Interoffice Memorandum

March 24, 2020

TO: Mayor Jerry L. Demings
-AND-
Board of County Commissioners

FROM: Jon V. Weiss, P. E., Director
Planning, Environmental and Development Services Department

CONTACT PERSON: **Renzo Nastasi, AICP, Manager**
Transportation Planning Division
(407) 836-8072

SUBJECT: March 24, 2020 – Public Hearing
Orange Avenue Roadway Conceptual Analysis Study

The Orange County Transportation Planning Division has completed the Roadway Conceptual Analysis Study for the widening of Orange Avenue from two to four lanes. Orange Avenue is located in south-central Orange County. The project limits are from the Orange-Osceola county line to the south terminus of Florida's Turnpike overpass bridges, a distance of approximately 0.61 miles. This study and subsequent production phase that completes the widening of Orange Avenue will be funded under a Roadway Agreement Committee public – private partnership agreement.

The purpose of the study was to develop the most appropriate road alignment with stormwater facilities and bicycle and pedestrian accommodations while minimizing environmental impacts. The need for this roadway is based on a variety of factors including future traffic operations, safety and social and economic demands.

This project was presented to the Local Planning Agency (LPA) on February 20, 2020. The LPA found the project consistent with the Comprehensive Plan and recommended the Board find the Orange Avenue Roadway Conceptual Analysis Study consistent with the Comprehensive Plan, approve the study, and approve initiation of design, right-of-way acquisition and construction.

Staff will present the results of the study for consideration and approval. The study is also available under the Roadway Project section of the county's Traffic and Transportation webpage:

https://www.orangecountyfl.net/TrafficTransportation/OrangeAvenuefromtheOrangeOsceolaCountyLinetoFloridasTurnpike.aspx

Should the Board of County Commissioners approve the study and initiation of design, right-of-way acquisition and construction, the project will advance to the Public Works Department, Engineering Division for acquisition of a consultant for design.

The backup documentation for this item is attached.

Action Requested: **Find the Orange Avenue Roadway Conceptual Analysis Study consistent with the Comprehensive Plan; approval of the study; and approval to initiate design, right-of-way acquisition and construction. District 4.**

RN/bh/am
Attachments

C: Joseph C. Kunkel, P.E., Director, Public Works Department
Diana Almodovar, P.E., Deputy Director, Public Works Department
Brian Sanders, Assistant Manager, Transportation Planning
Blanche Hardy, P.G., Assistant Project Manager, Transportation Planning

ORANGE COUNTY GOVERNMENT FLORIDA

MEMORANDUM

February 20, 2020

TO: Mayor Jerry L. Demings
-AND-
Board of County Commissioners

FROM: J. Gordon Spears, Chairperson
Planning and Zoning Commission (PZC) / Local Planning Agency (LPA) Members

SUBJ: **Orange Avenue Roadway Conceptual Analysis Study**

On February 20, 2020, the Local Planning Agency (LPA) held a public hearing regarding the Roadway Conceptual Analysis Study for Orange Avenue. Orange Avenue is located in south central Orange County. The project limits are from the Orange – Osceola county line to the Florida's Turnpike (State Road 91) overpass, a distance of approximately 0.61 miles.

The purpose of the study was to add roadway capacity and develop the most appropriate road alignment with stormwater facilities and bicycle and pedestrian accommodations while minimizing environmental impacts. The need for this roadway is based on variety of factors including future traffic demand, safety, and social and economic factors.

The LPA approved the findings of the study and found them consistent with the Comprehensive Plan.

cc: Local Planning Agency
Jon V. Weiss, P.E., Director, Planning, Environmental and Development Services Department
Joseph C. Kunkel, P.E., Director, Public Works Department
Renzo Nastasi, AICP, Manager, Public Works Transportation Planning Division
Raymond L. Williams, P.E., Manager, Public Works Engineering Division
Jason Sorensen, Chief Planner, Orange County Planning Division

2019

Roadway Conceptual Analysis Report

Orange Avenue

The Orange/Osceola County Line to Florida's Turnpike

DRAFT

Prepared for:

ORANGE COUNTY GOVERNMENT FLORIDA

Prepared By:

HARRIS

Harris Civil Engineers, LLC

ROADWAY CONCEPTUAL ANALYSIS REPORT

FOR

ORANGE AVENUE

THE ORANGE/OSCEOLA COUNTY LINE TO FLORIDA'S TURNPIKE

PREPARED FOR

ORANGE COUNTY PUBLIC WORKS
TRANSPORTATION DIVISION
4200 S. John Young Parkway
Orlando, Florida 32839

PREPARED BY

HARRIS
Harris Civil Engineers, LLC

Harris Civil Engineers, LLC.
1200 Hillcrest Street, Ste. 200
Orlando, Florida 32803

DECEMBER 2019

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I am a Registered Professional Engineer in the State of Florida practicing with Harris Civil Engineers, LLC., and that I have supervised the preparation and approve the evaluation findings, opinions, conclusions, and technical advice hereby reported for:

PROJECT: Orange Avenue Roadway Conceptual Analysis (RCA) Study

LOCATION: Orange/Osceola County Line to Florida's Turnpike

This report includes a summary of data collection efforts, corridor analysis, conceptual design analyses and environmental evaluations for the above referenced project. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering and planning as applied through professional judgment and experience.

NAME: Abdul Alkadry, P.E.
Florida P.E. Number 66693

SIGNATURE: _____
Date

Table of Contents

Appendices

List of Figures

List of Tables

Executive Summary

ES.1 Introduction

Harris Civil Engineers, LLC, was selected by Deerfield Land Corporation, in partnership with Orange County, to conduct a Roadway Conceptual Analysis (RCA) study for 0.61 miles of Orange Avenue from the Orange/Osceola County Line to Florida's Turnpike.

The objective of this RCA Study is to identify a full range of potential roadway improvements needed in order to address current and future traffic demands in the Orange Avenue corridor. The options presented in this study will be analyzed and documented in order to form design recommendations and ultimately the preparation of final construction plans for Orange Avenue. The RCA report has summarized all aspects of the study including Public Involvement, Data Collection, Roadway Design, Drainage and Environmental Impacts, and Corridor Analysis.

ES.2 Need for Project

There are several factors that contribute to the need for improvements along Orange Avenue. First is the need to account for development through the corridor and to address any current capacity deficiencies and projected future increase in traffic congestion. Additionally, there is a need to provide adequate sidewalks and bicycle facilities for pedestrians and bicyclists. Continuous roadway lighting will be included to provide safely for those traveling along the study corridor.

ES.3 Existing Conditions

Existing Orange Avenue from the Orange/Osceola County Line to Florida's Turnpike consists of a two-lane roadway. The roadway contains 11 to 12-foot travel lanes and 0 to 2-foot paved shoulders. There is approximately 800 feet of sidewalk on the west side of Orange Avenue beginning at the Orange/Osceola County Line. There are no pedestrian features in the remainder of the study area. Additionally, there are no bicycle lanes. The existing right-of-way along the study corridor varies from 64 feet to 140 feet.

ES.4 Traffic

Detailed traffic information is provided in a *Supporting Document* titled *Orange Avenue Design Traffic Technical Memorandum*. This document summarizes the existing traffic conditions and analysis for the no-build and build scenarios.

ES.5 Alternative Alignment Analysis

Several roadway alignments were considered during the RCA in order to provide the necessary roadway improvements while minimizing impacts. The three alternatives were analyzed based on factors such as right-of-way acquisition, environmental impacts and estimated capital costs. Each of the alternatives propose a 4-lane roadway with buffered bicycle lanes and sidewalks on both sides of the road. Additionally, a culvert to allow for drainage and to allow wildlife to access the surrounding wetlands. The alternatives differ in the roadway geometry and their alignment.

- **Alternative 1-** S-curve with an east alignment.
- **Alternative 2-** Bend with a center alignment.
- **Alternative 3-** S-curve with a west alignment.

ES.6 Recommended Improvements

The Orange Avenue RCA Study analyzes the project traffic conditions, development of improvement alternatives, investigation of environmental and social impacts, and public involvement. The recommended improvements offer a balance between engineering considerations and impacts to the residences, businesses, and existing environment.

It is recommended that Orange Avenue, from the Orange/Osceola County Line to Florida's Turnpike, should be expanded to a four-lane divided urban roadway with sidewalks and buffered bicycle lanes. The recommended roadway geometry consists of a slight bend and a center alignment. The conceptual plan and proposed improvements can be found in *Appendix A*.

The typical section for the proposed improvements will be consistent along the corridor. The improvements include four travel lanes, 11 feet wide, separated by a raised median. Future development will require left turn lanes in several sections of the study corridor. Seven-foot buffered bicycle lanes and five-foot sidewalks will be added to both sides of the roadway. Additionally, a seven-foot utility strip will be provided between the outside edge of pavement and the sidewalk. A 120-foot right-of-way along the corridor is required in order to achieve the desired section. Typical roadway sections are illustrated in ***Figure ES-1.***

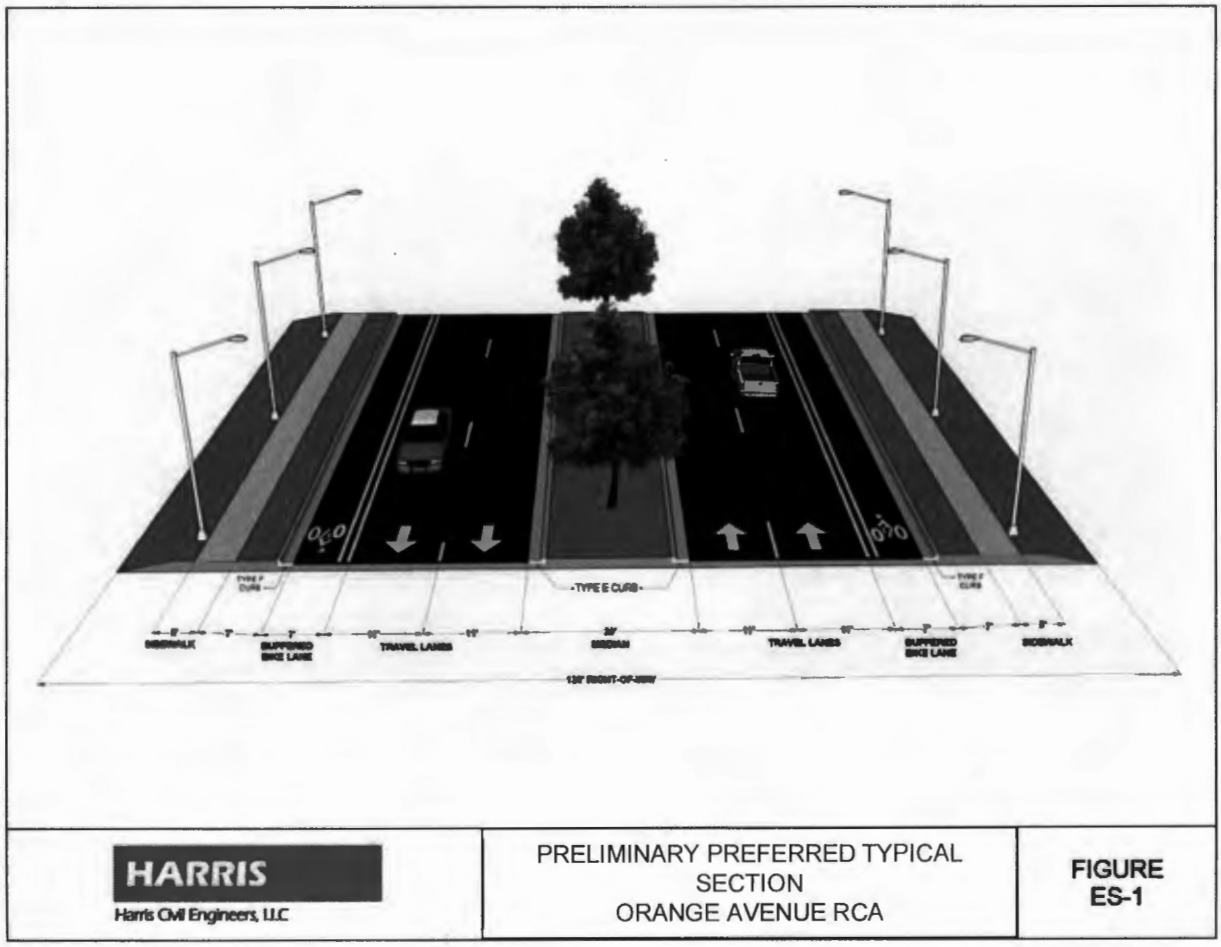


Figure ES- 1: Preliminary Preferred Typical Section

ES.7 Supporting Documents

Supporting documents were prepared as part of the RCA Study process in order to support project need, existing conditions, and alternative evaluation methods and results. The supporting documents include:

- Public Involvement Plan
- Corridor and Project Need Analysis
- Design Traffic Engineering Report
- Environmental Assessment Report
- Preliminary Geotechnical Report
- Alternatives Analysis
- Stormwater Alternatives Analysis
- Stormwater Alternatives – Recommended Alternative
- Public Hearing Transcript and Summary

ES. 8 Impacts and Costs

Table ES-1 summarizes the alternatives analyzes associated with the study.

Orange Avenue Roadway Conceptual Analysis (RCA) Study
From the County Line to Florida's Turnpike
Table ES-1 Alternatives Evaluation Matrix
Summary of Project Costs and Impacts

Evaluation Criteria	Alternative Improvements		
	1	2	3
Community Impacts			
Residential			
Single Family Homes Impacted (Each)	0	0	0
Single Family Homes Displaced (Each)(Roadway)	0	0	0
Single Family Homes Displaced (Each)(Ponds)	0	0	0
Vacant Land Impacts	0	0	0
Business			
Businesses Impacted (Each)	0	0	0
Businesses Displaced (Each)	0	0	0
Right-of-Way Impacts			
Acres Impacted (Roadway)	0.85	1.23	0.86
Acres Impacted (Joint Pond with Tupperware)	4.94	4.94	4.94
Total Acres Impacted	5.79	6.17	5.80
Environmental Impacts			
Wetland Impacts (acres)[1]	1.29	1.60	1.59
Potential Contamination Sites Impacted	None	None	None
Threatened and Endangered Species Impacts	Minimal	Minimal	Minimal
Mitigation Banking Costs[2]			
Wetlands (Based on $145,000/Credit)	$140,287.50	$174,000.00	$172,912.50
Project Costs			
Design Cost	$654,221.43	$654,221.43	$654,221.43
Right-of-way Costs[3]	$2,263,990.00	$2,313,007.00	$2,152,420.00
Construction Costs	$6,542,214.27	$6,542,214.27	$6,542,214.27
Mitigation Banking Costs[2]	$140,287.50	$174,000.00	$172,912.50
Total Costs	$9,600,713.20	$9,683,442.70	$9,521,768.20

Notes:
1. Wetland impacts include direct impacts.
2. Mitigation banking costs are preliminary with final costs to be determined during the design phase.
3. Right of Way cost estimates are for budgeting purposes only and cannot substitute for appraisals. This is only an estimate of land-only costs. In any acquisition (whether "under threat" or not), additional costs for improvements, costs to cure, severance damages, attorney's fees, owner costs, etc. may (and likely would) be incurred.

CHAPTER 1

Summary

1.0 Summary

The following section addresses the anticipated commitments and recommendations to occur at the conclusion of the RCA study. The preliminary commitments will be updated to reflect the outcome of the Local Planning Agency (LPA) Public Hearing and the Orange County Board of County Commissioner (BCC) Public Hearing.

1.1 Commitments

As part of the Orange Avenue Roadway Conceptual Analysis Study, the following commitments have been made:

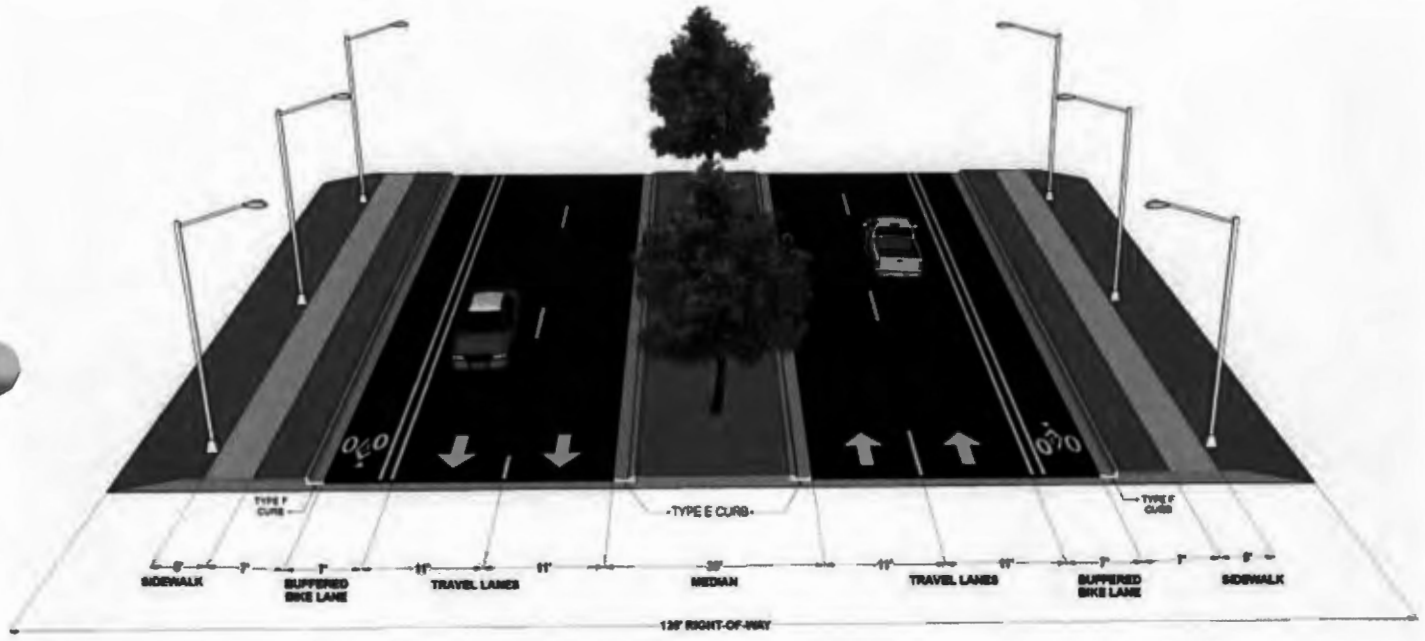
- Orange Avenue will be improved as a four-lane urban facility with buffered bicycle lanes, sidewalks, lighting and a closed drainage system.
- Implementation of the improvements will adhere to Orange County's standard practices, with an emphasis on maintaining access and acceptable driving conditions during construction.
- Consideration will be given to aesthetics, such as landscaping, during the design phase.
- The proposed Orange Avenue improvements will be coordinated with the current Florida's Turnpike project along Orange Avenue.
- Property owners affected by the proposed improvements will be contacted during the design and construction phases to coordinate various aspects of the project such as driveways and access.
- A Public Involvement Plan will be continued throughout the remaining phases of the project.

1.2 Recommendations

The Orange Avenue RCA Study analyzes the project traffic conditions, development of improvement alternatives, investigation of environmental and social impacts, and public involvement. The recommended improvements offer a balance between engineering considerations and impacts to the residences, businesses, and existing environment. Public involvement was stressed throughout the study to gain the support from users of the corridor.

It is recommended that Orange Avenue, from the Orange/Osceola County Line to Florida's Turnpike, shall be expanded to a four-lane urban roadway with sidewalks and buffered bicycle lanes. The recommended roadway geometry consists of a slight bend and a center alignment. The conceptual plan and proposed improvements can be found in ***Appendix A.***

The typical section for the proposed improvements will be consistent along the corridor. The improvements include four travel lanes, 11 feet wide, separated by a raised median. Future development will require left turn lanes in several sections of the study corridor. Seven-foot buffered bicycle lanes and five-foot sidewalks will be added to both sides of the roadway. Additionally, a seven-foot utility strip will be provided between the edge of pavement and the sidewalk. A 120-foot right-of-way along the corridor is required in order to achieve the desired section. Typical roadway sections are illustrated in ***Figure 1-1.***



HARRIS Harris Civil Engineers, LLC	PRELIMINARY PREFERRED TYPICAL SECTION ORANGE AVENUE RCA	**FIGURE 1-1**

CHAPTER 2

Introduction

2.0 Introduction

This section provides an overview of the study area as well as the purpose and need of the project.

2.1 Purpose

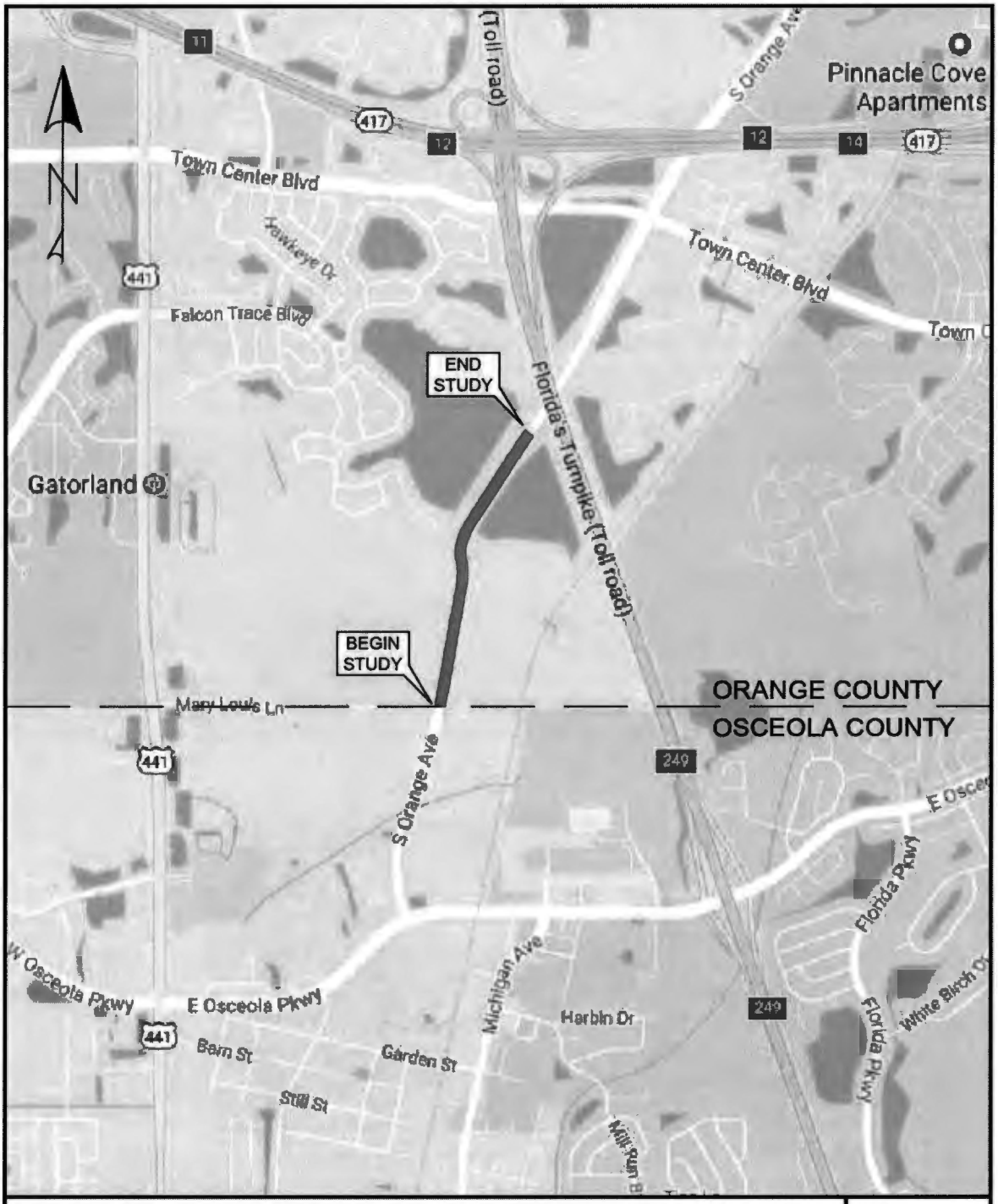
Harris Civil Engineers, LLC, was selected by Deerfield Land Corporation, in partnership with Orange County, to conduct a Roadway Conceptual Analysis (RCA) study for 0.61 miles of Orange Avenue from the Orange/Osceola County Line to Florida's Turnpike. The objective of the RCA study is to analyze the impacts and implications of widening Orange Avenue and to document the design recommendations which will be used to develop final construction plans. The RCA report will summarize the study to include Public Involvement, Data Collection, Traffic Data, Roadway Design, Drainage and Environmental Impacts and the Corridor Analysis.

Engineering and environmental data, Orange County goals and objectives, input from the public, and the application of current roadway design standards were evaluated and developed during the study process to provide potential alternatives to the improvement of Orange Avenue. The alternatives were evaluated based on estimated right-of-way costs and environmental impacts. The criteria used for evaluation during the study is discussed in ***Chapter 7-Alternative Alignment Analysis***. The conceptual plans for the recommended improvements are included in ***Appendix A.***

2.2 Project Description

The Orange Avenue corridor provides connection from Winter Park to Kissimmee, passing through downtown Orlando. The section of Orange Avenue under investigation spans from the Orange/Osceola County Line to Florida's Turnpike. The existing section is undeveloped and contains one northbound and one southbound travel lane. There are currently no sidewalks or dedicated bicycle facilities along this section of Orange Avenue. Figure 2-2 illustrates the limits of the project study.

Figure 2- 1: Perspective View of Orange Avenue



STUDY LOCATION
ORANGE AVENUE RCA
ORANGE COUNTY, FLORIDA

FIGURE 2-2

CHAPTER 3

Need for Improvements

3.0 Need for Improvements

This section focuses on the factors contributing to the need for improvements on Orange Avenue.

3.1 Need for Improvements

The need for improvements to Orange Avenue is based on several factors

- ***Roadway Capacity*** – The existing roadway capacity is at saturation level and currently operating at a Level of Service (LOS) F.
- ***Safety*** – Currently there are no sidewalks or bicycle facilities along this section of Orange Avenue. The lack of pedestrian facilities creates a safety concern for users of the corridor.
- ***Future Development*** – Vacant land surrounding the study corridor is expected to be developed in the near future.
- ***Consistency*** –The sections of Orange Avenue to the north and south of the study area are undergoing improvements as a part of other projects. By improving this section of Orange Avenue, there will be consistency throughout the roadway.

3.2 Roadway Capacity

The existing operating conditions along Orange Avenue and intersecting roadways during am and pm peak hour periods were evaluated during the study.

3.2.1 Existing Condition Level of Service Analysis

Existing traffic volumes on Orange Avenue range from 21,077 ADT South of Florida's Turnpike to 24,460 ADT South of Town Center Boulevard. Using the FDOT generalized AADT volume threshold, a roadway segment analysis was conducted. Based on the analysis, Orange Avenue is currently operating at LOS F.

An intersection LOS analysis was conducted along Orange Avenue at Mary Louis Lane and Town Center Boulevard. During the A.M. and P.M. peak hours, the signals operated at a LOS A and D, respectively.

3.2.2 Future Condition Level of Service Analysis

By the design year, 2045, traffic volumes are expected to increase to 41,409 ADT under the no-build scenario. The study segments are anticipated to operate below the adopted LOS capacity by the opening year. With the proposed build scenario, the study segments are anticipated to operate within the adopted LOS capacity in the design year.

3.3 Safety

Crash information was obtained from FDOT for 2014 through 2018. The data revealed that most of the crashed occurring within the study area were front to rear crashes (aka rear-end crashes). 64% of the crashed resulted in property damage with 71% occurring in dry conditions, and 57% during daylight. A more detailed analysis is provided within the ***Design Traffic Technical Memorandum (DTTM)*** developed as a ***Supporting Document*** of this study.

3.4 Future Development

Deerfield Land Corporation owns most of the land along the study corridor. It is anticipated that the property will be developed in the near future. An increase in development increases the need for improvements along Orange Avenue.

3.5 Consistency

The segment of Orange Avenue to the south of the study area underwent widening improvements from Osceola Parkway to the Orange/Osceola County Line, which were completed in 2018. The roadway improvements included expanding from two lanes to four lanes and includes bicycle lanes and well as sidewalks. Additionally, the segment to the north of the study area is undergoing improvements through the Florida's Turnpike project. The proposed improvements in the study area will ascetically match the recent improvements, and those still in progress around the study area.

CHAPTER 4

Existing Corridor Conditions

4.0 Existing Corridor Conditions

This section presents and overview of the existing physical characteristics and conditions of the Orange Avenue study corridor.

4.1 Roadway Characteristics

The study area consists of a two-lane undivided Urban Class 1 arterial roadway. The roadway contains 11 to 12-foot travel lanes and 0 to 2-foot paved shoulders.

There is approximately 800 feet of sidewalk on the west side of Orange Avenue at the Orange/Osceola County Line. There are no pedestrian features in the remainder of the study area. Additionally, there are no bicycle lanes.

The existing right-of-way width is primarily 64 feet throughout the study area. Deerfield Land Corporation, which is the property owner of the land adjacent to the south end of the study area, previously dedicated right-of-way to Orange County in anticipation of the need for roadway improvements. Additionally, Orange County owns land adjacent to the roadway on the north end of the study area.

4.2 Crash Data

Crash information was obtained from FDOT for 2014 through 2018. The information is summarized in ***Table 4-1.***

Table 4- 1: Orange Avenue Crash Data from 2014 to 2018

Year	Total Crashes	Crash Type			
		Rear End	Sideswipe	Off Road	Other
2014	29	15	3	5	6
2015	42	16	8	6	12
2016	41	24	5	2	10
2017	22	7	4	4	7
2018	27	8	4	2	13
Total	**161**	**70**	**24**	**19**	**48**

4.3 Existing Transportation Network

The existing transportation network within the study area is comprised mainly of the current roadway system. There are no LYNX bus routes that utilize the study area. There are no major roadways within the study area. A Sun Rail station located 1/3 mile south of the study area opened in 2018.

4.4 Long Range Transportation Improvements

Roadway improvements are already underway to the north and completed to the south of the study area.

4.4.1 Orange Avenue

4.4.1.1 Osceola Parkway to the Orange/Osceola County Line

Orange Avenue was widened in 2018 to a four-lane divided roadway with sidewalks and bicycle lanes in both directions. Several signals have been added along Orange Avenue, including the intersection of Mary Louis Lane and Orange Avenue.

4.4.1.2 Orange Avenue Bridge Over Turnpike

Reconstruction of the Orange Avenue bridge over the Turnpike is currently under construction. The full buildout will include 4 travel lanes, and paved shoulders.

4.4.2. SunRail Station

A SunRail station was built 1/3 of a mile south of the study area in 2018.

The planned roadway and transportation improvements are summarized in ***Table 4-2*** below.

Table 4- 2: Programmed Roadway Improvements in the Vicinity of the Study Area

Roadway Facility	Project Limits	Work Description	Responsible Agency	Work Phase	Year of Completion
Orange Avenue	Osceola Parkway to the Orange/Osceola County line	Widening to 4 lanes, addition of bicycle lanes and sidewalks	Osceola County	Completed	2018
Orange Avenue	South of Turnpike overpass to Town Center Blvd.	Overpass expansion and widening OA to 4 lanes	FDOT	Construction Underway	2021

The proposed improvements stay consistent with the Long Range Plans of Orange County by providing an enhanced system of roads, public transit, bicycle and pedestrian systems, while focusing on safety, accessibility, convenience and minimizing environmental impacts.

The Comprehensive Plan and Long Rage Plans of Orange County focus on connectivity throughout the corridor. The alternatives will offer connectivity by providing both pedestrian and bicycle access that is not present in the existing infrastructure.

4.5 Lighting

There is currently lighting along the west side of Orange Avenue for the entirety of the study area. The lighting fixtures are located on joint use utility poles.

4.6 Existing Utilities

There are several existing utilities within the corridor which include overhead electric lines, water lines, and fiber optic cables. The details of the existing utilities are provided below in ***Table 4-3.***

Table 4- 3: Existing Utilities

Utility	Types of Lines	General Location
Orange County Utilities	Water Main	**Existing:** There is an existing water main to the west of the proposed storm water pond. No conflict is expected with the proposed improvements. During design it may be discovered that relocation of all or part of the water main may be necessary. **Existing:** A water main from the County line was extended north to Falcon Trace in 2018.
Spectrum	Fiber optic cables	**Existing:** Fiber optic cables are located on the east side of Orange Avenue. The cable may need to be relocated.
Duke Energy	Power Lines	**Existing:** Duke Energy has power lines running north through the study area. They are responsible for the lighting along Orange Avenue.

4.7 Pavement Conditions

The existing pavement is in fair condition with minor cracking and rutting. ***Figure 4-1*** displays the existing pavement and striping along Orange Avenue.

Figure 4- 1: Pavement Condition of Orange Avenue

4.8 Geotechnical

A preliminary geotechnical evaluation was completed as part of the Orange Avenue RCA, as documented in the ***Supporting Document*** titled ***Roadway Soil Survey Report***.

According to the "Kissimmee, Florida" USGS Quadrangle Maps, the natural ground surface contours (5 foot), in the project area, are from +80 feet to +85 feet. The USGS Quadrangle Map is shown in ***Figure 4-2***.

4.8.1 Soil Exploration

The United States Department of Agriculture (USDA) Soil Survey map of the study area can be found in ***Figure 4-3***. A summary of the soils in the study area is presented in ***Table 4-4.***

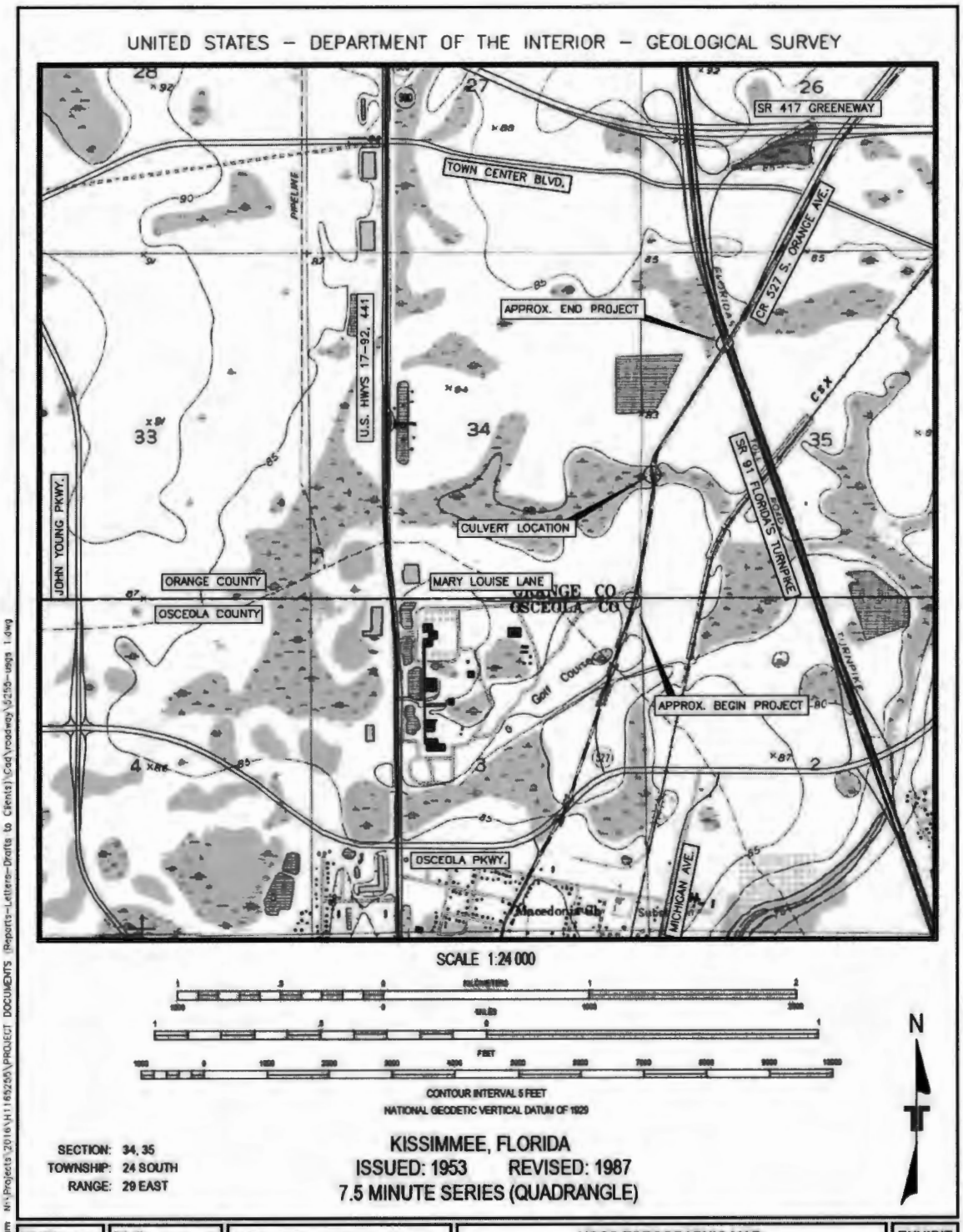
Table 4- 4: Near Surface Soil Units

USDA Map Symbol	USDA Soil Name	Depth of Season High Groundwater Table for Site Soils in Natural Conditions
3	Basinger Fine Sand, depressional	Standing water or within 12 inches
34	Pomello fine sand, 0 to 5 percent slopes	20 to 40 inches
37	St. Johns Fine sand	Within 10 inches
41	Samsula-Hontoon-Basinger Association, depressional	Standing water or within 10 inches
44	Smyrna fine sand	Within 10 inches

The subsurface exploration consisted of hand auger borings and Standard Penetration Test (SPT) borings to depths of 5 to 15 feet below the existing ground surface. SPT borings for the dry pond and stormwater pond expansion were performed as part of this study. Additionally, an SPT muck probing was performed at the location of the proposed box culvert extension.

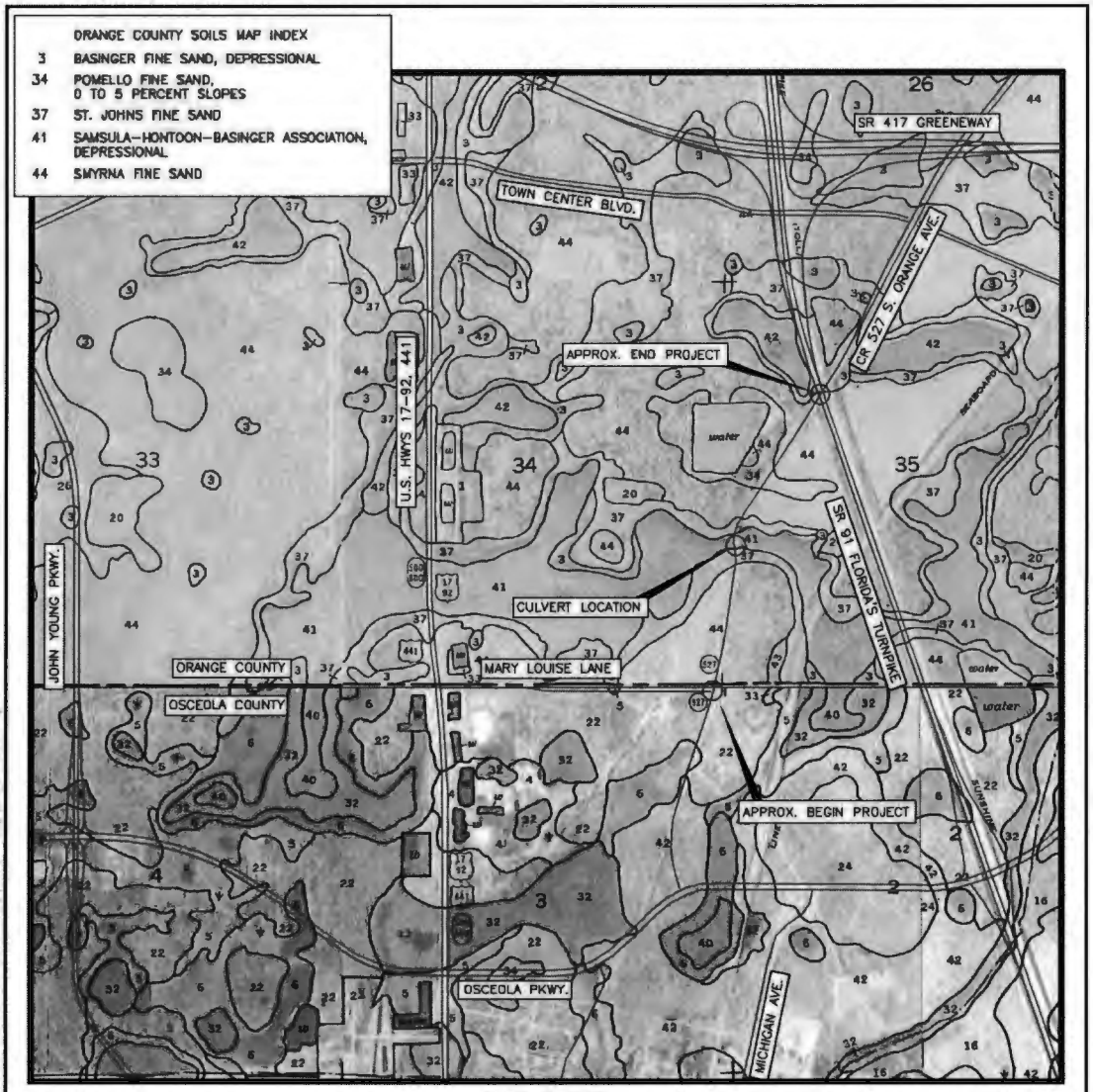
The hand auger boring procedure consisted of manually turning a 3-inch diameter, 6-inch long sample into the soil until it was full. The sampler was then retrieved and the soils in the sampler were visually examined and classified. The procedure was repeated until the desired termination depth was achieved. Samples of representative strata were obtained for further visual examination and classification in the laboratory.

There were several strata, visually identified and laboratory tested, that were found in the study area. Descriptions of the soils encountered in the borings, and the ASSHTO classification symbols are presented in ***Table 4-5***. It should be noted that soil transition between soil types is gradual and layer boundaries between soil types are considered approximate.



Project Mngr: XZ	Project No: H1165255	Terracon Consulting Engineers and Scientists	USGS TOPOGRAPHIC MAP	EXHIBIT
Drawn By: SW	Scale: AS SHOWN	1675 LEE ROAD WINTER PARK, FLORIDA 32789	GEOTECHNICAL ENGINEERING EVALUATION	4-2
Checked By: XZ	File No: H1165255-1	PH. (407) 740-8110 FAX. (407) 740-8112	ORANGE AVENUE SOUTH WIDENING	
Approved By: AMS	Date: 9-23-17		FROM MARY LOUIS LANE TO FLORIDA'S TURNPIKE	
			ORANGE COUNTY, FLORIDA	

Sep 25, 2017 - 9:33am M:\Projects\2016\H1165255\PROJECT DOCUMENTS (Reports-Letters-Drafts to Clients)\Cad\roadway\5255-usgs 1.dwg



U.S.D.A. SOIL SURVEY FOR ORANGE COUNTY, FLORIDA
ISSUED: 1989

SECTION: 34, 35
TOWNSHIP: 24 SOUTH
RANGE: 29 EAST

Project Mngr: XZ	Project No: H1165255	Terracon Consulting Engineers and Scientists	U.S.D.A. SOILS MAP	EXHIBIT
Drawn By: SW	Scale: AS SHOWN	1675 LEE ROAD WINTER PARK, FLORIDA 32789	GEOTECHNICAL ENGINEERING EVALUATION	4-3
Checked By: XZ	File No: H1165255-2	PH (407) 740-6110 FAX (407) 740-6112	ORANGE AVENUE SOUTH WIDENING	
Approved By: AMS	Date: 9-23-17		FROM MARY LOUIS LANE TO FLORIDA'S TURNPIKE	
			ORANGE COUNTY, FLORIDA	

Sep 25, 2017 - 8:34am N:\Projects\2016\H1165255\PROJECT DOCUMENTS (Reports-Letters-Drafts to Clients)\Cad\roadway\525-usda 2.dwg

Table 4- 5: Soil Stratification

Stratum No.	Description	ASSHTO Classification
1	Light gray to light brown to dark gray fine sand to fine sand with silt with some organics, limerock base, gravel, root fibers, and trace cemented sands	A-3
2	Gray to grayish brown to brown silty fine sand trace organics, cemented sands and some decayed wood	A-2-4
3	Light brown grayish brown clayey fine sand	A-2-6

4.8.1.1 Roadway

The roadway borings typically encountered Stratum 1 and Stratum 2, with Stratum 3 intermittently encountered at various depths and thicknesses in the borings.

During drilling, the boreholes were observed for the presence and level of groundwater. In a majority of the borings, groundwater was observed at depths ranging from standing water to around five feet below existing grade. Groundwater was not observed at several locations to a termination depth of six feet below existing grade.

4.8.1.2 Pond

The pond borings typically encountered Stratum 1 and Stratum 2, with Stratum 3 intermittently encountered at various depths and thicknesses in the borings.

During drilling, the boreholes were observed for the presence and level of groundwater. In a majority of the borings, groundwater was observed at depths ranging from standing water to around three feet below existing grade.

4.8.1.3 Box Culvert

Manual muck probes were performed and approximately 4 feet of standing water and a maximum thickness of 2 feet of surficial organic soil or muck was encountered. It is recommended that two additional SPT borings to be performed when the area is accessible after clearing.

4.8.2 Preliminary Evaluation

The data obtained in the field exploration and experience with similar subsurface conditions and construction types were used to evaluate the project characteristics previously outlined. The evaluation is presented in this section.

4.8.2.1 Roadway Borings

The material from Strata 1 and 3 (A-3, A-2-4) can be classified as Select (S) and can be used as embankment material in accordance with Index 505 of the Florida Department of Transportation (FDOT) Roadway and Traffic Design Standards. The material from Strata 2 (A-2-4) may retain excess moisture and may be difficult to compact.

The material from Stratum 3 (A-2-6) should be classified as Plastic (P). This material should be removed with Index 500 and 505. It may be placed above the existing water level at the time of construction to within 4 feet of the proposed base. It should be placed

uniformly in the lower portion of the embankment for some distance along the project rather than full depth at shorter distances.

If plastic and/or organic materials are encountered along the project alignment during construction, at locations that were not indicated on this report or where soil borings were not preformed, these materials should be removed in accordance with FDOT Index 500 and 505.

Generally, a minimum separation of 2 feet is recommended between the estimated seasonal high groundwater level and the bottom of a lime rock base. For a non-lime rock base, typically, a minimum separation of 1 foot is recommended between the seasonal high groundwater level and the bottom of an asphalt or soil cement base. Once cross sections are available for review, an evaluation of the clearance between the estimated seasonal high groundwater level and the bottom of the roadway base will be performed.

4.8.2.2 Pond Borings

The material from Strata 1 and 2 can be classified as Select (S) and can be used as embankment material in accordance with Index 505. The material from Strata 2 will retain excess moisture and be difficult to compact. The material from Strata 2 shall be classified as Plastic (P) material.

4.8.2.3 Culvert Foundation Recommendations

Based on the boring results, it appears that the subsurface conditions at the sites will be suitable for support of the proposed box culvert or culvert extensions on properly prepared subsoils. Subsoil preparation consisting of dewatering, over-excavation of deleterious foundation material and organic material, subsoil compaction, and fill compaction will be required to provide adequate support for the box culvert foundations.

Based on groundwater levels encountered at the time of this evaluation, dewatering will likely be necessary for adequate preparation of the box culvert foundation subsoil. Diversion of water flow will be necessary to facilitate dewatering and subsoil preparation. After the flow has been diverted, all standing water should be pumped from the area of the proposed box culverts and groundwater levels should be lowered to at least two feet below the deepest excavation. A series of sumps in the bottom of the open excavation or properly designed well point system should adequately lower the groundwater level.

Once dewatering has been accomplished, the subsoil should be examined by the Geotechnical engineer, and should be proof rolled using an adequately sized roller. At that time, any organic, plastic, or highly compressive soil, such as clay, peat, or muck, should be removed in accordance with Specification 125 of the FDOT Standard Specifications.

4.9 Potential Contamination Issues

No contamination sites were located in the study area, or within 1/4-mile. The closest documented site is 1/2-mile to the southwest of the study area. Florida Department of Environmental Protection's (FDEP) online Contamination Locator Map was used to locate and evaluate the study area.

4.10 Land Uses

4.10.1 Existing Land Use

The existing land use along Orange Avenue consists of planned-development. ***Figure 4-4*** illustrates the land use designations along the study corridor.

4.10.2 Future Land Use

The future land use for Orange County, as designated by the Orange County Future Land Use Maps can be found in ***Figure 4-5.***

4.11 Cultural Features

This section discussed cultural features that are found within the study area.

Schools

There are no schools that fall within the study area. ***Table 4-6*** shows the public-school zoning for the study area. Currently there is no residential development along the study area.

Table 4- 6: Public School Zoning within Study Area

School Type	Boundary Along Orange Avenue	School
Elementary School	Westside of Orange Avenue	Endeavor
	Eastside of Orange Avenue	Oakshire
Middle School	N/A	Meadow Woods
High School	N/A	Cyprus Creek

Religious Institutions

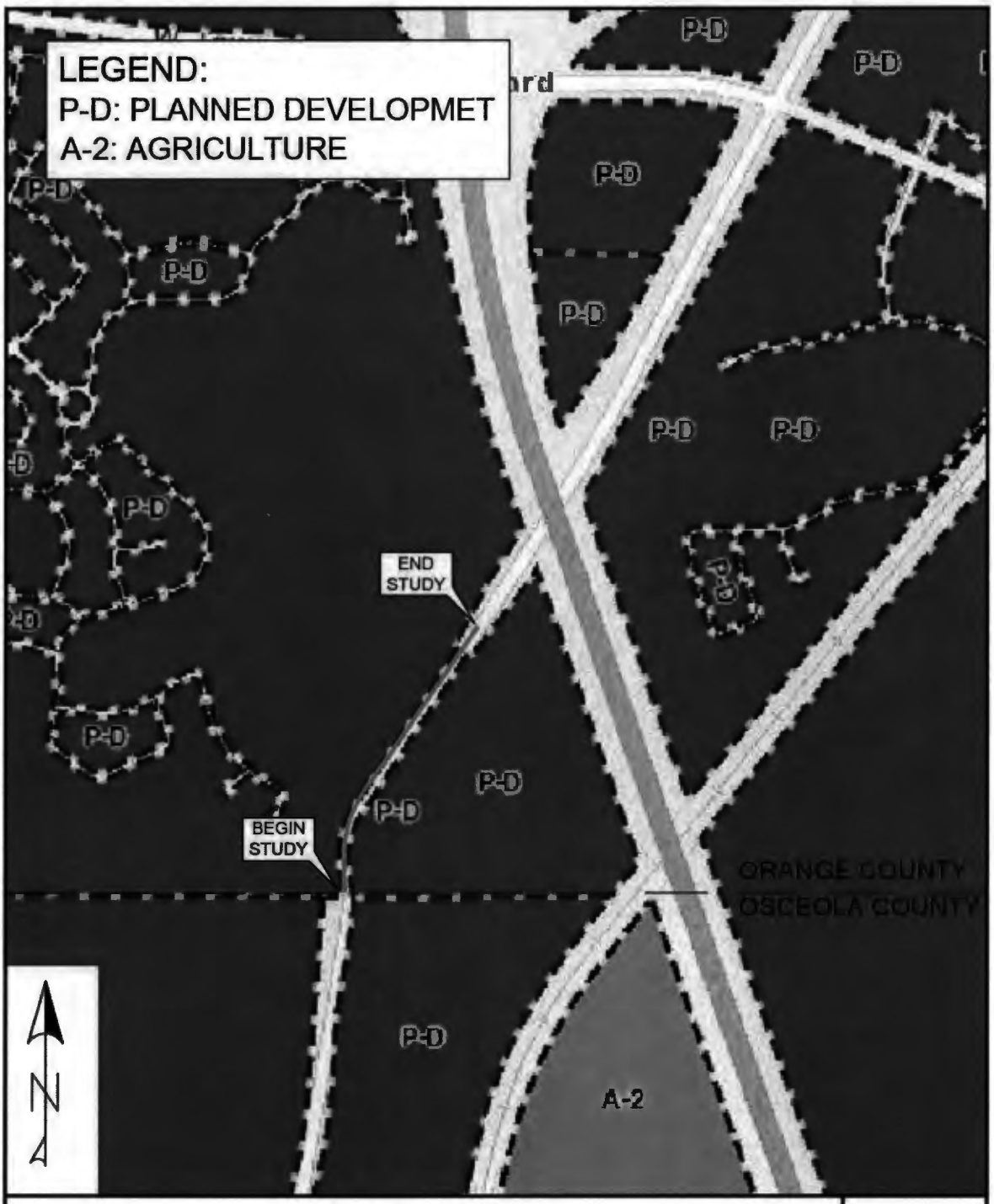
There are no religious institutions that fall within the study area.

Community Centers

There are no community centers that fall within the study area.

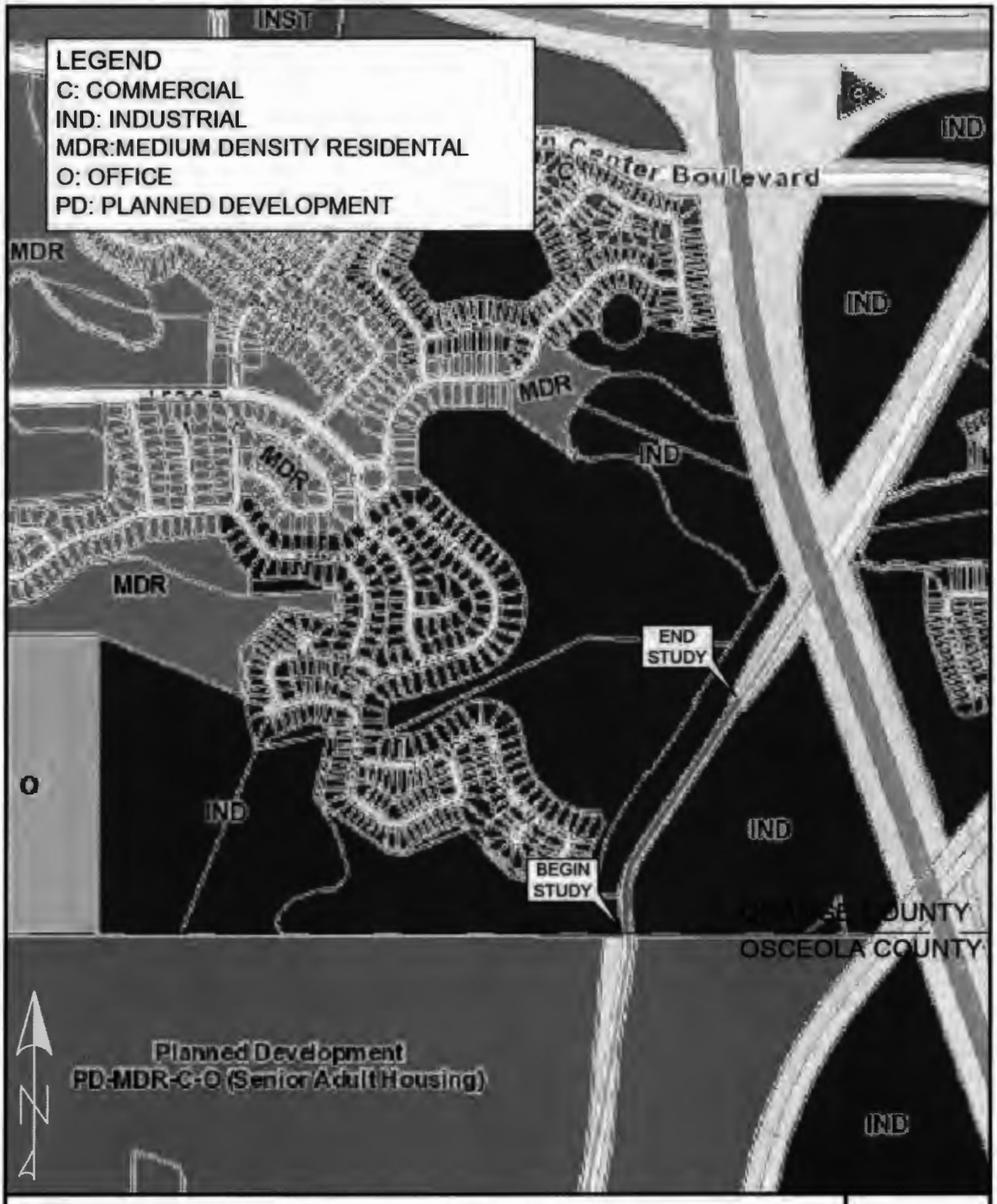
Parks

There are no public parks within the study area.



EXISTING LAND USE
ORANGE AVENUE RCA
ORANGE COUNTY, FLORIDA

FIGURE 4-4



FUTURE LAND USE
ORANGE AVENUE RCA
ORANGE COUNTY, FLORIDA

FIGURE 4-5

4.12 Archaeological and Historic Features

According to the Florida Master Site File, there are no archeological or historic features in the study area. It should be noted that the Florida Department of State's Division of Historical Resources (DHR) may request a Cultural Resources Assessment Survey at the time of permitting.

4.13 Hydraulic and Natural Features

4.13.1 Existing Drainage Features

In the study area, stormwater flows off the roadway into adjacent swales which conveys the water to the wetlands on either side of Orange Avenue. Currently there are no stormwater treatment facilities.

4.13.2 Floodplains and Floodways

Based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM's), the north part of the study area is located in Zone A (100 year) floodplain. The remainder of the site is located in Zone X (500 Year) floodplain. Zone A typically occurs in wetlands or low-lying areas. Figure 4-6 displays the FEMA floodplains.

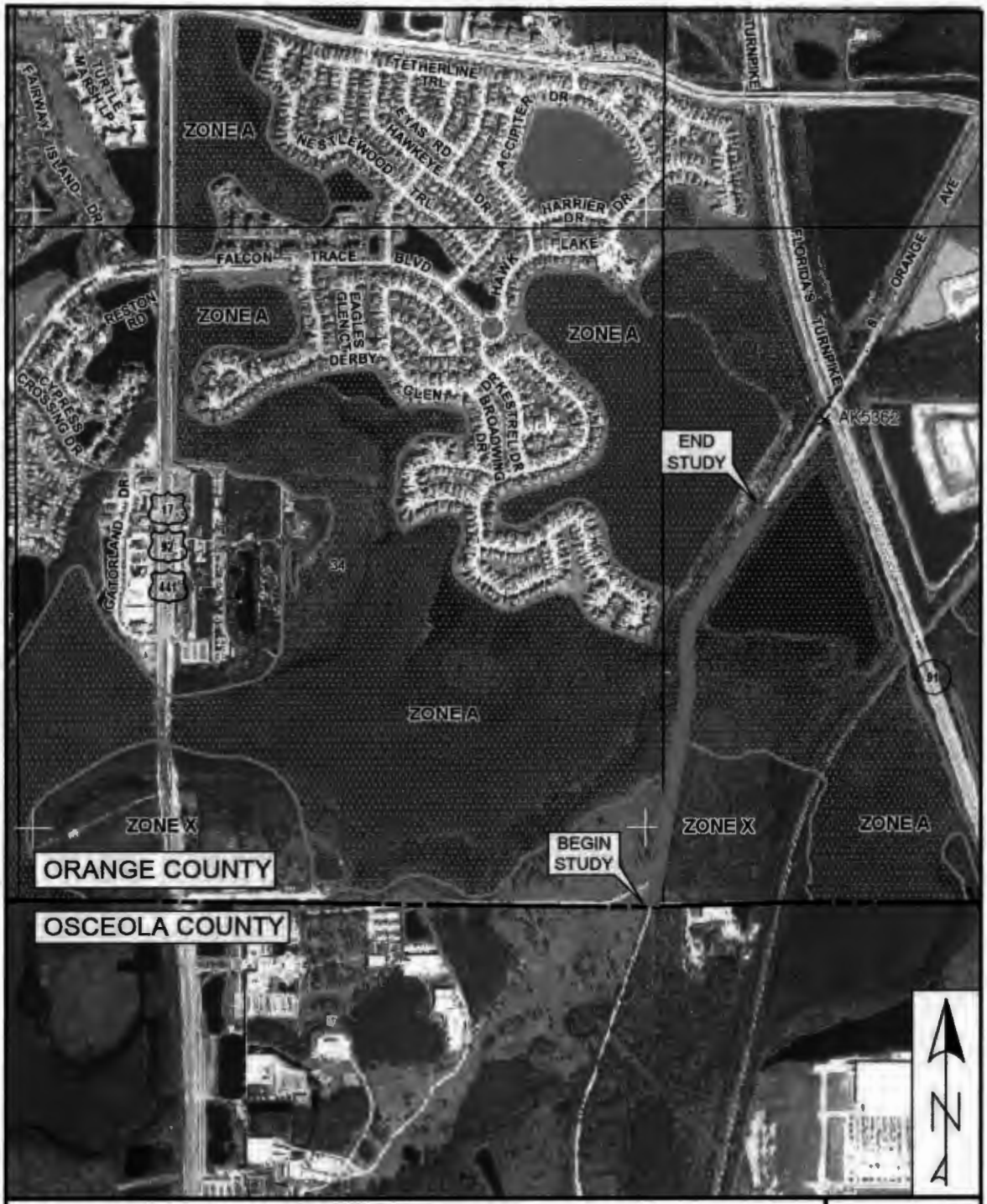
4.13.3 Wetlands

The proposed roadway improvements result in an impact to surrounding wetlands and uplands. ***Figure 4-7*** displays the land use, defined by the Cover and Forms Classification System (FLUCFCS, FDOT 1999). A description of the land cover can be found in ***Table 4-7.***

Table 4- 7: Land Cover Description

Land Cover	Description
190-Open Land	Vegetative cover consists of bahia grass (*Paspalum notatum*) with a few longleaf pines (*Pinus palustris*)
411-Pine Flatwoods	Dominated by a canopy of long-leaf pine (*Pinus elliottii*) with an understory of saw palmetto (*Serenoa repens*).
621- Cypress	Wetlands associated within the project corridor are classified as cypress. The canopy is dominated by bald cypress (*Taxodium distichum*), with pond cypress (*Taxodium ascendens*)
Roads and Highways	Existing paved 2 lane road and right-of-way

The wetlands are currently protected by a Conservation Easement (CE), and were used as mitigation for the original Southchase development permits. Falcon Trace Property Owner's Association owns the land to the west of the existing roadway. Coordination is needed to acquire the property required for the proposed improvements. The impacts will require a CE release and mitigation to replace the existing preservation mitigation. The jurisdictional wetlands are regulated and constrained by the South Florida Water Management District (SFWMD), the U.S. Army Corps of Engineers (ACOE), and Orange County Environmental Protection Division (OCEPD). Special permits and wetland mitigation are required when impacting wetlands.



FEMA FLOOD MAP
ORANGE AVE RCA
ORANGE COUNTY, FLORIDA

FIGURE 4-6

Figure 4- 7: Land Cover

4.14 Threatened and Endangered Species

The project area was surveyed for the presence and potential of occurrence of protected wildlife and plants. The following section discusses the results.

4.14.1 Listed Wildlife

Based on the Florida Natural Areas Inventory (FNAI) species tracking list for Orange County, there were several species identified as having the potential for occurrence in or near the project area. Table 4-8 summarizes the habitat descriptions and potential for occurrence of these species within the study area.

Table 4- 8: Protected Wildlife Species, Habitat Descriptions, and Potential for Occurrence

Species	Status[1]		Habitat	Potential for Occurrence
	USFWS[2]	FFWCC[3]		
BIRDS				
Haliaeetus leucocephalus Bald Eagle	--	P	Estuarine, lacustrine, riverine, tidal marsh, tidal swamp	Low
Mycteria americana Wood Stork	--	E	Freshwater wetlands, calm waters, no dense thickets of vegetation	Present
REPTILES				
Neoseps reynoldsi Sand Skink	T	T	Spends its lifecycle beneath the surface of sandy soils.	Low
Gopherus Polyphemus Gopher Tortoise	--	T	Dry upland areas such as sand hills, scrub, xeric oak hammock, and dry pine flatwoods.	Low
Alligator mississippiensis American Alligator	S	--	Swamps, streams, rivers, ponds, and lakes.	Low

[1]T=Threatened; E=Endangered; P= Protected under Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act; S=Similarity of appearance to a threatened species
[2]USFWS=U.S. Fish and Wildlife Service
[3]FFWCC= Florida Fish and Wildlife Conservation Commission

4.14.2 Wildlife Crossing

The location of potential wildlife crossings can be coordinated with Orange County staff to maintain or enhance current wildlife crossings in the area. The current roadway design does not incorporate and specific wildlife crossings with the exception of the small bridge that crosses Mill Slough. The addition of a wildlife crossing would both enhance the area and help reduce wildlife fatalities. After the preferred alternative for the roadway alignment is selected, design specifications can be discussed. A box culvert will be incorporated into the final roadway design and will allow for the safe crossing of wildlife.

4.14.3 Protected Flora

No protected floral species were identified within the project area. Because of the anthropogenically disturbed and maintained nature of the majority of the project site and vicinity, there is a low potential for listed floral species to exist within the study area. There are typically no developmental constraints associated with listed species that occur on privately owned lan

5.0 Design Controls and Standards

5.1 Roadway Design Criteria

The FDOT Plans Preparation Manual, the FDOT Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, and the Manual of Uniform Traffic Control Devices, as well as Orange County standards provide the basis of design criteria for the Orange Avenue RCA.

Specific design criteria used for the development of the proposed design are shown in the ***Table 5-1*** below.

Table 5- 1: Orange Avenue Roadway Design Criteria

Criteria	Value
Functional Classification	Urban Class 1 Arterial Road
Design Speed	45 mph (Posted 35 mph)
Level of Service	E or better
Lane Widths	11 feet
Bicycle Lane Widths	7 feet
Sidewalk Width	5 feet
Median Width	20 feet
Curb Type	Type F (outside) Type E (inside)
Clear Zone	7 feet from edge of pavement

5.2 Drainage Criteria

For the purposes of this study, stormwater design criteria will need to meet the requirements of the South Florida Water Management District (SFWMD) and Orange County. The following design criteria will be critical in determining the pond sizing property requirements for the stormwater ponds needed for the roadway widening project.

- Open Basins: Match post-development to pre-development peak discharge rates out falling from ponds for the 25-year, 24 hour storm event (SFWMD criteria).
- Wet Detention: Treatment volume to be greater of one inch of runoff over basin or 2.5 inches of runoff over the total roadway impervious area (including existing pavement) within the project limits (SFWMD criteria).
- Pond dimensional criteria: 0.5 acre minimum area, 100 feet minimum width for linear areas in excess of 200 feet length, and a 4:1 (horizontal: vertical) minimal slope from top of bank out to a minimum depth of two feet below the control elevation, or an equivalent substitute. Side slopes shall be top soiled, and stabilized through seeding or planting from 2 feet below to 1 foot above the control elevation to promote vegetative growth.

The pond dimensional criteria for the pond sizing calculations, as discussed above, are based on standard slopes and dimensions that are commonly used for wet detention stormwater ponds.

CHAPTER 6

Traffic

6.0 Traffic

This chapter presents a summary of the existing traffic conditions as well as the future traffic projections for Orange Avenue as documented within the ***Design Traffic Technical Memorandum (DTTM)*** developed as a ***Supporting Document*** of this study.

Traffic counts were conducted at pertinent roadway sections and intersections along the study area. The following intersections were evaluated:

- Town Center Boulevard
- Mary Louis Lane

Then a Level of Service (LOS) analysis was conducted using the existing traffic counts, signal timing data and roadway intersection geometry. The following sections provide details regarding the overall process and results.

6.1 Existing Conditions

6.1.1 Traffic Counts

Existing traffic count data was collected during the month of May 2017. The data collection included:

- 72-hour Classification Counts (3 locations)
- 8-hour intersection Turning Movement Counts (2 intersections)

The 72-hour classification counts were conducted during peak season, and therefore not adjusted using a peak seasonal correction factor. Existing turning movement counts were obtained at the intersections of Mary Louis Lane and Town Center Boulevard for the A.M and P.M. peak periods. The existing turning movement counts did not need to be adjusted using seasonal factors as the counts were conducted during peak season. The traffic data count locations are shown in ***Figure 6-1.***

6.1.2 Traffic Characteristics

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

- K_{30}—represents the relationship between the travel demands occurring the 30th highest hour of the year and the average annual daily traffic
- D_{30}—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.

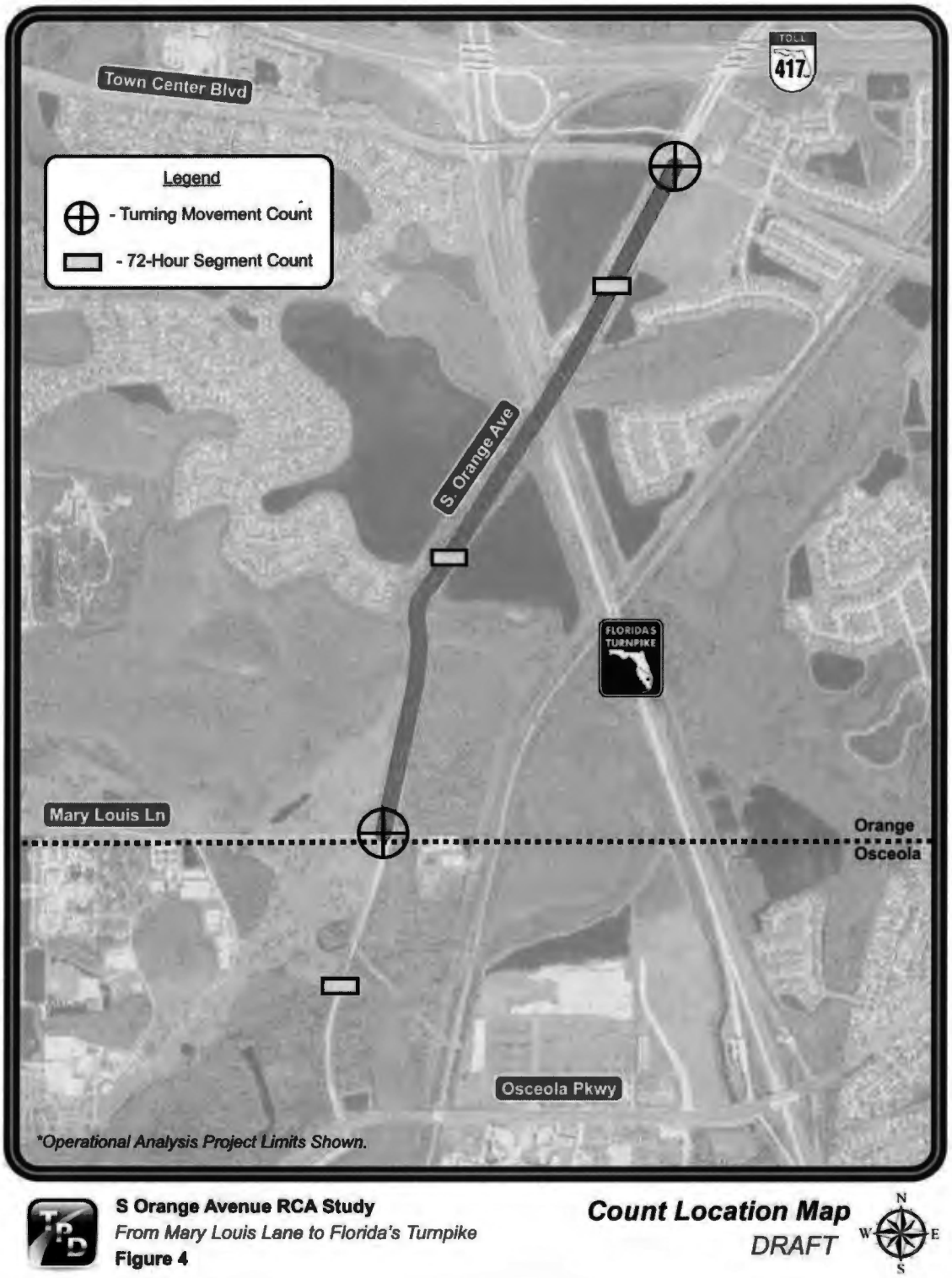


Figure 6- 1: Traffic Count Locations

The characteristics determined by the traffic count were compared with the factors reported in the FDOT traffic counts data. The K, D and T factors used in the analysis are provided in ***Table 6-1.***

Table 6- 1: Design Characteristics for Orange Avenue

Factor	Measured	FDOT	Recommended
K	7.36%	9.00%	9.00%
D	57.4%	52.5%	55.0%
T Daily	7.48 %	6.00%	6.70%

6.1.3 Existing Geometry

The existing geometry is used in evaluating the need for improvements based on projected future travel demands. The existing geometry along the study area can be found in ***Figure 6-2.***

6.1.4 Existing Year Traffic Volumes

The Adjusted Average Daily Traffic (AADT) for segments within the study area are provided in ***Table 6-2***. ***Figure 6-3*** provides the existing AM/PM intersection volumes for the intersections counted during the traffic study.

Table 6- 2: Existing Traffic Volumes†

Roadway Segment Orange Avenue	ADT
South of Mary Louise Lane	24,243
South of Florida's Turnpike	24,463
South of Town Center Blvd	24,500

†Table Source: Design Traffic Technical Memorandum Prepared by TPD, 2017

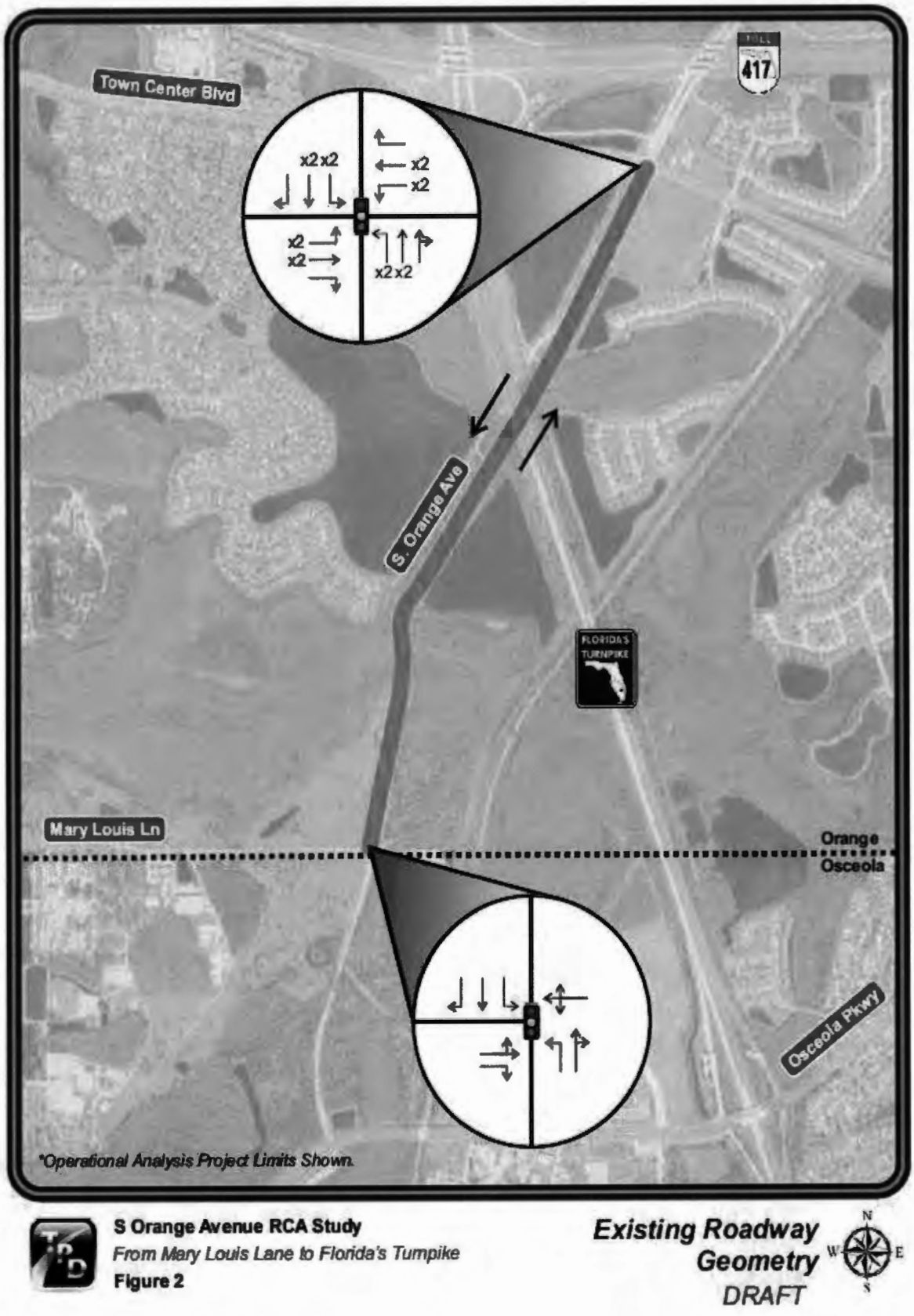
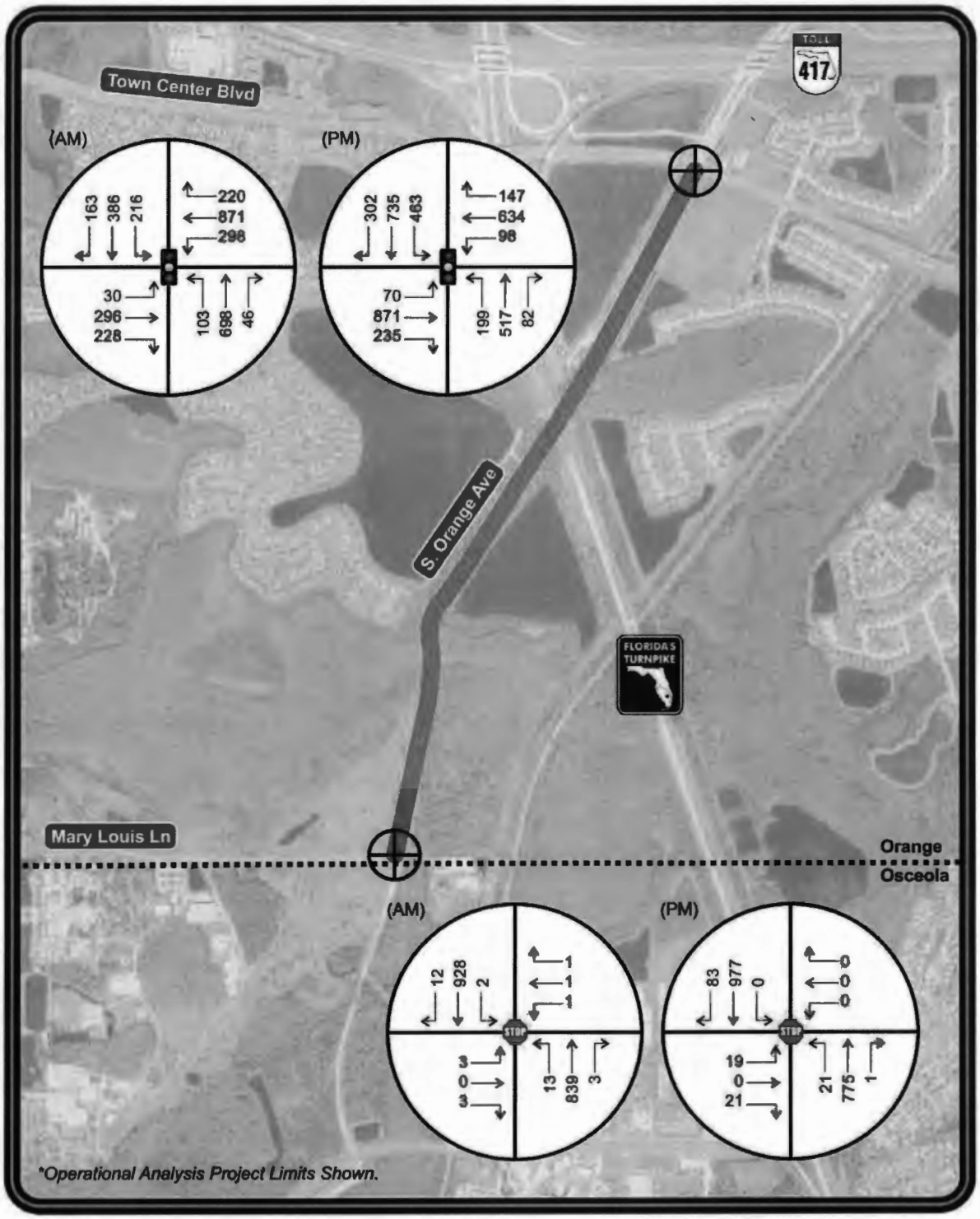


Figure 6- 2: Existing Roadway Geometry



S Orange Avenue RCA Study
From Mary Louis Lane to Florida's Turnpike
Figure 3

Existing A.M./P.M. Intersection Volumes
DRAFT

N W E S

Figure 6- 3: Existing Turning Movement Counts

6.1.5 Existing Condition Level of Service Analysis

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

Orange Avenue was evaluated to determine the existing roadway and intersection operating conditions. The results are provided and discussed in the following sections.

6.1.5.1 Roadway Segment

The study corridor was analyzed by comparing the existing daily traffic volume on Orange Avenue and the corresponding capacity at the adopted LOS standard. The existing volumes on S. Orange Avenue, as determined from the 72-hour counts and as documented in the Orange County Concurrency Management Program (CMP) were compared and the more conservative values from the Orange County CMP utilized for the analysis.

Table 6- 3: Existing PM Peak Hour Roadway Capacity Analysis and LOS

Roadway Segment	No. of Lanes	LOS Standard	PM Peak-Hour Peak-Direction		
			Volume*	Capacity	LOS
S. Orange Avenue					
County Line to Town Center Blvd	2U	E	1,034	880	F

**Based on the P.M. Peak Hour Volume During the 24-Hour Count Obtained South of FL's Turnpike*

The analysis reveals that the study segment is currently operating at LOS F under the existing conditions.

6.1.5.2 Intersections

The capacity analysis at each intersection was performed using existing intersection geometry, traffic volumes during the A.M. and P.M. peak hours, and signal timing data.

Table 6- 4: Existing AM/PM Intersection Capacity Analysis and LOS

Intersection	Control	Time Period	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
S. Orange Ave & Mary Louis Lane	Stop	AM	53.3	F	55.2	F	0.2	A	0.0	A	--	--
		PM	107.5	F	0.0	A	0.0	A	0.8	A	--	--
S. Orange Ave & Town Center Blvd	Signal	AM	33.3	C	34.7	C	39.0	D	38.3	D	36.3	D
		PM	32.6	C	28.4	C	39.7	D	56.3	E	41.2	D

The results of the analysis concluded that the intersections under investigation are generally currently operating at satisfactory overall LOS. Some of the east-west minor street movements at the Orange Avenue and Mary Louis Lane intersection are operating at a failing intersection.

6.2 Future Analysis Scenarios

6.2.1 Design Period

Orange County estimates the opening year target for the widening of Orange avenue is 2025. The following years were used to provide future traffic forecasts for the corridor:

- Existing Year—2017
- Opening Year—2025
- Mid-Year—2035
- Design Year—2045

6.2.2 Analysis Scenarios

Design traffic volumes were developed for both a no-build and build scenario. The no-build scenario assumes the roadway will maintain the existing geometry and intersection configurations. The build scenario includes widening Orange Avenue to four lanes and signalizing the intersection at Mary Louis Lane. Since the time of the traffic report, the intersection of Mary Louis Lane and Orange Avenue has been signalized.

6.3 Future Year Traffic Projections

6.3.1 Future Corridor Travel Demands

Examination of historical traffic growth, proposed development in the study area, and a basic understanding of traffic circulation patterns are required for the development of traffic projections. The following sections discuss growth rates for various method, and the recommended growth factor.

6.3.2 Trends Analysis

The Trends Analysis method for determining traffic projections uses historical growth patterns to determine traffic projections. The analysis of historical data was conducted using trends analysis of AAST volume obtained from the FDOT 2016 Traffic Counts Online traffic count station located on S. Orange Avenue, 0.150 miles north of the Orange/Osceola County Line. The linear trend analysis resulted in an annual growth rate of 3.67%.

6.3.3 CFRPM Model

The analysis of CFRPM travel demand forecasting model data was conducted by comparing model base/validation year (2010) and future year (2045) model projected volumes along the study corridor. The buildout of the Tupperware large scale development was included in the 2045 model so that the impact of these development on the study corridor could be assessed in both the No-Build and Build conditions. The model trend analysis resulted in an annual growth rate of 1.58% and 2.40% in the No-Build and Build scenarios, respectively.

6.3.4 Growth Rate Determination

The historical data and model derived annual growth rates were subsequently used in determining the growth factor to be used for future year traffic projections. ***Table 6-4*** shows a comparison of the annual traffic growth rates using historical trends analysis, the CFRPM model, and growth rates calculated from population growth in Orange County based on information from the Bureau of Economic and Business Research (BEBR). The FSTUMS rates of 1.58% and 2.40% were used to develop future No-Build and volumes respectively. This value is recommended for development of future traffic projections along the study corridor.

Table 6- 5: Establishment of Growth Rate

Location Along S. Orange Avenue	Trends	BEBR*	FSUTMS	
			No-Build	Build
South of Florida's Turnpike South of Town Center Blvd	3.67%	2.33%	1.55%	5.82%

6.3.5 Mainline Traffic Volume Projections

Table 6-5 shows the future year Annual Average Daily Traffic (AADT) projections for the existing year 2017, opening year 2025, interim year 2035, and design year 2045.

Table 6- 6: South Orange Avenue Traffic Projections

Year	AADT	
	No-Build	Build
Existing (2017)	24,463*	24,463*
Opening (2025)	27,556	29,160
Interim (2035)	31,421	35,032
Design (2045)	35,286	49,903

*AADT Obtained from existing year 72-hour counts

6.3.6 Intersection Turning Movement Volume Projections

The no-build and build projected intersection volumes for the, opening year 2025, interim year 2035, and design year 2045 for the build scenario along Orange Avenue can be found in the ***Design Traffic Technical Memorandum (DTTM)*** developed as a ***Supporting Document*** of this study

6.4 Future Year Level of Service

6.4.1 Future Signal Requirements

The signalization of S. Orange Avenue and Mary Louis Lane continues to be recommended. It is also recommended that any proposed driveways for future development are revisited at the time of design to determine if signals are required.

6.4.2 Operational and Level of Service Analysis

A detailed Level of Service Analysis was conducted using the procedures of the Highway Capacity Manual (HCM) and Synchro software. The LOS was determined based on the comparison of traffic volumes and roadway capacity. Roadway segment and intersection operational analyses were performed for the opening year 2025, interim year 2035, and design year 2045.

6.4.3 No-Build Scenario

The No-Build geometry is displayed in ***Figure 6-4.***

6.4.3.1 Segment Level of Service Analysis

Future roadway capacity for a four-lane divided roadway was established from the Generalized Level of Service Volume Tables provided in the 2012 FDOT Level of Service Handbook. LOS were derived for opening, interim, and design years. The results

are shown in ***Table 6-6*** and indicated that in the No-Build scenario, the study segments are anticipated to operate below the LOS capacity by the opening year.

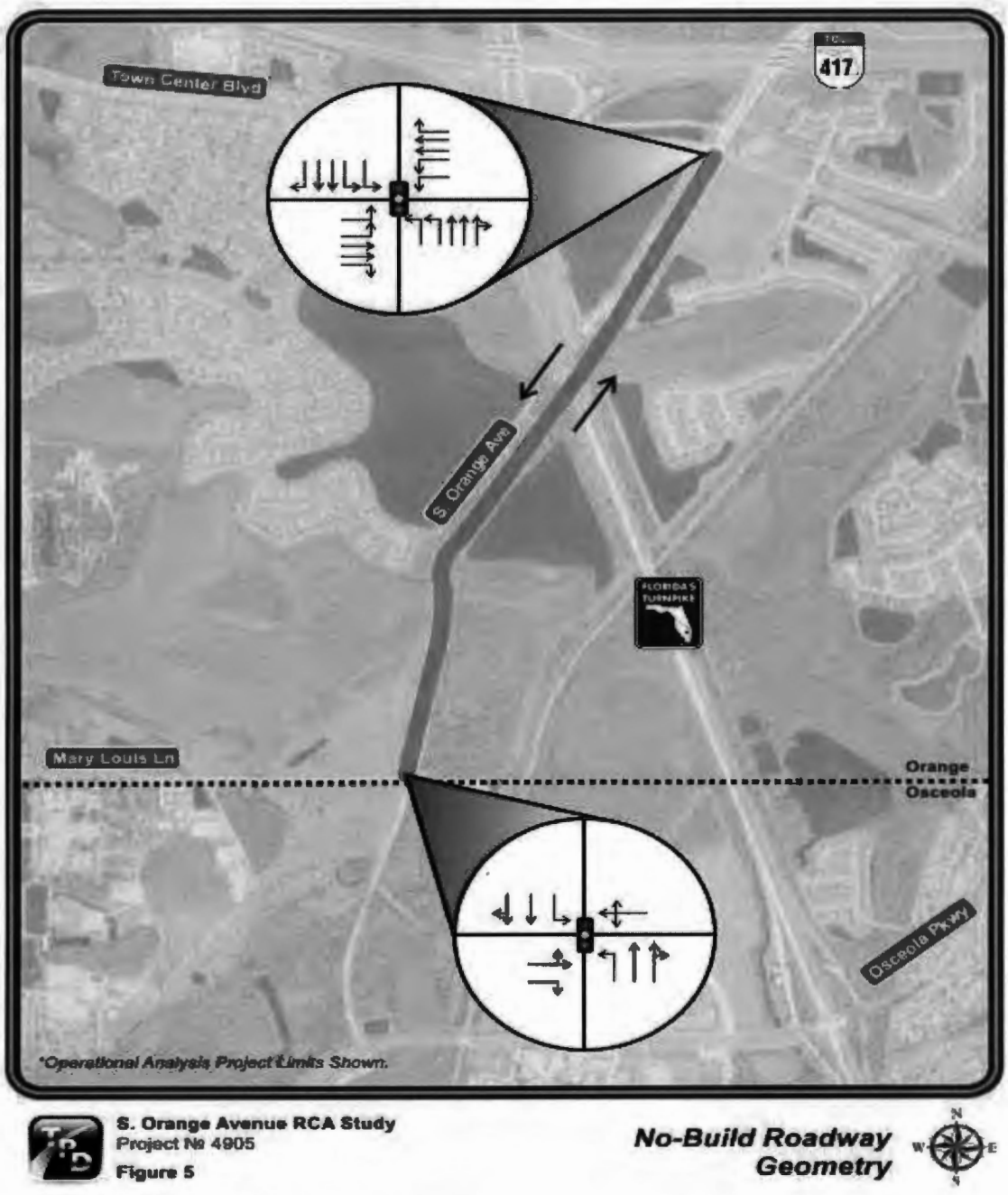


Figure 6- 4: Orange Avenue No-Build Geometry

Table 6- 7: Projected Daily Roadway Capacity Analysis (No-Build)

Future Year	No. of Lanes	LOS Standard	PM Peak-Hour Peak-Direction		
			Volume[1]	Capacity[2]	Meet LOS Standard?
Opening (2025)	2U	E	1,364	1,120	No
Interim (2035)	2U	E	1,555	1,120	No
Design (2045)	2U	E	1,747	1,120	No

1- Projected PM Peak hour volume = Future Year AADT * K * D
2- Capacities based on ArtPlan analysis for study segment

6.4.3.2 Intersection Level of Service Analysis

Intersection analysis was conducted similar to the existing conditions analysis utilizing the procedures of the Highway Capacity Manual (HCM) and Synchro software. The projected year volumes were derived by applying the previously discussed growth rate to the existing turning movement volumes. ***Table 6-7*** displays the projected levels of service for the No-Build scenario.

Table 6- 8: Projected A.M./P.M. Intersection Capacity Analysis (No-Build)

Intersection	Control	Time Period	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
2025 No-Build												
S. Orange Ave & Mary Louis Lane	Signal	AM	74.5	F	135.7	F	21.6	C	27.1	C	32.5	C
		PM	279.2	F	54.2	D	27.7	C	58.9	E	71.1	E
S. Orange Ave & Town Center Blvd	Signal	AM	34.0	C	32.4	C	40.0	D	33.5	C	34.7	C
		PM	49.9	D	33.9	C	87.0	F	62.4	E	58.7	E
2035 No-Build												
S. Orange Ave & Mary Louis Lane	Signal	AM	75.1	E	135.7	F	25.3	C	36.5	D	37.5	D
		PM	285.2	E	54.8	D	34.6	C	73.8	E	79.8	E
S. Orange Ave & Town Center Blvd	Signal	AM	41.4	D	40.5	D	53.6	D	37.8	D	43.2	D
		PM	64.1	F	46.4	D	101.3	F	73.4	E	71.4	E
2045 No-Build												
S. Orange Ave & Mary Louis Lane	Signal	AM	75.1	E	135.7	F	28.2	C	54.7	D	46.1	D
		PM	307.9	F	56.0	E	39.4	D	94.1	F	92.1	F
S. Orange Ave & Town Center Blvd	Signal	AM	48.1	D	46.2	D	68.6	E	49.4	D	52.5	D
		PM	75.4	E	60.4	E	145.3	F	105.4	F	96.9	F

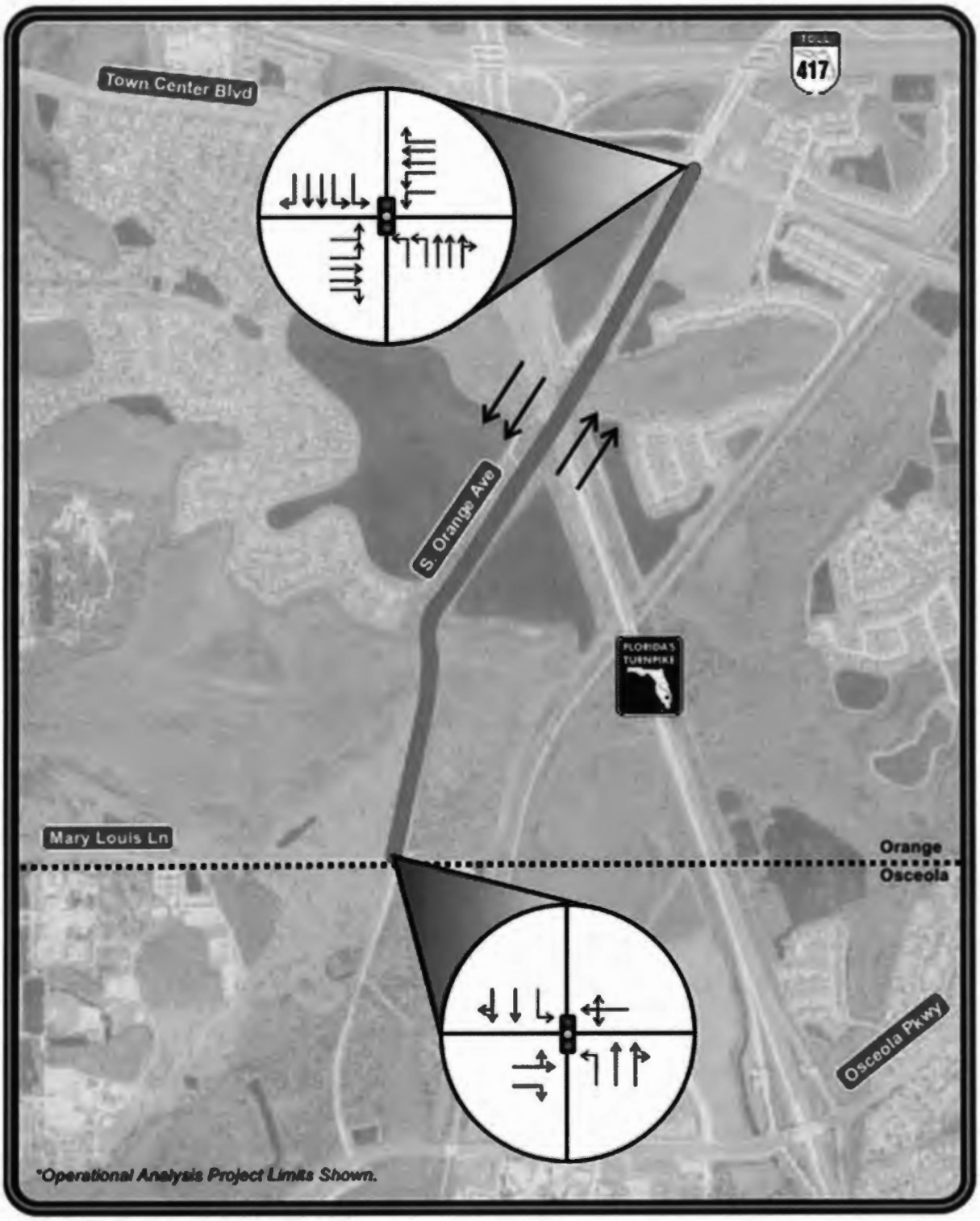
The No-Build scenario indicates that the study intersections are anticipated to operate below the LOS by the opening year.

6.4.4 Build Scenario

The build geometry is displayed in ***Figure 6-5.***

6.4.4.1 Segment Level of Service Analysis

Future roadway capacity for a four-lane divided roadway was established from the Generalized Level of Service Volume Tables provided in the 2012 FDOT Level of Service Handbook. LOS were derived for opening, interim, and design years. The results are shown in ***Table 6-8*** and indicated that in the Build scenario, the study segments are anticipated to operate within the LOS capacity by the design year.



S. Orange Avenue RCA Study
Project № 4905
Figure 6

Build Roadway Geometry

Figure 6- 5: Orange Avenue Build Geometry

Table 6- 9: Projected Daily Roadway Capacity Analysis (Build)

Future Year	No. of Lanes	LOS Standard	PM Peak-Hour Peak-Direction		
			Volume	Capacity	Meet LOS Standard?
Opening (2025)	4D	E	1,443	2,420	Yes
Interim (2035)	4D	E	1,734	2,420	Yes
Design (2045)	4D	E	2,025	2,420	Yes

1- Projected PM Peak hour volume = Future Year AADT * K * D
2- Capacities based on ArtPlan analysis for study segment

6.4.4.2 Intersection Level of Service Analysis

Intersection analysis was conducted similar to the existing conditions analysis utilizing the procedures of the Highway Capacity Manual (HCM) and Synchro software. The projected year volumes were derived by applying the previously discussed growth rate to the existing turning movement volumes. ***Table 6-8*** displays the projected levels of service for the Build scenario.

Table 6-8: Projected A.M./P.M. Intersection Capacity Analysis (Build)

Intersection	Control	Time Period	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
2025 Build												
S. Orange Ave & Mary Louis Lane	Signal	AM	75.1	E	135.7	F	23.2	C	30.4	C	34.4	C
		PM	279.3	F	54.5	F	28.4	C	70.3	E	75.8	E
S. Orange Ave & Town Center Blvd	Signal	AM	37.1	D	35.7	E	46.7	D	35.4	D	38.6	D
		PM	61.6	E	34.7	F	105.5	F	74.5	E	69.7	E
2035 Build												
S. Orange Ave & Mary Louis Lane	Signal	AM	75.1	E	135.7	F	28.0	C	52.9	D	45.3	D
		PM	307.9	F	56.0	E	39.5	D	91.8	F	91.1	F
S. Orange Ave & Town Center Blvd	Signal	AM	46.2	E	47.4	D	85.2	F	46.1	D	56.0	E
		PM	77.5	F	54.2	D	148.5	F	114.0	F	99.7	F
2045 Build												
S. Orange Ave & Mary Louis Lane	Signal	AM	76.8	E	148.3	F	30.9	C	97.6	F	66.0	E
		PM	313.7	F	56.7	E	51.1	D	127.9	F	111.7	F
S. Orange Ave & Town Center Blvd	Signal	AM	61.1	E	62.4	E	121.6	F	69.5	E	77.9	E
		PM	132.2	F	64.0	E	182.2	F	182.7	F	145.6	F

6.5 Turn Lane Analysis

Due to the high volume of anticipated development in the study area, a review was conducted to access the adequacy of the turn lanes at the two intersections which lie in the study area. This section provides the findings of the investigation.

6.5.1 S. Orange Avenue and Mary Louis Lane

A review was conducted to assess the adequacy of the existing exclusive northbound left turn lane at the S. Orange Avenue and Mary Louis Lane intersection. The review was conducted to ensure that enough storage is available to serve the projected traffic volumes for the "Build" scenario at the design year 2045.

The existing turn lane length is 430 feet (including the taper), and it was determined that the required turn lane length for future development is 1,130 feet (including taper). The northbound left turn lane cannot be lengthened due to the SunRail entrance located 900 feet south of the intersection in question.

Alternatively, the addition of a second northbound left turn lane should be considered to provide the required stacking distance for the projected design year (2045) traffic.

6.5.2 S. Orange Avenue and Town Center Boulevard

A review was conducted to assess the adequacy of the existing exclusive left turn lanes at the S. Orange Avenue and Town Center Boulevard intersection. The review was conducted to ensure that enough storage is available to serve the projected traffic volumes for the "Build" scenario at the design year 2045.

The eastbound left turn lane is expected to be sufficient in the design year (2045) while the northbound, southbound, and westbound turn lanes will need to be lengthened to accommodate the turning traffic at this intersection. The required and existing turn lane lengths are provided in ***Table 6-9.***

Table 6- 10: Turn Lane Analysis

Movement	Total Length Required (feet)	Existing Length (feet)
S. Orange Avenue & Town Center Blvd		
NBL	625	490
SBL	1,148	470
EBL	310	400
WBL	583	400

The length of these turn lanes should be monitored and considered for lengthening as the traffic patterns in the area develops.

6.6 Recommended Improvements

Based on evaluation of operating conditions for the No-Build and Build conditions, it is recommended to widen Orange Avenue from two lanes to four lanes. Additionally, the mitigation measures below are provided for academic purposes only and a more detailed analyses should be conducted as the project corridor moves into design.

S. Orange Avenue & Mary Louis Lane

- Reconfigure eastbound approach to provide a channelized right turn movement
- Implement eastbound right turn overlap phasing
- The addition of a second northbound turn lane
- Retime intersection signal

S. Orange Avenue & Town Center Boulevard

- Add exclusive northbound right turn lane
- Implement right turn overlap phasing for the eastbound and westbound right turn movements.
- Retime intersection signal

Additionally, it is recommended that the turn lanes at the study intersection be monitored at the need for additional turn lanes and/or turn lengthening be determined as the surrounding area develops.

CHAPTER 7

Alternative Alignment Analysis

7.0 Alternative Alignment Analysis

After determining the need to improve Orange Avenue, the next step in the RCA process is to identify alternatives to provide a safe transportation facility that meets the purpose and need of the project, is acceptable to the community, minimizes the impacts on the environment, is cost effective, and minimizes the need for right-of-way acquisition. After analyzing the options, a recommended alternative is selected to be advanced into the design phase. This section summaries the alternatives considered for this project.

7.1 Characteristics and Constraints

Various characteristics and constraints are considered during the assessment of the improvements. The characteristics and constraints are discussed in the subsequent sections.

7.1.1 Right-of-Way Constraints

The existing right-of-way width is primarily 64 feet throughout the study area. Deerfield Land Corporation, which is the property owner of the land adjacent to the south end of the study area, previously dedicated right-of-way to Orange County in anticipation of the need for roadway improvements. Additionally, Orange County owns land adjacent to the roadway on the north end of the study area. There is a stretch of approximately 250 lineal feet, where there is not sufficient right-of-way to provide the proposed roadway improvements. The alternatives are required to minimize the right-of-way impacts to this area.

7.1.2 Potential Physical and Natural Environmental Impacts

Wetlands are present on both sides of the existing roadway. The impacts to these wetlands, along with the drainage patterns associated with them, must be taken into consideration while developing the alternatives.

7.1.3 Cross Section Consistency

The areas to the north and south of the study area have undergone improvements. The alternatives presented in this report will take the cross sections into consideration while developing the alternatives. It is important to provide consistency and safety to users throughout the corridor.

7.2 Alternatives Analysis

Three Alternatives were evaluated to determine the ability to meet the purpose and needs of the study area. The alternatives include:

- No Build Alternative
- Transportation System Management (TSM)
- Build Alternatives
    - Alternative 1 – Curve Alignment East
    - Alternative 2 – Curve Alignment Center
    - Alternative 3 – Curve Alignment West

7.2.1 No-Build Alternative

The No Build alternative includes maintaining the existing conditions along Orange Avenue in the study limits. Based on the projected travel forecast and development plans, this alternative can be expected to provide poor operating conditions, higher travel times, and a higher potential for accidents.

7.2.2 Advantages of the No-Build Alternative

Benefits to the No Build Alternative are as follows:

- No design and right-of-way acquisition costs.
- No construction or utility relocation costs.
- No residential property impacts.
- No direct impacts to the natural environment.
- No roadway construction inconveniences.

7.2.3 Disadvantages of the No-Build Alternative

The following implications are anticipated if there are no improvements made to Orange Avenue. The disadvantages are as follows:

- The level of service will continue to deteriorate as the capacity along Orange Avenue increases with anticipated development.
- There is still a lack of pedestrian and bicycle facilities.
- There will be a lack of lane and capacity consistency throughout the corridor due to current improvements being made to the north and south of the study area.

7.2.2 Transportation System Management (TSM) Strategies

Other alternatives for building an efficient transportation system include Transportation System Management (TSM) and Travel Demand Management (TDM) strategies. TSM and TDM measures are typically low cost and low impact methods for improving the performance and vehicle carrying capacity of existing roadway systems with little or no construction.

TSM measures may include short-term strategies to improve operations of the roadway, such as additional turn lanes, access management, and adjusting signalization. TDM is a collection of methods used to change travel behavior and manage the number of times of day that vehicles are on the road. TDM strategies include ride sharing, park and ride lots, car/van pooling, and high occupancy vehicles (HOV) lanes.

As noted in the Design Traffic Technical Memorandum, the following segments and intersections are operating at LOS D or worse:

Roadway Segments (Current Year)
Orange/Osceola County Line to Town Center Boulevard

Intersections (Current Year)
Town Center Boulevard

It should be noted that Orange Avenue is undergoing expansion from Florida's Turnpike to Town Center Boulevard. This should provide some improvement in the LOS for both the roadway and intersection.

As stated previously, TSM measures may include short-term strategies to improve the operations of the roadway. Strategies include the addition of turn lanes, access management, and adjusting signalization. The signal at Town Center Boulevard could be adjusted, however by doing so could result in negative effects, such as added congestion, along Town Center

Boulevard. TSM strategies are not expected to produce significant results to the above intersection.

TDM is used to change travel behavior and manage the number of times of day that vehicles are on the road. TDM methods include ride sharing, park and ride lots, carpooling and HOV lanes. Given the study area, these are not viable options for improvements. The lack of high-density travel in the corridor does not support demand for a park and ride, or HOV lanes.

TSM and TDM for Orange Avenue do not provide significant relief for the corridor. These alternatives would not eliminate the need to widen Orange Avenue. The only effective option to reduce traffic delays and improve capacity along the corridor is the addition of travel lanes.

7.2.3 Alternative Roadway Alignment Considerations

Additional right-of-way is needed for all of the alternatives in order to construct the proposed improvements. Different roadway geometry and alignments were analyzed in order to minimize additional right-of-way needs and environmental impacts to the surrounding wetlands.

7.2.3.1 Alternative 1 – Curve Alignment East

Alternative 1 consists of a slight s-curve with an alignment that generally falls to the east of the existing alignment.

7.2.3.2 Alternative 2 – Curve Alignment Center

Alternative 2 consists of a bend with alignment in the center of the current roadway. Although this alternative follows the alignment and geometry of the current roadway, the acquisition of land is still required

7.2.3.3 Alternative 3 – Curve Alignment West

Alternative 3 attempts to eliminate the need for additional right-of-way on the eastside. Despite accomplishing this, the need for additional right-of-way on the west side is still present. The roadway alignment generally falls to the west of the existing alignment.

7.2.4 Recommended Orange Avenue Alternative

It is recommended that Orange County proceeds with Alternative 2 as the recommended alternative. Although this alternative requires the most right-of-way acquisition, the improvements provide the most comfort and safety for the user. The alternative follows the general geometry of the existing roadway, while taking into consideration the impacts to the surrounding wetland.

Table 7-1 provides a qualitative evaluation of the above alternatives. For each alternative, qualitative evaluation factors are rated on a one to five scale, with the rating of one being assignment to the least impacts and five being assigned for the highest impact. The alternative comparison does not provide a weighted total.

Table 7- 1: Alternatives Comparison

Alternative	Right-of-Way Impacts	Wetland Impacts	Construction Costs	Total
1	3	3	3	9
2	4	4	3	11
3	3	4	3	10

7.3 Typical Sections

It is recommended alternatives from the Orange Avenue improvements consist of a four-lane divided typical section, shown in ***Figure 8-1.*** The design elements are:

- 11-foot travel lanes
- 7-foot buffered bicycle lanes
- 5-foot sidewalks
- 2.0 -foot Type F curb and gutter
- 18-foot raised median
- 7-foot grass utility strip between the edge of pavement and sidewalk

The required right-of-way width for the recommended improvements is 120 feet. Depending on the location along the study area, the proposed widening falls outside the current right-of-way.

7.4 Recommended Improvements

The recommended improvements for Orange Avenue will generally follow the existing roadway geometry. The addition of two travel lanes, as well as pedestrian facilities will require additionally right-of-way. This recommendation is based upon the results of the engineering considerations, social and natural environment analyses, and input received from the public.

Table 7-2 reflects the estimated costs for the recommended improvements. The summary is based on right-of-way costs using current dollars with adjustments for legal fees and administrative costs. Also included in the evaluation are environmental and social impacts.

The recommended Orange Avenue improvements are shown in the Concept Plans in ***Appendix A***. A detailed discussion on the recommended improvements is also provided in ***Chapter 8- Preliminary Design Analysis.***

Orange Avenue Roadway Conceptual Analysis (RCA) Study
From the County Line to Florida's Turnpike
Table ES-1 Alternatives Evaluation Matrix
Summary of Project Costs and Impacts

Evaluation Criteria	Alternative Improvements		
	1	2	3
Community Impacts			
Residential			
Single Family Homes Impacted (Each)	0	0	0
Single Family Homes Displaced (Each)(Roadway)	0	0	0
Single Family Homes Displaced (Each)(Ponds)	0	0	0
Vacant Land Impacts	0	0	0
Business			
Businesses Impacted (Each)	0	0	0
Businesses Displaced (Each)	0	0	0
Right-of-Way Impacts			
Acres Impacted (Roadway)	0.85	1.23	0.86
Acres Impacted (Joint Pond with Tupperware)	4.94	4.94	4.94
Total Acres Impacted	5.79	6.17	5.80
Environmental Impacts			
Wetland Impacts (acres)[1]	1.29	1.60	1.59
Potential Contamination Sites Impacted	None	None	None
Threatened and Endangered Species Impacts	Minimal	Minimal	Minimal
Mitigation Banking Costs[2]			
Wetlands (Based on $145,000/Credit)	$ 140,287.50	$ 174,000.00	$ 172,912.50
Project Costs			
Design Cost	$654,221.43	$654,221.43	$654,221.43
Right-of-way Costs	$2,263,990.00	$2,313,007.00	$2,152,420.00
Construction Costs	$6,542,214.27	$6,542,214.27	$6,542,214.27
Mitigation Banking Costs[2]	$140,287.50	$174,000.00	$172,912.50
Total Costs	$9,600,713.20	$9,683,442.70	$9,521,768.20

Notes:
1. Wetland impacts include direct impacts.
2. Mitigation banking costs are preliminary with final costs to be determined during the design phase.

CHAPTER 8

Preliminary Design Analysis

8.0 Recommended Improvements

This section discusses the results of the preliminary design analysis and the preferred alternative as recommended in ***Section 7.4.***

8.1 Design Traffic Volumes

The Orange Avenue ***Design Traffic Technical Memorandum*** documents the existing traffic conditions and analysis of the Build vs No-Build scenario. The design factors from the traffic analysis, which were utilized in the development of roadway improvements, can be found in ***Table 8-1.***

Table 8- 1: Recommended Design Characteristics

Factor	Measured	FDOT	Recommended
K	7.23%	9.00%	9.00%
D	50.1%	52.5%	52.5%
T Factor	6.20 %	6.00%	6.20%

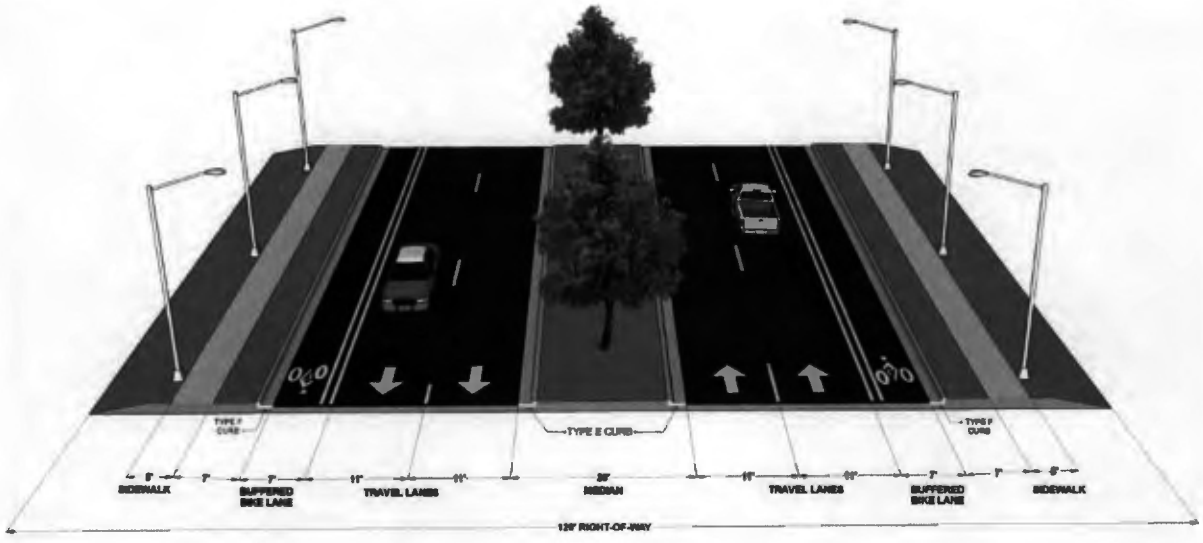
Under the No-Build scenario, traffic volumes are expected to reach over 41,000 ADT resulting in a LOS F throughout the corridor.

8.2 Typical Section

It is recommended alternatives from the Orange Avenue improvements consist of a four-lane divided typical section, shown in ***Figure 8-1.*** The design elements are:

- 11-foot travel lanes
- 7-foot bicycle lanes
- 5-foot sidewalks
- 2.0 -foot Type F curb and gutter
- 20-foot raised median (with curb)
- 7-foot grass utility strip between the edge of pavement and sidewalk

The required right-of-way width for the recommended improvements is 120 feet. Depending on the location along the study area, the proposed widening falls outside the current right-of-way.



HARRIS Harris Civil Engineers, LLC	PRELIMINARY PREFERRED TYPICAL SECTIONS Orange Avenue RCA Orange County, Florida	FIGURE 8-1

8.3 Intersection Concepts and Signal Analysis

The recommended roadway improvements and geometry are shown in ***Appendix A.*** The exhibits indicate the roadway geometry required to provide improved LOS throughout the study corridor. All intersections and roadway segments can expect to operate at a LOS of E or higher by the design year, 2045.

It is recommended that the following improvements are made to the intersections within the study area:

S. Orange Avenue & Mary Louis Lane

- Reconfigure eastbound approach to provide a channelized right turn movement
- Implement eastbound right turn overlap phasing
- The addition of a second northbound turn lane
- Retime intersection signal

S. Orange Avenue & Town Center Boulevard

- Add exclusive northbound right turn lane

- Implement right turn overlap phasing for the eastbound and westbound right turn movements.
- Retime intersection signal

Additionally, it is recommended that the turn lanes at the study intersection be monitored at the need for additional turn lanes and/or turn lengthening be determined as the surrounding area develops.

8.4 Alignment and Right-of-Way Needs

The existing right of way varies along the study corridor. The preliminary right-of-way needs are discussed in ***Table 8-2.***

Table 8- 2: Anticipated Right-of-Way Needs

Location	Anticipated Right-of-Way Take	Discussion
6+00 to 12+50	Varies	The right-of-way at this location will be a joint use pond, and an easement will be provided to Orange County, from Deerfield Land Corporation.
18+50 to 21+00	Varies	Right-of-way will be necessary for the entirety of the roadway in this section. In addition, it will be required for the proposed culvert running under the roadway.
21+50 to 35+00	10-feet take, 1350-feet in length	Required along the east side of the roadway to provide stormwater management and enough area to grade behind the sidewalk.

8.5 Displacements

The preferred alignment is not anticipated to result in any residential displacements.

8.6 Project Costs

The estimated projected costs identified in this section are based on 2019 dollars. Similar projects within Orange County areas and historical pricing information from FDOT were used to estimate construction costs.

8.6.1 Engineering Design Costs

Engineering costs typically include components for topographic and design surveys, geotechnical investigations, right-of-way engineering, roadway and drainage design, and post design services during construction. Engineering design costs are estimated at $654,221.43.

8.6.2 Right-of-Way Costs

Orange County Real Estates Management estimates the preliminary right-of-way costs to be $2,313,007.00. Please note that this is only an estimate of land-only costs. In any acquisition (whether "under threat" or not), additional costs for improvements, costs to

cure, severance damages, attorney's fees, owner costs, etc. may (and likely would) be incurred.

8.6.3 Construction Costs

The construction cost for the proposed improvements is $6,542,214.27. A detailed cost estimate is provided in *Appendix E.*

8.6.4 Total Project Costs

The estimated improvement costs for Orange Avenue are $9,683,442.70 including $174,000 for wetland mitigation.

8.7 Recycling of Salvageable Materials

The County encourages contractors to recycle salvageable materials, such as old asphaltic concrete pavement, base material, and drainage structures. During construction, the existing pavement will be completely removed and recycled. Any salvageable materials, such as the existing pipe culverts, will be identified during the design of the project.

Any materials removed from the construction site will meet current FDOT Standard Specifications for Road and Bridge Construction. During the final design of the project, the opportunity to utilize existing pavement will be evaluated.

8.8 User Benefits

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

The recommended alternative provides significant benefits to the project when compared to the no-build scenario. The following benefits are expected to occur with the recommended build alternative:

- Expected reduction in motor vehicle running costs.
- Expected reduction in user travel time.
- Potential for reduction in traffic accident costs.

Also, the addition of sidewalks and bicycle lanes will benefit the non-motorist user by providing additional safety while traveling through the study corridor.

8.9 Pedestrian and Bicycle Facilities

Pedestrian and bicycle facilities will be incorporated into the study area. A designated seven-foot buffered bicycle lane will be provided in both the northbound and southbound direction. Additionally, fife-foot sidewalks will be provided along each side of the roadway. The sidewalk and Type F curb will be separated by a 7-foot utility strip to provide more safety between motorists and pedestrians.

The safety of the corridor will be increased with the use of curb cut ramps, pavement markings, signs, and traffic signals with pedestrian indications. These enhancements will also make the corridor more user friendly for pedestrians and bicyclists.

8.10 Enhancements

Improved pavement conditions, adequate drainage systems, roadway geometry, access management, pedestrian and bicycle facilities, landscaping, and roadway lighting were all major aspects in the development of the roadway improvements. These enhancements allow for an increase in traffic operations and the movement of motorists, pedestrians, and bicyclists.

8.11 Economic and Community Development

The land use through the study corridor is undeveloped. Any improvements made to Orange Avenue will have a positive effect on the future economic vitality of the area. The improvements are expected to benefit the surrounding community by providing a safe and efficient means of transportation as the study area is developed.

8.12 Environmental Impacts

Detailed studied and evaluations were performed throughout the study corridor too determine the adverse impacts that may result from the project. The *Geotechnical Report* and *Environmental Analysis* contain data, evaluation procedures, and an analysis of results.

8.12.1 Land Use

The existing land use along Orange Avenue consists almost entirely of undeveloped land. There is a residential community adjacent to the study area. The proposed improvements to Orange Avenue are not anticipated to alter the current land use within the study area.

8.12.2 Community Cohesion

The proposed improvements will not alter community boundaries nor interrupt the service areas of these facilities. Residents of the nearby communities will not be physically or psychologically separated from the community. The addition of bicycle lanes and sidewalks will enhance the cohesion of the community throughout the study corridor.

8.12.3 Cultural Impacts

The Florida Department of State's Division of Historical Resources was used to research any historical and archeological sites within the Orange Avenue study corridor. It was revealed that there are no recorded historical or archeological sites located within the study area.

8.12.4 Wetlands

The *Environmental Analysis* included as part of this study, addressed the surrounding wetlands and the impacts from roadway improvements. In total, approximately 1.60 acres of wetland will be impacted based on the preferred improvements. The recommended method of wetland mitigation is purchasing credits from a mitigation bank. The estimated costs of wetland mitigation for the proposed improvements is $174,000. The final design will dictate the mitigation costs, and those provided are susceptible to change.

From the results of the study, there are no practical alternatives to the construction within wetlands. Further minimization to wetland impacts will be implemented where possible during the design phase of the roadway. All unavoidable wetland impacts will be mitigated through the

ACOE, SFWMD and OCEPD prior to approval of the final project. ***Figure 8-2*** displays the wetland impacts for the preferred roadway improvements.

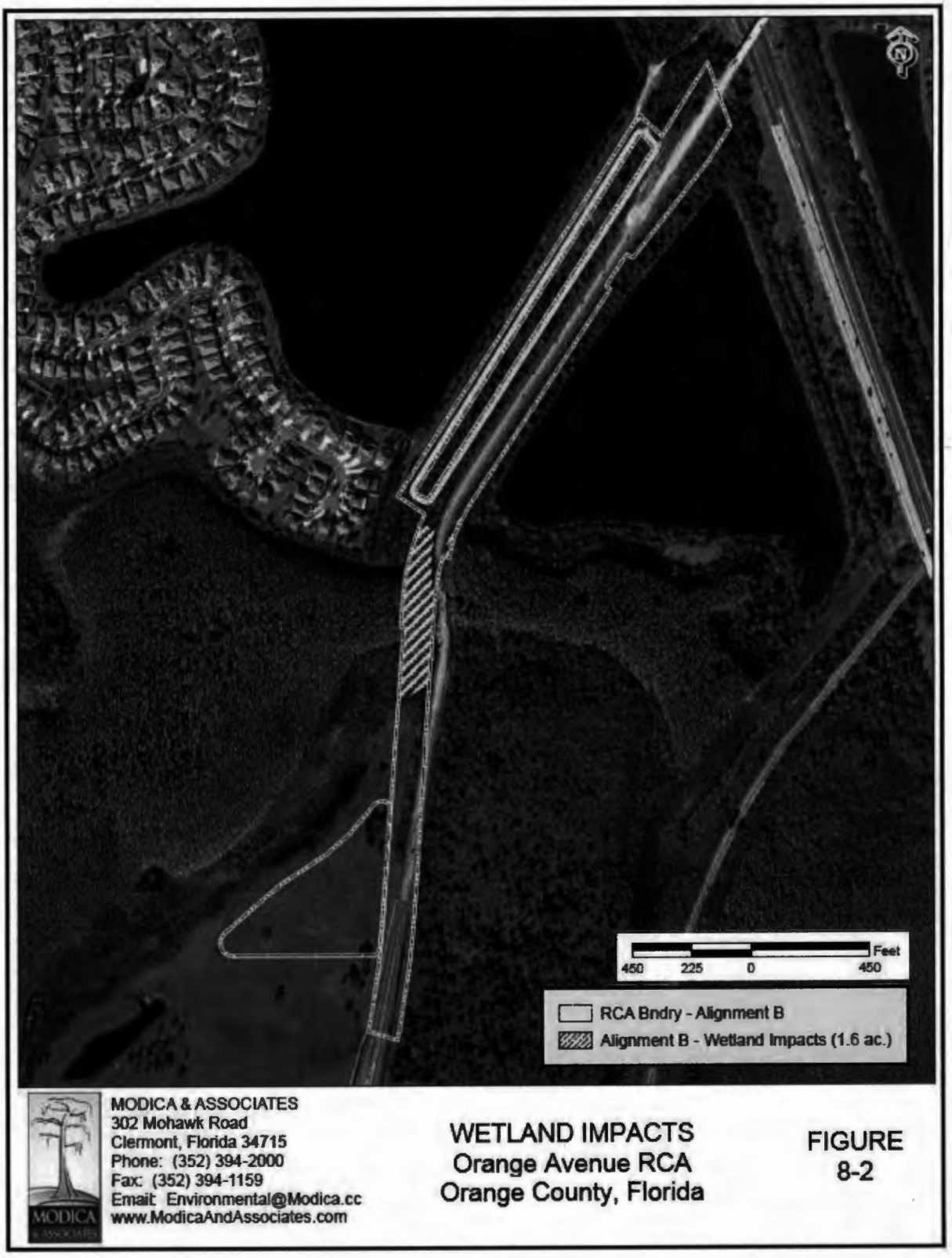
8.12.5 Wildlife and Habitat

The proposed improvements are expected to have minimal impacts to the existing wildlife and their habitat. The proposed improvements are not expected to impact any listed species.

8.12.6 Construction

Construction activities will have temporary air, noise, water quality, traffic flow and visual impacts for the travelers within the immediate vicinity of the project. Adherence to all State and local regulations, and the FDOT Standard Specification for Road and Bridge Construction, current edition, will minimize these impacts.

There should be no direct impacts to wetlands other than those falling within the expanded right-of-way. Ingress/egress of construction vehicles, materials storage and other secondary construction related activities are not expected to infringe on the wetland boundaries any more than necessary.
Industry-standard precautions and methods will keep secondary impacts to a minimum. Such items as silt fences and turbidity barriers, in appropriate locations, will aid in minimizing effects outside of the construction zone.



MODICA & ASSOCIATES
302 Mohawk Road
Clermont, Florida 34715
Phone: (352) 394-2000
Fax: (352) 394-1159
Email: Environmental@Modica.cc
www.ModicaAndAssociates.com

WETLAND IMPACTS
Orange Avenue RCA
Orange County, Florida

FIGURE
8-2

8.12.7 Utility Impacts

There are several existing utilities within the project corridor including overhead and underground electric lines, water and sewer lines, cable television and telephone lines. The details of existing utilities are summarized in ***Table 8-3***. It should be noted that coordination measures will be taken into consideration during the design phase to successfully relocate any existing utilities. Estimated utility relocation costs have been included in the construction costs.

Table 8- 3: Existing Utilities

Utility	Types of Lines	General Location
Orange County Utilities	Water Main	A water main was extended from the county line to Falcon Trace subdivision, along Orange Avenue in 2018 as.
Spectrum	Fiber optic cables	Spectrum is extended their service through a portion of the south end of the study area in 2018.
Duke Energy	Power Lines	Duke Energy has power lines running north through the study area. They are responsible for the lighting along Orange Avenue.

8.13 Traffic Control Plan

The maintenance of traffic during the construction of the proposed improvements will minimize impacts to motorists using the project corridor. Additionally, it will maintain acceptable access to residents and business owners living and working adjacent to the roadway. The maintenance of traffic plan is developed based on the existing conditions and the proposed improvements.

Traffic Control Through Work Zones from The FDOT Design Standards will be followed when creating the traffic control plan. Orange County strives to complete roadway projects with minimal impact to the current traffic. It is anticipated that the project will be completed in two phases. Phase one will likely consist of the southbound lanes and stormwater management ponds, while the northbound lanes would be constructed as phase two.

8.14 Stormwater and Drainage

8.14.1 Preliminary Drainage Analysis

The existing roadway north of Mary Louis Lane has a break down the centerline. The existing analysis (SFWMD Permit No. 49-00477-S) shows two points of interest: one being the DOT pond to the north (out of scope) and second being Wetland G in accordance with the Osceola Corporate Center Master Plan. It should be noted that Wetland C also serves as a discharge point; however, because it is connected to Wetland G via box culvert, Wetland G was considered the final outfall.

8.14.2 Pond Locations

The proposed storm water facilities will discharge into the nearby wetlands or drainage conveyances via fixed permanent outfall structures. Pond and outfall locations are based upon topography and are intended to maintain the current drainage patterns.

Several storm water pond locations and options were analyzed as part of this study. A detailed ***Stormwater Alternatives Analysis*** can be found in the ***Supporting Documents*** of this report. It was decided by the County that the best option includes a shared use pond with Tupperware, in addition to a dry pond adjacent to the roadway improvements. The analysis included as part

of this study is preliminary in nature. Final size and location of stormwater ponds and outfall structures will be determined in the design phase of the project.

The proposed stormwater pond locations are illustrated on the alternatives located in ***Appendix A and Appendix B.***

8.14.4 Floodplains and Floodways

Based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM's), the north part of the study area is located in Zone A (100 year) floodplain. The remainder of the site is located in Zone X (500 Year) floodplain. Zone A typically occurs in wetlands or low-lying areas.

8.14.5 Stormwater Permits

Permitting considerations for the stormwater management facilities will involve the South Florida Water Management District (SFWMD), the Army Corps of Engineers (ACOE), and the Department of Environmental Protection (DEP) criteria. The proposed project will require securing an Environmental Resource Permit (ERP) through the SJRWMD. Construction activities will require development of a Stormwater Pollution Prevention Plan (SWPPP) and proper coordination for NPDES requirements.

8.15 Special Features

8.15.1 Culvert

Currently, there is a series of reinforced concrete pipes under Orange Avenue, which connects the adjacent wetlands. As part of this study, it is recommended to replace the pipes with a box culvert. The new box culvert will allow for the continued connection of the wetlands, in addition to providing safety for wildlife to cross Orange Avenue.

8.16 Access Management

Access management refers to the coordination between roadway design and land use to improve transportation. Access management includes strategies such as: limiting the number of driveways per lot, locating driveways away from intersections, increasing minimum lot frontage on major streets, and regulation the location, spacing and design of driveways. These strategies, along with the input from Orange County, will be considered in the design phase of the roadway. It should be noted that the only access to Orange Avenue in the study area will be from the anticipated Deerfield Land Corporation development. Coordination between all involved parties will be vital during the design phase to insure proper access management.

8.17 Aesthetics and Landscaping

The final design phase will investigate aesthetic and landscaping improvements. The typical section shows options for landscape enhancements in the median to provide consistency with the Osceola County improvements that are currently under construction. All landscaping improvements should be developed in conformance with the design for appropriate maintenance of the required clear zones and lines of sight at intersections.

CHAPTER 9

Public Involvement

9.0 Public Involvement

This section of the report provides an overview of the public involvement activates during the Orange Avenue Roadway Conceptual Analysis (RCA) project. ***Appendix C*** contains the meeting minutes from the public meetings, newsletters, sign-in sheets, comment forms, and PowerPoint presentations.

9.1 Public Involvement Plan

Community involvement is critical throughout the roadway study. The inclusion of the public allows for Orange County to implement transportation improvements that meet the needs of area, and supported by the community. A ***Public Involvement Plan*** was developed and implemented during the RCA. The plan set the framework to involve the public, local businesses and other interested parties, and the methods used to respond and record various input. The ***Public Involvement Plan*** was developed to inform and involve the citizens of Orange County, the State and local agencies, and the responsible appointed and elected public officials in the project planning, review and approval process.

The ***Public Involvement Plan*** outlined the process of the public involvement program including public meetings, newsletters, website creation and maintenance, and the public hearing. **The *Public Involvement Plan*** is located in ***Appendix C*** for reference.

9.2 Public Information

Public Information included public notifications, coordination meetings, public meetings, small group (informal) meetings, Orange County staff presentations, and the LPA/BCC public hearings. The following methods were used to reach those affected by the roadway improvements and to solicit public input throughout the study:

- Development and maintenance of a property owners and elected/appointed officials mailing list.
- Newsletters were mailed to property owners and interest stakeholders prior to each public meeting.
- A project website was created and maintained. The website was updated with the latest study-related information on project issues. It included newsletters, meeting minutes, and schedules.
- Public meeting advertisements were placed in local newspapers (in English and Spanish) prior to each public meeting.
- Local elected and appointed officials were notified of all public events via the project newsletter.

9.3 Coordination and Small Group Meetings

Meetings were held with any groups, or concerned individuals, in order to discuss the improvement alternatives. These meetings were held throughout the length of the study as needed.

Small group meetings were held with Falcon Trace Property Owners Association and Southchase-West Property Owners Association Inc. Coordination meetings where held with Orange County throughout the duration of the study. Meeting attendees included, Duke Energy, FL Fish & Wildlife, US Fish & Wildlife, The Army Corps of Engineers, FL Department of

Environmental Protection, Orange County Environmental Protection, South Florida Water Management District, Orange County Utilities, and the Orange County Public School District.

9.4 Public Meetings

The following public meetings were held throughout the duration of the study:

The Introduction/Kick-Off Meeting was held on April 17, 2019 at Tupperware Brands Headquarters from 6:00pm-8:00pm. Four residents attended the public meeting. Also, in attendance were four Orange County representatives and two of the study team. Zero written comments were received at the meeting.

9.5 Local Planning Agency Public Hearing

The Local Planning Agency (LPA) Public Hearing was held on February 20, 2020. *Appendix C* includes the PowerPoint presentation and meeting minutes.

9.6 Board of County Commissioners Public Hearing

The Board of County Commissioners (BCC) Public Hearing will be scheduled. *Appendix C* will include the PowerPoint presentation and meeting minutes. (To be updated following the BCC Public Hearing.)

9.7 RCA Study Documentation

The Final Roadway Conceptual Analysis Report can be obtained from Orange County Public Works.