned a No and Low Risk status (Table 2-15). Five (5) facilities were assigned a No risk assessment and three (3) were assigned Low risk assessment. No facility was assigned a Medium or High risk.

Table 3-5
Potential Contamination Sites

Site No.	Facility ID	Site Name	Site Address	Source / Database	Risk Rating	Comments
1	FLR000157024	Columbia Elementary School	18501 Cypress Lake Glen Blvd Orlando, FL 32820	RCRA VSQG	**No**	This facility is an OCPS which uses a Very Small Quantity Generator. As of Jun 2021, there are no Compliance Monitoring and Enforcement (violation) records associated with this facility. Based on records review and site reconnaissance, a risk of no was assigned.
2	FLR000156539	Corner Lake Middle School	1700 Chuluota RD, Orlando FL 32820-1401	RCRA VSQG FINDS/ FRS	**No**	This facility is an OCPS which uses a Very Small Quantity Generator. As of Jun 2021, there are no Compliance Monitoring and Enforcement (violation) records associated with this facility. Based on records review and site reconnaissance, a risk of no was assigned.
3	#60558/ /9101787	AMOCO OIL STATION/ CIRCLE K #2708972	16891 E COLONIAL DR ORLANDO FL 32820	RCRA NON-GEN UST	**Low**	As of Jun 2021, there are no Compliance Monitoring and Enforcement (violation) records associated with this facility. This facility has five (5) USTs (3, 12,000; 1 15,000 and 1, 20,000-gallon gasoline). The three (3) 12,000-gallon tanks were installed May 1, 1991 and the 15,000- and 20,000-gallon tanks were installed in August 1, 2004. Based on the records reviewed, the site is assigned a risk rating of Low Risk
4	8521400	CIRCLE K #7502	16959 E COLONIAL DR (E HWY 50)	LST, UST, ***RCRA VSQG, SITE, WELL SURVEILLANCE***	**Low**	This facility had four (4) 10,000-gallon USTs installed February 1, 1985. Discharged occurred 11/6/1988. Pollutant: unleaded gas and leaded gas contaminated groundwater. Discharge Cleanup started 4/30/2007. Site rehabilitation completion report submitted 9/21/2021. On 9/23/2021, OCEPD submitted to FDEP the SRCO package for review and form processing. Per OCEPD the site qualifies for Site Rehabilitation Completion pursuant to Substation 62-

						780.680(1). Based on the records reviewed, the site is assigned a risk rating of Low Risk
5	110056345192	RANGER CONSTRUCTION INDUSTRIES INC	CHULUOTA RD AT LAKE PICKETT RD	FINDS/FRS	**No**	This facility is located near the intersection of Chuluota Road and Lake Pickett Road. FDEP approved a NOI permit on 12/09/2013 (updated 01/11/2016), for stormwater discharged. Based on records review and site reconnaissance, the facility was assigned a risk rating of no.
6	101487/86888	HONEY BEE RANCH LCD/ MONARCH MULCH, LLC	16877 EAST COLONIAL DRIVE #322 ORLANDO FL 32820	SWF/LF	**No**	This facility is located about 311 feet South West of the project corridor ROW. It is identified as a closed solid waste facility (yard waste facility). Based on records review and site reconnaissance, the facility was assigned a risk rating of no.
7	FLR000210625	TRACTOR SUPPLY COMPANY #560	16849 E COLONIAL DR ORLANDO FL 32820-1910	RCRA VSQG	**No**	This facility is located about 512 feet Southwest of the project corridor ROW. It is identified as a tractor supply facility. As of June 2021, there is no compliance monitoring and enforcement (violation) records associated with the facility. Based on records review and site reconnaissance, the facility was assigned a risk rating of no.
8	9810114	CORNER LAKE PLAZA (PUBLIX) #897	16825 E COLONIAL DR ORLANDO FL 32820	AST	**Low**	This facility has one (1) 1,000-gallon aboveground storage system (AST). It has a spill bucket containment and a rupture alarm that provides electronic release detection. Based on records review and site reconnaissance, the facility was assigned a risk rating of Low Risk.

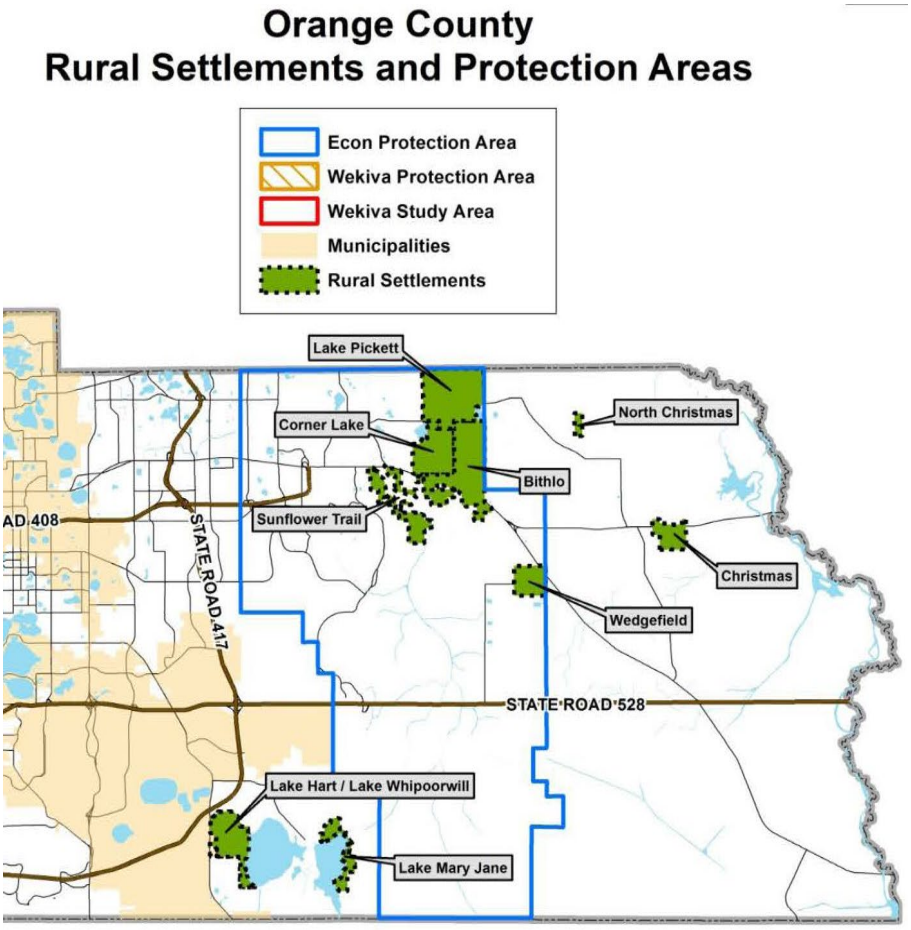
At Site 4, the Circle K gas station is no longer operational, though this property has received some cleanup operations in the past. On September 23, 2021, Orange County Environmental Protection Division (OCEPD) found that recent cleanup work by Atlas was performed in conjunction with Rule 62-780.680 FAC. OCEPD has indicated the site qualifies for a Site Rehabilitation Completion Order (SRCO) pursuant to Subsection 62-780.680(1) and they will submit a Site Rehabilitation Completion Order (SRCO) package to FDEP for review and formal processing.

Despite the cleanup efforts, County staff has some remaining concerns about the extent of the remediation efforts and would prefer to avoid encroaching onto the Circle K property with the proposed improvements. Accordingly, the project improvements will be shifted to the west side of Chuluota Road to avoid any right-of-way acquisition on this property.

3.9 Land Use and Current Development Plans

3.9.1 Existing Land Use

Figure 3-3 Existing Land Use Map



Orange County's Planning and Zoning Guide also indicates that Chuluota Road crosses two Rural Settlements as shown on the figure to the right (Figure 3-3) – Corner Lake and Lake Pickett. Rural Settlements are intended to recognize and preserve communities that existed as of adoption of the 1991 Comprehensive Plan. Chuluota is also within the Econ Protection Area.

Most of the corridor consists of low density, single family housing developments as well as wetlands, drainage ponds, and conservation areas.

Major developments include Cypress Lakes on the east side of Chuluota Road, and Corner Lake Estates and Country Lake Estates on the west side of the project. Commercial activities are focused at SR 50 and include the Corner Lakes Plaza which contains a major traffic generator, the Publix grocery store.

There are only a few remaining vacant parcels along the corridor including the Cross Life Church property near the middle of the corridor and some vacant land at the Lake Pickett Road intersection. All of these properties have plans or are expected to be developed in the near future.

3.9.2 Future Land Use

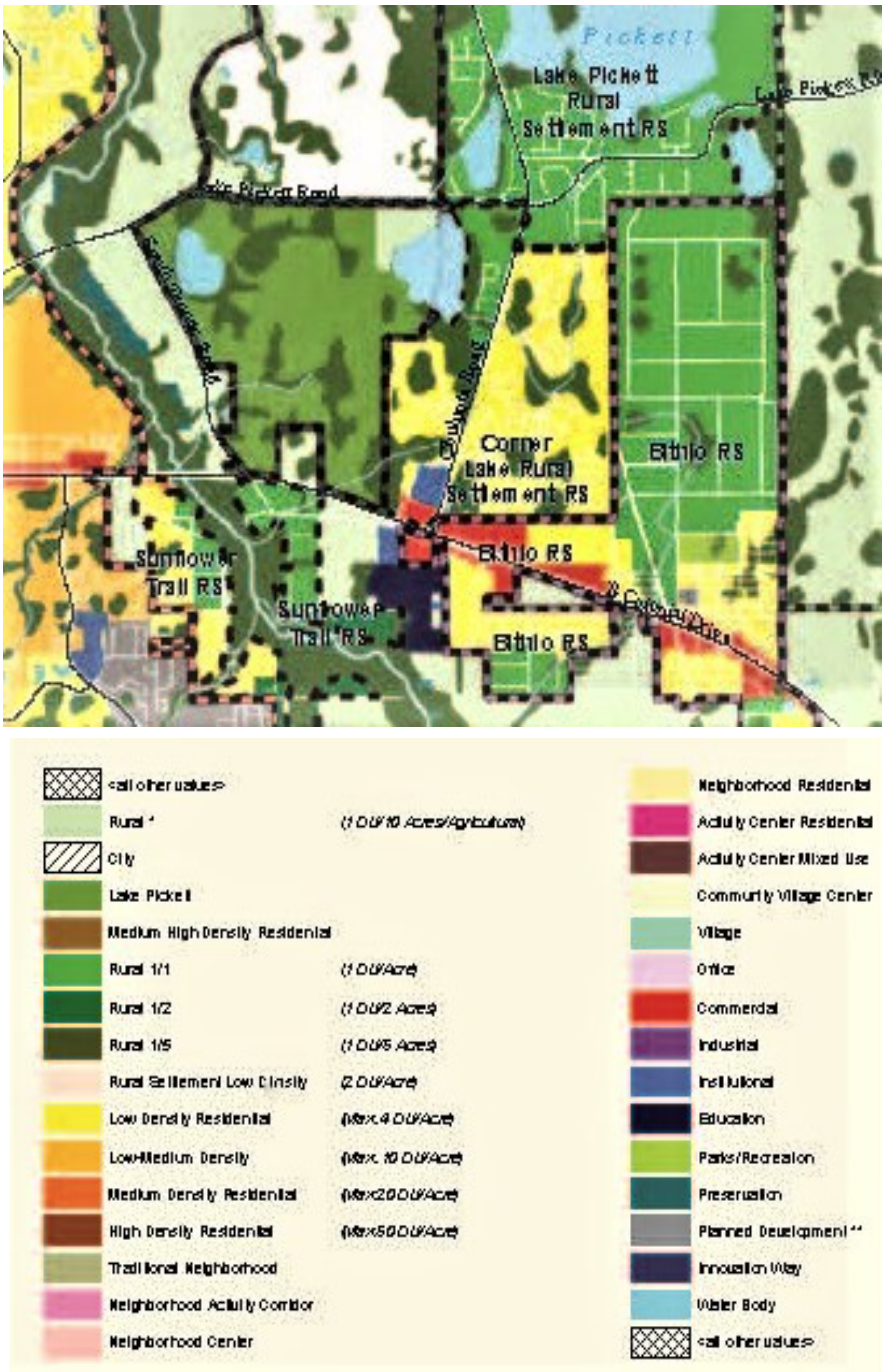
The 2010-2030 Orange County Comprehensive Plan Future Land Use Map to the right indicates that land use along most of the Chuluota Road corridor is designated as predominantly Low Density Residential or Rural (1/1 or One DU per Acre).

At the southern end of the corridor, the land use is primarily Commercial property related to development along SR 50. Currently, the County is undertaking the Vision 2050 initiative which will guide how and where growth will occur beyond 2030.

Approximately one mile west of Chuluota Road, two major developments are planned adjacent to Lake Pickett Road which are likely to have some influence on Chuluota Road. The Grow, to the south of Lake Pickett Road, has been approved and is expected to include 2,078 dwelling units (DU), 165,000 SF of retail, and 7,000 SF of offices.

To the north of Lake Pickett Road and The Grow, the Sustanee development is being planned, though has not yet been approved. Their buildout is expected to include 2,500 DU.

Figure 3-4: 2030 Orange County Comprehensive Plan, Future Land Use



3.10 Cultural Features

The following cultural features can be found in Chuluota Road corridor.

Religious Institutions – There are no religious institutions currently located along Chuluota Road, though Cross Life Church has plans to build their church on the former Archdiocese property.

Schools - There are two existing schools along the project corridor. Corner Lake Middle School is located at the south end of the project and draws students from the entire Chuluota Road corridor. Columbia Elementary is located near the north end of the project and draws students east of Chuluota Road.

Elementary-age students on the west side of Chuluota Road are assigned to East Lake School. The nearest high school is East River HS south of SR 50. Table 3- summarizes the attendance zones for various schools in the corridor.

Table 3-6 Public School Attendance Zones

School Type	Boundary Along Chuluota Road	Assigned School
Elementary	East Side of Chuluota Road West Side of Chuluota Road	Columbia Elementary East Lake Elementary
Middle	None	Corner Lake Middle
High School	None	East River High

Police/Fire Protection - There are no police or fire protection stations located adjacent to Chuluota Road within the project limits.

Community Centers - There are no community service facilities located adjacent to Chuluota Road within the project limits.

Hospitals - There are no hospitals located adjacent to Chuluota Road within the project limits.

Cemeteries - There are no cemeteries located adjacent to Chuluota Road within the project limits.

Parks and Trails - There are no public parks or trails located adjacent to Chuluota Road within the project limits. As indicated in Section 3.4, Orange County has plans to build the East Orange Trail, portions of which will coincide with the northern section of Chuluota Road near Lake Pickett Road.

3.11 Archaeological and Historic Features

A cultural resource assessment desktop analysis was performed for the Chuluota Road study area to identify any cultural and historic resources that may be impacted by the project. This analysis was completed in 2021. Based on this analysis, there are no cultural resources listed, determined eligible, or appear to be potentially eligible for listing in the National Register of Historic Places (NRHP). Historic resources will not be an issue for this project.

3.12 Hydrologic and Natural Features

3.12.1 Existing Drainage Features

The Chuluota Road project area is located in the Big Econlockhatchee River Basin within the jurisdiction of the St. Johns River Water Management District (SJRWMD). The Econlockhatchee River System is considered an Outstanding Florida Waters (OFW).

Chuluota Road initially is a four-lane rural minor arterial roadway. At the Cypress Lake Glen Boulevard intersection, the road transitions to 2-lanes with turn lanes for adjacent residential subdivisions. Generally, stormwater sheet flows off the roadway into roadside ditches, which convey the stormwater to adjacent wetlands draining west into Corner Lake or east towards the Econlockhatchee River System. For a depiction of the existing drainage features, please refer to the Hydrologic & Natural

Features Map in the Pond Siting Report, Appendix H.

3.12.2 Water Quality

The water quality of the receiving water for this drainage basin is Corner Lake, which was reviewed by Orange County in February of 2021. The water sampling location, Station ID BE3, is located at the center of the lake. Please refer to Table 3-7 for a partial summary of the routine samples taken at approximately 0.5 meters of depth within the lake.

According to the sample results, Corner Lake is not classified as an impaired water body by the Florida Department of Environmental Protection (FDEP). The Chuluota Road project area is located in the Big Econlockhatchee River Basin within the jurisdiction of the St. Johns River Water Management District (SJRWMD). The Econlockhatchee River System is considered an Outstanding Florida Waters (OFW).

Table 3-7
Water Quality

Station ID	WBID	Category	Characteristic	Result Value	Result Units	Analysis Date
BE3	140023	Routine Sample	Nitrogen, Nitrite (NO2) + Nitrate (NO3) as N	9.00	ug/l	5/18/2021
BE3	140023	Routine Sample	Phosphorus as P	13.00	ug/l	5/18/2021
BE3	140023	Routine Sample	pH	6.00		5/18/2021
BE3	140023	Routine Sample	Sulfur, sulfate (SO4) as SO4	5.52	mg/l	5/18/2021
BE3	140023	Routine Sample	Turbidity	1.60	NTU	5/18/2021
BE3	140023	Routine Sample	Total Suspended Solids (TSS)	3	mg/l	5/18/2021

3.12.3 Existing Permits

Over 15 permits were researched to obtain stormwater and environmental design information for existing systems within the project corridor. Please refer to Table 3-8 for a summary of permits referenced during the development of the proposed stormwater management systems for Chuluota RCA.

Table 3-8
Existing Permits

Project Name	Agency/Permit Type	Permit No.	Date Issued	Description
Lake Picket Road Realignment	SJWMD/ ERP Standard General	101908 - 4	11/14/2011	Proposed intersection improvements of Chuluota Road at Lake Pickett Road
Lukas Estates Subdivision	SJWMD/ ERP Standard General	57286 - 1	5/24/2000	Construction plans for Lukas Estates
Corner Lake Middle School	SJWMD/ ERP Standard General	27857 - 1	1/13/1997	Retention pond plans for Corner Lake Middle School
Corner Lake Plaza	SJWMD/ ERP Standard General	63516 - 8	11/18/2014	Proposed Drainage Modifications for the Corner Lake Plaza
Corner Lake Estates	SJWMD/ ERP Standard General	81542 - 9	7/10/2000	The construction of a surface water management system, which consists of a 243-acre single-family residential subdivision to be known as Corner Lake Estate Subdivision
CR 419 Improvement Plans	SJWMD/ ERP Standard General	58045 - 1	12/1/1999	The proposed County Road (CR) 419 expansion project conducted by Orange County

Other existing environmental resource permit documents that were reviewed included:

- #21001 Cypress Lakes (multiple phases)
- #27857 Corner Lake Middle School
- #57286 Lukas Estates
- #63516 Corner Lake Estates
- #63516 Corner Lakes Plaza
- #81542 Country Lake Estates
- #83067 BP Amoco (Retail Shopping Center)
- #101908-1 and -2 Mandalay Subdivision & Estates / Lake Pickett Road Realignment
- #101908-4 Lake Pickett Road and Chuluota Road Intersection Improvements

Proposed development plans that were reviewed included:

- ERP#21001 Cypress Lakes Phase I (Parcel P), aka YardCo
- ERP#166225 YardCo - East Colonial
- FDOT 60% Roadway Plans for SR 50, 239203-7-52-01
- Cross Life Church
- The Grow Farm & Garden Community
- East Orange Trail

3.12.4 Floodplains and Floodways

Based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM's) dated September 25, 2009, portions of the study area are located within Zone A (100 Year) floodplain (see Appendix H). There are no Zone AE floodplains within the study area. The Zone A floodplains occur:

- East of Chuluota Road across from Corner Lake Middle School. This Zone A floodplain is isolated.
- North and South of Cypress Lake Glen Boulevard. This Zone A floodplain ultimately drains to Lake Pickett.

Please refer to the Pond Siting Report for a depiction of the floodplains in the study area. There will be floodplain impacts within the project corridor that will be mitigated by providing compensatory volume in proposed floodplain compensation ponds. Calculations supporting the floodplain compensatory volume required have been included in Appendix H. A floodplain compensatory pond (FC-1) is proposed across from Corner Lake Middle School, and a floodplain compensatory pond (FC-2) is proposed adjacent to wetlands south of Lake Pickett Road and east of Chuluota Road.

3.12.5 Existing Cross Drains

Three existing cross drains are located within the study area as indicated in Table 3-9 below.

Table 3-9 Existing Cross Drains

Culvert	Station	Existing Conditions	
		#	Size/ Type
CD #1	46+25	1	30" RCP
CD #2	74+92	1	42" CMP
CD #3	107+75	1	24" RCP

3.12.6 Drainage Basin Descriptions

Four major existing roadway basins are delineated along the corridor with nine subbasins altogether, as described below). These basins generally outfall into roadside ditches, which convey the stormwater to adjacent wetlands or to existing storm drain systems. These existing drainage systems provide positive outfalls for the basins. There is no existing stormwater treatment or attenuation of

flows in most basins.

Runoff from subbasin 2B is conveyed to an existing wet detention pond east of Schoolview Way, and runoff from subbasin 4-100 and 4-200 are conveyed to an existing pond on the northwest corner of Lake Pickett Road and Chuluota Road. All of Basin 4 (4-100, 4-200, 4-300, and 4-400) are ultimately conveyed to wet detention ponds farther east on Lake Pickett Road.

Runoff from Basins 1A and 2B is ultimately conveyed to the Econlockhatchee River. Runoff from Basins 2A, 2B, and 3 is ultimately conveyed to Corner Lake. Runoff from Basin 4 (4-100, 4-200, 4-300, and 4-400) is ultimately conveyed to Lake Pickett.

3.12.6.1 Basin 1A, Basin 1B

Basin 1A consists of the southbound portion of grassed right-of-way and existing pavement area of the intersection of SR-50 and Chuluota Road beginning at station 10+00 north to station 17+00 containing 1.28 acres of right-of-way. The soil is classified as HSG A/D, with a SHWT depth of 1 foot or less based on the soil types. County LiDAR indicates that Basin 1A ranges in elevation from 68 feet to 73 feet (mean 71.5 feet).

Stormwater runoff is conveyed by a ditch into an existing FDOT storm drain system draining west along SR 50. There is no existing stormwater attenuation or water quality treatment.

Existing inlet drains west into FDOT SR 50 ROW

Basin 1B consists of the northbound portion of grassed right-of-way and existing pavement area of the intersection of SR-50 and Chuluota Road beginning at station 10+00 north to station 12+00 containing 0.30 acres of right-of-way. The soil is classified as HSG A/D, with a SHWT depth of 1 foot or less based on the soil types.

County LiDAR indicates that Basin 1B ranges in elevation from 68 feet to 73 feet (mean 70.9 feet).

Stormwater runoff sheet flows into the existing FDOT storm drain system draining east along Colonial Blvd. There is no existing stormwater attenuation or water quality treatment.

Existing inlet on east side of Chuluota Road drains into FDOT SR 50 ROW

3.12.6.2 Basin 2A, Basin 2B

Basin 2A begins at the centerline of the existing service entry way into the Corner Lakes Plaza and includes the southbound portion of roadway and grassed right-of-way. The basin contains 1.60 acres of right-of-way. The soil is classified as HSG A/D, with a SHWT depth of 1 foot or less based on the soil types.

County LiDAR indicates that Basin 2A ranges in elevation from 70 feet to 73 feet (mean 72.0 feet). Stormwater runoff sheet flows into a ditch which is conveyed via a ditch bottom inlet and storm drain into the existing pond north of intersection of Schoolview Way and Chuluota Road (ERP#27857).

Roadside ditch facing south

Chuluota Road and Schoolview Way showing ditch bottom inlet which drains to existing pond

Basin 2B contains 7.62 acres of right-of-way along the east side of Chuluota Road. An 0.38-acre offsite area composed of a residential berm from Corner Lakes drains to the right-of-way. The soil is classified as HSG A and A/D, with a SHWT depth of 2.8 feet or less (mostly 1 foot or less) based on the soil types.

County LiDAR indicates that Basin 2B ranges in elevation from 66.7 feet to 73.5 feet (mean 70.7 feet). Stormwater runoff sheet flows into adjacent roadside diches that flow towards an existing cross drain (CD-1). The existing cross drain flows toward the wetland system to the west of Chuluota Road. A side drain under Corner Lake Drive conveys this runoff to wetlands west of Chuluota Road in Basin 3.

Roadside ditch facing north

3.12.6.3 Basin 3

Basin 3 includes both northbound and southbound Chuluota Road lanes. The basin contains 13.77 acres of right-of-way. An 0.7-acre offsite area composed of a berm from Columbia Elementary School drains to the right-of-way. The soil is classified as HSG A/D, with a SHWT depth of 1.0 foot or less

based on the soil types. County LiDAR indicates that Basin 3 ranges in elevation from 64.9 feet to 73.7 feet (mean 69.2 feet). Stormwater runoff sheet flows into adjacent roadside diches that flow towards an existing cross drain (CD-2) located at station 74+92.

The existing cross drain drains to a relict wetland canal west of Chuluota Road which ultimately discharges to Corner Lake.

Existing side drain under Corner Lake Drive which conveys runoff from Basin 2B to Basin 3

3.12.6.4 Basin 4-100, Basin 4-200, Basin 4-300, Basin 4-400

Basin 4-100 covers the north end of the project including applicable portions of the Lake Pickett Road and Chuluota Road intersection. It includes southbound Chuluota Road and westbound Lake Pickett Road only.

The basin contains 1.60 acres of right-of-way. The soil is classified as HSG A/D, with a SHWT depth of 1.0 foot or less based on the soil types. County LiDAR indicates that Basin 4-100 ranges in elevation from 71.0 feet to 73.8 feet (mean 72.3 feet).

Existing dry pond northeast of Lake Pickett Road and Chuluota Road

The soil is classified as HSG A, with a SHWT depth of 2.5 feet or less based on the soil types. Runoff from the northwest corner of the Chuluota Road and Lake Pickett Road intersection is conveyed via

sheet flow into an existing dry pond northeast of Lake Pickett Road and Chuluota Road. Runoff is ultimately conveyed to the existing storm drain system along Lake Pickett Road to wet detention ponds associated with the Mandalay Subdivision (ERP#101908-1, -2, and -4).

Basin 4-200 includes southbound Chuluota Road and eastbound Lake Pickett Road only. The basin contains 0.41 acres of right-of-way.

The soil is classified as HSG A/D, with a SHWT depth of 1.0 foot or less based on the soil types. County LiDAR indicates that Basin 4-200 ranges in elevation from 69.7 feet to 73.8 feet (mean 72.0 feet).

Ditch bottom inlet at southwest intersection of Lake Pickett Road and Chuluota Road, facing north

The soil is classified as HSG A, with a SHWT depth of 2.5 feet or less based on the soil types. County LiDAR indicates that Basin 4-200 ranges in elevation from 69.7 feet to 74 feet (mean 72.4 feet). Runoff is conveyed via sheet flow to swales which are collected by a ditch bottom inlet. The runoff is then conveyed to the dry detention pond in Basin 4-100. Runoff is ultimately conveyed to the existing storm drain system along Lake Pickett Road to wet detention ponds associated with the Mandalay Subdivision (ERP#101908-1, -2, and -4).

Basin 4-300 includes southbound Chuluota Road only. The basin contains 32.25 acres including offsite wetlands and pasture on the west side of Chuluota Road.

County LiDAR indicates that Basin 4-300 ranges in elevation from 66.7 feet to 74.3 feet (mean 70.9 feet). The soil is classified as HSG A/D, with a SHWT depth of 1.0 feet or less based on the soil types.

Cross drain which conveys runoff from basin 4-300 to storm drain on east side of Chuluota Road, facing north and east.

Runoff is conveyed via sheet flow to a roadside ditch which drains to a cross drain under Chuluota Road. That cross drain conveys runoff to a storm drain on the east side of Chuluota Road (in Basin 4-400). Runoff is ultimately conveyed to the existing storm drain system along Lake Pickett Road to wet detention ponds associated with the Mandalay Subdivision (ERP#101908-1, -2, and -4).

Ditch bottom inlet which conveys sheet flow from Chuluota Road to existing storm drain, facing south

Basin 4-400 extends north of the intersection of Chuluota Road and Lake Pickett Road and includes northbound Chuluota Road only. The basin contains 9.40 acres including offsite wetlands and pasture on the east side of Chuluota Road. County LiDAR indicates that Basin 4-400 ranges in elevation from 67.8 feet to 74.7 feet (mean 71.7 feet).

The soil is classified as HSG A/D, with a SHWT depth of 1.0 feet or less based on the soil types. Onsite runoff is conveyed via sheet flow to a roadside ditch, which drains to a storm drain system along Chuluota Road. Offsite runoff flows into two inlets which also drain into the storm drain system along Chuluota Road. This storm drain connects to a storm drain system along Lake Pickett Road, which drains to wet detention ponds associated with the Mandalay Subdivision (ERP#101908-1, -2, and -4).

3.13 Wetlands and Species

A*n Ecological Summary Report* has been prepared as part of the Chuluota Road RCA Study and is located in Appendix E. The following is a summary of the evaluation results.

3.13.1 Wetlands and Surface Waters

The NWI and FDEP's Statewide Land Use databases were reviewed for jurisdictional wetlands and/or other surface waters within the study corridor. Each wetland and/or other surface water was field verified, and their dominant vegetative species were recorded. Wetlands were then classified using Florida Land Use Cover and Forms Classification (FLUCFCS) codes to FLUCFCS Level III for specific identification of habitat. Wetland systems and other surface waters were identified from south to north along the north-bound travel lane, and north to south along the south-bound travel lane (See Appendix F, Figures 6-1 and 6-2). The wetland and surface water systems delineated are discussed below.

FLUCFCS 5130 – Streams and Waterways (Upland-Cut) – This land use type best describes an upland-cut surface water system within the study corridor. Designated as SW-1, this system is located east of Chuluota Road between Cypress Lake Glen Boulevard's north and south access. SW-1 is vegetatively comprised of bahiagrass (*Paspalum notatum*), scattered Carolina willow (*Salix caroliniana*), Virginia chain fern (*Woodwardia virginica*), swamp fern (*Blechnum serrulatum*), pennywort (*Hydrocotyle* spp.), cattail (*Typha* spp.), and greenbrier (*Smilax* spp.).

FLUCFCS 5300 – Reservoirs – This land use type best classifies stormwater management ponds located adjacent to the study corridor and designated SW 2, 2a, 3 through 6, and 10 through 16 in Appendix F, Figures 6-1 and 6-2.

FLUCFCS 6170 – Mixed Wetland Hardwoods –This land use type best describes WL-1, located south of Cypress Lake Glenn Boulevard, east of Chuluota Road. This system is vegetatively comprised of a canopy of Cypress (*Taxodium* spp.), sweet bay (*Magnolia virginiana*), wax myrtle (*Myrica cerifera*), red bay (*Persea borbonia*), southern magnolia (*Magnolia grandiflora*), pines (*Pinus* spp.), Virginia chain fern, swamp fern, and greenbrier. This wetland system was placed under conservation easement (OR Book 07308, Page 2152) in support of the Cypress Lakes subdivision.

FLUCFCS 6210 – Cypress – This land use type best describes wetlands WL-2, WL-4, WL-5, and WL-6, which are located east of Chuluota Road. These systems are vegetatively compromised of cypress, pines, wax myrtle, Australian pine (*Casuarina* spp.), sweet bay, dahoon holly, camphor tree (*Cinnamomum camphora*), Brazilian pepper (*Schinus terebinthifolia*), saltbush (*Baccharis halimifolia*), swamp fern, pennywort, and greenbrier.

FLUCFCS 6300 – Wetland Forested Mixed – This land use type best characterizes wetlands WL-7, WL-8, and WL-9. These systems are vegetatively compromised of loblolly bay (*Gordonia lasianthus*), swamp bay (*Persea palustris*), red bay, sweet bay, laurel oak (*Quercus laurifolia*), slash pine (*Pinus elliottii*), pond pine (*Pinus serotina*), red maple (*Acer rubrum*), cypress, dahoon holly (*Illex cassine*), camphor tree, wax myrtle, primrose willow (*Ludwigia peruviana*), cogon grass (*Imperata cylindrica*), elderberry (*Sambucus nigra*), Virginia chain fern, swamp fern, arrowhead (*Sagittaria* spp.), grapevine (*Vitis rotundifolia*), and greenbrier.

Wetlands 7 and 8 were placed under a conservation easement (OR Book 6409, Page 5387) in support of the Corner Lake development, and a portion of WL-9 was placed under conservation easement (OR Book 06808, Page 2737) in support of the Corner Lake Kash-n-Karry development.

FLUCFCS 6410 – Freshwater Marshes – This land use best describes wetland WL-3, located north of Cypress Lake Glen Boulevard and east of Chuluota Road. This system is vegetatively compromised of scattered sweet bay, cypress, primrose willow, and wax myrtle with waterlily (*Nymphaea* spp.), pennywort, rush (*Juncus* spp.), and open water.

Secondary Impacts

With respect to secondary impacts, such impacts may occur from construction may include lighting, collisions with wildlife from vehicles, and impacts to water quality.

Generally, secondary impacts to the habitat function of wetlands will not be considered adverse if buffers, with a minimum width of 15 feet and an average width of 25 feet, are provided adjacent to the wetlands that will remain. Buffers must be maintained in their natural/undisturbed condition, provided the construction or use of these features does not adversely impact wetlands. Wetlands or other surface waters cannot be filled to create upland buffers.

Secondary impacts associated with stormwater pond locations and roadway alignment will need to be further evaluated during the final design phase to ensure the proposed hydroperiod of the stormwater management system does not adversely affect the hydrology of an adjacent wetland systems.

Estimated Wetland and RHPZ Impacts

Estimated wetland and RHPZ impacts are shown on Table 3-10 on the following page. Note, the shown impacts are ***for all possible improvement options*** – the final estimated impacts will be determined after the preferred roadway and pond improvements have been identified.

Table 3-10, Approximate Wetland Impacts

Wetland/Other Surface Water ID	FLUCFCS Code	Proposed Alignment Impact (ac)*	Proposed Pond ID	Proposed Pond Impacts (ac)*	RHPZ Uplands (ac)*
WL-1	6170	0.33			
WL-2	6170				
WL-3	6410	0.16			
WL-7	6210		Pond 3A	0.73	1.09
WL-7	6210		Pond 3B	0.11	0.18
WL-8	6300		Pond 2B	0.97**	
WL-9	6250		Pond 1B	1.22**	0.07
SW-1	5130	2.73***			
Upland			FC Pond 1	0.05**	
TOTAL		**3.22**		**3.08**	**1.34**

* Impact acreages are based on approximate limits through aerial interpretation and limited ground-truthing activities.
** Impacts to a system or upland area under a recorded conservation easement. Additional mitigation is likely required to offset the mitigation
value that was offset by the easement.
*** Upland-cut surface waters would not be jurisdictional unless inhabited by protected wildlife species.

Mitigation bank service areas and mitigation credit availability for Econlockhatchee River Nested Basins include Lake X Ranch, TM-Econ Phase I-III, and TM-Econ Phase IV. Orange County owned TM-Econ Phase IV is available for use, and the preferred option for required mitigation. Table 3-11 provides a summary of TM-Econ Phase IV's service areas and available credits.

Table 3-11, Summary of Available Mitigation Credits from TM-Econ MB Phase IV for Chuluota Road RCA

Mitigation Bank	Bank Service Area	*Credits Available
TM-Econ MB Phase IV, Orange County	(18) St. Johns River (Canaveral Marshes to Wekiva), (19) Econlockhatchee River Nested, (23) Lake Jesup, part of (20) Southern St. Johns River, Boggy Creek, Lake Hart, Lake Myrtle, and East Lake Toho	227.84 State (Includes RHPZ credits) 371.836 Federal

*Based on coordination with OCEPD personnel on May 3, 2022.

3.13.2 Federal and State Listed Species

FNAI is a non-profit conservation organization that maintains a database of recorded occurrences of rare habitat types and imperiled plant and wildlife species. FNAI classifies imperiled species on a 5-tiered rarity ranking system, both globally and state-wide, and also includes federal and state protection statuses for such species. FNAI is not a regulatory or law enforcement agency; however, FNAI's database was consulted for this study due to their comprehensive records of species occurrence.

The Florida Department of Agriculture and Consumer Services (FDACS) lists and regulates the economic use of flora identified as endangered, threatened, or commercially exploited. Typical economic uses include

gathering live wild plants for resale as ornaments or harvesting of plant material (e.g., saw palmetto berries) for resale. Incidental destruction of rare flora caused by land clearing associated with construction or agriculture is not regulated or prohibited by FDACS.

The FNAI and FDACS lists of protected and commercially exploited flora were reviewed for species known to occur within Orange County, Florida, and the potential for such species to inhabit the study corridor. Protected flora species are those categorized by FWS and/or FWC as T, E, or exploited, thereby receiving a level of protection because of their status. The potential occurrence of protected flora species identified within the study corridor is based on the type of vegetative communities present. The probability of each species occurring within the study corridor is ranked using the following requirements:

1. **No** – indicates no suitable habitat is present. Suitable habitat is defined as intact natural land that is typically used by the species under consideration.
2. **Low** – indicates that marginally suitable habitat may exist within the study corridor, but the species was not observed during field observations. "Marginal" describes natural land that has been altered from its native state due to human activity, ecological succession, or conversion; however, the species under consideration could still inhabit the area.
3. **Moderate** – indicates that suitable habitat exists within the study corridor, but the species was not observed during field observations.
4. **High** – indicates that suitable habitat exists within the study corridor and the species of interest was observed during field observations.

Table 3-12 lists the federally and/or state-protected flora species known to occur in Orange County, Florida, and their potential for occurrence within the study corridor.

Table 3-12
Federal and State Listed Plant Species

Scientific Name	Common Name	FWS Status	FWC Status	Occurrence Potential	Habitat
Bonamia grandiflora	Florida bonamia	T	E	No	Openings or disturbed areas in white sand scrub on central Florida ridges, with scrub oaks, sand pine, and lichens
Calopogon multiflorus	Many-flowered grass-pink	--	T	No	Dry to moist flatwoods with longleaf pine, wiregrass, and saw palmetto
Centrosema arenicola	Sand butterfly pea	--	E	Low	Sandhill, scrubby flatwoods, and dry upland woods
Clitoria fragrans	Scrub pigeonwing	T	E	Low	Turkey oak barrens with wire grass, bluejack and turkey oak; also scrub and scrubby high pine
Coelorachis tuberculosa	Piedmont jointgrass	--	T	Low	Ephemeral ponds and margins of sandhill upland lakes or depression marshes with sandy peat or sandy muck-peat
Coleataenia abscissa	Cutthroatgrass	--	E	Low	Wet flatwoods, prairies, and seepage areas

Scientific Name	Common Name	FWS Status	FWC Status	Occurrence Potential	Habitat
Deeringothamnus pulchellus	Beautiful pawpaw	E	E	Low	Open slash or longleaf pine flatwoods with wiregrass and dwarf live oak understory
Eriogonum longifolium var. gnaphalifolium	Scrub buckwheat	T	E	No	Sandhill, oak-hickory scrub on yellow sands, high pineland between scrub and sandhill, turkey oak barrens
Illicium parviflorum	Star anise	--	E	No	Banks of spring-run or seepage streams, bottomland forest, hydric hammock, and baygall dominated by red maple and sweet bay
Lechea cernua	Nodding pinweed	--	T	Low	Open, unshaded white sands of scrub and scrubby flatwoods; often associated with Florida rosemary (*Ceratiola ericoides*)
Lechea divaricata	Pine pinweed	--	E	Low	Scrub and scrubby flatwoods
Lupinus aridorum	Scrub lupine	E	E	No	Openings in sand pine and rosemary scrub
Lythrum flagellare	Florida loosestrife	--	E	Low	Seasonally inundated areas, such as wet prairies, floodplain marshes, and roadside ditches, in mucky or peat muck soils
Matelea floridana	Florida spiny-pod	--	E	No	Sandhill, upland pine, and dry hammock
Najas filifolia	Narrowleaf naiad	--	T	Low	Floating annual plant, prefers dark water less than 2 meters deep
Nemastylis floridana	Celestial lily	--	E	Low	Wet flatwoods (often in cabbage palm flatwoods variant), prairies, marshes, and cabbage palm hammock edges
Nolina atopocarpa	Florida beargrass	--	T	Low	In grassy areas of mesic and wet flatwoods
Nolina brittoniana	Britton's beargrass	E	E	Low	Scrub, sandhill, scrubby flatwoods, and xeric hammock
Ophioglossum palmatum	Hand fern	--	E	No	Old leaf bases of cabbage palms in maritime hammocks and wet hammocks
Paronychia chartacea	Paper-like nailwort	T	E	No	Sandy openings around sandhill upland lakes and karst ponds; Lake Wales Ridge scrub
Pecluma plumula	Plume polypody	--	E	Low	Wet hammocks and swamps; epiphytes on live oaks
Pecluma ptilota	Comp polypody	--	E	Low	Rockland hammocks, strand swamps, and wet woods at the base of trees and fallen logs
Platanthera integra	Yellow fringeless orchid	--	E	Low	Open wet prairies, wet flatwoods, bogs, and seepage slopes

Scientific Name	Common Name	FWS Status	FWC Status	Occurrence Potential	Habitat
Polygonum dentoceras	Small's jointweed	E	E	No	Open, sandy areas within scrub, mostly white sand
Prunus geniculata	Scrub plum	E	E	No	Sandhill and oak scrub
Orthochilus ecristatus	Giant orchid	--	T	Low	Sandhill, scrub, pine flatwoods, and pine rocklands
Salix floridana	Florida willow	--	E	Low	Wet, mucky soils in bottomland forests, floodplains, hydric hammocks, swamps, edges of spring-runs, and streams
Schizachyrium niveum	Pinescrub bluestem	--	E	No	White sand patches in rosemary scrub; also, sand pine scrub and oak scrub
Stylisma abdita	Scrub stylisma	--	E	No	Dry sandy soils in scrub and sandhills
Warea amplexifolia	Clasping warea	E	E	No	Limited to sunny openings with exposed sand in longleaf pine/turkey oak/wiregrass sandhills
Zephyranthes simpsonii	Redmargin zephyrlily	--	T	Moderate	Wet flatwoods and meadows; ditches and wet pasturelands
Commercially Exploited					
Encyclia tampensis	Butterfly orchid	--	--	Moderate	Epiphytic perennial in mesic hammocks, hardwood swamps, and mangrove forests; found on old live oaks, bald cypress, mangroves, and pond apples
Epidendrum conopseum	Green-fly orchid	--	--	Moderate	On trees in moist hammocks, cypress, and hardwood swamps
Lycopodiella cernua	Staghorn clubmoss	--	--	Moderate	damp areas, on ground, in full sun to shade
Osmunda cinnamomea	Cinnamon fern	--	--	Moderate	Swamps and wetlands
Osmunda regalis	Royal fern	--	--	Moderate	Swamps and wetlands
Rhapidophyllum hystrix	Needle palm	--	--	No	Moist-wet sites, seepage slopes, regularly but shallowly inundated floodplains, seepage swamps (especially associated with springs), and hydric seepage slopes
Serenoa repens	Saw palmetto	--	--	High	Wet to dry flatwoods and hammocks

E = Endangered, T = Threatened, SSC= Species of Special Concern, T S/A = Threatened Similar in Appearance

Data Source: FNAI Tracking List Orange County, Florida (FNAI 2022) Plants Institute for Systematic Botany (Wunderlin 2021); Florida Department of Agriculture (FDA) Endangered, Threatened, and Commercially Exploited Species (Florida Department of Agriculture and Consumer Services 2020-2021);

3.13.3 Federal and State Agencies Listed Wildlife Species

Literature reviews and database queries were conducted to identify federally and/or state-protected wildlife species known to occur in Orange County, Florida, and the potential occurrence of such species to inhabit

the study corridor. Federally and/or state-protected wildlife species are those categorized by FWS and/or FWC as T, E, or SSC, thereby receiving a level of protection due to their listed status. The potential occurrence of protected wildlife species within the study corridor is based on the and the type and quality of vegetative communities present. The probability of each wildlife species occurring within the study corridor is ranked using the following requirements:

1. No – Indicates no suitable habitat is present. Suitable habitat is defined as intact natural land that is typically used by a species under consideration.
2. Low – Indicates marginally suitable habitat may exist within the study corridor, but the species was not observed during field observations. "Marginal" describes natural land that a species under consideration could inhabit but that has been altered from its native state due to human activity, ecological succession, or conversion.
3. Moderate – Indicates suitable habitat exists within the study corridor, but the species was not observed during field observations.
4. High – Indicates suitable habitat exists within the study corridor, and the species of interest was observed during field observations.

Table 3-13 provides a summary of federally and/or state-protected species known to occur in Orange County, Florida, and their potential for occurrence within the study corridor. Protected wildlife species that have moderate or high potentials to occur within the study corridor are discussed in detail in the following paragraphs, as are species whose consultation areas fall within the study corridor.

Table 3-13
Federal and State Listed
Wildlife Species

Scientific Name	Common Name	Protection Status	Occurrence Potential	Consultation Area	Habitat
Fish					
Pteronotropis welaka	Bluenose shiner	ST	No	--	Quiet backwaters and pools of blackwater streams; rivers and spring runs, usually with thick vegetation nearby
Reptiles					
Alligator mississippiensis	American alligator	FT(S/A)	Moderate	--	Various aquatic habitats
Drymarchon corais couperi	Eastern indigo snake	FT	Low	--	Wide variety of habitats
Gopherus polyphemus	Gopher tortoise	ST	Moderate	--	Sandhills, scrub, hammocks, dry prairies, flatwoods, and mixed forests
Pituophis melanoleucus mugitus	Florida pine snake	ST	Low	--	Sandhills, scrubby flatwoods, xeric hammocks, and ruderal areas
Lampropeltis extenuate	Short-tailed snake	ST	Low		Longleaf pine and xeric oak sandhills
Plestiodon reynoldsi	Sand Skink	FT	No	No	Rosemary scrub, scrubby flatwoods, sand pine, and oak scrub
Birds					
Haliaeetus leucocephalus	*Bald eagle	--	Low	--	Forested areas adjacent to bodies of water

Scientific Name	Common Name	Protection Status	Occurrence Potential	Consultation Area	Habitat
Polyborus plancus audubonii	Audubon's Crested Caracara	FT	Low	Yes	Open country, dry prairie, and ruderal areas
Laterallus jamaicensis	Eastern black rail	FT	Low	--	Salt and freshwater marshes
Rostrhamus sociabilis	Everglade snail kite	FE	Moderate	Yes	Freshwater marshes, vegetated fringes of shallow lakes and ponds
Athene cunicularia floridana	Florida burrowing owl	ST	Low	--	Sparsely vegetated sandhills, dry prairies, and ruderal areas
Antigone canadensis pratensis	Florida sandhill crane	ST	High	--	Shallow wetlands, freshwater marshes, and wet prairies
Aphelocoma coeruluscens	Florida scrub-jay	FT	Low	Yes	Scrub and scrubby flatwoods
Egretta caerulea	Little blue heron	ST	Moderate	--	Marshes, ponds, and rivers
Picoides borealis	Red-cockaded woodpecker	FE	Low	Yes	Open, mature pine flatwoods
Egretta tricolor	Tricolored heron	ST	Moderate	--	Marshes, ponds, and rivers
Platalea ajaja	Roseate spoonbill	ST	No	--	Coastal mangroves, Brazilian pepper on man-made dredge spoil islands, and willow heads of freshwater
Mycteria americana	Wood stork	FT	Moderate	--	Fresh and brackish forested wetlands, swamps, ponds, and marshes

Occurrence Potential = No, Low, Moderate, High

Consultation Area = Identified within consultation area as depicted by FWS and/or FWC GIS Data

Code Key: FE = Federally Designated Endangered, ST = State-Designated Threatened, FT = Federally Designated Threatened, FT S/A = Federal Designated Threatened due to Similar in Appearance

Data Source: FWS ECOS (FWS 2021); FNAI (FNAI 2022)

Florida's endangered species, and threatened species (FWC 2021)

**Protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act*

Bald Eagle

Although the bald eagle (*Haliaeetus leucocephalus*) is delisted, the species remains protected through the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Florida has one of the densest concentrations of nesting bald eagles in the lower 48 states, with several clustered around significant lake, river, and coastal systems throughout the state (FWC 1999-2021). Bald eagles typically nest and roost in forested habitats that consist of mature canopy trees along habitat edges, allowing an unobstructed view of surrounding areas. Daytime roosts are often found in the highest trees and adjacent to shorelines. High-quality foraging habitat for bald eagles has a diversity and abundance of prey, access to shallow water, and tall trees or structures (FWC 1999-2021).

The AEW Program monitors nest sites during nesting season. Data provided on the AEW website is updated through the 2020–2021 nesting season (Audubon Society 2021). MSE biologists queried the AEW database for known bald eagle nest sites within a 1-mile radius of the study corridor. One bald eagle nest, nest ID OR074, was identified approximately 0.5 mile west of Chuluota Road (See Appendix F, Figure 7). This nest has not been monitored, and its status is unknown at this time.

No nest sites were observed during site reviews. It is anticipated that the proposed project will not adversely

impact the bald eagle or nesting trees. It is recommended that the database for documented bald eagle nest sites be queried, and a site review be conducted during the design and permitting phase of this project to verify nesting statuses at that time.

Federally Protected Wildlife Species

American Alligator

FWS considers the American alligator (*Alligator mississippiensis*) threatened due to similarity in appearance to the federally endangered American crocodile (*Crocodylus acutus*). The American alligator inhabits fresh and brackish marshes, ponds, lakes, rivers, swamps, bayous, and large spring runs; it is found in salt marsh and estuarine habitats in some parts of the state (Scott 2004). Alligators play a vital role in creating and maintaining microhabitats (gator holes), which can offer refuge to a host of species in water source habitats. A nest consists of a mound of compacted earth and vegetation, usually 4–7 feet in diameter, with nesting season occurring in the spring (Scott 2004). The alligator has a wide variety of food sources, including fish, ducks, wading birds, raccoons, and turtles.

The American alligator is known to inhabit a wide variety of aquatic habitats, including stormwater management ponds. Although this species was not observed during ground-truth activities, there is potential for the species to cross between wetland systems under Chuluota Road through drainage culverts.

The proposed roadway improvements include widening travel lanes throughout the study corridor and maintaining hydrologic connections (culverts) to systems located east and west of Chuluota Road, thus allowing the movement of this species. Roadway improvements within this study area are not likely to adversely affect this species or its habitat.

Audubon's Crested Caracara

FWS lists the crested caracara (*Polyborus plancus audubonii*) as threatened. This species is typically found in dry or wet prairies with scattered cabbage palms and improved/unimproved pasturelands (FWS 2019a). Nest sites are typically found in the tallest cabbage palm in the area or other structures free of dense vegetation. Caracara birds are opportunistic feeders, with their diets consisting of insects, fish, snakes, turtles, birds, and mammals (rabbits, skunks, prairie dogs).

The study corridor lies within the northern limits of FWS's consultation area for this species (See Appendix F, Figure 8) and supports suitable habitat within the northern limits of the corridor. Although suitable habitat consisting of improved pastures and scattered cabbage palms is present, this species was not observed during site reviews. If proposed impacts to cabbage palms are identified during final design, FWS may request that a formal survey be conducted using FWC's "Recommended Management Practices and Survey Protocols for Audubon's Crested Caracaras (*Caracara cheriway audubonii*) in Florida" (FWC 2001). Surveys should be conducted between January and March, when nesting is at its peak and adults are likely to be feeding nestlings, or between March and April, when chicks have fledged the nest and adults are active.

No crested caracaras were observed during site review, and it is anticipated that the proposed roadway improvements will not adversely affect the crested caracara; however, additional surveys may be necessary based on final design.

Florida Scrub-Jay

FWS lists the Florida scrub-jay (*Aphelocoma coerulescens*) as threatened. This species is typically found in sand pine, xeric oak scrub, and scrubby flatwoods with sandy soils and fire-dominated habitat types. The scrub-jay's diet consists mainly of acorns, arthropods, berries, seeds, and a wide variety of insects (Woolfenden and Fitzpatrick 1996).

The study corridor lies within the consultation area for the Florida scrub-jay (See Appendix F, Figure 9); however, no suitable habitat is present within the study corridor. It is anticipated that this species will not be adversely impacted, and a formal survey following FWS's protocol is not anticipated for this species.

Red-Cockaded Woodpecker

FWS lists the red-cockaded woodpecker (RCW) (*Picoides Borealis*) as endangered. The RCW is known to inhabit mature pine forests to bore out cavities in living pines (FWS 2020). Cavity trees can be in clusters of trees found on an average of 10 acres. The size of the RCW's territory is dependent upon habitat suitability. The RCW's diet consists primarily of insects (egg, larval, and adult stages) found on or in pine trees. Large, older pine trees are preferred, as the RCW's foraging method includes flaking away bark and probing under bark (FWS 2020).

Although the study corridor lies within the RCW consultation area (See Appendix F, Figure 10), no suitable habitat was identified during site reviews. It is anticipated that this species will not be adversely impacted, and formal surveys will likely not be needed.

Snail Kite

FWS lists the snail kite (*Rostrhamus sociabilis plumbeus*) as endangered. The snail kite is found near extensive, open freshwater marshes and lakes with shallow water and a low density of emergent vegetation of natural and artificial systems (FWS 1986). The apple snail (*Pomacea paludosa*) is the snail kite's primary food source, making the snail kite's survival dependent on the hydrology and water quality of watersheds associated with the Everglades, Lake Okeechobee, Kissimmee Valley, and the upper St. Johns River (FWS 1986).

The study corridor lies within the FWS consultation area for this species; however, it is outside of the FWS designated "critical habitat" (See Appendix F, Figure 11). Neither the snail kite nor apple snails were observed within the study corridor. If stormwater pond locations or alignments shift during the final design, it is recommended that a site review be conducted for the species. It is anticipated that the proposed project will not adversely impact the snail kite or its habitat.

Wood Stork

FWS lists the wood stork (*Mycteria americana*) as threatened. This species is typically found in freshwater marshes, swamps, lagoons, ponds, flooded fields, depressions in marshes, and brackish wetlands. The core foraging areas (CFA) for this species include areas of very shallow water, generally 6–10 inches in depth, where there is an abundance of small fishes and other aquatic life. These small fishes may include mosquitofish, sailfin mollies, flagfish, and several species of sunfish. Wood storks may also prey on frogs, salamanders, snakes, crayfish, insects, and baby alligators (Scott 2004). Suitable foraging habitat is defined in "The Corps of Engineers, Jacksonville District, U.S. Fish and Wildlife Service, Jacksonville Ecological Services Field Office, and State of Florida Effect Determination Key for the Wood Stork in Central and North Peninsular Florida" (USACE, FWS, FWC 2018) as "any area containing patches of relatively open (25% aquatic vegetation), calm water, and having a permanent or seasonal water depth between 2 and 15 inches."

FWS has identified a 15-mile radius CFA around known wood stork colonies. This CFA is deemed essential for reproductive success. The study corridor is within the 15-mile CFA of two wood stork colonies (See Appendix F, Figure 12):

- **Lake Mary Jane** last active 2019 (FWS 2010-2019), located approximately 12.7 miles south.
- **Orlando Wetland Park** last active 2018 (FWS 2010-2019), located approximately 8.9 miles east.

Impacts to suitable foraging habitat are not anticipated to result from the proposed project. Using the "*Effect Determination Key for the Wood Stork in Central and North Peninsular Florida"* (USACE, FWS, FWC 2018) to evaluate the project's effect on the wood stork, the following were concluded:

- The project corridor is more than 2,500 feet from a colony.
- The proposed work will not affect suitable foraging habitat.

Because of these conditions, the proposed project received a determination of "no effect" (See Appendix F, Attachment A*)*.

State-Protected Wildlife Species

Gopher Tortoise

FWC lists the gopher tortoise (*Gopherus polyphemus*) as threatened. The gopher tortoise inhabits subterranean burrows in dry upland habitats, such as longleaf pine sandhills, xeric oak hammocks, scrub, pine flatwoods, dry prairies, and coastal dunes. Gopher tortoises can also be found in pastures, ruderal fields, and grassy roadsides. To be suitable for gopher tortoises, the habitat must have well-drained sandy soils for digging burrows, herbaceous plants, and open sunny areas for nesting and basking.

Periodic natural fires play an important role in maintaining tortoise habitat by opening the canopy and promoting growth of herbaceous plants used for forage. If natural fires are suppressed, the habitat becomes unsuitable for gopher tortoises (Cox, Inkley and Kautz December 1987). Gopher tortoise burrows are an important habitat to many native species. It is estimated that 39 invertebrates and 42 vertebrate species use gopher tortoise burrows to some degree (Cox, Inkley and Kautz December 1987). Of those species, protected species that frequently inhabit gopher tortoise burrows include the Florida pine snake, eastern indigo snake, and burrowing owl. This commensal relationship warranted field investigation for such species within the study corridor.

Although suitable habitat for the gopher tortoise was found within the northern limits of the corridor, no burrows were identified during the site review; however, this area is not precluded from gopher tortoises entering the property and establishing burrows. During final design, and prior to construction activities, it is recommended that a survey for gopher tortoise burrows be conducted in accordance with FWC's "Gopher Tortoise Permitting Guidelines" (FWC 2008/Revised Effective July 2020). Should gopher tortoise burrows be identified, coordination with FWC will be required.

Florida Sandhill Crane

FWC lists the Florida sandhill crane (*Antigone canadensis pratensis*) as threatened. The Florida sandhill crane is a non-migratory bird found in freshwater marshes, prairies, and pastures. Florida sandhill cranes tend to avoid areas with taller vegetation or dense forest canopies and prefer habitat with short vegetation (e.g., less than 20 inches high in uplands) (FWC 2019). The sandhill crane is often found foraging in a variety of open habitats, including roadsides. Their diet consists of berries, seeds, insects, mice, small birds, snakes, lizards, and frogs. Shallow freshwater marshes with an average water depth of 4–13 inches are critical for nesting and roosting (FWC 2019). Additionally, uplands adjacent to nesting marshes are important for young until they are able to fly (FWC 2019).

Suitable foraging and nesting habitat was found within the study corridor, and the species was observed foraging within uplands and wetlands adjacent to Chuluota Road, but no active nest sites were observed. FWC recommends conducting a survey following the Florida Sandhill Crane Survey Protocol (See Appendix F, Attachment B) between December and August for active nest sites. If no active nests are detected, no additional coordination with FWC is required. The Florida sandhill crane was observed foraging within the right-of-way and WL-3 during site reviews.

Wading Birds

FWC lists the little blue heron (*Egretta caerulea*) and tricolored heron (*Egretta tricolor*) as threatened. These species are typically found in marshes, ponds, lakes, meadows, mudflats, lagoons, streams, mangrove lagoons, and other bodies of shallow water. Their diet consists of various types of fish, amphibians, and invertebrates. Nesting generally occurs in both coastal and freshwater environments in swamps and mangrove forests. They share nesting sites with other wading birds to form rookery colonies (Rodgers, Jr., Kale, II and Smith 1996).

These species were not observed during ground-truth activities. Measures to mitigate impacts to wetlands can be designed to provide additional benefits to wetland dependent species potentially impacted by this project.

Non-Protected Wildlife Species

In addition to federally and/or state-protected wildlife, the study corridor supports habitat for non-protected species. Wildlife species observed during site reviews include the following: great egret (*Ardea alba*), red-shoulder hawk (*Buteo lineatus*), brown anole (*Anolis sagrei*), mockingbird (*Mimus polyglottos*), and black vulture (*Coragyps atratus*). Areas within the study corridor may provide resting, nesting, and foraging opportunities for wetland dependent wildlife species and migratory birds.

3.13.4 Wetland and/or Surface Water Regulatory Overview and Permitting Requirements

Federal, state, and local government agencies are charged with protecting jurisdictional wetlands and surface waters, and protected wildlife species, and their habitats. A discussion of each agency's general requirements in protecting such features is provided below.

Federal Requirements

U.S. Army Corps of Engineers

The Department of the Army, through its regulatory division, regulates the discharge of dredge or fill material into waters of the United States (WOTUS) under Section 404 of the Clean Water Act (CWA), and in navigable waters of the United States under Sections 9 and 10 of the Rivers and Harbors Act of 1899 (RHA) (USACE n.d.). The term "navigable waters of the United States" is defined to include all waters that are subject to the ebb and flow of the tide, and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce (33 Code of Federal Regulations. Part 329. n.d.). Since 1970, the USACE and U.S. Environmental Protection Agency (EPA) have defined wetlands under the CWA as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" and "wetlands [that] generally include swamps, marshes, bogs, and similar areas" (EPA n.d.).

On June 22, 2020, the Navigable Waters Protection Rule (NWPR) became affective codifying the definition of "water of the United States" under the CWA. The NWPR includes four categories of jurisdictional waters and provides specific exclusions for many water features that traditionally had been regulated (Federal Register Vol. 85, No 77. April 21, 2020). In this final rule, "waters of the United States" include the following:

- Territorial seas and traditional navigable waters
- Perennial and intermittent tributaries that contribute surface flow to such waters
- Certain lakes, ponds, and impoundments of jurisdictional waters (dams)
- Wetlands adjacent to other jurisdictional waters

To determine if a wetland system meets jurisdiction under the USACE rules and regulations, an applicant may submit for an Approved Jurisdictional Determination (AJD). USACE will review wetland and/or other surface water systems within limits of a project and verify presence/absence of waters of the United States under the NWPR. If federal jurisdiction is determined, impacts to wetland systems would require coordination with USACE to obtain one of the following three types of permits (USACE Jacksonville n.d.):

Nationwide Permits (NWP) – NWPs are used to allow filling of wetlands and other jurisdictional waterbodies in situations where impacts to systems will have minimal adverse environmental effect. NWPs allow certain categorical activities to take place so long as the activity does not exceed impact thresholds.

- **NWP 14 – Linear Transportation Projects** – This permit is available for projects such as roadways, highways, railways, trails, airport runways, and taxiways. For issuance of an NWP-14, a project must have 0.5-acre or less of impacts to USACE-regulated waters, for non-tidal waters.

General Permits (GP) – GPs are issued on a nationwide or regional basis for a category of activities that are substantially similar in nature and cause only minimal individual and cumulative impacts. GPs are reviewed every 5 years and have been developed to reduce the burden of the regulatory program on the public and ensure timely issuance of permits.

Standard Permits (SP) – SPs are required when the proposed project does not meet the criteria of a GP or NWP. SPs require a 21-day comment period under public notice.

Federal Delegation

In December 2020, the Environmental Protection Agency (EPA) approved the Florida Department of Environmental Protection's (FDEP) application to adopt the federal 404 program, known as the "State 404 Program". State assumption over the 404 program intends to streamline permitting procedures, in which both federal and state permits are required for impacts to jurisdictional wetland and surface waters.

FDEP, under Chapter 62-331, assumed jurisdiction over dredging and filling in waters of the US regulated by the State (Section 373.4145, FS) effective December 22, 2020. Section 404 of the CWA allows for authorization of activities within certain waters (state-assumed waters) to be issued by FDEP. State-assumed waters are all waters of the US that are not retained USACE. Retained Waters are "those waters which are presently used or are susceptible to use in their natural condition or by reasonable improvement to transport interstate or foreign commerce shoreward to their ordinary high-water mark, including all waters which are subject to the ebb and flow of the tide shoreward to their mean high-water mark, including wetlands adjacent thereto. The Corps will retain responsibility for permitting for the discharge of dredged or fill material in those waters identified in the Retained Waters List, as well as all waters subject to the ebb and flow of the tide shoreward to their mean high-water mark that are not specifically listed in the Retained Waters List, including wetlands adjacent thereto landward to the administrative boundary. The administrative boundary demarcating the adjacent wetlands over which jurisdiction is retained by the USACE is a 300-foot guideline established from the ordinary high-water mark or mean high tide line of the retained water" (FDEP 2020).

If impacts to state-assumed wetland systems are proposed, coordination with FDEP would be necessary to obtain the necessary permit; however, regulations should be reviewed during final design and permitting to determine which agency will review the project under federal regulations.

During the design phase, wetlands and other surface water systems will need to be delineated in accordance with federal regulations to accurately determine impacts. Unavoidable direct and secondary impacts to "waters of the United States" may be offset through appropriate mitigation.

U.S. Fish and Wildlife Service

FWS regulates protected wildlife species under the Endangered Species Act (ESA) of 1973. FWS typically becomes involved during the wetland permitting process through a Section 7 Consultation with USACE. In accordance with the Fish and Wildlife Coordination Act (16 USC 661-666c), consultation with FWS and FWC is necessary when "waters of any stream or other body of water are proposed or authorized to be impounded, diverted,…or otherwise controlled or modified" under a federal permit.

Section 10 of the ESA is designed to regulate a wide range of activities affecting endangered or threatened organisms and their habitats (protected resources). With some exceptions, the ESA prohibits activities affecting these protected species and their habitats unless authorized by a permit from FWS or the National Marine Fisheries Service (NMFS). Permitted activities are designed to be consistent with the conservation of the species and this action is undertaken when USACE permitting is not required.

During consultation with FWS, the agency will evaluate the project and provide one of the following determinations for each species identified within the project area:

No effect – USACE has determined that the project will not adversely impact the species and no further coordination with FWS is required.

May affect – USACE has determined that the proposed project may impact a protected resource. USACE will consult with FWS to take either of the following actions:

- Request concurrence with "may affect, but not likely to adversely affect."
- Request initiation of formal consultation for determinations of "may affect, likely to adversely affect."

Both requests should include written analysis explaining the determination in the form of a Biological Assessment (BA) or a Biological Evaluation (BE) (FWS 2016).

Desktop analysis and site reviews did not identify critical foraging, resting, or nesting habitat within the study corridor for federally protected wildlife; therefore, coordination with FWS is not anticipated. If proposed pond locations or alignments shift during final design, additional site reviews and surveys may be warranted.

State Requirements

St. Johns River Water Management District

The state of Florida defines wetlands as "those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances, do support, a prevalence of vegetation typically adapted for life in saturated soils" (Chapter 62-340.200 FAC). SJRWMD regulates impacts to wetlands and/or other surface waters, pursuant to Part IV Chapter 373 of the Florida Statute (FS), and in accordance with Chapter 62-330 FAC for area of the Chuluota Road RCA. SJRWMD requires an Environmental Resource Permit (ERP) that authorizes activities in a manner that prevents flooding, manages surface water, and protects water quality, wetlands, and other surface waters.

Local Government

Orange County Environmental Protection Division

The Orange County Environmental Protection Division (OCEPD) is a local government agency that regulates wetlands pursuant to Article X – Wetland Conservations Areas Section 15 (Orange County Government 2019). This ordinance classifies wetland systems by size, hydrologic connection, and use of the system by protected wildlife species. All wetland systems within unincorporated Orange County, Florida, are classified using the following criteria:

- Class I – System has a hydrologic connection to natural surface water bodies, or lake littoral zone; is 40 acres or larger in size; or provides critical habitat to federal- and/or state-protected wildlife species
- Class II – System consists of isolated wetlands or formerly isolated wetlands that have been altered to have a direct connection to other surface water drainage, and the system is greater than or equal to 5 acres or is not otherwise classified as a Class I wetland
- Class III – System is isolated wetland less than 5 acres and does not qualify as a Class I or Class II system

Class I wetland systems receive the greatest protection and may be impacted only when no alternative exists for the reasonable use of the land where there is an overriding public benefit. Class II wetland systems may be impacted except when contrary to public interest. Class III wetland systems may be impacted in every case.

OCEPD evaluates secondary impacts like that of SJRWMD with a 15-foot minimum, 25-foot average width into a system. In addition, direct and secondary impacts may be offset through appropriate mitigation.

3.13.5 Wildlife Corridors

As part of the RCA ecological evaluation, the opportunity of implementing wildlife crossings within the study corridor was evaluated. Wildlife crossings are typically associated with linear projects when natural habitat is located on both sides of a proposed crossing and that habitat is protected from site conversion by having a preservation or conservation status. These crossings allow for terrestrial wildlife to move uninterrupted and safely through a roadway corridor.

Evaluation Criteria

The study corridor was analyzed for opportunities of implementing wildlife crossings. The analysis included a review of the following:

- Biodiversity Resource Priorities (BRP)
- Identification and location of conservation lands and/or public lands
- Current and future development plans

The CLIP was developed between FNAI, University of Florida GeoPlan Center and Center for Landscape Conservation Planning, and FWC. CLIP is a collection of spatial data that identifies statewide opportunities for protecting biodiversity, landscapes, and water resources in Florida. CLIP is available for use as a resource planning tool for state, regional, and local agencies in natural resource protection by providing a broad picture of natural resources to support conservation opportunities (NatureServe 2021). CLIP is organized into a set of core natural resource data layers that are combined into five resource categories, with the first three making up the Aggregated CLIP Model:

Biodiversity figures have been included in Appendix F. Based on a desktop review of the BPR data (See Appendix F, Figure 15) areas within this RCA received a ranking between 2 and 5. Areas throughout the study corridor have been bisected through land development (e.g., roads, residential areas, commercial), suggesting a wildlife crossing location may not be feasible.

Current and Future Corridor Conditions

Chuluota Road is currently a two-lane road with some sidewalks and maintained right-of-way. The Chuluota Road corridor includes residential and commercial development, stormwater management areas, and areas of natural, undeveloped forested uplands and wetlands land use types. Undeveloped lands are located east and west of Chuluota Road but are bisected by development and roadways. Continuous uninterrupted natural habitat is not present within the study corridor.

Proposed Wildlife Crossing

Two critical evaluation criteria were considered when determining the implementation and placement of wildlife crossings:

- The presence of natural habitat on both sides of the roadway that is protected from site alteration.
- The ability to construct a fence to guide wildlife to that crossing.

Therefore, if a potential wildlife crossing location currently has natural habitat on both sides of the roadway, is under private ownership, and the property owner prohibits the construction of a fence, or reserves the right to move or remove the wildlife fence in the future, the long-term viability of the location is greatly diminished.

Applying the above criteria, review of biodiversity data for the study corridor, existing natural habitat, and site reviews, one potential wildlife crossing location was evaluated south of Cypress Lake Glen Boulevard (North) (Figure 18).

Wildlife Crossing Location 1 – This site is located near an existing 42-inch cross culvert that has natural habitat consisting of forested uplands and wetlands on both sides of the roadway, with the east parcel under conservation. The west side of the roadway in this area is owned by Cross Life Church which is in discussions

with the County regarding a full right-of-way acquisition to accommodate Pond 3C. In addition, the following items were noted at this location:

• BPR – This area is identified with a ranking of 4 west of and 3 east of Chuluota Road.

• Conservation – FL-SOLARIS CLEAR data indicates land under conservation easement is located east of the study corridor, with the remainder of the location not under conservation.

• Current and Future Land Use – This location consists of undeveloped forested uplands and wetlands located on both sides of Chuluota Road. However, the eastern boundary of conservation area is bordered by existing development.

Based on the information and analysis presented above, and wildlife known to inhabit this area, a wildlife crossing is not justified due to the lack of sustainable natural communities and a continuous corridor for wildlife movement. However, this location should be reviewed further during final design once discussions between the church and County have been concluded.

4 DESIGN CONTROLS AND STANDARDS

4.1 Roadway Design Criteria

Sources used to determine the design criteria for the Chuluota Road RCA include the FDOT Design Manual, the FDOT Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, the FDOT Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook), and the Manual of Uniform Traffic Control Devices (MUTCD). Specific design criteria used for the development of the proposed design are identified below:

- Design Speed: 40 mph (Posted 40 mph) from SR 50 to Cypress Lake Glen Boulevard (South), and 45 mph from Cypress Lake Glen Boulevard (South) to Lake Pickett Road (Posted 45 mph)
- Functional Classification: Urban Minor Arterial
- Desired Level of Service: LOS of "D" or better
- Lane Widths: Travel lane - 11 feet
- Sidewalk Width: 6 feet
- Multiuse Path: 10 feet from SR 50 to north of Cypress Lakes development, 14 feet from north of Cypress Lakes to Lake Pickett Road which will accommodate the proposed East Orange Trail
- Median Width: 22 feet, raised
- Curb Type: Type E (median) Type F (outside)
- Border Width: Varies
- Lateral Offset/Utility Strip: Four feet from Back of Curb
- Pavement Design: (to be determined)
- Landscape Budget: (to be determined during design, though typically $75,000/mile)

4.2 Drainage Design Criteria

The Chuluota Road project area is located within the Big Econlockhatchee River Basin within the jurisdiction of the St. Johns River Water Management District (SJRWMD). The Econlockhatchee River System is considered an Outstanding Florida Waters (OFW). Compensation will be required for all flood water displaced by development below the 100-year flood elevation. Compensating storage is to be accomplished between the normal seasonal high-water elevation and the 100-year flood elevation.

The design of the stormwater management facilities for the project will be governed by the rules set forth by SJRWMD and Orange County. Water treatment and attenuation requirements will comply with the guidelines as defined in the SJRWMD ERP Manual. The stormwater management facilities have been sized to meet the criteria of the SJRWMD and the Orange County Public Works Department Engineering Manual. The following drainage design criteria has been used for the sizing of the proposed stormwater management ponds:

- For a project or portion of a project located within an open drainage basin, the allowable discharge is based on the SJRWMD's 24-hour, 25-year rainfall maps and the NRCS Type II Florida Modified 24-hour rainfall distribution.
- The Orange County Municipal Code indicates that "[f]or predevelopment time of concentration between zero and thirty (30) minutes, use six-hour storm duration for design" and "[f] or

predevelopment time of concentration over thirty (30) minutes, use twenty-four-hour storm duration for design." The 25-year 6-hour rainfall total is 5.75 inches, and the 24-year 24-hour rainfall total is 8.4 inches (based on intensity of rainfall derived from FDOT rainfall charts, per municipal code). For this project, a design storm of the 25-year, 24-hour rainfall was used for pond sizing to meet the SJRWMD criteria and to be conservative.

- The post-development volume of direct runoff must not exceed the pre-development volume of direct runoff for the 25-year frequency, 96-hour duration storm for systems discharging to landlocked lakes which are adjacent to properties of more than one ownership. These systems shall not cause an increase in the total pre-development flood stage. [SJRWMD Permit Information Manual (PIM) Part III, Chapter 3, Section 3.2.1(c)]
- A stormwater facility shall be designed as an open space amenity which is consistent with the urban design concepts of the particular CVC. Stormwater facilities serving nonresidential development may be located outside of the area designated for commercial or office development.
- Except as stated below, a retention or detention facility shall be designed with a maximum side slope of 5:1, so that fencing is not required. A wet-bottom retention pond with a side slope steeper than 5:1 may be permitted as an integral element of the urban design or architectural theme of the development.
- Pool depths should be a minimum of six feet below the design "normal" water level.
- A wet-bottom retention pond shall be landscaped in accordance with the following criteria:
    - Up to two and one-half acres. At least ten percent of the land above the design high-water level, excluding maintenance berms, shall be landscaped with plant materials other than ground cover over at least fifty percent of the required area, and at least fifty percent of those plant materials shall be native species; or a littoral zone band at least five feet in width for at least fifty percent of the shoreline shall be established with native aquatic or semi-aquatic plant species.
    - From two and one-half to five acres. At least five percent of the land above the design high-water level excluding maintenance berms shall be landscaped with plant materials other than ground cover over at least fifty percent of the required area, and at least fifty percent of those plant materials shall be native species; or a littoral zone band at least five feet in width for at least thirty-five percent of the shoreline shall be established with native aquatic or semi-aquatic plant species.
    - More than five acres. A littoral zone band at least five feet in width for at least twenty percent of the shoreline shall be established with native aquatic or semi-aquatic plant species.
- A wet-bottom retention pond shall be designed as a barrier-free aesthetic amenity.
- A skimmer shall be provided on a wet-bottom stormwater management facility to minimize the accumulation of trash and pollutants.
- Any wet-bottom retention pond visible from any existing arterial right-of-way shall provide an aquatic planting in a continuous band on the side of the pond remote from the right-of-way to screen the bank area between the normal water elevation and the high-water elevation. This littoral zone planting shall be at least four feet wide and average six feet wide.
- A dry-bottom stormwater management facility shall be designed with at least five percent of the area above the peak stage elevation landscaped with plant materials other than ground cover over at least fifty percent of the required area, and at least fifty percent of those plant materials shall be native species.
- A dry-bottom stormwater management facility shall be unfenced with a side slope of 5:1.
- Any dry-bottom stormwater management facility visible from any existing arterial right-of-way shall provide screening in the form of a hedge, berm, wall, or combination in a continuous band on the side of the facility proximate to the right-of-way to screen the bank area of the facility.

5 TRAFFIC CONDITIONS

The chapter presents a summary of the existing traffic conditions as well as the future traffic projections for the major intersections and roadway segments along Chuluota Road as documented within the Draft Design Traffic Technical Memorandum (DDTTM) developed as part of this study and completed in April of 2022.

In analyzing the existing operating conditions, traffic counts were first conducted at pertinent roadway segments and intersections. The following intersections along Chuluota Road were evaluated as part of this study:

- Chuluota Road at Lake Pickett Road (Signalized)
- Chuluota Road at Long Boat Lane / Cypress Lake Glen Boulevard (Unsignalized)
- Chuluota Road at Corner Lake Drive (Unsignalized)
- Chuluota Road at Cypress Lake Glen Boulevard (Signalized)
- Chuluota Road at 500 ft North of SR-50/ Publix shopping Center south driveway (Unsignalized)
- Chuluota Road at Colonial Drive/SR 50 (Signalized)

Level of Service (LOS) analyses were then conducted for both intersections and roadway segments using the existing traffic counts, existing signal timing data, and roadway and intersection geometry. The intersection LOS analysis was performed based on the Highway Capacity Manual methodologies as commuted using the Synchro software. The roadway segment LOS analysis was conducted based on the generalized Annual Average Daily Traffic (AADT) volumes for urbanized areas from the latest FDOT Q/LOS Handbook. The following sub-sections describe in more detail the overall process and results.

5.1 Existing Conditions

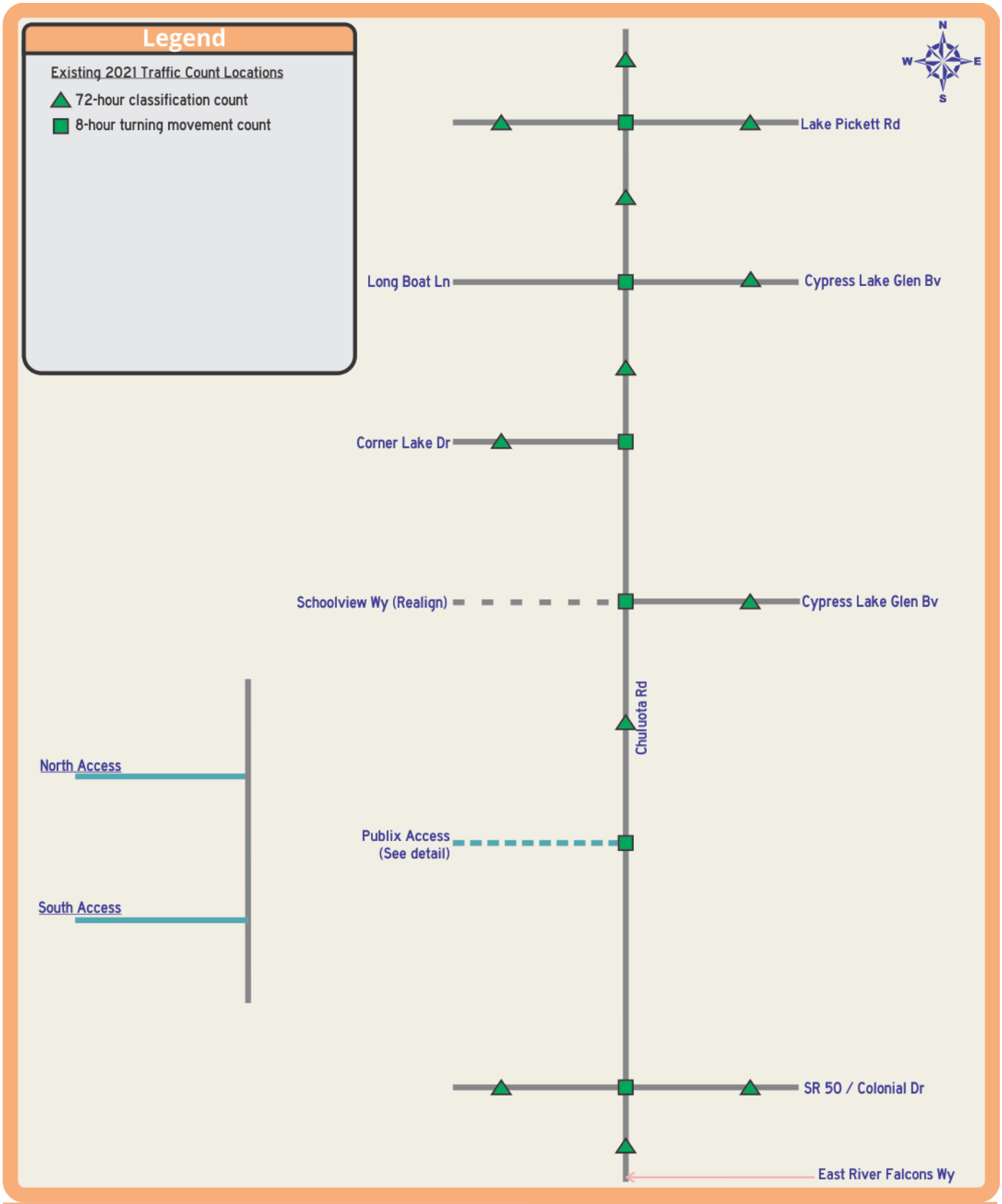
5.1.1 Traffic Counts

All existing traffic count data was collected during the month of September 2018. The data collected included:

- 72-Hour Classification Counts (13 locations)
- 10-Hour intersection turning movement counts for A.M. and P.M. peak hours (6 intersections)

The weekday turning movement counts were collected for the intersections along Chuluota Road between the peak hours of 7:00-9:00 a.m. and 12:00-8:00 p.m.

All traffic count data collected were adjusted utilizing the latest (2020) FDOT seasonal adjustment factors for Orange County to provide 2021 annual average conditions. Daily classification counts were adjusted to AADT using FDOT peak season adjustment factors only, as no axle adjustment was necessary. The traffic data collection locations are summarized in Figure 5-1.



Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-1
Traffic Count Locations by Type

5.1.2 Traffic Characteristics

The following design traffic characteristics were established using traffic flow characteristics obtained from the traffic count data:

- K30 - represents the relationship between the travel demand occurring during the 30th highest hour of the year and the average annual daily traffic.
- D30 - represents the directional factor occurring in the traffic flow during the 30th highest hour.
- T-factor - represents the percentage composition of medium sized and heavy trucks occurring in the traffic stream.

The existing traffic characteristics were established using the traffic counts collected. Specific traffic characteristics are listed below:

- K – the proportion of AADT occurring during the peak study hour for the study roadway
- D – the proportion of traffic in the design hour of the design year traveling in the peak direction
- T-daily – the percentage of buses and trucks occurring during a day (24-hours)
- T-peak – the percentage of buses and trucks occurring during the design hour

These measured K, D, and T-daily factors are annotated in Table 5-1. This table also includes FDOT and Orange County K and D factors for comparisons purposes.

The following design traffic characteristics were established using traffic flow characteristics obtained from the traffic count data and the FDOT Project Traffic Forecasting Handbook (PTFH):

- Standard K – the design peak hour factor utilized for the design traffic volumes within a Large Urbanized Area.
- D - represents the directional factor occurring in the traffic flow during the peak hour.
- T-daily - the percentage of buses and trucks occurring in the traffic stream during a day (24-hours).
- T-peak – the percentage of trucks and buses occurring during the design hour

Table 5-2 presents the recommended design traffic characteristics for Chuluota Road and the intersecting side streets. The design traffic characteristics are used to develop design hour volumes (DHV) and directional design hour volumes (DDHV). The recommended T-daily factor is used to determine the Equivalent Single Axle Loadings (ESALs) for the project corridor for pavement design and the recommended T-peak factor is used in the intersection operational analysis.

Table 5-1

Chuluota Road Roadway Conceptual Analysis - From Colonial Drive/SR 50 to Lake Pickett Road
Roadway Design Characteristics Comparison

Roadway/Segment	Measured Characteristics			"K" Estimated[1]	FDOT 2020 FTI[2]			Orange County Counts[3]		
	"K"	"D"	"Tdaily"		"K"	"D"	"Tdaily"	"K"	"D"	"Tdaily"
Mainline Characteristics										
Chuluota Rd (CR 419)										
Colonial Dr to Cypress Lake Glen Bv (S)	8.35%	51.09%	8.26%	6.77%	9.00%	53.00%	6.40%	10.20%	56.20%	--
Cypress Lake Glen Bv (S) to Corner Lake Dr	8.63%	50.05%	9.38%	7.00%	--	--	--	--	--	--
Corner Lake Dr to Cypress Lake Glen Bv (N)	8.86%	50.28%	5.07%	7.18%	--	--	--	--	--	--
Cypress Lake Glen Bv (N) to Lake Pickett Rd	8.95%	53.07%	5.57%	7.26%	--	--	--	8.90%	52.00%	--
North of Lake Pickett Rd	9.11%	54.14%	6.51%	7.39%	--	--	--	9.40%	51.90%	--
Average	**8.78%**	**51.73%**	**6.96%**	**7.12%**	9.00%	53.00%	6.40%	9.50%	53.37%	--
Side Street Characteristics										
Colonial Dr (SR 50)										
West of Chuluota Rd	7.68%	58.67%	7.32%	6.23%	9.00%	53.00%	5.10%	8.20%	57.40%	--
East of Chuluota Rd	8.00%	55.26%	8.51%	6.49%	9.50%	52.90%	4.30%	8.10%	53.00%	--
East River Falcons Wy										
South of Colonial Dr	19.84%	52.07%	6.83%	16.09%	--	--	--	--	--	--
Cypress Lake Glen Bv										
East of Chuluota Rd (S)	11.47%	59.63%	2.70%	9.30%	--	--	--	--	--	--
East of Chuluota Rd (N)	8.35%	63.96%	2.18%	6.77%	--	--	--	--	--	--
Corner Lake Dr										
West of Chuluota Rd	8.09%	53.85%	2.79%	6.56%	--	--	--	--	--	--
Lake Pickett Rd										
West of Chuluota Rd	9.65%	62.80%	5.22%	7.82%	9.00%	53.00%	5.50%	--	--	--
East of Chuluota Rd	8.74%	63.52%	10.29%	7.09%	9.00%	53.00%	6.40%	8.90%	69.30%	--
Average	**10.23%**	**58.72%**	**5.73%**	**8.29%**	9.13%	52.98%	5.33%	8.40%	59.90%	--

Notes:

1. Estimated K Standard = Measured K * (median of the thirteen highest consecutive peak season factors / median of thirteen lowest consecutive peak season factors). (0.9 / 1.11) = 0.810811
2. FDOT Florida Traffic Online (2020)
3. Orange County Public Works 2020 Traffic Counts

Table 5-2

Chuluota Road Roadway Conceptual Analysis - From Colonial Drive/SR 50 to Lake Pickett
Recommended Roadway Design Characteristics

Roadway/Segment	Recommended Design Characteristics *			
	"K" Factor	"D" Factor	"Tdaily" Factor	"Tpeak" Factor
Mainline Characteristics				
Chuluota Rd (CR 419)				
SR 50 to Lake Pickett Rd	9.00%	*55.00%*	6.96%	3.48%
Side Street Characteristics				
Colonial Dr (SR 50)	9.25%	*55.00%*	6.96%	3.48%
Cypress Lake Glen Bv	9.00%	61.80%	6.96%	3.48%
Corner Lake Dr	9.00%	53.85%	6.96%	3.48%
Lake Pickett Rd	9.00%	63.16%	6.96%	3.48%

Notes:

** K Factor for Chuluota Road and side streets are based on FDOT Standard K values recommended for an urban arterial from the **2019 Project Traffic Forecasting Handbook**.*

** D Factor for Chuluota Road is based on the average of the field data collected for Chuluota Road. 'D' factor calculation is 55.00% = (51.73% + 53.00% + 53.37%) / 3*

** D Factor for SR 50 side street is based on the measured values from FDOT.*

** D Factor for the other side streets are based on the measured values for the side street.*

** The Tdaily Factor for Chuluota Road and Side Streets are based on the average of the field data collected for Chuluota Road.*

** The Tpeak Factor is the Tdaily factor divided by 2*

The K factor was based on the FDOT PTFH Large Urbanized Area Arterials & Highways Standard K factor. Existing D factors were compared to historical FDOT D factors for Chuluota Road for the last six years and also compared to the range of acceptable factors found in the FDOT PTFH. Side street D factors were based on existing D percentages. The Chuluota Road T and DHT factors were based on the average of the existing traffic count percentages. Minor street T and DHT factors were also based on the Chuluota Road factors.

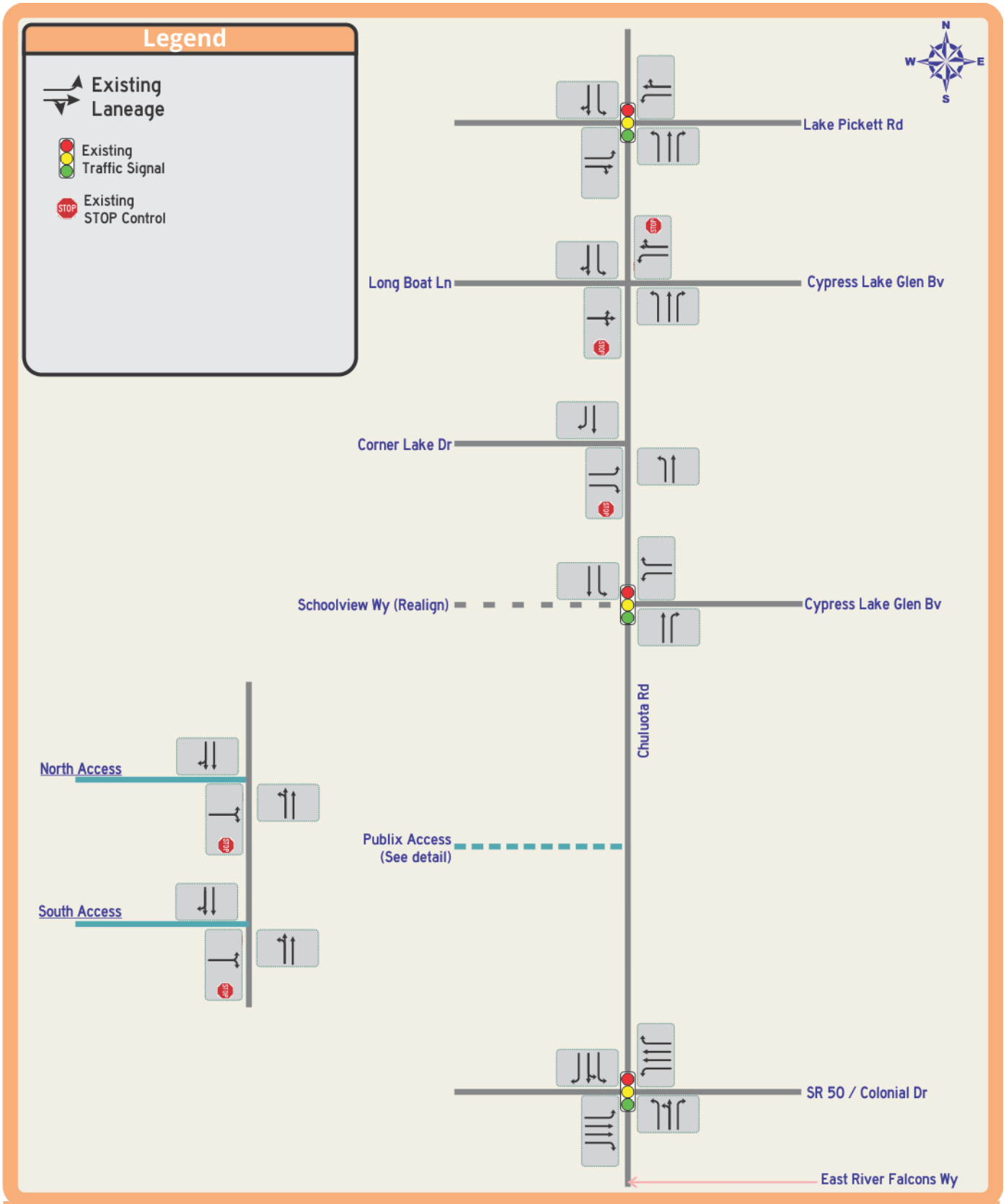
The recommended D Factor was determined to be 52.7% (12/14/21 summary- Table 4) based on a review of the detailed data collected along Chuluota Road per the prescribed RCA scope. Per the County staff direction, the D Factor for the study segment volumes were increased to 55%.

5.1.3 Existing Geometry

Figure 5-2 provides the current (year 2022) intersection geometry for all the intersections evaluated in the study. The existing intersection geometries were used in evaluating the need for potential geometric improvements to accommodate future travel demand.

5.1.4 Existing Year Traffic Volumes

The adjusted 2021 AADT's for the individual roadway segments within the project study limits are provided in Table 5-3. Figure 5-3 provides the existing AM and PM turning movement counts for each of the intersections counted.



Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-2
Existing Intersection Geometry

Table 5-3

Chuluota Road Roadway Conceptual Analysis - From Colonial Drive/SR 50 to Lake Pickett Road
Existing Roadway Level Of Service

Roadway/Segment	Adopted Functional Class [1]	Adopted LOS [1]	# of Lanes	Roadway Service Volumes Peak Hour / Peak Direction Capacity Table [1]					AADT [2]	Peak Hour Traffic Volumes [2]		Peak Time [2]	LOS
Mainline Characteristics													
Chuluota Rd (CR 419)				***A***	***B***	***C***	***D***	***E***		*NB*	*SB*		
Colonial Dr to Cypress Lake Glen Bv (S)	Collector	D	2	0	0	670	740	740	15,400	656	730	4:45-5:45 PM	D
Cypress Lake Glen Bv (S) to Corner Lake Dr	Collector	D	2	0	0	670	740	740	12,500	532	593	4:45-5:45 PM	C
Corner Lake Dr to Cypress Lake Glen Bv (N)	Collector	D	2	0	0	670	740	740	12,000	569	511	4:45-5:45 PM	C
Cypress Lake Glen Bv (N) to Lake Pickett Rd	Collector	D	2	0	0	670	740	740	11,500	490	545	5:00-6:00 PM	C
North of Lake Pickett Rd	Collector	D	2	0	0	670	740	740	10,100	479	430	4:30-5:30 PM	C
Side Street Characteristics													
Colonial Dr (SR 50)				***A***	***B***	***C***	***D***	***E***		*EB*	*WB*		
West of Chuluota Rd	Arterial	D	4	0	0	1,530	1,580	1,580	38,000	1802	1618	4:45-5:45 PM	F
East of Chuluota Rd	Arterial	D	4	0	1,490	2,150	2,660	3,000	35,200	1670	1498	4:45-5:45 PM	C
East River Falcons Wy				***A***	***B***	***C***	***D***	***E***		*NB*	*SB*		
South of Colonial Dr	Local	D	2	0	0	670	740	740	3,400	145	161	7:00-8:00 AM	C
Cypress Lake Glen Bv				***A***	***B***	***C***	***D***	***E***		*EB*	*WB*		
East of Chuluota Rd (S)	Local	D	2	0	0	670	740	740	3,300	140	157	7:45-8:45 AM	C
East of Chuluota Rd (N)	Local	D	2	0	0	670	740	740	5,000	237	213	5:30-6:30 PM	C
Corner Lake Dr				***A***	***B***	***C***	***D***	***E***		*EB*	*WB*		
West of Chuluota Rd	Local	D	2	0	0	670	740	740	1,400	66	60	5:00-6:00 PM	C
Lake Pickett Rd				***A***	***B***	***C***	***D***	***E***		*EB*	*WB*		
West of Chuluota Rd	Collector	D	2	0	0	670	740	740	6,600	313	281	4:45-5:45 PM	C
East of Chuluota Rd	Collector	D	2	0	0	670	740	740	3,600	171	153	4:45-5:45 PM	C

Notes:
1. From Orange County Traffic Concurrency Management Program

2. Daily and Peak Hour traffic volumes from Table 1, with recommended "D" applied, and the maximum of either the recommended "D" or the observed "D".

5.1.5 Existing Condition Level of Service Analysis

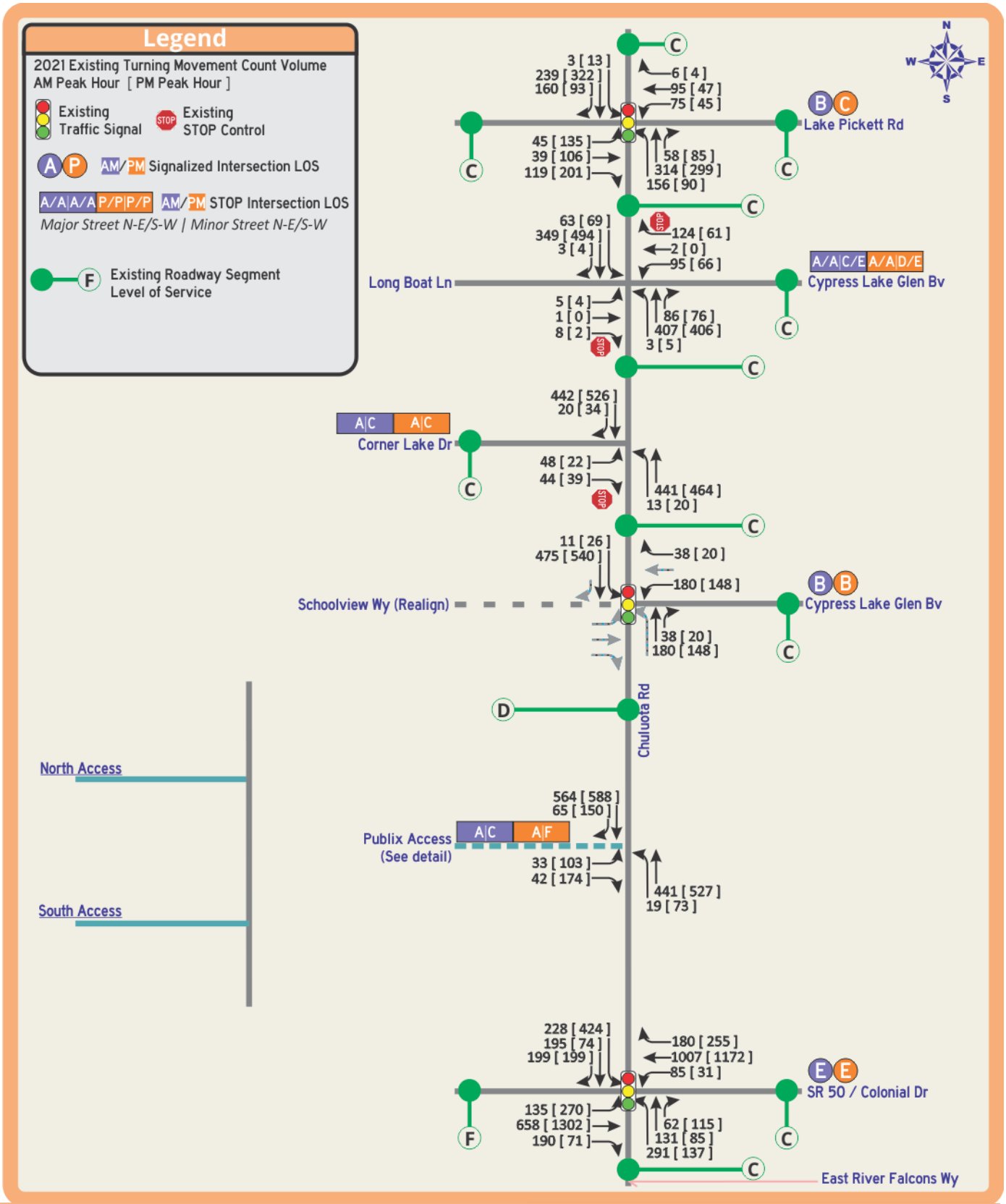
Chuluota Road and intersecting roadways were evaluated to determine existing operating conditions during AM and PM peak hour periods.

Level of Service (LOS) is a qualitative measure that seeks to describe the operating conditions of a roadway segment or intersection. Various factors such as speed, travel time, traffic delay due to signalization, freedom to maneuver, safety, driving comfort, and convenience play into the determination of LOS. Levels of Service are designated as “A” through “F” as a way to describe the full range of traffic operation conditions. LOS “A” represents virtually free flow conditions and LOS “F” represents constrained or failed conditions.

Roadway Segments

Table 5-3 also provides a list of the roadway parameters utilized in this analysis, taken from the Orange County Concurrency Management System. Included in this table are number of lanes, functional classification, adopted Level of Service (LOS) standard, roadway service volumes, a.m. and p.m. peak hour traffic volumes and existing LOS.

Based upon this analysis, all Chuluota Road roadway segments currently operate within acceptable levels of service. The segment of SR 50, west of Chuluota Road, is the only segment in the study corridor that currently operates at over-capacity conditions. FDOT has programmed improvements to widen this section of SR 50 to six lanes.



Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-3
A.M. & P.M. Peak Hour Turning Movement Volumes

Intersections

The study intersections were analyzed under existing conditions using the procedures of the Highway Capacity Manual, 6th Edition for signalized and unsignalized intersections. This analysis used existing traffic volumes, existing geometric conditions, and existing signal timings. Table 5-4 includes the summary results for the a.m. and p.m. peak hour intersection delay and level of service. Analysis sheets are included in Appendix G. As can be seen, all the existing study intersections currently operate at satisfactory levels of service, with the exception of Corner Lakes Plaza driveways.

Table 5-4

Chuluota Road Roadway Conceptual Analysis - From Colonial Drive/SR 50 to Lake Pickett Road
Existing Intersection Delay and LOS for the Study Intersections

Study Intersections	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay (Sec/Veh)	LOS	Delay (Sec/Veh)	LOS
Chuluota Road					
Lake Pickett Rd	Signal	19.3	B	22.8	C
Long Boat Ln-Cypress Lk Glen Bv (N)	STOP [1]	8.1 / 8.5 | 18.8 / 40.2	A/A|C/E	8.5 / 8.4 | 25.0 / 42.5	A/A|D/E
Corner Lake Dr	STOP [2]	8.7 | 21.3	A | C	8.8 | 24.0	A | C
Cypress Lake Glen Bv (S)	Signal	13.2	B	11.6	B
Publix Plaza Dwy	STOP [2]	9.1 | 16.2	A | C	9.9 | 119.8	A | F
SR 50-Colonial Dr	STOP	51.9	E	59.6	E

Notes:

[1] - NB / SB Left Turn Major Street Movement | EB / WB Minor Street Movements

[2] - NB Left Turn Major Street Movement | EB Minor Street Movement

5.2 Future Analysis Scenarios

5.2.1 Design Period

Orange County estimates that the opening year target for the widening of Chuluota Road is 2028. Given this anticipated schedule, the following periods were used to provide design traffic forecasts for the Chuluota Road Roadway Conceptual Analysis study:

- Opening Year 2028
- Mid Design Year 2038
- Design Year 2048

5.2.2 Analysis Scenarios

Design traffic volumes were developed for two traffic conditions, No-Build and Build. The No-Build condition for Chuluota Road, between SR 50 and Lake Pickett Road, assumes that the subject facilities will maintain existing lane geometry and intersection configurations. The Build condition includes Chuluota Road from SR 50 and Lake Pickett Road being widened to a four-lane roadway.

The build scenario of four-laning Chuluota Road between SR 50 and Lake Pickett Road (RCA/Study Phase), is included in the adopted Orange County Capital Improvements Plan (CIP).

Other major network improvements included in the CFRPM 7 future year networks for the RCA study included the following for both the No-Build and Build scenarios:

Opening Year Network

- SR 50: East of Old Cheney Hwy to Chuluota Rd- widen to 6 lanes
- SR 50: Chuluota Rd to SR 520- widen to 6 lanes

Mid-design Year Network

- Chuluota Road/CR 419: Snow Hill Rd to the Orange County line- widen to 4 lanes
- Woodbury Road: Lake Underhill Road to SR 50- widen to 4 lanes
- McCulloch Road: North Orion Boulevard to North Tanner Road- widen to 4 lanes

Design Year Network

- Richard Crotty Parkway: Goldenrod Road to Dean Road- new four-lane roadway

5.3 Future Year Traffic Projections

5.3.1 Future Corridor Travel Demand

The development of traffic projections for Chuluota Road requires the examination of historical traffic growth, proposed development within the corridor vicinity, and a basic understanding of the traffic circulation patterns and characteristics of the corridor. In arriving at the volume forecasts for the Chuluota Road Corridor, various growth rates were examined. The following sections discuss the resulting growth rates from various methodologies and the recommended growth factor used in this analysis.

5.3.2 Trend Analysis

Traffic projections using historical growth patterns derived from annual traffic count reports form the basis of the Trends Analysis methodology. Trends analysis uses linear regression techniques relating traffic volumes with time. Statistical validity of trends-based analysis increases with increasing number of sample years, and increasing R2 value. R2 values of 70% or greater are recommended. It should be noted that future travel demand estimated from trends analysis is based solely on historical traffic, economic and development growth patterns. Similarly, the trend analysis method relies on historical traffic counts and does not consider traffic diversion to other roadways due to road capacity improvements within the surrounding roadway system.

The trends growth rate analysis was based on a calculation of historic growth rates from the following Orange County traffic count stations:

- #8142- Chuluota Road south of Long Boat Lane
- #306- Chuluota Road south of Lake Pickett Road
- #304- Chuluota Road north of Lake Pickett Road
- #313- SR 50 west of Chuluota Road
- #314- SR 50 east of Chuluota Road
- #307- Lake Pickett Road west of Chuluota Road

The historic traffic count showed a 4.5% annual growth rate from year 2016 to year 2019. Count volumes collected over the COVID-19 pandemic conditions for year 2020 were excluded. The trend analysis worksheets are included in Appendix G.

The annual growth rate determined over year 2016 – 2019 does not reflect any activities in advance of two major development projects in the region - the Grow's land use program includes 2,088 residential units and 172,000 square feet of commercial uses, while the Sustanee's planned program will consist of 2,400 residential units to the north of SR 50 and west of Chuluota Road. Once development of these projects begin, traffic growth trends are expected to increase until the assumed build-out for these projects by year 2038.

5.3.3 FSUTMS Model

The current, adopted Central Florida Regional Planning Model (CFRPM 7) travel forecast model was used to produce future traffic volumes for the Chuluota Road RCA study corridor. As part of the process to develop the future CFRPM 7 traffic volume forecasts, a summary of coding assumptions relating to the study area network and the edits to the future socio-economic data inputs were summarized for review by Orange County staff. Based on input from County staff, a summary of the CFRPM 7 coding assumptions for the network and socio-economic data was prepared. This model was used to forecast volumes for two scenarios, Build and No-Build conditions. The Build condition reflects the widening of Chuluota Road from SR 50 to Lake Pickett Road. The No-Build condition represents maintaining existing roadway geometry (two lanes) along Chuluota Road from SR 50 to Lake Pickett Road.

The key network coding modifications to the adopted CFRPM 7 future year networks were included as follow to reflect the current programmed and planned roadway improvements, correlating to the Chuluota Road RCA opening year (2028), mid-design year (2038), and design year (2048) volumes for both the No-Build and Build scenarios:

<u>Opening Year Network</u>

- SR 50: East of Old Cheney Hwy to Chuluota Rd- widen to 6 lanes
- SR 50: Chuluota Rd to SR 520- widen to 6 lanes

<u>Mid-design Year Network</u>

- Chuluota Road/CR 419: Snow Hill Rd to the Orange County line- widen to 4 lanes
- Woodbury Road: Lake Underhill Road to SR 50- widen to 4 lanes
- McCulloch Road: North Orion Boulevard to North Tanner Road- widen to 4 lanes

<u>Design Year Network</u>

- Richard Crotty Parkway: Goldenrod Road to Dean Road- new four-lane roadway

The CFRPM 7 model includes updated future land use data (ZDATA files) for the future years, as developed by MetroPlan Orlando in coordination with the city & county governments within the model boundaries. In order to confirm that specific major developments will be reflected in the Chuluota Road RCA future traffic volumes, the traffic analysis zones (TAZ's) corresponding to major developments were reviewed to ensure that the land use growth is included in the appropriate TAZ's. This included a review of the TAZ centroid connectors. The CFRPM 7 ZDATA reasonably

reflected the land use data for the major existing uses in the study area (UCF, Central Florida Research Park, Waterford Lakes).

The additional future development land use plans that were also included were for The Grow and Sustanee programs. Both future developments are located, generally, north of SR 50, south of the Orange/Seminole county line, east of North Tanner Road, and west of CR 419. Based on a research of County documents, The Grow and Sustanee programs were identified and summarized below:

The Grow		
Land Use	Amount	
Single Family	1,967	SFDU's
Multi Family	121	MFDU's
Retail & Office	172,000	Sq Ft

Source: The Grow PD Plan (June 2016)

Sustanee		
Land Use	Amount	
Single Family	2,400	SFDU's

Source: Sustanee PD Transportation Facilities Analysis (March 2021)

Based on direction from Orange County, both development plans were assumed to be built-out by year 2038 and incorporated accordingly in the CFRPM 7 TAZ ZDATA.

Model assignments were completed for the Chuluota Road Build networks through year 2048 for the Build and No Build Alternatives. As produced by the CFRPM 7, the average growth rate for the Build Alternative to Opening Year 2028 was 11.99% per year, decreasing to 4.39% per year by mid-year 2038, and 3.00% per year for Design Year 2048. The growth rates are based on the existing traffic counts, e.g., the growth rate from 2021 to 2048 was 3.00% per year for a total growth of 80.90%.

The average growth rate for the No Build Alternative produced by the CFRPM 7 assignments were 7.74% per year to Opening Year 2028, decreasing to 3.07% per year by mid-year 2038, and 1.96% per year for Design Year 2048.

Similarly, growth rates were estimated for SR 50 east and west of Chuluota Road. As the existing volume on SR 50 is significantly higher than Chuluota Road, travel on SR 50 was expected to reflect growth at a lower percentage rate. The average growth rate per year for SR 50 to Opening Year 2028 is 6.8%, decreasing to 2.69% by mid-year 2038, and 2.21% for Design Year 2048 for the Build Alternative.

Based on traffic growth rates produced by the CFRPM 7 assignments, the future volumes for both the Build and No Build Alternatives resulted in over-capacity conditions for the existing two-lane configuration of Chuluota Road by year 2048.

The model accounts for the built-out land uses in the surrounding area. Most of the land use growth in the area will occur within the area north of SR 50 and west of Chuluota Road- The Grow and Sustanee are assumed to be build-out by year 2038. Waterford Lakes and Avalon Park, to the southwest, have been built-out for some time. The summary of the development of the recommended future traffic growth rates for the Chuluota Road RCA Design Traffic Technical Memorandum which is included in Appendix G.

Bureau of Economic and Business Research (BEBR)

Population projection data obtained from BEBR published by the University of Florida were also used for comparison purposes. The BEBR population projections suggest limited growth over the long-range horizon in the Chuluota Road corridor or Orange County. The Orange County-wide estimate obtained from BEBR reported an annual growth rate of 2.03% to year 2025, 1.71% per year through year 2035, and 1.49% per year through year 2045.

Traffic Forecasts Utilized for Analysis

The growth rates obtained from the above three sources, combined with the consideration of short-range and long-range development along and surrounding the study corridor, were reviewed to derive the recommended growth rate for the study area. As the result of Orange County staff's review of the summary of the recommended future traffic growth rates to apply for the Chuluota Road RCA Design Traffic, direction was provided by Orange County to apply the following:

No Build Alternative

- Existing year 2021 to Opening Year 2028 rate: 1.96% per year traffic growth
- Existing year 2021 to Interim Year 2038 rate: 1.96% per year traffic growth
- Existing year 2021 to Design Year 2048 rate: 1.96% per year traffic

Build Alternative

- Existing year 2021 to Opening Year 2028 rate: 4.0% per year traffic growth
- Existing year 2021 to Interim Year 2038 rate: 4.0% per year traffic growth
- Existing year 2021 to Design Year 2048 rate: 4.0% per year traffic growth

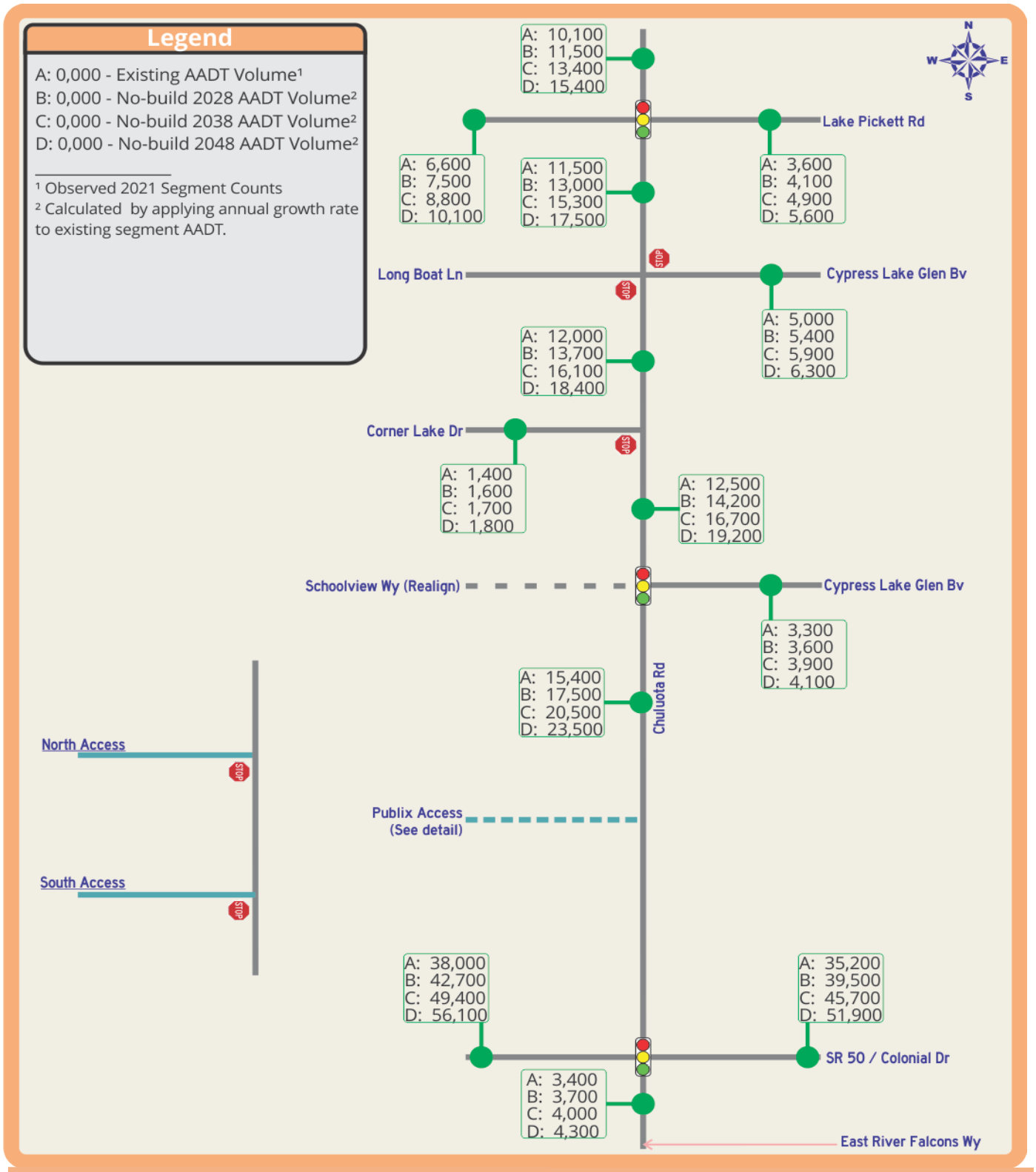
5.3.4 Mainline Traffic Volume Projections

Figure 5-4 and Figure 5-5 show the future year Annual Average Daily Traffic (AADT) traffic projections for the opening year 2028, interim year 2038, and design year 2048 along Chuluota Road and the side streets for the No-Build and Build Scenarios, respectively. Information regarding the methodology used to develop future traffic projections are contained within the DTTM, Appendix G.

5.3.5 Intersection Turning Movement Volume Projections

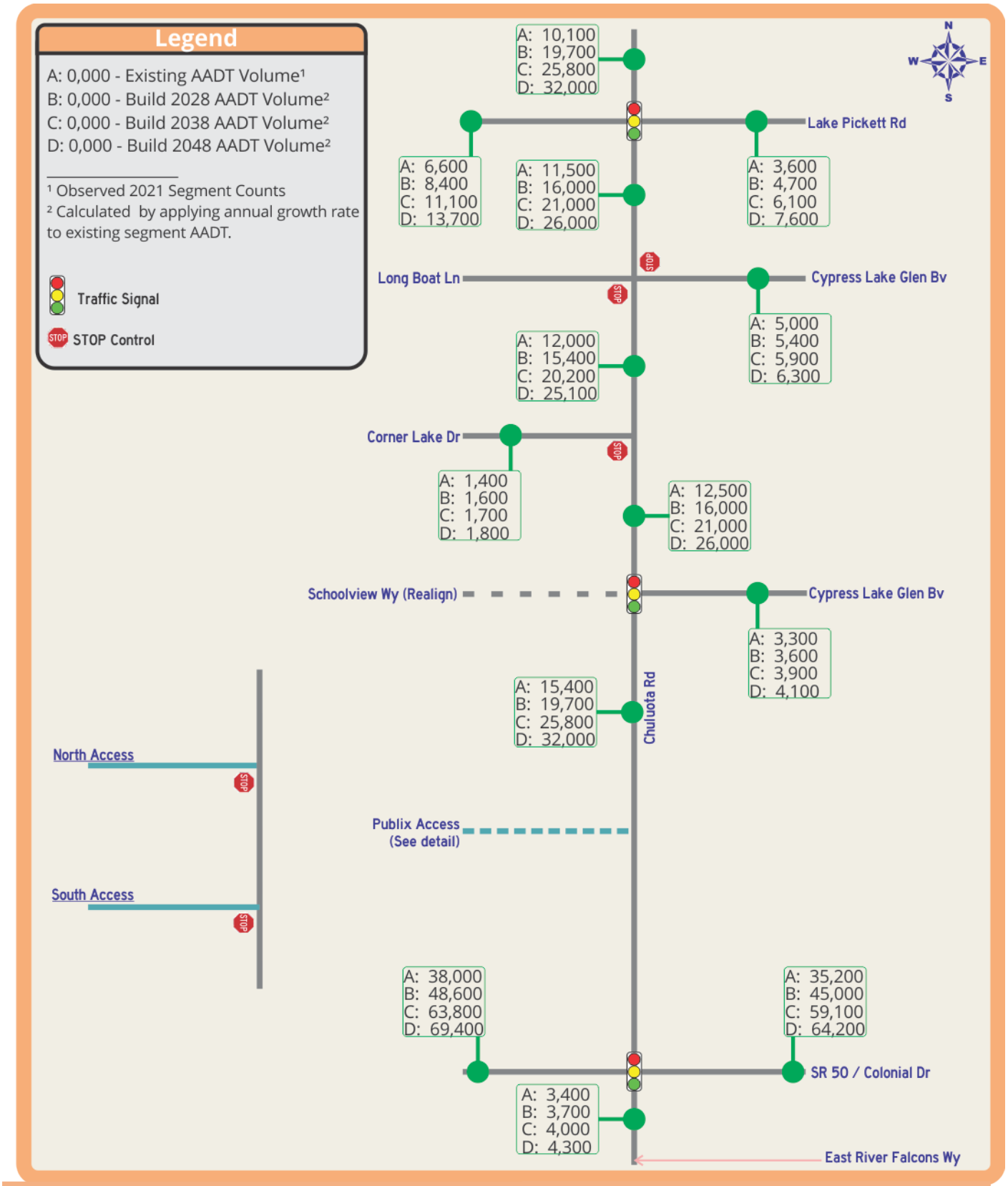
Figures 5-6 to Figure 5-8 show the intersection turning movement volumes projections for the opening year 2028, interim year 2038, and design year 2048 for the No-Build scenario along the Chuluota Road study corridor.

Figures 5-9 to Figure 5-11 show the intersection turning movement volumes projected for the opening year 2028, interim year 2038, and design year 2048 for the Build scenario along the Chuluota Road study corridor. Information regarding the methodology used to develop future traffic projections is contained within the DTTM.



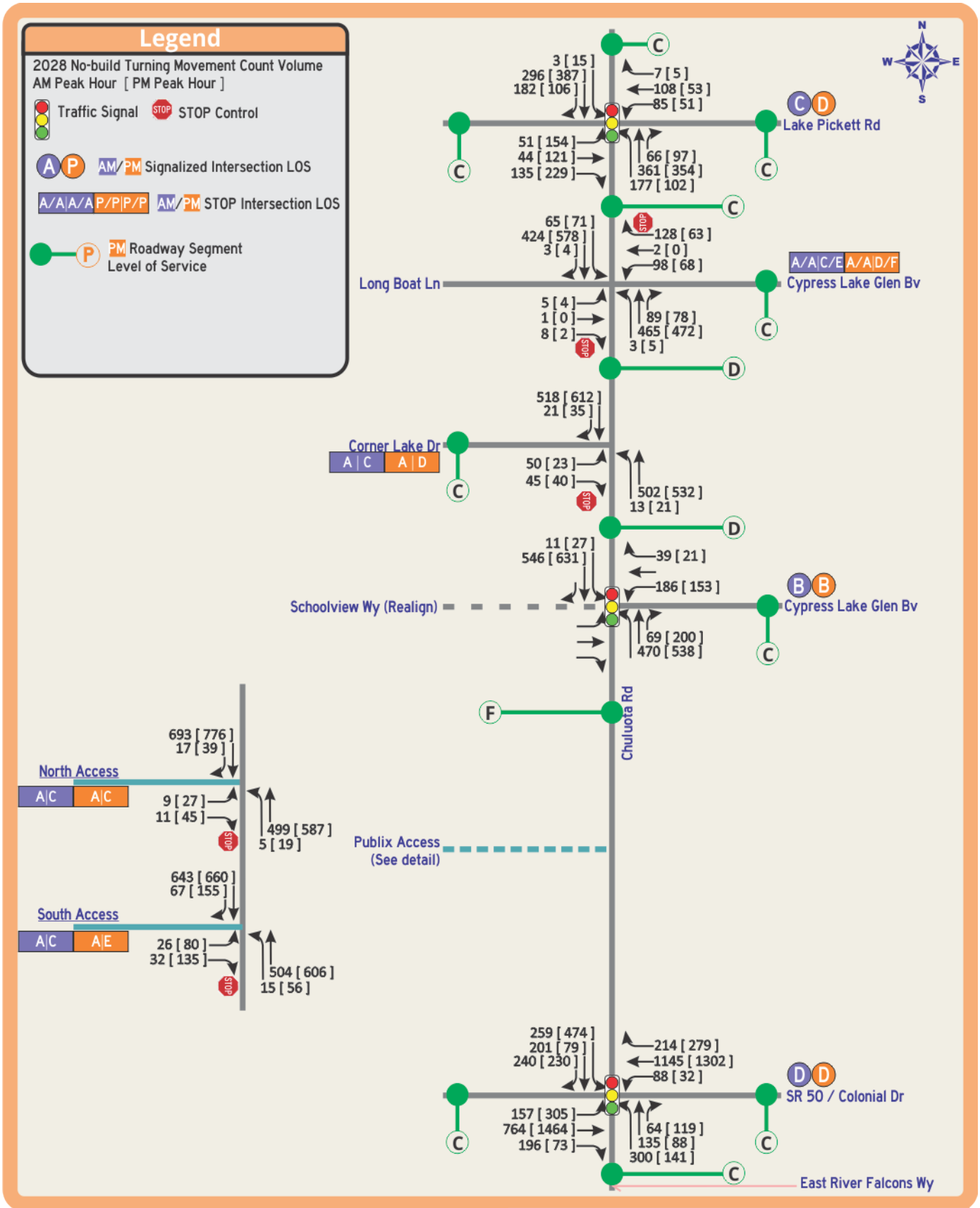
Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-4
No-Build AADT Volumes



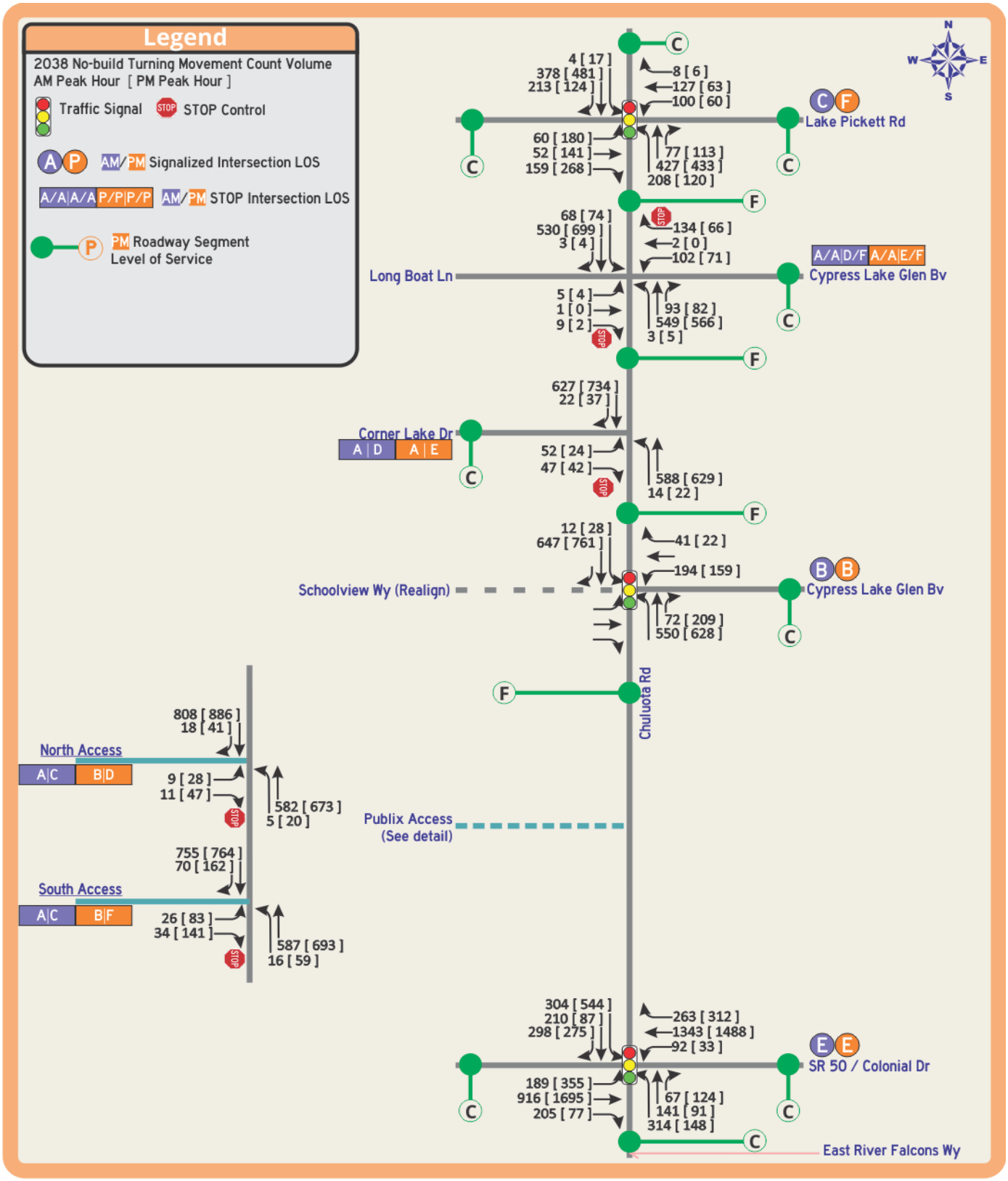
Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-5
Build AADT Volume



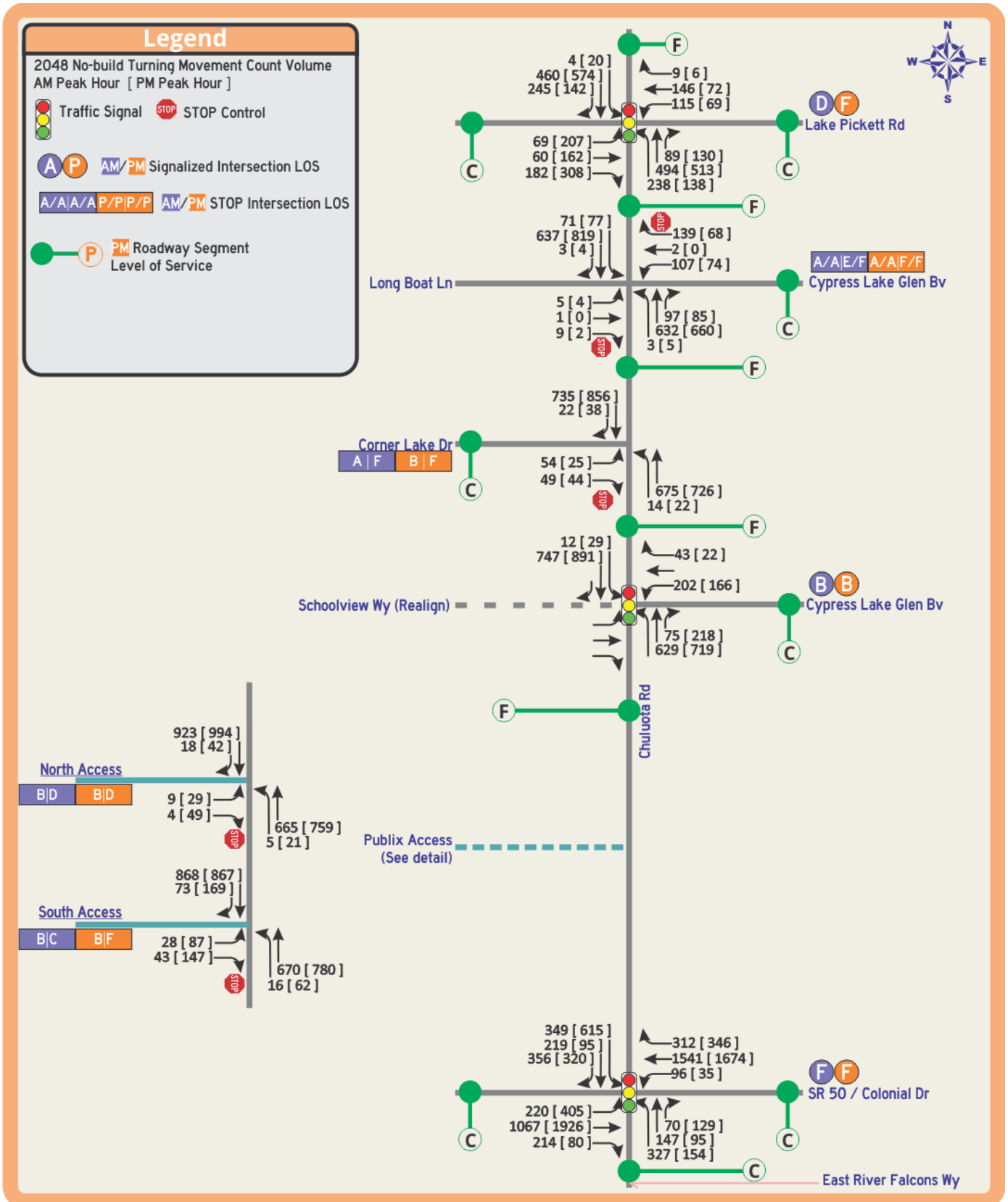
Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-6
No-Build 2028 Turning Movement Volumes



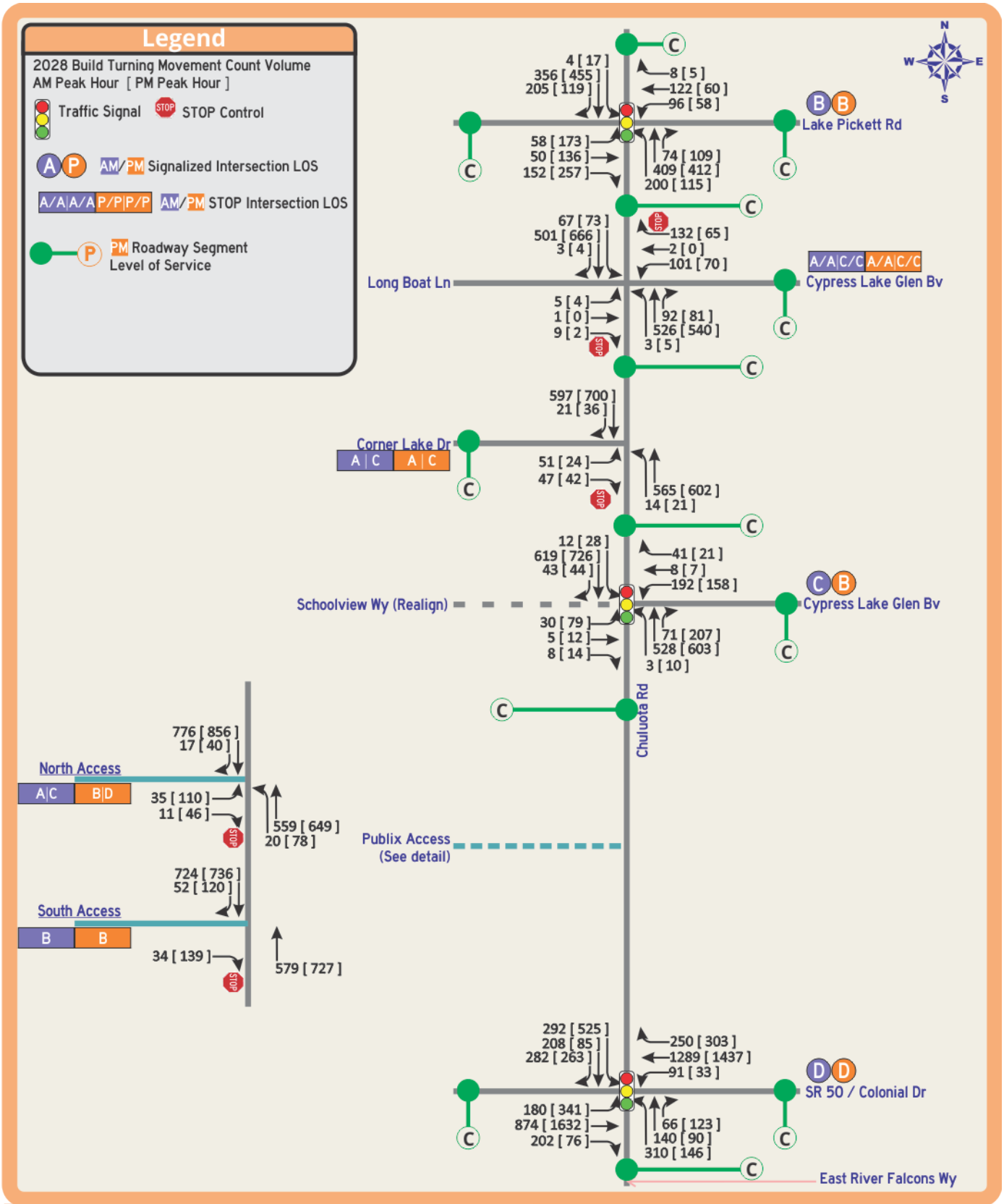
Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-7
No-Build 2038 Turning Movement Volumes



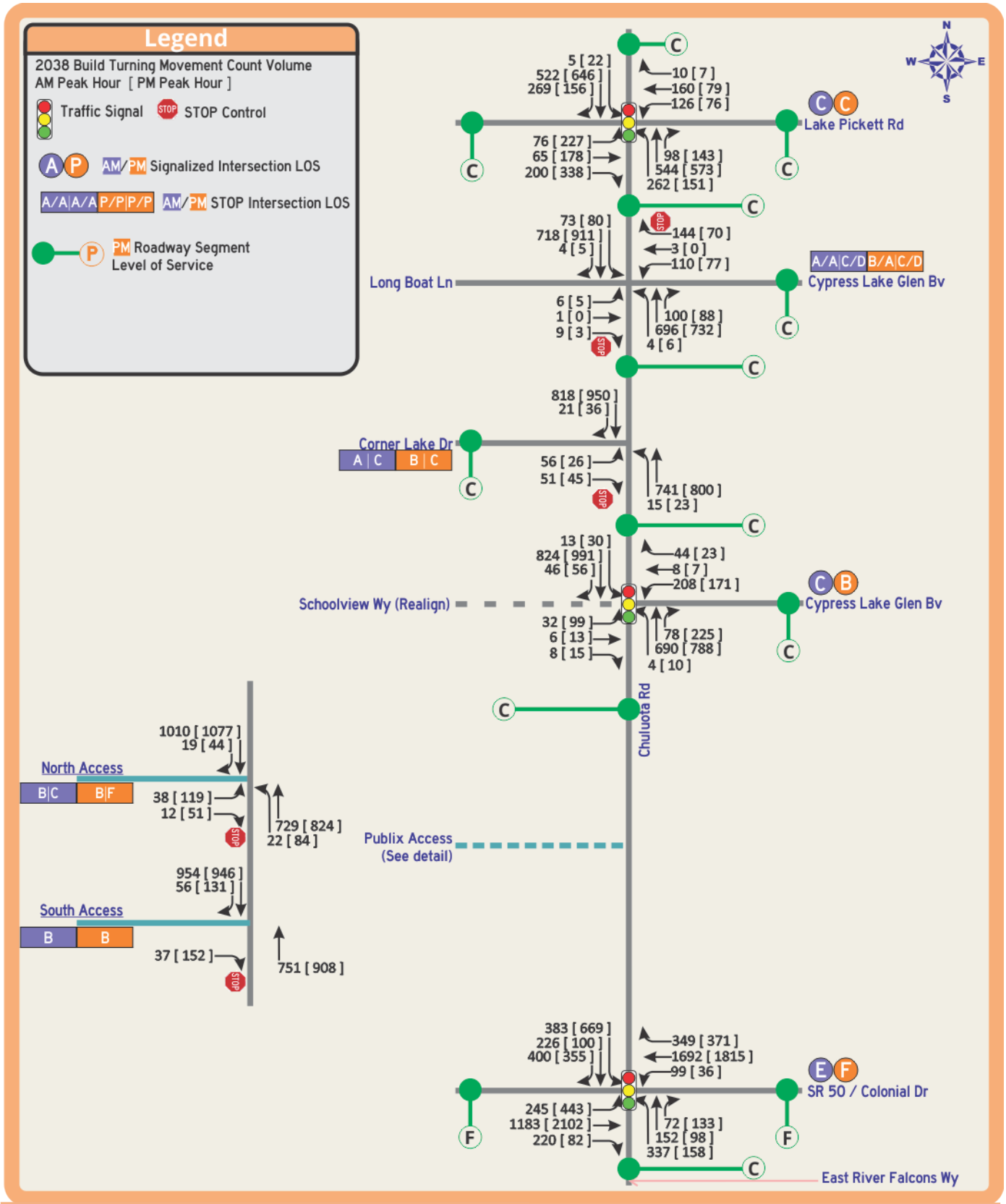
Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-8
No-Build 2048 Turning Movement Volumes



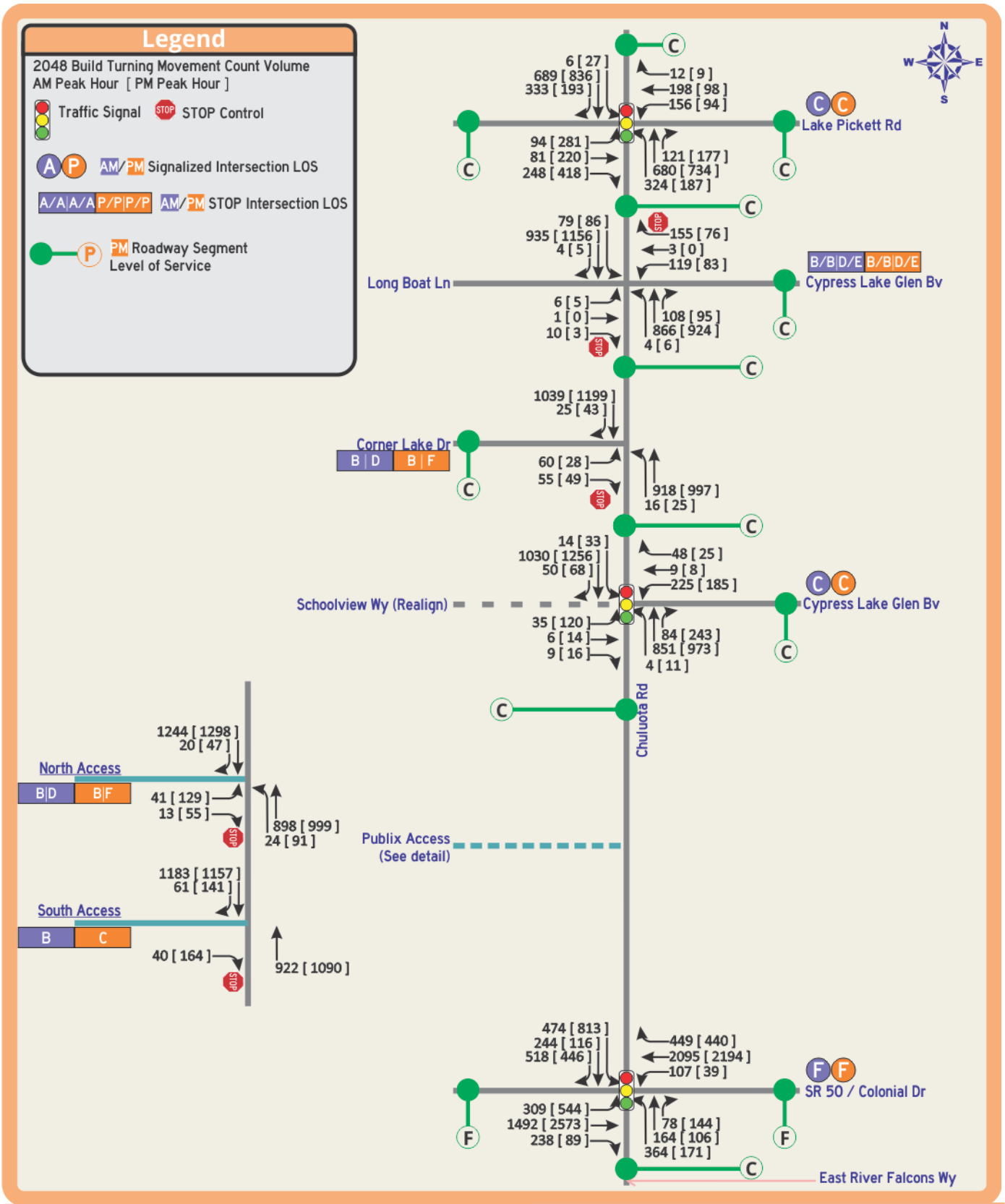
Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-9
Build 2028 Turning Movement Volumes



Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-10
Build 2038 Turning Movement Volumes



Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-11
Build 2048 Turning Movement Volumes

5.4 Future Year Levels of Service

5.4.1 Future Signal Requirements

Under the No-Build and Build scenarios, the unsignalized intersections along Chuluota Road were evaluated for future signal requirements. The need for future signal requirements at these unsignalized locations was assessed using signal warrants #1, #2, #3, #4 and #7 as specified in the latest MUTCD.

The future intersection volumes at the unsignalized intersections were estimated using the same hourly percentages from the existing turning movement counts grown using the projected 2048 design hour volumes for the minor streets and the approved annual growth rates for Chuluota Road, to obtain the No-build and Build eight highest hourly volumes.

As noted in the existing conditions section, the minor street approaches all have auxiliary turn lanes or the approach is wide enough (18/19 feet wide and vehicles were observed to treat the approach as having a de facto left turn lane), so the minor street was evaluated as a single lane approach using the left turn volumes compared to the threshold volumes as well as a two-lane approach. In addition, the major street left turn volumes were also evaluated under a single-lane approach compared to the threshold volumes.

The future Build Scenario signal warrant summary is provided in Table 5-5 on the next two pages. As shown in the table, Warrant 2 and Warrant 3 were not met for the Chuluota Road and Long Boat Lane/Cypress Lake Glen Boulevard intersection for design year 2048.

Because the projected turning movement traffic volumes for the Chuluota Road and Long Boat Lane/Cypress Lake Glen Boulevard intersection are conservatively high (the subdivisions are built out), a traffic signal is not recommended to be included as part of Build Alternative design at this time. However, the need for a traffic signal in the future should be monitored. The summary of the future signal warrant worksheets for the design year 2048 (and 2028 and 2038 where appropriate) are provided in the DTTM, Appendix G.

Table 5-5

Signal Justification – Traffic Volume Analysis

Chuluota Rd at Cypress Lake Glen Bv (N)

Wednesday		Approach Volumes																	Qualifying Warrant (1)															
		Major Roadway									Minor Roadway																							
9/15/2021		Chuluota Road								E/W	Long Boat Lane				Cypress Lake Glen Blvd				N/S	Major Street Left Turn Lane						Minor Street Approach											
Time		Northbound				Southbound				Peds	Eastbound				Westbound				Peds	One Lane Analysis (3)						One Lane Analysis (4)						Two Lane Analysis (5)					
																				Left Turn Lane Volume						Total Approach Volume											
From:	To:	Left	Thru	Right	Total	Left	Thru	Right	Total	(2)	Left	Thru	Right	Total	Left	Thru	Right	Total	(2)	1A	1B	2	3	4	7	1A	1B	2	3	4	7	1A	1B	2	3	4	7
6	7	0	221	21	242	8	297	0	305	0	0	3	0	3	63	0	44	107	0																		
7	8	9	363	56	428	39	297	2	338	3	0	9	0	9	72	0	96	168	1								X						X				X
8	9	17	374	76	467	57	354	5	416	2	0	4	1	5	105	2	110	217	5							X	X	X	X			X	X				X
12	13	7	282	48	337	38	290	4	332	0	0	8	0	8	49	0	36	85	2																		
13	14	14	301	90	405	58	285	2	345	0	1	2	0	3	52	2	34	88	0								X						X				
16	17	14	392	66	472	71	412	5	488	2	0	6	1	7	51	1	55	107	3														X				
17	18	8	401	82	491	71	480	3	554	6	0	3	0	3	65	1	58	124	3								X						X				
18	19	12	359	62	433	72	419	7	498	0	1	7	1	9	50	1	56	107	0														X				
Warrant 3 Maximum Delay in Vehicle Hours & Warrant 7 Number of Crashes:																							0.2		1				1.7		1				2.1		1
Number of hours that a warrant is met:																				0	0	0	0	0	0	1	4	1	1	0	0	1	6	0	0	0	2
Required Vehicle Hours of Delay / Pedestrians / Accidents to meet warrant:																							4	75	5				4	75	5				5	75	5
Required number of hours to meet warrant:																				8	8	4	1	4	8	8	8	4	1	4	8	8	8	4	1	4	8
Minimum Hours of Delay / Pedestrian / Volume Hours Warrant Met?																				No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Table 5-5 (Continued)
Signal Justification – Traffic Volume Analysis
Chuluota Rd at Corner Lake Dr

Wednesday		Approach Volumes														Qualifying Warrant (1)															
		Major Roadway									Minor Roadway																				
9/15/2021		Chuluota Road								E/W	Corner Lake Drive				N/S	Major Street Left Turn Lane						Minor Street Approach									
Time		Northbound				Southbound				Peds	Eastbound				Peds	One Lane Analysis (3)						One Lane Analysis (4)						Two Lane Analysis (5)					
																Left Turn Lane Volume						Total Approach Volume									
From:	To:	Left	Thru	Right	Total	Left	Thru	Right	Total	(2)	Left	Thru	Right	Total	(2)	1A	1B	2	3	4	7	1A	1B	2	3	4	7	1A	1B	2	3	4	7
6	7	9	231		240		362	4	366	0	15		39	54	0																	
7	8	14	387		401		366	6	372	1	33		56	89	1																	
8	9	14	412		426		443	21	464	0	39		36	75	5																	
12	13	24	327		351		335	8	343	1	12		38	50	0																	
13	14	23	379		402		340	7	347	0	21		26	47	1																	
16	17	24	460		484		447	26	473	0	13		25	38	3																	
17	18	16	469		485		509	36	545	0	26		42	69	4																	
18	19	32	413		445		450	25	475	0	12		36	48	0																	
Warrant 3 Maximum Delay in Vehicle Hours & Warrant 7 Number of Crashes:																			0.1		1				0.3		1				0.5		1
Number of hours that a warrant is met:																0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Required Vehicle Hours of Delay / Pedestrians / Accidents to meet warrant:																			4	75	5				4	75	5				5	75	5
Required number of hours to meet warrant:																8	8	4	1	4	8	8	8	4	1	4	8	8	8	4	1	4	8
Minimum Hours of Delay / Pedestrian / Volume Hours Warrant Met?																No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

(1) Posted speed 50/55 mph, therefore minimum volumes are 70% of the standard requirements.

Warrant 1A - Eight-Hour Minimum Vehicular Volume, Warrant 1B - Eight-Hour Interruption of Continuous Traffic.

Warrant 2 - Four Hour Vehicular Volume (Plotted Point) - Minimum 1-Lane volume - 60 and Minimum 2-Lane volume - 80

Warrant 3 - Peak Hour Vehicular Volume (Plotted Point) plus Delay Study - Minimum 1-Lane volume - 75 ***or*** *Minimum Delay 4.0 Vehicle Hours*

Warrant 3 - Peak Hour Vehicular Volume (Plotted Point) plus Delay Study - Minimum 2-Lane volume - 75 ***or*** *Minimum Delay 5.0 Vehicle Hours*

Warrant 4 - Peak Hour Pedestrian/Bikes Volume crossing ***main road*** *- Minimum Ped/Bike crossing volume - 75*

Warrant 7 - Crash Experience - 80% of Warrant 1 Minimum Threshold Volumes and 5 correctable accidents within a 12 month period.

(2) The Peds column includes pedestrians and bicycle riders. Pedestrians & Bicycle riders under age 12 or adults 65 years or older were doubled.

(3) For the Major Street One Lane Approach Analysis Scenario, the highest northbound or southbound left turn volumes were utilized.

(4) As a conservative analysis, the One Lane Analysis Left Turn Lane Volume utilizes only the Maximum Eastbound or Maximum Westbound left turn volumes for the minor street.

(5) The Two lane Analysis utilizes the 100% of the Left turn lane volumes + 100% of the Through lane volumes + 50% of the Right turn volumes.

5.4.2 Operational and Level of Service Analysis

Mainline Level of Service (LOS) analysis was performed for the No-Build and Build scenarios. All conditions were analyzed using the most current adopted procedures as outlined in the Transportation Research Board's - Highway Capacity Manual (HCM), 6th Edition report procedures utilizing the Synchro Software (Version 11). Specific analysis techniques utilized in this study include unsignalized intersections, signalized intersections and arterial analyses. It should be noted that detailed mainline operational LOS analysis was conducted using the Synchro software which is included in the DTTM.

5.4.3 No-Build Scenario

The No-Build geometry and traffic control for Chuluota Road from SR 50 to Lake Pickett Road as shown in Figure 5-11 maintains the same capacity of through-lanes and auxiliary turn lanes as the existing roadway and intersection geometries. Figure 5-4 (presented earlier) provides the No-Build AADT for the study roadway segments.

Figure 5-6 to Figure 5-8 (presented earlier) and Table 5-7 show the opening year, interim year, and design year LOS results for the No-Build scenario along the Chuluota Road project corridor.

Opening Year 2028

The projected year 2028 LOS for the Chuluota Road RCA roadway segments and study intersections are summarized in Figure 5-6 and Table 5-6 for the peak hour conditions. The East Colonial Drive (SR 50) signalized intersection is projected to operate at LOS D for the AM and PM peak hours. The other two (2) signalized intersections (Schoolview Way/Cypress Lakes Glen Boulevard, and Lake Pickett Road) are projected to operate at LOS D or better for the AM and PM peak hours. Of the three (3) full access unsignalized intersections, Corner Lake Drive and the Publix Store north access driveway are projected to operate at LOS D or better for the minor street movements, and LOS A for the major street movements. The Long Boat Lane/Cypress Lake Glen Boulevard and Publix Store south access are projected to operate at LOS E or F for the minor street movements, and LOS A for the major street movements.

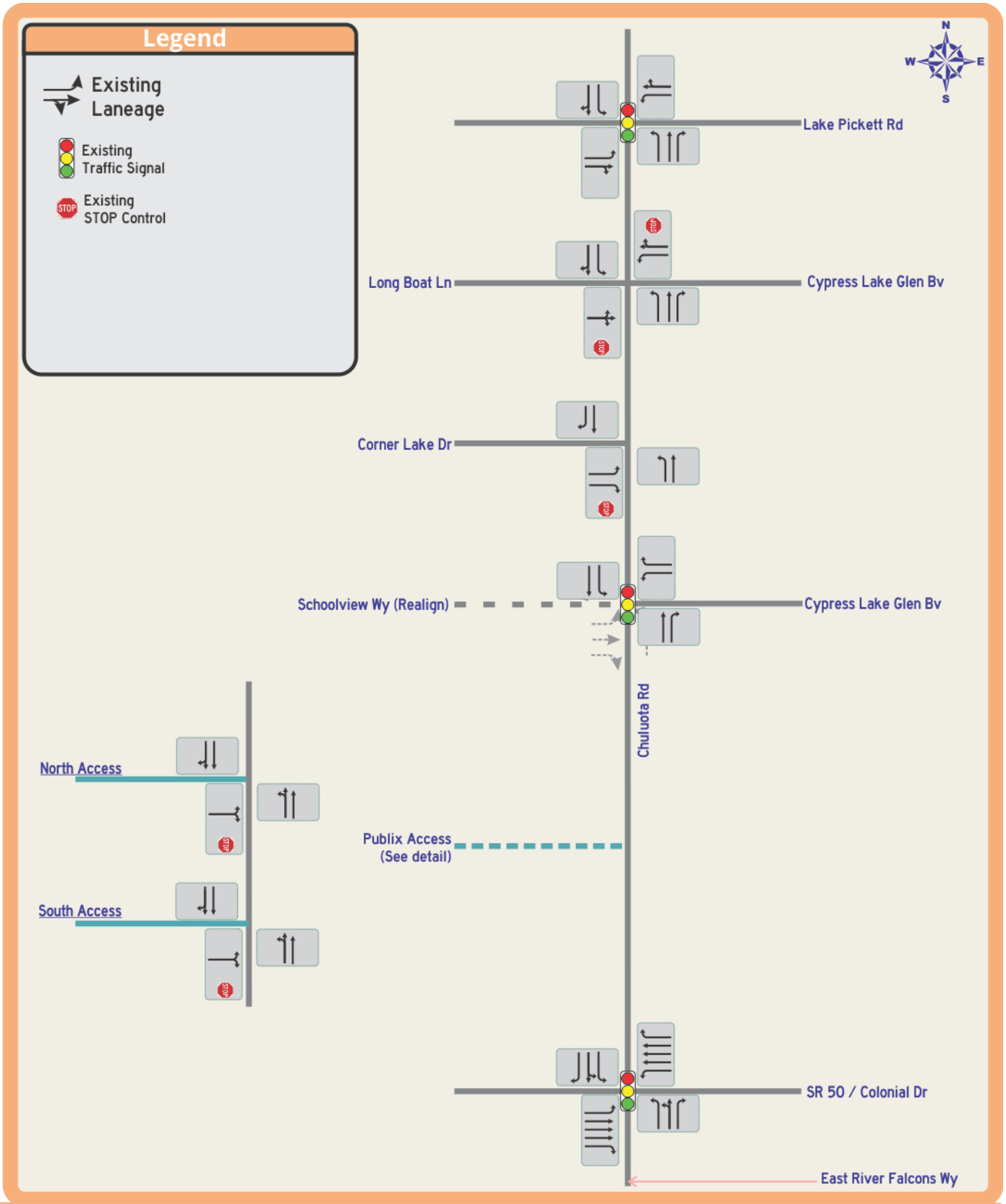
Interim Year 2038

As shown in Figure 5-7 (presented earlier) and Table 5-6, the PM Peak Hour, the SR 50 and Lake Pickett Road signalized intersections are projected to operate at LOS F. Schoolview Way/Cypress Lakes Glen Boulevard (signalized) is estimated to operate at LOS B for the peak hours. The unsignalized intersections at Corner Lake Drive, Long Boat Lane/Cypress Lake Glen Boulevard and Publix Store south access are projected to operate at LOS E or F for the minor street movements, and LOS A or B for the major street movements over the peak hours. The Publix Store north access is projected to operate at LOS C or D for the minor street movements, and LOS A or B for the major street movements over the peak hours.

Design Year 2048

The projected year 2048 LOS for the Chuluota Road RCA study intersections are summarized in Figure 5-8 above and Table 5-6 for the peak hour conditions. The East Colonial Drive (SR 50) signalized intersection is projected to operate at LOS D for the AM and PM peak hours. The other two signalized intersections (Schoolview Way/Cypress Lakes Glen Boulevard (South), and Lake Pickett Road) are projected to operate at LOS D or better for the AM and PM peak hours.

Of the three full access unsignalized intersections, Corner Lake Drive and Publix Store north access are projected to operate at LOS D or better for the minor street movements, and LOS A for the major street movements. The Long Boat Lane/Cypress Lake Glen Boulevard, and Publix Store south access are projected to operate at LOS E or F for the minor street movements, and LOS A for the major street movements.



Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-12
No-Build Geometry

Table 5-6

Chuluota Road Roadway Conceptual Analysis - From Colonial Drive/SR 50 to Lake Pickett Road
Projected Intersection Delay and LOS for the Study Intersections - No -build Scenarios

Study Intersections	Future Traffic Control	No-build AM Peak Hour - Existing 2-Lane Chuluota Road Cross Section					
		Opening Year 2028		Mid Year 2038		Design Year 2048	
		Delay (Sec/Veh)	LOS	Delay (Sec/Veh)	LOS	Delay (Sec/Veh)	LOS
Chuluota Road							
Lake Pickett Rd	Signal	23.9	C	32.2	C	54.1	D
Long Boat Ln-Cypress Lk Glen Bv (N)	STOP [1]	8.2/8.6|20.6/47.9	A/A|C/E	8.5/8.9|26.4/104.2	A/A|D/F	8.9/9.2|36.8/249.8	A/A/E/F
Corner Lake Dr	STOP [2]	8.9 | 24.9	A | C	9.3 | 34.9	A | D	9.8 | 52.6	A | F
Cypress Lake Glen Bv (S)	Signal	12.5	B	13.1	B	14.3	B
Publix Plaza Dwy (N)	STOP [2]	9.2 | 15.7	A | C	9.7 | 18.3	A | C	10.2 | 26.4	B | D
Publix Plaza Dwy (S)	STOP [3]	9.2 | 17.0	A | C	9.6 | 20.2	A | C	10.1 | 24.8	B | C
SR 50-Colonial Dr	Signal	47.6	D	61.9	E	89.7	F

Study Intersections	Future Traffic Control	No-build PM Peak Hour - Existing 2-Lane Chuluota Road Cross Section					
		Opening Year 2028		Mid Year 2038		Design Year 2048	
		Delay (Sec/Veh)	LOS	Delay (Sec/Veh)	LOS	Delay (Sec/Veh)	LOS
Chuluota Road							
Lake Pickett Rd	Signal	44.7	D	84.4	F	132.3	F
Long Boat Ln-Cypress Lk Glen Bv (N)	STOP [1]	8.7/8.6|28.9/57.7	A/A|D/F	9.1/9.0|41.1/125.8	A/A|E/F	9.6/9.4|60.6/292.3	A/A|F/F
Corner Lake Dr	STOP [2]	9.3 | 27.0	A | D	9.9 | 37.7	A | E	10.5 | 54.7	B | F
Cypress Lake Glen Bv (S)	Signal	12.7	B	14.0	B	17.0	B
Publix Plaza Dwy (N)	STOP [2]	9.7 | 20.5	A | C	10.3 | 25.8	B | D	10.9 | 33.8	B | D
Publix Plaza Dwy (S)	STOP [3]	9.7 | 46.6	A | E	10.3 | 97.6	B | F	11.2 | 243.1	B | F
SR 50-Colonial Dr	Signal	51.4	D	77.9	E	125.7	F

Notes:

[1] - NB / SB Left Turn Major Street Movement | EB / WB Minor Street Movements

[2] - NB Left Turn Major Street Movement | EB Minor Street Movement

[3] - EB Minor Street Movement

5.4.4 Build Scenario

The proposed Build geometry and traffic control for Chuluota Road from SR 50 to Lake Pickett Road as shown in Figure 5-13 includes a four-lane section and turn lanes as required. Figure 5-5 (presented earlier) provides the Build AADT for the study roadway segments.

Figure 5-9 to Figure 5-11 (presented earlier) show the opening year, interim year, and design year LOS results for the Build scenario along the Chuluota Road project corridor.

Opening Year 2028

The projected year 2028 LOS for the Chuluota Road RCA study intersections are summarized in Figure 5-9 for the peak hour conditions. The three (3) signalized intersections (SR 50, Schoolview Way (South)/Cypress Lakes Glen Boulevard, and Lake Pickett Road) are projected to operate at LOS D or better for the AM and PM peak hours. The three (3) full access unsignalized intersections, Corner Lake Drive, Long Boat Lane/Cypress Lake Glen Boulevard, and Publix Store north access are projected to operate at LOS D or better for the minor street movements, and LOS A for the major street movements. The Publix Store south access (right turn in-out-only) is projected to operate at LOS C for the minor street movements and for the major street movements.

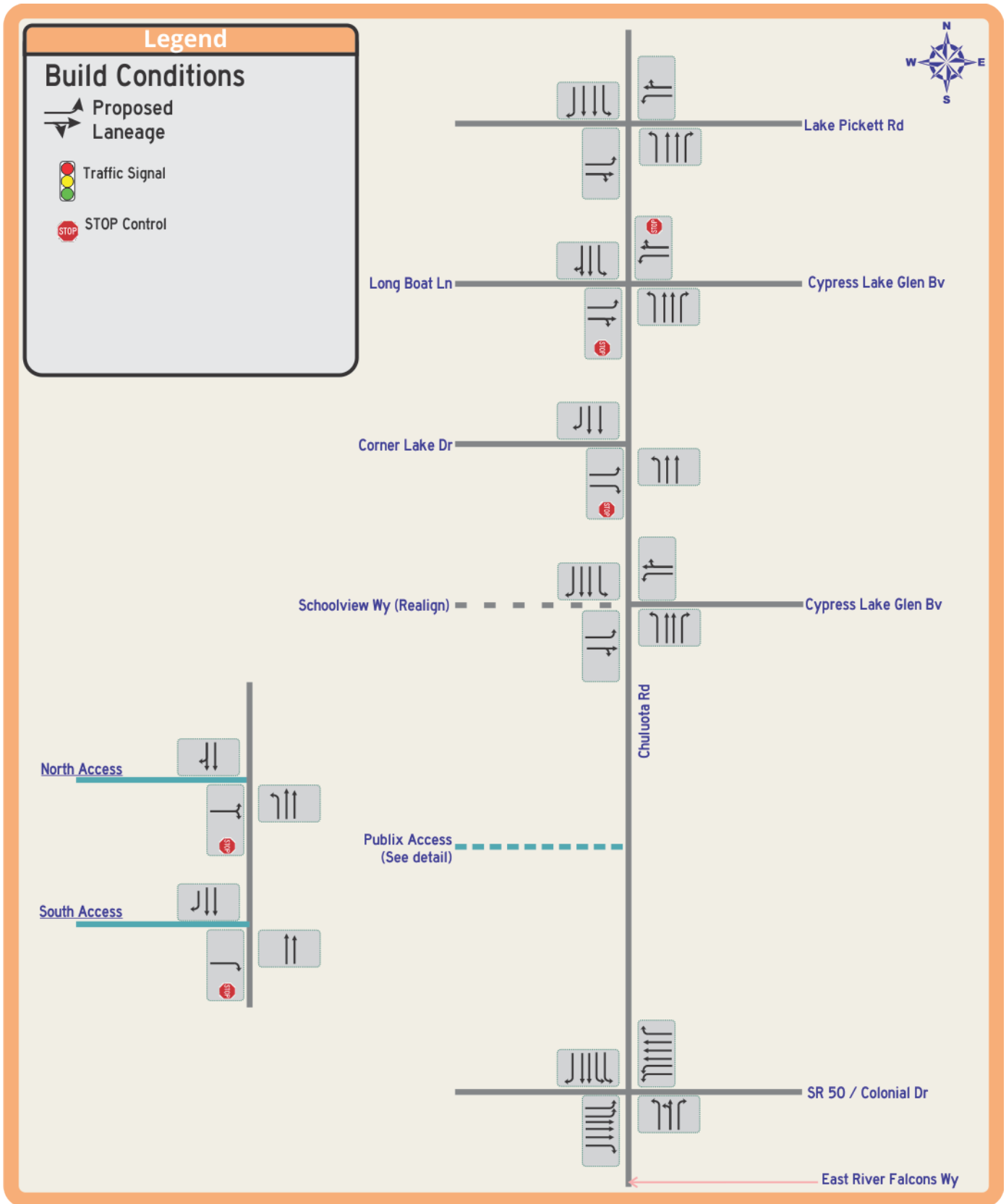
Interim Year 2038

As shown in Figure 10, the SR 50 signalized intersection is projected to operate at LOS E for the AM peak hour and LOS F for the PM peak hour by year 2038. The other signalized intersections (Schoolview Way/Cypress Lakes Glen Boulevard and Lake Pickett Road) are projected to operate at LOS C or better for the AM and PM peak hours. The unsignalized intersections at Corner Lake Drive, Long Boat Lane/Cypress Lake Glen Boulevard and Publix Store south access are projected to operate at LOS D or better for the minor street movements, and LOS C for the major street movements over the peak hours. The Publix Store north access is projected to operate at LOS C (AM peak hour) and F (PM peak hour) for the minor street movements, and LOS C for the major street movements over the peak hours.

Design Year 2048

The projected year 2048 LOS for the Chuluota Road RCA roadway segments and study intersections are summarized in Figure 11 for the peak hour conditions. As shown, the year 2048 segment conditions are LOS F between SR 50 and Cypress Lake Glen Boulevard. From that point to the north limits of the study corridor, the LOS is D or better. The East Colonial Drive (SR 50) signalized intersection is projected to operate at LOS D for the AM and PM peak hours.

The other two (2) signalized intersections (Schoolview Way/Cypress Lakes Glen Boulevard, and Lake Pickett Road) are projected to operate at LOS D or better for the AM and PM peak hours. Of the three (3) full access unsignalized intersections, Corner Lake Drive and the Publix Store north access driveway are projected to operate at LOS D or better for the minor street movements, and LOS A for the major street movements. The Long Boat Lane/Cypress Lake Glen Boulevard and Publix Store south access are projected to operate at LOS E or F for the minor street movements, and LOS C for the major street movements.



Chuluota Road from SR 50 to Lake Pickett Road RCA – Design Traffic Report

Figure 5-13
Build Geometry

Table 5-7

Chuluota Road Roadway Conceptual Analysis - From Colonial Drive/SR 50 to Lake Pickett Road
Projected Intersection Delay and LOS for the Study Intersections - Build Scenarios

Study Intersections	Future Traffic Control	Build AM Peak Hour - Proposed 4-Lane Chuluota Road Cross Section					
		Opening Year 2028		Mid Year 2038		Design Year 2048	
		Delay (Sec/Veh)	LOS	Delay (Sec/Veh)	LOS	Delay (Sec/Veh)	LOS
Chuluota Road							
Lake Pickett Rd	Signal	18.0	B	21.1	C	28.4	C
Long Boat Ln-Cypress Lk Glen Bv (N)	STOP [1]	8.4/8.8|15.9/17.9	A/A|C/C	9.2/9.5|20.5/25.0	A/A|C/D	10.1/10.4|27.1/39.4	B/B|D/E
Corner Lake Dr	STOP [2]	8.9 | 16.2	A | C	9.8 | 21.4	A | C	10.9 | 29.9	B | D
Cypress Lake Glen Bv (S)	Signal	21.4	C	22.3	C	23.0	C
Publix Plaza Dwy (N)	STOP [2]	9.7 | 15.8	A | C	10.8 | 20.4	B| C	12.4 | 27.1	B | D
Publix Plaza Dwy (S)	STOP [3]	11.2	B	12.5	B	14.3	B
SR 50-Colonial Dr	Signal	35.1	D	66.5	E	132.4	F

Study Intersections	Future Traffic Control	Build PM Peak Hour - Proposed 4-Lane Chuluota Road Cross Section					
		Opening Year 2028		Mid Year 2038		Design Year 2048	
		Delay (Sec/Veh)	LOS	Delay (Sec/Veh)	LOS	Delay (Sec/Veh)	LOS
Chuluota Road							
Lake Pickett Rd	Signal	18.5	B	20.8	C	26.1	C
Long Boat Ln-Cypress Lk Glen Bv (N)	STOP [1]	9.0/8.8|18.0/18.0	A/A|C/C	10.0/9.7|24.3/25.0	B/A|C/D	11.3/10.7|3.4/38.2	B/B|D/E
Corner Lake Dr	STOP [2]	9.3 | 17.0	A | C	10.5 | 22.6	B | C	12.1 | 31.1	B | D
Cypress Lake Glen Bv (S)	Signal	17.8	B	18.8	B	20.7	C
Publix Plaza Dwy (N)	STOP [2]	10.6 | 29.3	B | D	12.2 | 54.1	B | F	14.4 | 191.0	B | F
Publix Plaza Dwy (S)	STOP [3]	12.1	B	13.9	B	16.3	C
SR 50-Colonial Dr	Signal	38.4	D	88.5	F	191.5	F

Notes:
[1] - NB / SB Left Turn Major Street Movement | EB / WB Minor Street Movements
[2] - NB Left Turn Major Street Movement | EB Minor Street Movement
[3] - EB Minor Street Movement

Based on the intersection level of service analyses, the Build scenario has a moderate reduction in delay and better LOS, with degradation of levels of service by the Design Year 2048 as shown in Table 5-7. The Synchro printouts for the intersection LOS for the Opening Year, the Mid-Design Year, and Design Year for design hour for the No- Build and Build scenarios are provided in Appendix G.

5.5 Recommended Improvements

Based on the evaluation of operating conditions for the design year 2048 Build scenario, this study provides the following recommendations to improve the traffic flow along Chuluota Road from SR 50 to Lake Pickett Road:

- Widen Chuluota Road from SR 50 to Lake Pickett Road to provide a four-lane facility
- Include the intersection geometries along Chuluota Road as shown in the proposed build geometry in Figure 5-13

In addition to the above improvements, this study used Synchro to develop the queue length requirements at the signalized intersections along the study corridor. In case of the unsignalized intersections, calculated queue lengths were based on the 95th percentile queue lengths from the Synchro analysis using HCM methods. Actual design and implementation of these storage length requirements will be a function of design and the physical practicality of their construction. Further information on the intersection storage requirements can be found in DTTM.

6 ALTERNATIVES ANALYSIS

The objective of the alternatives analysis process is to identify technically and environmentally sound alternatives to provide a safe transportation facility that meets the purpose and need of the project, is acceptable to the community, minimizes impacts on the environment, and is cost effective. The process results in the selection of a Preferred Alternative, which can be advanced to the design phase. This section summarizes the alternatives considered for this project.

6.1 Constraints

6.1.1 Right-of-Way Constraints

The existing overall right-of-way width varies from 100-130 feet throughout the project corridor. The tightest area is at the beginning of the project from SR 50 to the north end of the Corner Lake Plaza where the right-of-way is 100 feet wide. Throughout the remainder of the project, the existing right-of-way varies from 110-130 feet wide. The proposed typical section requires a minimum right-of-way width of 120 feet to allow for right turn lanes. Thus, where only 100 feet of existing right-of-way is available, additional acquisition is needed to address the overall improvements.

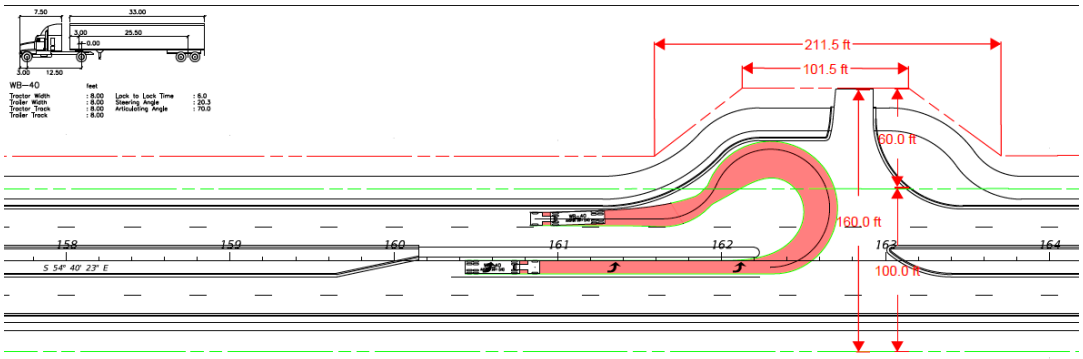
Another constraint along the project is the old Circle K property in the NE quadrant of Chuluota Road and SR 50. Although remediation has occurred on this property, the County has concerns over the possibility that there may be some lingering contamination issues. Accordingly, the County would prefer that the proposed improvements avoid this property which will result in shifting the improvements to the west side of Chuluota Road, thus resulting in right-of-way acquisition.

In addition, another issue along the corridor is the presence of the FP&L 110-foot easement which crosses Chuluota Road and Corner School Drive north of Schoolview Way. The proposed improvements will require widening under the FPL lines for both of these roadways. Depending on the extent of the proposed improvements, additional coordination with this utility will likely be needed to coordinate the design and construction of the project elements.

6.1.2 U-turn Accommodations

The County has expressed a desire to provide for the ability of trucks (WB-40) to make U- turns along the corridor. As shown on Figure 6-1, the typical right-of-way width required at a median opening to accommodate this movement is approximately 160 feet.

Figure 6-1: Typical U-turn Layout



However, right-of-way has already been dedicated along the project and there is little opportunity to acquire additional right-of-way without impacting existing residences, conservation areas, or pond sites. Since the County does not wish to acquire additional right-of-way from a property from which right-of-way has already been acquired, the project improvements will generally be constrained to the current right-of-way width. Therefore, the ability to provide U- turns along the project may not be feasible.

6.2 Opportunities for Improvement

6.2.1 Corner Lake Plaza

There are currently two entrances to the Corner Lake Plaza complex in the NW quadrant of Chuluota Road and SR 50 intersection. The south driveway is approximately 315 north of SR 50 and is heavily affected by the traffic movements at this intersection.

FDOT's Access Management Guidelines indicate that the preferred distance between full median openings is 660 feet for Class 7 operations, which is the least restrictive and provides the highest level of access to a roadway facility. A full or even directional median opening would not meet FDOT's guidelines, nor is it be recommended for safety and operational issues since SR 50 is in close proximity. For example, the north approach at SR 50 will likely require longer, dual left turn lanes for the SB to EB movement which would make it difficult to safely permit NB to WB left turn movements into the south driveway of the shopping center.

A more viable option would be to shift the NB to WB movements to the north driveway by providing a full median opening which would be 700 feet north of SR 50. This opening meets FDOT guidelines for Class 7 operations. For motorists exiting the shopping center, options include using the north driveway onto Chuluota Road or using Corner School Drive to the west.

6.2.2 Schoolview Way

Schoolview Way provides primary access to Corner Lake Middle School and is 470 feet from the nearby signalized Cypress Lake Glen Boulevard (South) intersection. With the proposed median improvements, FDOT Class 7 guidelines would not permit full median openings at both intersections, and since Cypress Lake Glen Boulevard (South) serves traffic for a major development throughout an entire year, the preferred full median opening is recommended to be located at this intersection.

To address the loss of full access at Schoolview Way and to increase operational efficiencies along Chuluota Road, this report studied modifications to the Cypress Lake Glen Boulevard (South) intersection to relocate Schoolview Way to this intersection by adding a short east-west roadway connection between Chuluota Road and Corner School Drive. This modified intersection would provide a safer operation by focusing turning movements for both inbound and outbound movements at a single, signalized intersection. Existing Schoolview Way will be eliminated as part of this project and all movements serving Corner Lake Middle School will be provided at the modified Cypress Lake Glen Boulevard (South) intersection.

6.2.3 Wildlife Crossing South of Cypress Lake Glen Boulevard (North)

As previously discussed in Section 3.13.5 Wildlife Corridors, provisions for a wildlife corridor or crossing as part of the Chuluota Road improvements was reviewed near the existing 42-inch culvert crossing south of Cypress Lake Glen Boulevard (North). Based on the information and analysis presented in this section, and wildlife known to inhabit this area, a wildlife crossing is not justified due to the lack of sustainable natural communities and a continuous corridor for wildlife movement. However, this location should be reviewed further during final design.

6.3 Alternatives Development

Given that the Chuluota Road corridor already has sufficient existing right-of-way that can accommodate the proposed typical section, the alternatives are somewhat limited and would include the following:

- No-Build Alternative
- Transportation Systems Management (TSM)
- Build Alternatives
    - Build Preferred Alternative – Note, since sufficient existing right-of-way is available for most of the project, the proposed improvements can be built within the existing right-of-way, thus eliminating a need for a left/right/center alignment analysis.

6.3.1 No-Build Alternative

The No-Build Alternative assumes that no modifications or improvements will be implemented for Chuluota Road within the limits of the study. The primary advantages of the No-Build Alternative are that it does not directly require any capital or expenditure of funds and it results in no physical or social impacts.

Certain advantages would be associated with the implementation of the No-Build Alternative:

- No acquisition of right-of-way as well as no design, right-of-way, or construction costs
- No inconvenience to the traveling public and property owners during construction
- No impacts to utilities
- No impacts to the adjacent natural, physical, and human environment

The potential disadvantages of the No-Build Alternative include:

- Is not consistent with the Orange County Comprehensive Plan

- Does not improve multimodal mobility, particularly for pedestrians and bicyclists
- Results in reduced LOS and increased traffic congestion
- May increase crashes, property damage, injuries, and fatalities due to increased congestion
- Potentially higher user costs due to increased levels of congestion

6.3.2 Transportation Systems Management (TSM)

TSM alternatives involve low-cost improvements designed to maximize the utilization and efficiency of the existing facility through improved system and demand management. Various TSM options typically include minor projects such as traffic signal and intersection improvements, access management, and transit improvements.

However, the additional capacity required to meet the projected traffic demands along Chuluota Road cannot be met solely through the implementation of TSM improvements only. Viable TSM alternatives are limited because traffic demands are very high and cannot be addressed by low-cost minor projects such as adding signals (no new signals were found to be warranted) or simple intersection widenings (the needed capacity cannot be provided). Instead, only major widening improvements can address the forecasted traffic demands for Chuluota.

Where possible, this study has incorporated a number of improvements into the final recommendations that reflect the theme of TSM such as:

- Complete Streets were considered in the RCA recommendations which reflect FDOT's Context Classifications of C3R Suburban Residential and C3C Suburban Commercial for this project. The proposed recommendations including access measures and improvements, lowering the design speed, and roadway and ped/bike measures, all of which are consistent with these designations.
- To promote a lower speed limit, the travel lanes are proposed to be 11-feet wide
- All proposed improvements comply with ADA requirements
- Schoolview Way is recommended to be closed and relocated to the signalized intersection of Cypress Lake Glen Boulevard which will reduce several unsignalized conflict points and is expected to improve operations to/from Corner Lake MS.
- The proposed median will improve the safety and efficiency of the corridor.
- Allowing only right-in/right-out movements at the south entrance to Corner Lakes Shopping Center is expected to improve operations and safety
- Roundabouts were evaluated, though are not recommended due in part to longer delays, increased right-of-way acquisition, and concerns over two-lane operations
- Major intersections have dedicated right and left turn bays to improve overall intersection efficiencies.

6.3.3 Build Alternative

The proposed typical section requires a preferred right-of-way width of 120 feet, and since most of the existing right-of-way has at least this width, a typical left/right/center alignment analysis is not needed. However, at the south end of the project, the existing right-of-way is only 100 feet wide, thus requiring right-of-way acquisition. Consequently, two alignment alternatives were evaluated.

The East Alignment Alternative would hold the existing west right-of-way line and shift all of the needed widening to the east onto the old Circle K site in the NE quadrant of Chuluota Road and SR 50. This parcel has had petroleum leaks in the past, though this property has completed the necessary remediation requirements by the County. While the CSER rated this site as low risk, there is a concern by the County that some contamination may still linger on the property.

Consequently, the West Alignment Alternative was developed that would hold the existing east right-of-way line and shift the proposed widening entirely to the west to avoid the old Circle K property. As a result, right-of-way acquisition will be needed along the west side of Chuluota Road to accommodate this alignment. Based on concerns with the East Alignment, the preferred alternative is the West Alignment.

A total of eight stormwater and two floodplain compensation ponds were identified and received detailed drainage analysis including field borings. Towards the latter stages of the study, two other stormwater ponds surfaced for consideration and were found to have certain advantages. Pond 3C on the Cross Life Church property was estimated to be able to support most of the drainage needs along the project thus eliminating the need for Ponds 1A and 2A.

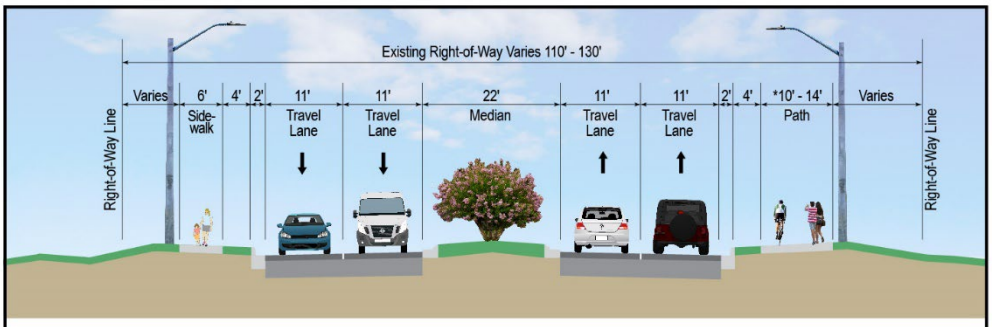
Also, since the proposed and future improvements at Lake Pickett Road are expected to impact the current residence in the NE quadrant of this intersection, the County intends to proceed with a full taking of the entire parcel for pond purposes. Together, Ponds 3C and 4C are recommended as the preferred stormwater treatment ponds for this project.

6.3.3.1 Typical Sections

The basic elements of the typical section include the full reconstruction of Chuluota Road and consist of two 11-foot travel lanes in each direction separated by a 22-foot median with Type E curb and gutter along the inside lanes and Type F curb and gutter is used along the outside lanes. The consideration and location of median trees is recommended during design. A six-foot-wide sidewalk is to be provided along one side of Chuluota Road while a 10 to 14-foot-wide multiuse path will be provided on the opposite side of the roadway.

The preferred right-of-way width is 120 feet which allows for right turn lanes as well as possible small swales behind the back of curb to intercept off-site drainage. In addition, the consideration and location of median trees is recommended during final design.

Other typical sections, such as a five-lane, undivided section, were considered, though discarded since these sections typically have a higher crash rate experience than roadways with median separations. The proposed typical section is shown on Figure 6-2.



TYPICAL SECTION
Chuluota Road
Four-Lane Divided Section

Figure 6-2 Proposed Typical Section

6.4 Evaluation of Build Alternatives

The Preferred Typical Section and Alignment has been evaluated based on impacts to the social, natural, and physical environmental, and construction costs. The evaluation is summarized in a matrix evaluation as shown in Table 6-1. The Preferred Alignment utilizes the existing right-of-way to its' fullest extent.

6.5 Preferred Alternative

Based on the matrix evaluation and public involvement activities, the preferred alternative will improve operations, minimize right-of-way impacts, and is expected to improve safety with the divided roadway section. The Preferred Alternative is shown on the concept plans contained in Appendix A as well as described in more detail in this report in Section 7.0 Preliminary Design Analysis. The right-of-way identification maps for the preferred concept are contained in Appendix B.

Table 6-1 Alternatives Matrix Evaluation

Chuluota Road RCA
From SR 50 to Lake Pickett Road

Alternatives Evaluation Matrix

	No-Build Alternative	Preferred Alternative
Evaluation Criteria	**No Improvements**	**Four-Lane Urban Section with 6' SW and 10-14' Path**
Relocations		
Number of Residential Acquisitions	None	1
Number of Business Acquisitions	None	None
Number of Parcels Impacted	None	10
Social, Natural and Physical Impacts		
Social and Neighborhood	None	Low
Archeological/Historic Sites	None	None
Threatened and Endangered Species	None	No Adverse Impacts
Wetland Impacts (Acres)	None	None
RHPZ Uplands Impacts (Acres)	None	1.03
Floodplain Impacts (Acre-Feet)	None	0.798
Potential High or Medium Ranked Contamination Sites	None	None
Estimated Costs (Present Day Costs)		
Estimated Construction Cost	No Cost	$27,538,176
Design, Adm Costs (12% of Construction)	No Cost	$3,304,581
CEI (15% of Construction)	No Cost	$4,130,726
Right-of-Way Costs	No Cost	$2,196,355
Wetland Mitigation	No Cost	
RHPZ Uplands Mitigation	No Cost	$103,000
Reimbursable Utility Relocation	No Cost	
Subtotal		$37,272,839
Contingency (20%)		$7,454,568
TOTAL ESTIMATED COSTS		***$44,727,406***

7 PREFERRED ALTERNATIVE

This section presents the results of the preliminary design analysis that was conducted for the preferred alternative identified in Section 6.4. The proposed project improvements will address the increased mobility demands and safety needs along the corridor, while minimizing impacts to the social, natural, and physical environment.

7.1 Design Traffic Volumes

The Chuluota Road Roadway Conceptual Analysis Design Traffic Technical Memorandum (DTTM) in Appendix G documents the existing traffic conditions and the analysis of the No-Build and Build scenarios. The existing and future traffic conditions and the associated analyses are summarized in Section 5 of this report.

With the proposed four-lane widening improvements, all roadway segments and intersections will operate at an acceptable level of service in the design year of 2048 except for SR 50 and the Long Boat Lane/Cypress Lake Glen Boulevard intersections, the latter only during certain hours of the day. Without the proposed widening (no build scenario), portions of Chuluota Road will reach capacity by opening year, and all of Chuluota Road will be at LOS F by the year 2038.

7.2 Typical Sections

The proposed typical section is shown on Figure 7-1 (next page) and reflected on the concept plans contained in Appendix A. The roadway design elements incorporated into the preferred alternative include the following:

- Four 11-foot travel lanes
- A six-foot sidewalk located on one side of the roadway and 10-foot to 14-path on the other side
- A 22-foot raised median with Type E curb and gutter to include street trees
- Type F curb and gutter along the outside lanes with four-foot utility strips between the back of curb and the sidewalk or path
- A grass strip between the path or sidewalk with the right-of-way line of varying width
- A proposed right-of-way width of 120 feet (note, much of the existing right-of-way is already 120-feet wide, thus minimizing the right-of-way impacts for this project

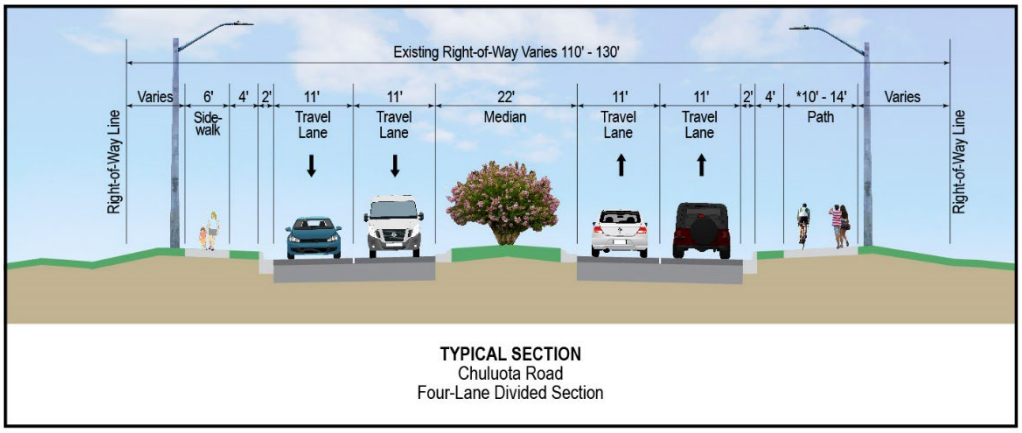


Figure 7-1 Proposed Typical Section

7.3 Intersection Concepts and Signal Analysis

Within the project limits, the proposed signalized intersections are at SR 50, Cypress Lake Glen Boulevard (South), and Lake Pickett Road. No other intersections met the necessary signal warrants. The full improvements and intersection concepts for the entire project are shown in Appendix A.

7.4 Alignment and Right-of-Way Needs

In general, the preferred alignment will generally bisect the existing right-of-way, though at the south end of the project, the proposed centerline has been shifted to the west to avoid impacts to the old Circle K property. The resulting intersection will have a significant deflection at SR 50 and East River Falcons Way (approximately 15 degrees).

The preferred alignment is shown in Appendix A. In general, the proposed typical section can be accommodated within the proposed 120-foot right-of-way except at the south end of the project, at the Cross Life Church property, and at the northeast quadrant of Chuluota Road and Lake Pickett Road where additional right-of-way will be needed.

The right-of-way requirements are shown in the concept plans contained in Appendix A and on the right-of-way identification maps contained in Appendix B.

7.5 Drainage

7.5.1 Preliminary Design Analysis

The design of the stormwater management facilities for the project is governed by the rules set forth by SJRWMD and Orange County. Water treatment and attenuation requirements will comply with the guidelines as defined in the SJRWMD ERP Manual.

The stormwater management facilities have been sized to meet the criteria of the SJRWMD and the Orange County Public Works Department Engineering Manual. The following drainage design criteria has been used for the sizing of the proposed stormwater management ponds:

- For a project or portion of a project located within an open drainage basin, the allowable discharge is based on the SJRWMD's 24-hour, 25-year rainfall maps and the NRCS Type II Florida Modified 24-hour rainfall distribution.
- The Orange County Municipal Code indicates that "[f]or predevelopment time of concentration between zero and thirty (30) minutes, use six-hour storm duration for design" and "[f]or

- predevelopment time of concentration over thirty (30) minutes, use twenty-four-hour storm duration for design." The 25-year 6-hour rainfall total is 5.75 inches, and the 24-year 24-hour rainfall total is 8.4 inches (based on intensity of rainfall derived from FDOT rainfall charts, per municipal code). For this project, a design storm of the 25-year, 24-hour rainfall was used for pond sizing to meet the SJRWMD criteria and to be conservative.
  - The post-development volume of direct runoff must not exceed the pre-development volume of direct runoff for the 25-year frequency, 96-hour duration storm for systems discharging to landlocked lakes which are adjacent to properties of more than one ownership. These systems shall not cause an increase in the total pre-development flood stage. [SJRWMD Permit Information Manual (PIM) Part III, Chapter 3, Section 3.2.1(c)]
  - A stormwater facility shall be designed as an open space amenity which is consistent with the urban design concepts of the particular CVC. Stormwater facilities serving nonresidential development may be located outside of the area designated for commercial or office development.
  - Except as stated below, a retention or detention facility shall be designed with a maximum side slope of 5:1, so that fencing is not required. A wet-bottom retention pond with a side slope steeper than 5:1 may be permitted as an integral element of the urban design or architectural theme of the development.
  - Pool depths should be a minimum of six feet below the design "normal" water level.
  - A wet-bottom retention pond shall be landscaped in accordance with the following criteria:
    - Up to two and one-half acres. At least ten percent of the land above the design high-water level, excluding maintenance berms, shall be landscaped with plant materials other than ground cover over at least fifty percent of the required area, and at least fifty percent of those plant materials shall be native species; or a littoral zone band at least five feet in width for at least fifty percent of the shoreline shall be established with native aquatic or semi-aquatic plant species.
    - From two and one-half to five acres. At least five percent of the land above the design high-water level excluding maintenance berms shall be landscaped with plant materials other than ground cover over at least fifty percent of the required area, and at least fifty percent of those plant materials shall be native species; or a littoral zone band at least five feet in width for at least thirty-five percent of the shoreline shall be established with native aquatic or semi-aquatic plant species.
    - More than five acres. A littoral zone band at least five feet in width for at least twenty percent of the shoreline shall be established with native aquatic or semi-aquatic plant species.
  - A wet-bottom retention pond shall be designed as a barrier-free aesthetic amenity.
  - A skimmer shall be provided on a wet-bottom stormwater management facility to minimize the accumulation of trash and pollutants.
  - Any wet-bottom retention pond visible from any existing arterial right-of-way shall provide an aquatic planting in a continuous band on the side of the pond remote from the right-of-way to screen the bank area between the normal water elevation and the high-water elevation. This littoral zone planting shall be at least four feet wide and average six feet wide.
  - A dry-bottom stormwater management facility shall be designed with at least five percent of the area above the peak stage elevation landscaped with plant materials other than ground cover over at least fifty percent of the required area, and at least fifty percent of those plant materials shall be native species.
  - A dry-bottom stormwater management facility shall be unfenced with a maximum side slope of 5:1 and shall be sodded.
  - Any dry-bottom stormwater management facility visible from any existing arterial right-of-

way shall provide screening in the form of a hedge, berm, wall, or combination in a continuous band on the side of the facility proximate to the right-of-way to screen the bank area of the facility.

7.5.2 Stormwater Management Facilities

The preliminary stormwater ponds have been sized based upon the proposed typical sections to determine the impervious surface for each segment of the road. The impervious surface was then used to determine the required treatment volume and runoff volume for the basins. The ponds were only sized for the right of way areas that will drain to each pond.

The pond sites were selected based upon several criteria. This criterion included existing land use, right-of-way and drainage easements, topography, wetland impacts, and flood plain impacts. Topography was reviewed to provide sufficient elevation change for conveyance of the run-off from the roadway to the pond site. Where possible, wetland and flood plain impacts have been avoided.

Existing permits and nearby borings (where possible) adjacent to the preliminary ponds and existing topography were used to determine the seasonal high / control elevations. Top of berm elevations were established using the adjacent existing grade.

The alternative and preferred stormwater management facilities and floodplain compensation ponds are shown on Figure 7-2. The preferred ponds were derived based on a number of factors including avoidance of wetlands and conservation areas, hydrologic considerations, and available right-of-way. The preferred pond sites are:

- Pond 3C
- Pond 4C
- Pond FC1
- Pond FC2

The final design effort will refine the current preliminary ponds based on surveys and additional borings which will provide detailed information to further define the pond elements, determine pond bottom elevations, and pond control elevations. Accordingly, pond sizes and pond configurations may vary from the preliminary ponds based upon final topographic surveys and geotechnical information.

7.5.3 Cross Drains

The existing cross drains were analyzed, and a preliminary determination was undertaken regarding the need for replacement. This report recommends that the current pipe sizes remain as is, though all culverts are recommended to be replaced with new concrete pipe for future maintenance savings. The proposed cross drains by type and sizes are shown in Table 7-1 on the next page.

Table 7-1
Proposed Cross Drain Types and Sizes

Culvert	Station	Existing Conditions		Proposed Conditions
		#	Size/ Type	Size/ Type
CD #1	46+25	1	30" RCP	30” RCP
CD #2	74+92	1	42" CMP	42” RCP
CD #3	107+75	1	24” RCP	24” RCP

7.5.4 Floodplain and Floodways

Based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM’s) dated September 25, 2009, portions of the study area are located within Zone A (100 Year) floodplain. There are no Zone AE floodplains within the study area. The Zone A floodplains occur:

- East of Chuluota Road across from Corner Lake Middle School. This Zone A floodplain is isolated.
- North and South of Cypress Lake Glen Boulevard. This Zone A floodplain ultimately drains to Lake Pickett.

Please refer to Appendix H for a depiction of the floodplains in the study area. There are no floodways within the project limits.

There will be floodplain impacts within the project right-of-way that be affected by the proposed improvements which will be mitigated by providing compensatory volume in proposed floodplain compensation ponds. There is 0.029 ac-ft of floodplain impact between STA 22+00 and 26+00, and there is 0.769 ac-ft of floodplain impacts between STA 73+00 and 90+00. Calculations supporting the floodplain compensatory volume required and those provided are included in Appendix H.

A floodplain compensatory pond (FC-1) is proposed across from Corner Lake Middle School, and a floodplain compensatory pond (FC-2) is proposed adjacent to wetlands south of Lake Pickett Road and east of Chuluota Road.

Figure 7-2 – Post Development Drainage Map

Figure 7-2 – Post Development Drainage Map

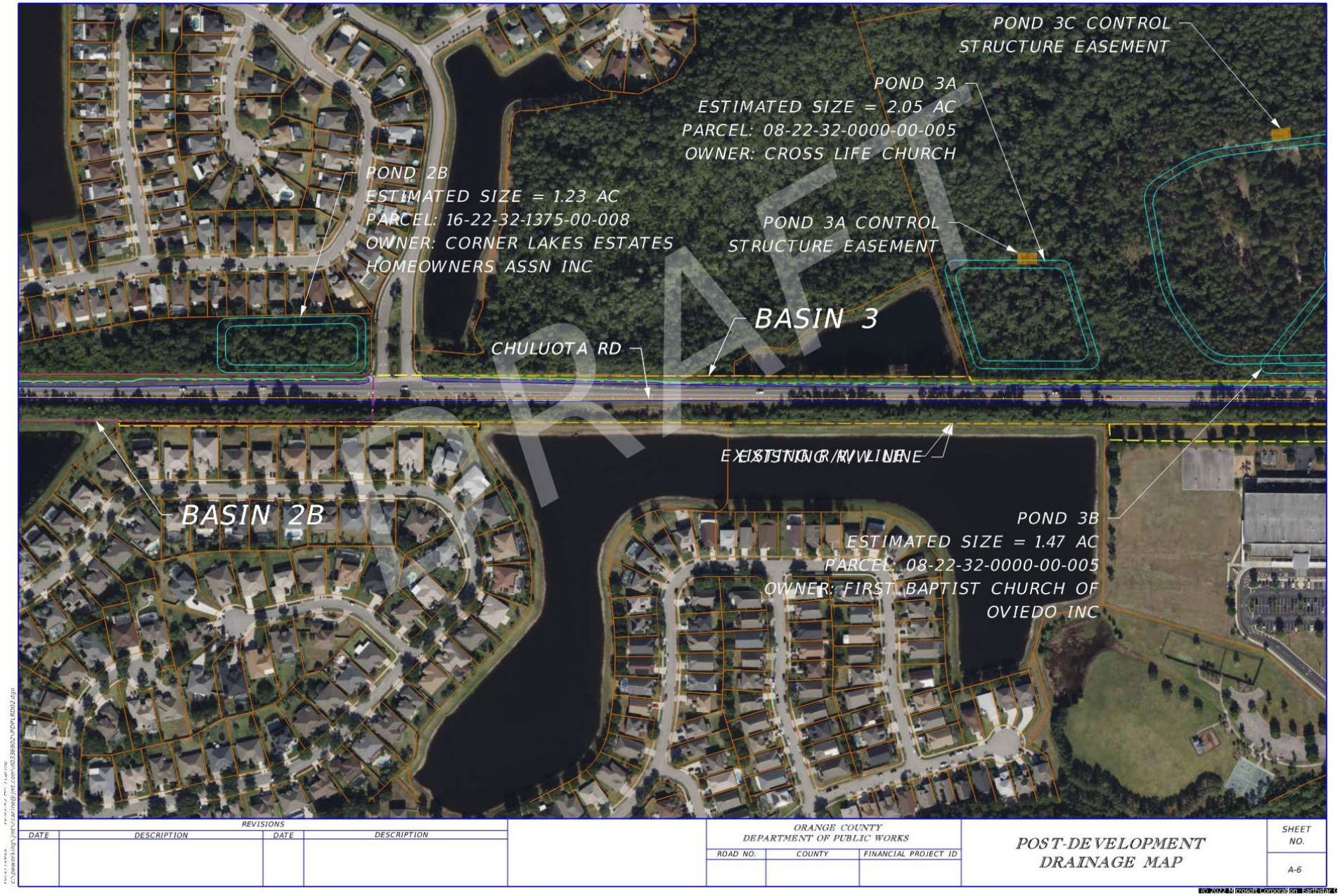


Figure 7-2 – Post Development Drainage Map

Figure 7-2 – Post Development Drainage Map

7.5.5 Stormwater Permits

Over 15 permits were researched to obtain stormwater and environmental design information for existing systems within the project corridor. Please refer to Table 7-2 for a summary of permits referenced during the development of the proposed stormwater management systems for Chuluota RCA.

Table 7-2
Existing Permits

Project Name	Agency/Permit Type	Permit No.	Date Issued	Description
Lake Picket Road Realignment	SJWMD/ ERP Standard General	101908 - 4	11/14/2011	Proposed intersection improvements of Chuluota Road at Lake Pickett Road
Lukas Estates Subdivision	SJWMD/ ERP Standard General	57286 - 1	5/24/2000	Construction plans for Lukas Estates
Corner Lake Middle School	SJWMD/ ERP Standard General	27857 - 1	1/13/1997	Retention pond plans for Corner Lake Middle School
Corner Lake Plaza	SJWMD/ ERP Standard General	63516 - 8	11/18/2014	Proposed Drainage Modifications for the Corner Lake Plaza
Corner Lake Estates	SJWMD/ ERP Standard General	81542 - 9	7/10/2000	The construction of a surface water management system, which consists of a 243-acre single-family residential subdivision to be known as Corner Lake Estate Subdivision
CR 419 Improvement Plans	SJWMD/ ERP Standard General	58045 - 1	12/1/1999	The proposed County Road (CR) 419 expansion project conducted by Orange County

Other existing environmental resource permit documents that were reviewed included:

- #21001 Cypress Lakes (multiple phases)
- #27857 Corner Lake Middle School
- #57286 Lukas Estates
- #63516 Corner Lake Estates
- #63516 Corner Lakes Plaza
- #81542 Country Lake Estates
- #83067 BP Amoco (Retail Shopping Center)
- #101908-1 and -2 Mandalay Subdivision & Estates / Lake Pickett Road Realignment
- #101908-4 Lake Pickett Road and Chuluota Road Intersection Improvements

Proposed development plans that were reviewed included:

- ERP#21001 Cypress Lakes Phase I (Parcel P), aka YardCo
- ERP#166225 YardCo - East Colonial
- FDOT 60% Roadway Plans for SR 50, 239203-7-52-01
- Cross Life Church
- The Grow Farm & Garden Community
- East Orange Trail

7.6 Displacements

The preferred alignment has one residential displacement at the existing residence located in the NE quadrant of Lake Pickett Road and Chuluota Road.

7.7 Estimated Project Costs

The estimated project costs for the preferred alternative are under development.

Table 7-3
Total Estimated Project Costs

Project Item	Cost
Estimated Construction Cost	$27,538,176
Design, Adm Costs (12% of Construction)	$3,304,581
CEI (15% of Construction)	$4,130,726
Right-of-Way Costs	$2,196,355
Wetland Mitigation	
RHPZ Uplands Mitigation	$103,000
Reimbursable Utility Relocation	
Subtotal	$37,272,839
Contingency (20%)	$7,454,568
TOTAL ESTIMATED COSTS	***$44,727,406***

7.8 Recycling of Salvageable Materials

The opportunity to recycle any salvageable materials by the contractor is encouraged by Orange County. Such materials may include old asphaltic concrete pavement, base material, and drainage structures.

The existing pavement on existing roadways may be milled for recycling during the construction of the project. Any other salvageable materials will be identified during the design of the project. If these materials should be removed from the construction site, it is to be undertaken as specified in the current FDOT Standard Specifications.

7.9 User Benefits

Highway user costs are defined by AASHTO's A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements, 1977, as the sum of (1) motor vehicle running cost, (2) the value of the vehicle user travel time and (3) traffic accident cost. User benefits are the cost reductions and other advantages that occur to highway motor vehicle users through the use of a particular transportation facility as compared with the use of another. Benefits are generally measured in terms of a decrease in user costs.

It is anticipated that the preferred alternative will provide user benefits due to a reduction in roadway congestion as compared to the "No Build" alternative. In addition, the improved typical section and access management provided with the project should reduce the crash experience along the roadway such as minimizing head-on crashes though the use of a median.

7.10 Pedestrian and Bicycle Facilities

A continuous six-foot wide sidewalk will be provided on one side of Chuluota Road and a 10 to 14-foot wide multiuse path will be provided on the other side of the roadway. The path will tie into the future East Orange Trail at the north end of the project. The sidewalk and the multiuse path will be separated from the roadway by curb and gutter and a four-foot-wide grass/utility strip. Pedestrian features, including crosswalks and pedestrian signals, will be provided at each signalized intersection. The pedestrian and bicycle facilities will comply with the Americans with Disabilities Act (ADA).

7.11 Environmental Impacts

Detailed studies and evaluations were conducted to determine the potential for adverse impacts that may result from the proposed project. Baseline data, evaluation procedures and analysis of results are contained in the project files and the following reports: "Ecological Summary Report" (see Appendix E) and "Contamination Screening Evaluation Report" (see Appendix F).

7.11.1 Land Use

The land use along the corridor is primarily residential with intermittent conservation areas and drainage ponds. There is some commercial activity at the south end of the project at SR 50. There are also some open spaces at the northern end of the corridor, though these parcels are expected to be developed in the future. The project is consistent with the existing and future land use along the corridor.

7.11.2 Community Cohesion

The project does not bifurcate any neighborhoods or developments.

7.11.3 Cultural Impacts

Based on the analysis conducted for this study, there are no cultural resources listed, determined eligible, or appear to be potentially eligible for listing in the NRHP. As such, historic resources will not be a critical issue on this project.

7.11.4 Wetlands

The recommended improvements are not expected to have any wetland impacts. During final design, if wetland impacts occur, Federal, state, and local government agencies will generally require mitigation to offset unavoidable impacts as a condition of the permit.

Mitigation requirements are based on a compilation of wetland parameters including quality, type, function, and size. Impacts to wetlands and/or other surface waters will be avoided and minimized to the maximum extent possible while maintaining safe and sound engineering and construction practices. Primarily, avoidance and minimization efforts are related to the proposed stormwater management pond locations.

A mitigation plan that adequately offsets adverse impacts will be developed and implemented during the design phase. Adverse wetland impacts that may result from the construction of this project will be mitigated, satisfying the County requirements. Compensatory mitigation for this project will be completed through the use of mitigation banks and/or any other mitigation options that satisfy federal and state requirements.

7.11.5 Wildlife and Habitat

The potential impact to federal and/or state-listed wildlife species was evaluated based upon the occurrence determinations for Orange County, Florida. Further analysis will be required during final design to specifically address quantities of impact, current status of wildlife species, and other design and/or construction measures which can be incorporated to reduce or eliminate potential impacts.

7.12 Utility Impacts

Many of the utilities along the corridor will be affected by the preferred alternative since the proposed improvements will occupy most of the proposed right-of-way. In particular, the overhead lines are likely to be affected by the roadway widening, and the underground lines may be affected by the new storm sewer.

One utility requiring special consideration is the Florida Power and Light (FPL) overhead transmission lines which cross Chuluota Road north of Schoolview Way in a 110-foot easement. Some of the proposed roadway and drainage improvements for the Chuluota Road and Corner School Drive improvements will cross under these lines and the latter will be in FPL's formal easement. Close coordination with FPL will be required during the course of design and construction phases.

Note, requests have been sent to all utility providers to submit their estimated relocation costs including estimates for reimbursable costs if applicable. At this time, this information has not been provided.

7.13 Traffic Control Plan

A formal traffic control plan (TCP) will be developed during the final design process. Typically, the TCP staging will include building two new lanes on one side of the road while traffic is carried on the existing travel lanes. Once the new lanes are completed, traffic will be shifted to the completed lanes and work continues on finishing the remaining two lanes of improvements.

7.14 Special Features

7.14.1 Gravity Walls

Gravity walls may be needed in certain areas to contain the limits of the proposed improvements so that right-of-way impacts can be reduced.

7.14.2 Access Management

The access management plan for Chuluota Road (see Appendix I for additional information) was developed in general conformance with the Florida Department of Transportation (FDOT) Access Management criteria. By providing the proposed intersection spacing shown on the concept plans in Appendix A, most of the project can attain Access Class 5 or better.

At the south end of the project, a full access intersection is being proposed at the north entrance to the Corner Lakes Plaza, while the south entrance will be limited to right-in, right-out movements. Accordingly, the south end of the project would have an Access Class 7 designation resulting from these changes.

Also, since the Cypress Lake Glen Boulevard intersection is being improved, access to existing Schoolview Way will be maintained with right-in, right-out operations only.

7.14.3 Wildlife Crossing

As previously discussed in Section 3.13.5 Wildlife Corridors, provisions for a wildlife corridor or crossing as part of the Chuluota Road improvements was reviewed near the existing 42-inch culvert crossing south of Cypress Lake Glen Boulevard (North). Based on the information and analysis presented in this section, and wildlife known to inhabit this area, a wildlife crossing is not justified due to the lack of sustainable natural communities and a continuous corridor for wildlife movement. However, this location should be reviewed further during final design.

7.14.4 Street Lighting

It is the County's policy to provide street lighting along the corridor. Street lighting will be addressed during the design phase.

8 PUBLIC INVOLVEMENT

8.1 Public Involvement Plan

In 2021, a Public Involvement Plan (PIP) was created for the Chuluota Road RCA and implemented into the project's public involvement approach. The PIP identifies key local and state agency, elected, and appointed officials; and property owners and tenants for the study area, in addition to outlining public outreach strategies.

Specific strategies established in the PIP are project newsletter mailouts, contact with the media; community and small group stakeholder meetings, presentations to Orange County Planning and Zoning Commission/Local Planning Agency, and presentations to the Orange County Board of County Commissioners. All public involvement documents can be found in Appendix C.

8.2 Public Information Distribution

Public information for this project will be dispersed through the following methods:

- Newsletters will be mailed to property owners, tenants, and other interested persons
- Public meeting advertisements will be placed in *The Orlando Sentinel*, and *El Sentinel*
- A project website has been created which contains information such as the project study area map, project schedule, meeting notices, newsletters, and other study documents.

8.3 Coordination and Small Group Meetings

Small group meetings were held with representatives from FDOT, property owners, utility companies, and other interested parties.

8.4 Public Meetings

The first community public meeting was held on September 20, 2022, with the second meeting is scheduled for December 5, 2022. The meetings format consists of an open house that allows informal discussions between the project team and the public, followed by a presentation and an open question and answer forum. Public information to date is located in Appendix C.

8.5 Local Planning Agency (LPA) and Board of County Commissioners Meetings

8.5.1 Orange County Planning and Zoning Commission/Local Planning Agency

The study's recommendations will be presented to the Orange County Planning and Zoning Commission /Local Planning Agency two times. The LPA Workshop occurred on January 19, 2023, and the LPA Hearing occurred on February 16, 2023 with the proposed improvements being approved by the LPA Board.

8.5.2 Orange County Board of County Commissioners (BCC)

The study's recommendations will be presented twice to the BCC. The BCC Workshop occurred on Feb 7, 2023, and the BCC Hearing is scheduled for March 7, 2023.

9 CONCLUSIONS AND RECOMMENDATIONS

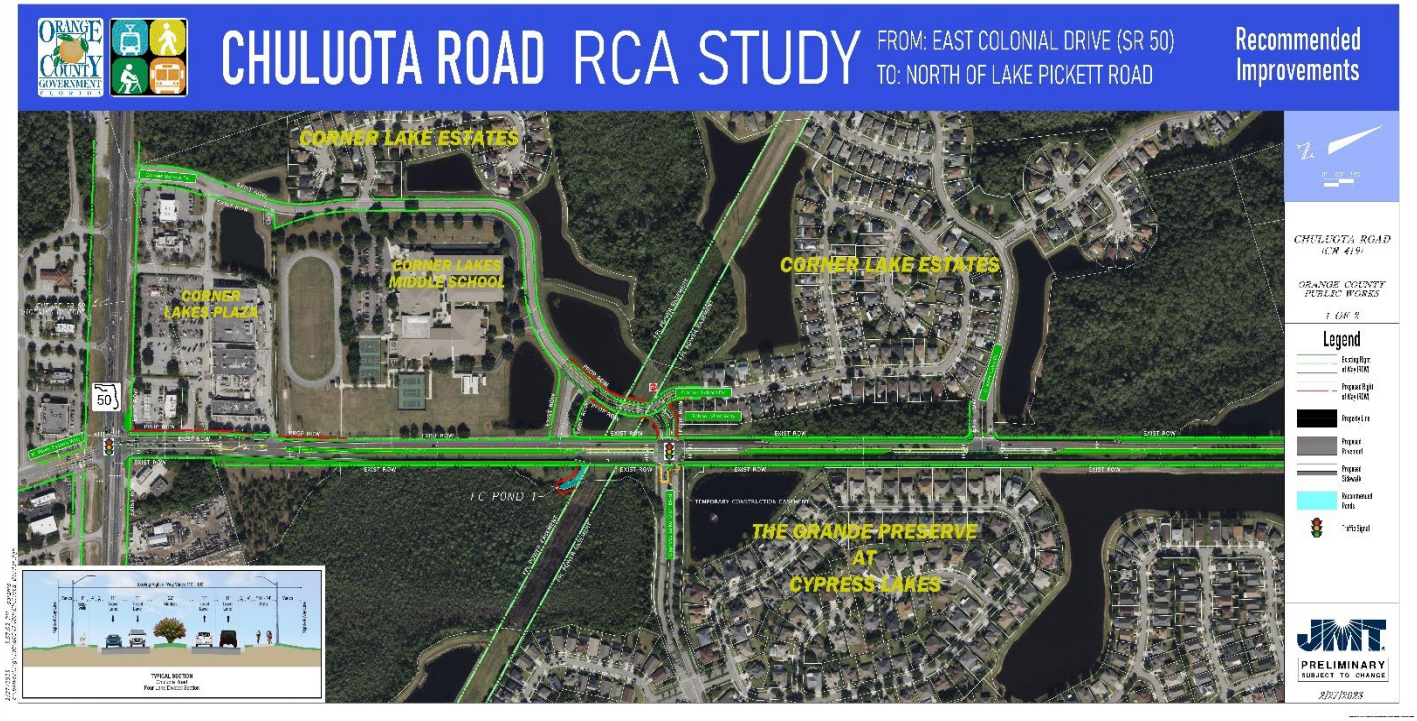
The objective of the Chuluota Road RCA is to develop and evaluate alternatives for improvements to Chuluota Road from SR 50 to Lake Pickett Road in order to address the current and future transportation needs along the corridor. The preferred improvements identified in this report will serve as the basis for the subsequent design of the roadway improvements.

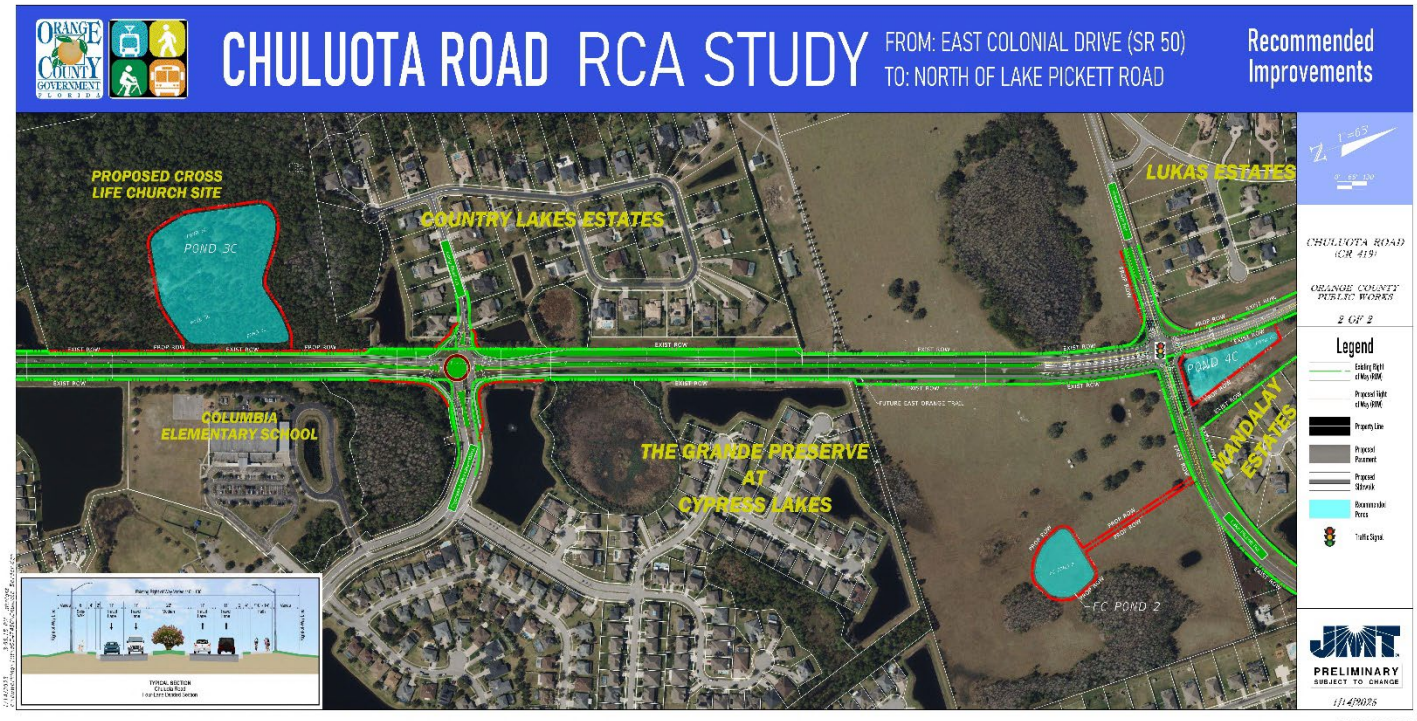
As noted in the Executive Summary, an Intersection Control Evaluation (ICE) Study was conducted after the BCC Public Hearing to explore additional alternatives. The ICE Study Addendum has been attached following this section which summarizes the findings of the ICE process which included the identification and consideration of various intersection concepts and recommendations.

Recommendations from the ICE Study included providing a roundabout at the Long Boat Lane/Cypress Lake Glen Boulevard (North) intersection. Although the roundabout would be more costly and require more right-of-way, it has certain advantages in that it would be expected to lower travel speeds along the northern section of the corridor – excessive speeding was a major concern expressed by the public at both community meetings. Consequently, the combination of the roundabout and lowering the posted speed limit to 40 mph along the entire corridor can be expected to reduce overall travel speeds.

The RCA report, along with the ICE Study Addendum, summarizes the essential components of the Chuluota Road study, including public involvement, data collection, traffic analysis, roadway design, drainage design, and environmental impacts. The development of the proposed improvements incorporated the insights from planning, engineering, and the public to refine the alternatives and to ultimately advance a preferred alternative.

The preferred four-lane widening alternative for Chuluota Road as detailed in Section 7 of the RCA report along with the ICE Study recommendations are proposed to be advanced to the design phase. Roll plots have been prepared showing these improvements and are attached on the following page.


CHULUOTA ROAD RCA STUDY
FROM: EAST COLONIAL DRIVE (SR 50)
TO: NORTH OF LAKE PICKETT ROAD
Recommended Improvements
CORNER LAKE ESTATES
CORNER LAKES MIDDLE SCHOOL
CORNER LAKES PLAZA
CORNER LAKE ESTATES
50
FC POND 1
THE GRANDE PRESERVE AT CYPRESS LAKES
CHULUOTA ROAD (CR 419)
ORANGE COUNTY PUBLIC WORKS
1 OF 2
Legend
PRELIMINARY
SUBJECT TO CHANGE


CHULUOTA ROAD RCA STUDY
FROM: EAST COLONIAL DRIVE (SR 50)
TO: NORTH OF LAKE PICKETT ROAD
Recommended Improvements
PROPOSED CROSS LIFE CHURCH SITE
POND 3C
COUNTRY LAKES ESTATES
LUKAS ESTATES
POND 4C
COLUMBIA ELEMENTARY SCHOOL
THE GRANDE PRESERVE AT CYPRESS LAKES
NANDLAY ESTATES
FC POND 2
CHULUOTA ROAD (CR 419)
ORANGE COUNTY PUBLIC WORKS
2 OF 2
Legend
PRELIMINARY
SUBJECT TO CHANGE