ORANGE COUNTY GOVERNMENT FLORIDA

Interoffice Memorandum

AGENDA ITEM

DATE: September 9, 2022

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

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

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

SUBJECT: October 11, 2022 – Discussion Item
North East Orange County Areawide Transportation Study Report

The Orange County Transportation Planning Division has completed the North East Orange County Areawide Transportation Study (NEOCATS). NEOCATS was undertaken to proactively identify transportation needs to accommodate future growth that aligns with the needs of residents and businesses in the northeast area of the County. The NEOCATS study area is approximately 19.8 square miles bordered by the Orange/Seminole County Line to the north, CR 419/Chuluota Road to the east, Colonial Drive to the south, and Rouse Road to the west. The purpose of the study was to develop recommendations and to propose a future year 2045 transportation needs plan, including roadway widening, new roadways, safety improvements, intersection improvements, pedestrian/bicycle related improvements, and transit improvements.

At the October 11, 2022 Discussion, staff will present the NEOCATS background, study analysis, and recommendations. The limited changes to the Long Range Transportation Plan will be advanced pursuant to a separate amendment to the Transportation Element of the Comprehensive Plan. Recommendations for specific transportation improvement projects will be included in the budget for future year capital improvements as appropriate, subject to future Board authorization and funding availability.

ACTION REQUESTED: **Acceptance of North East Orange County Areawide Transportation Study (NEOCATS) Needs Plan Study Report. District 5.**

JVW/RN/bh/ep
Attachment

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 Division
Hatem Abou-Senna, PhD., P.E., Assistant Project Manager, Transportation Planning Division
Blanche Hardy, P.G., Assistant Project Manager, Transportation Planning Division

ORANGE COUNTY GOVERNMENT
FLORIDA

September 2022

North East Orange County Areawide Transportation Study (NEOCATS)

Needs Plan Study Report

vhb

CONTENTS

LIST OF FIGURES

LIST OF TABLES

Introduction

1 STUDY OVERVIEW

Orange County is undertaking the Northeast Orange County Areawide Transportation Study (NEOCATS) to proactively identify future transportation needs that align with the needs of residents and businesses and accommodate future growth in the northeast area of the County. The NEOCATS study area is approximately 19.8 square miles bordered by the Orange/Seminole County Line to the north, County Road (CR) 419/Chuluota Road to the east, Colonial Drive to the south, and Rouse Road to the west as shown in **Figure 1-1.** Traffic demand for many of the area roadways currently exceeds the capacity of the facilities. As the region continues its rapid growth, the existing transportation system within the study area will not be able to accommodate the increase in transportation demand.

The study purpose is guided by overarching goals that together work to support future growth while preserving community character. This study conducted safety, operational and multimodal analyses to identify improvements that will improve network connectivity and provide relief to constrained corridors and prioritize them for the short-, mid-, and long-term periods. The study report includes information for both the Cost-Feasible Plan - as defined by Orange County based on the planned improvements identified for the study area, and Unfunded Needs Plan – with all the required improvements needed for the study area to accommodate future travel demand. Both transportation plans, Cost Feasible and Needs, will serve in the short term as a guide for capital improvement expenditures and in the long term as a basis for coordination between future land use and the area's transportation needs.

The study methodology included an extensive data collection program to understand the area's travel patterns and network deficiencies and help in achieving the main objective of developing transportation needs for the study area. As illustrated in **Figure 1-2**, public involvement is one of the key elements of the approach and the study team maintained constant coordination with the stakeholders to obtain their feedback.

The study report is broadly divided into five sections – Existing Conditions, Existing Environmental Conditions, Public Involvement, Future Conditions, and Evaluation of Scenarios and Needs Plan.

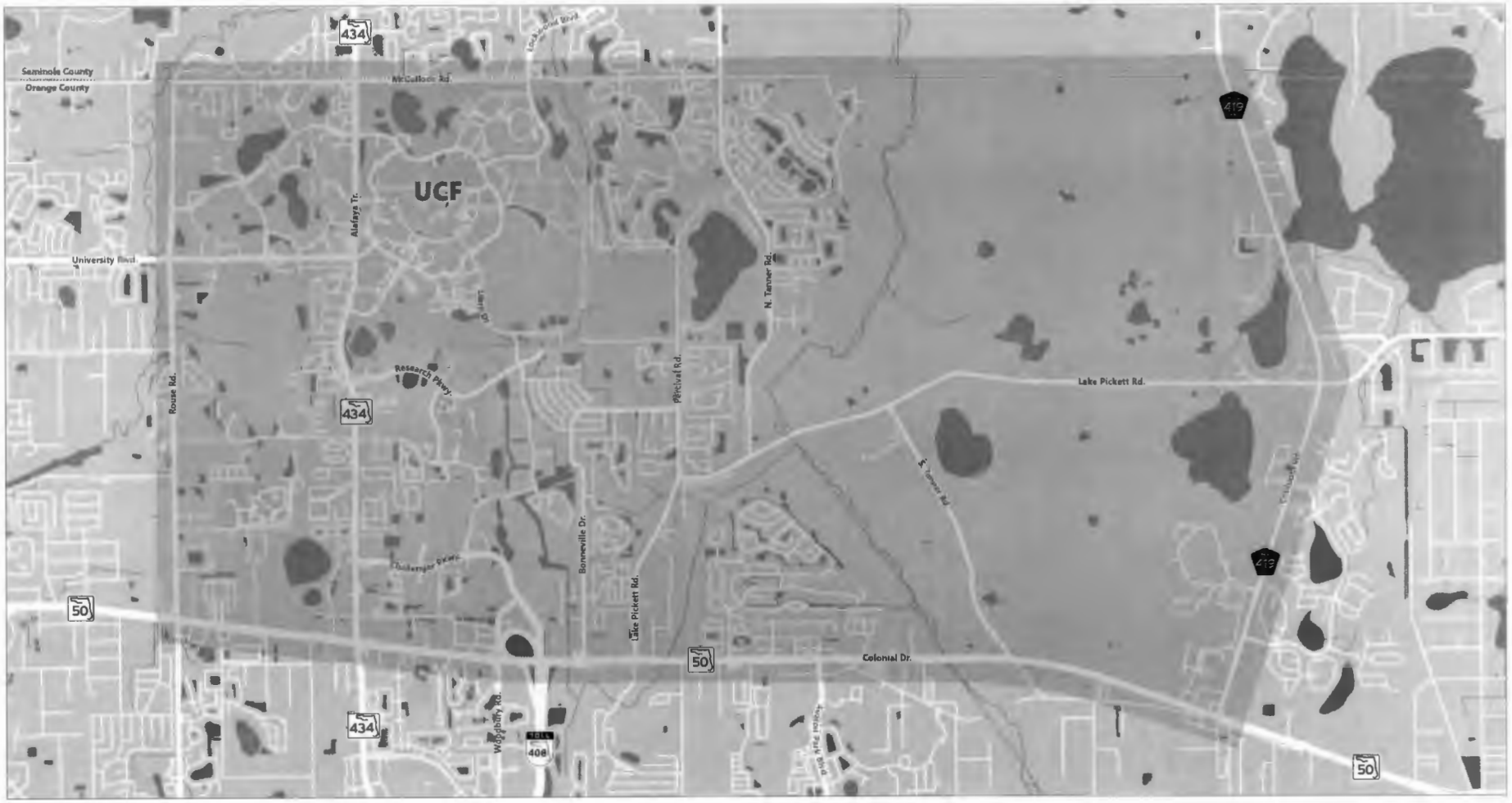
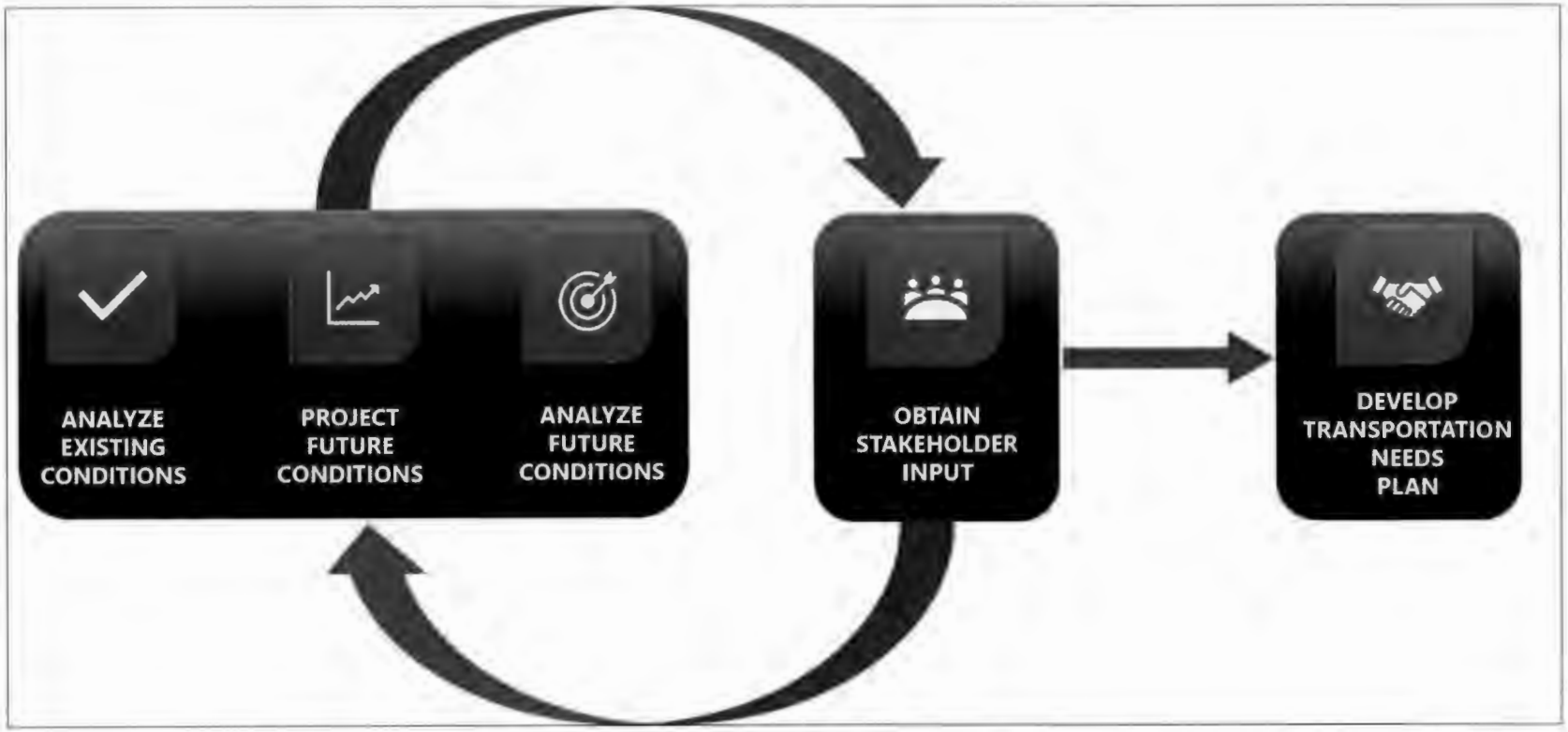


Figure 1-1

Study Area Map
The North East Orange County Areawide Transportation Study (NEOCATS)

FIGURE 1-2: STUDY APPROACH



1.1 STUDY AREA

The northeast area of Orange County is a major economic generator, home to the second largest university in the nation, University of Central Florida (UCF), two major business parks, and a growing number of residential subdivisions and small businesses. The area is anticipated to continue its rapid growth, with major mixed-use development projects Sustanee and The GROW proposed for the areas north and south of Lake Pickett Road. Several major roadways in the study area are failing to meet demand in existing conditions and the rapid development in the region is anticipated to increase future demand beyond the capacity of the existing transportation system.

The study area is bisected by the Econlockhatchee River and the Orange County Urban Service Area boundary. Features to the east of the boundary include farms, parks, nature preserves, sparse residential development, and undeveloped land. While this area has been historically rural, multiple suburban subdivisions have been approved along the Chuluota Road corridor. To the west of the boundary, the area includes a mix of suburban and urban developments including a variety of land uses for mainly residential, commercial, institutional, and recreational uses.

There are 37 study intersections in the NEOCATS area. Each intersection was reviewed looking at the Orange County Interactive Traffic Counts Map and the Florida Department of Transportation's (FDOT) Florida Traffic Online (FTO) application to collect data on number of lanes, pavement condition, and signalization/channelization.

Existing Conditions

2 PLANNED AND PROGRAMMED IMPROVEMENTS

From a review of various transportation plans throughout the study area, ongoing and upcoming planned and programmed (aka committed) transportation projects were identified. Planned and programmed improvements will be assumed to be in place the year after construction is funded during the future condition analysis of the NEOCATS area.

The latest available local public agency funding plans were obtained in June 2021 from each agency's website. During this exercise, the following documents were reviewed, and relevant pages are included in **Appendix A-1** through **A-3.**

- MetroPlan Orlando 2045 Metropolitan Transportation Plan – Cost Feasible Plan
- FDOT District Five Projects Website (CFLRoads.com)
- Orange County Transportation Projects Website (orangecountyfl.net)
- MetroPlan Orlando FY 2021/22 - 2025/26 Orlando Urban Area Transportation Improvement Program

Summaries of the programmed and planned projects are included in **Tables 2-1** and **2-2**, respectively. The list of ongoing projects within the NEOCATS study area obtained from Orange County ArcGIS maps is included in the **Table 2-3**.

TABLE 2-1: PROGRAMMED IMPROVEMENT PROJECTS

Responsible Agency	ID	Description	Project Location	From	To	Funded Phase(s)	Funded Year(s)
Programmed/Funded:							
FDOT	FM # 239203-7	Widen from 4 to 6 lanes	SR 50	Avalon Park Boulevard	Chuluota Road	CST	2023-2025
FDOT	FM # 239203-8	Widen from 4 to 6 lanes	SR 50	Chuluota Road	SR 520	CST	2024/25
FDOT	FM # 418232-2	Routine Maintenance	SR 408	W SR 50	E SR 50	MNT	2021-2025
FDOT	FM # 435731-1	Complete Streets	Alafaya Trail	Research Parkway	McCulloch Road	CST	-
Orange Co.	Management # 75115	Widen from 2 to 4 lanes	Chuluota Road	SR 50	Lake Pickett Road	RCA Study	2021-2025
Orange Co.	FM # 435526-1	Improve Intersection	Alafaya Trail	Corporate Boulevard	-	ROW/CST	2022/23
Orange Co.	FM # 446894-1	Improve Intersection	Rouse Road	University Boulevard	-	CST	2024/25
Orange Co.	FM # 441490-1	Improve Intersection	University Boulevard	Dean Road	-	CST	2023/24
Orange Co.	Management # 75114	Widen to 4 lanes	Woodbury Road	Lake Underhill Road	SR 50	PE	2021/22
Prioritized/Unfunded:							
Orange Co.	FM # 435731-1	Complete Streets	Alafaya Trail	Challenger Parkway	Research Parkway	N/A	Unfunded
FDOT	FM # 435731-1	Complete Streets	Alafaya Trail	Research Parkway	McCulloch Road	N/A	Unfunded
FDOT	-	Adaptive Signal System	SR 50	Forsyth Road	Avalon Park Boulevard	N/A	Unfunded

Source: MetroPlan Orlando FY 2021/22 - 2025/26 Orlando Urban Area Transportation Improvement Program, Adopted July 7, 2021

TABLE 2-2: PLANNED IMPROVEMENT PROJECTS

Location	MTP ID	From	To	Description	Unfunded	2026-30	2031-35	2036-45
Alafaya Trail	2144#	Research Parkway	McCulloch Road	Complete Streets/Safety/Ops		PDE to CEI		
	2156#	Challenger Parkway	Research Parkway	Complete Streets/Safety/Ops			PDE to ENV	CST to CEI
	2039	SR 50	University Boulevard	Operational/Safety			PE to ENV	CST to CEI
Challenger Parkway	**7530**	**SR 50**	**Woodbury Road**	**Operational/Safety**		**PE to CEI**		
McCulloch Road**		**N Orion Blvd**	**N Tanner Road**	**Widen from 2 to 4 Lanes**				
Lake Pickett Road	7542	S Tanner Road	Chuluota Road	Widen from 2 to 4 Lanes				PDE to CEI
	7541	Percival Road	S Tanner Road	Widen from 2 to 6 Lanes			PDE to CEI	
Lokanotosa Trail	**7269**	**Rouse Road**	**Alafaya Trail**	**Operational**			**PE to CEI**	
N Tanner Road	7529	Lake Pickett Road	County Line	Widen from 2 to 4 Lanes				PDE
Rouse Road	**7247**	**Lokanotosa Trail**	**University Boulevard**	**Operational**				**PE to CEI**
	7248	SR 50	Lokanotosa Trail	Operational				**PE to CEI**
SR 50	2154	Bumby Avenue	Old Cheney Highway	Complete Streets/Safety/Ops		PDE to ENV	CST to CEI	
	2005	Harrell Road	Alafaya Trail	ITS/Technology			PE to CEI	
	2008#	Forsyth Road	Avalon Park Boulevard	ITS/Technology			PE to CEI	
	2052	Rouse Road	Alafaya Trail	Operational/Safety			PE to ENV	CST to CEI
	2041	SR 408	Avalon Park Boulevard	Operational/Safety			PE to ENV	CST to CEI
	2136	Alafaya Trail	Lake Pickett Road	Safety Improvements			PE to ENV	CST to CEI
	2133	Lake Pickett Road	Chuluota Road	Safety Improvements		PE to ENV	CST to CEI	
	2090/2249	SR 408	Chuluota Road	Widen from 4 to 6 Lanes		PDE to ENV	CST to CEI	
Woodbury Road	**7528**	**Waterford Lakes Parkway**	**SR 50**	**Widen from 2 to 4 Lanes**		**PDE to CEI**		
	7146	SR 50	Challenger Parkway	Complete Streets/Safety/Ops	✓			
Chuluota Road	7420	Lake Pickett Road	County Line	Widen from 2 to 4 Lanes	✓			
	7421	SR 50	Lake Pickett Road	Widen from 2 to 4 Lanes	✓			
Gemini Boulevard	**3082**	**Centaurus Boulevard**	**Gemini Boulevard**	**ITS/Technology**	✓			
Innovation Way/UCF	5068	University Boulevard	Lake Underhill Road	Shared Use Path	✓			
Little Econ Greenway	**5071**	**SR 436**	**Chuluota Road**	**Shared Use Path**	✓			
McCulloch Road	9144	Dean Road	Lockwood Boulevard	Complete Streets	✓			
Rouse Road	**7137**	**Lake Underhill Road**	**SR 50**	**Complete Streets/Safety/Ops**	✓			
SR 50 Premium Rapid Transit*	5021	-	-	Premium Transit Service	✓			
S Tanner Road	**3077**	**SR 50**	**Lake Pickett Road**	**ITS/Technology**	✓			

**Extents of Premium Rapid Transit are yet to be determined*

Source: Metroplan Orlando 2045 Metropolitan Transportation Plan, Updated June 9, 2021, and MetroPlan Orlando Online Data Viewer

Phases: PDE – Project Development and Environment, PE – Preliminary Engineering, ENV – Environmental, CST – Construction, CEI – Construction Engineering Inspection

These projects are prioritized and included in the Table 2-1

**Based on Discussions with County Staff

TABLE 2-3: ONGOING PROJECTS

Project Name	Project Description	Location	Project Type	Percent Complete - Phase
Corporate Boulevard at Alafaya Trail	Construct an eastbound left turn lane in the median on Corporate Boulevard west of Alafaya Trail.	Corporate Boulevard at Alafaya Trail	Intersection Improvement	94
University Boulevard at Rouse Road	Construct an eastbound left turn lane extension at University Boulevard	University Boulevard at Rouse Road	Intersection Improvement	15
Buck Road	Design of replacement of Buck Road bridge to include a sidewalk to address a hazardous walking condition for students attending Riverdale Elementary.	Buck Road	Bridge Construction	30
Summer Woods Pond Design	Combine Ponds 6604 and 6621 into one retention pond.	East side of Hillmont Circle in Summer Woods Subdivision	Pond Retrofit	91
Avalon Park Boulevard at Pellicer Drive Traffic Signal	This purpose of this project is to increase safety by reducing crashes by installing a traffic signal. Based on both a volume and crash analysis this project is warranted. This was prompted by a citizen's request.	Avalon Park Boulevard at Pellicer Drive/Avalon Reserve Boulevard	Traffic Signal	0
Little Econ River Watershed Master Plan Survey	Field Survey for Topographic Data Acquisition of Little Econ	Little Econ Drainage Basin	Master Plan Survey Efforts	93
Little Econ River Watershed Master Plan Update	Little Econ River Master Plans being updated	Little Econ River Drainage Basin	Master Plan Updates	44
Rouse Road	Installed median trees on Rouse Road from SR 408 to Corporate Boulevard	Rouse Rd - SR 50 to Corporate Boulevard	Median Tree Landscaping	90
Rocking Horse Road - Ditch and pipe work	Design drainage improvements to outfall into the Little Econ River. On hold until easements are acquired.	Rocking Horse Road - Koi Rd to 5517 Rocking Horse Road	Drainage Improvement	74
Park Manor Estates - on hold	Repair of damaged sidewalks at identified locations throughout the subdivision.	Park Manor Estates	Sidewalk Repair	0
NORTH EAST ORANGE COUNTY AREAWIDE TRANSPORTATION STUDY (NEOCATS)	The main objective of this study is to identify and analyze potential transportation projects that would improve network connectivity and provide relief to constrained corridors. The study shall develop a prioritized list of regional roadway improvements as well as intersection improvements, transit, pedestrian, and bicycle enhancements.	The study area is bounded by Colonial Drive (SR 50) to the south, Seminole County Line to the north Rouse Road to the west and Chuluota Road to the East	Roadway Improvement	0
UCF Area Pedestrian Safety	The Phase I design will consist of additional guideway signage, new pedestrian channelization in medians, new landscaping, intersection improvements with curb modifications and enhanced crosswalks, new pedestrian-scale lighting, a much wider sidewalk along the UCF frontage, and two new signalized mid-block crosswalks.	Alafaya Trail/University Boulevard - Research Parkway/University Boulevard to Quadrangle Boulevard/Alafaya Trail	Pedestrian Safety	90
Big Econ River Watershed Master Plan Update	Big Econ River Basin Model Refinement	Big Econ River Drainage Basin	Master Plan Updates	1
Big Econ River Watershed Master Plan Survey	Big Econ River Survey Updates	Big Econ Drainage Basin	Master Plan Survey Efforts	100
Orpington Street Resurfacing	Milling and resurfacing of the roadway	Orpington Street – Alafaya Trail to Orion on Orpington	Pavement Resurfacing	0
Woodbury Road*	This RCA study will evaluate the widening of Woodbury Road to a four-lane divided roadway from Lake Underhill Road to SR 50. The study will also evaluate improvements to the intersection of Waterford Lakes Parkway and Woodbury Road.	East Orange County - Lake Underhill Road to SR 50	Roadway Improvement	-
Alafaya Trail Resurfacing	Milling and resurfacing of the roadway	Alafaya Trail – E Colonial Drive to Curry Ford Road	Pavement Resurfacing	0
N Tanner Road Resurfacing	Milling and resurfacing of the roadway	N Tanner Road – Lake Pickett Road to McCulloch Road	Pavement Resurfacing	0
Avalon Park Boulevard	Installing median trees on Avalon Park Blvd from SR 50 to Perdido Drive and Crystal Bay Lane to Crown Hill Boulevard	Avalon Park Blvd - SR 50 to Perdido Drive and Crystal Bay Lane to Crown Hill Boulevard	Median Tree Landscaping	0
Old Cheney Highway / Tanner Road Phase II	Drainage evaluation to determine causes of flooding.	Old Cheney Highway /Tanner Road	Drainage Improvement	25

Project Name	Project Description	Location	Project Type	Percent Complete - Phase
Chuluota Road Roadway Conceptual Analysis	The purpose of the study is to assess and recommend roadway improvements anticipated to improve safety and traffic flow in the area. The study considers the social and environmental impacts of adding travel lanes and other features such as, but not limited to, drainage conveyance and treatment improvements, a segment of the East Orange Trail and sidewalk, raised medians, lighting, landscaping and intersection improvements.	Chuluota Road - SR 50 to Lake Pickett Road	Roadway Improvement	0
Heartwood (18-S-070)	This project is to subdivide 40.62 acres to construct thirty-eight (38) single family residential dwelling units. The project is proposed to be gated. The construction plans were approved by the County Engineer on 10-16-2019.	South of Lake Pickett Road / West of Lake Louise	Subdivision	85
Lake Pickett Cluster Parcels 1-3 - Phase 4 (19-S-057)	The subject project is to subdivide 55.93 Acre into 39 single family residential dwelling units, the subdivision will be gated. The construction plans were approved by the county engineer on 03-10-2020.	West of Lake Pickett Road and East of Grayling Street	Subdivision	50
Lake Pickett Cluster Parcel 1-3 (18 S-046)	The proposed project is located on Lake Pickett Road East of C.R. 419 1.0 mile+/-. There are approximately 52 acres containing 41 lots. The developer is Pulte Home Company, and the construction plans were approved by the County Engineer on April 26, 2019.	18801 Lake Pickett Road, Orlando, Florida, 32820, USA	Subdivision	70
McCulloch Road RCA	The purpose of this RCA study is to assess and recommend roadway improvements anticipated to improve safety and traffic flow in the area. The study considers the social and environmental impacts of adding travel lanes and other features such as, but not limited to, drainage conveyance and treatment improvements, proposed multi-purpose path, raised medians, lighting and landscaping.	McCulloch Road N. Orion Boulevard to N. Tanner Road	Roadway Improvement	5
Lake Pickett Road Resurfacing	Milling and resurfacing of the roadway	Lake Pickett Road – Chuluota Road to Lake Pickett Road	Pavement Resurfacing	0

Notes:

1) Source (as of May 2021): https://ocfl.maps.arcgis.com/apps/webappviewer/index.html?id=67ac2772ca304d3f92fae29cd68b8006

*2) * As of November 2021, the RCA study has been approved and this project has moved into design*

3 TRAFFIC DATA COLLECTION AND EXISTING OPERATIONAL ANALYSIS

3.1 HISTORIC TRAFFIC COUNT DATA AND PREVIOUS STUDIES

Historic count data available online from FTO, Orange County (Interactive Traffic Count Map), Seminole County (Seminole GIS – Traffic Counts), and other recent projects were obtained for the project. The documentation for the historic data collection, including online counts and previous studies, is included in **Appendix B.**

3.2 FIELD-COLLECTED TRAFFIC DATA

In addition to the count data collected online and from previous studies, new counts were collected in the field on typical weekdays in May 2021.

The raw field-collected traffic counts are included in **Appendix C.**

3.3 EXISTING CONDITIONS TRAFFIC DEVELOPMENT

Due to COVID-19, the collected traffic data was reviewed against pre-pandemic data to develop appropriate existing conditions traffic data. Overall, the field-collected data was found to be much lower than the historic data, especially along the major arterials serving UCF (University Boulevard and Alafaya Trail). Therefore, the data was adjusted in coordination with Orange County to ensure a realistic base condition for the existing year analysis. Please note that based on County's input and because traffic volumes have not yet completely rebounded to pre-pandemic levels, the existing year for this study will be 2020.

A memorandum outlining the methodology used in the development of existing traffic volumes (both Annual Average Daily Traffic [AADT] and Traffic Movement Counts [TMC]) for all segments and intersections within the study area was submitted to the County in July 2021. The approved methodology along with final recommended existing AADTs were provided in **Appendix D.**

Since the field-collected TMCs were found to be much lower than the historic data due to the ongoing COVID-19 pandemic, based on County's approval, turning movement volumes (TMVs) were extracted from StreetLight for typical AM and PM weekday condition for September 2019 to reflect the pre-pandemic traffic conditions. The 2020 AM and PM peak hour turning movement volumes for all study intersections are included in **Figure 3-1.**

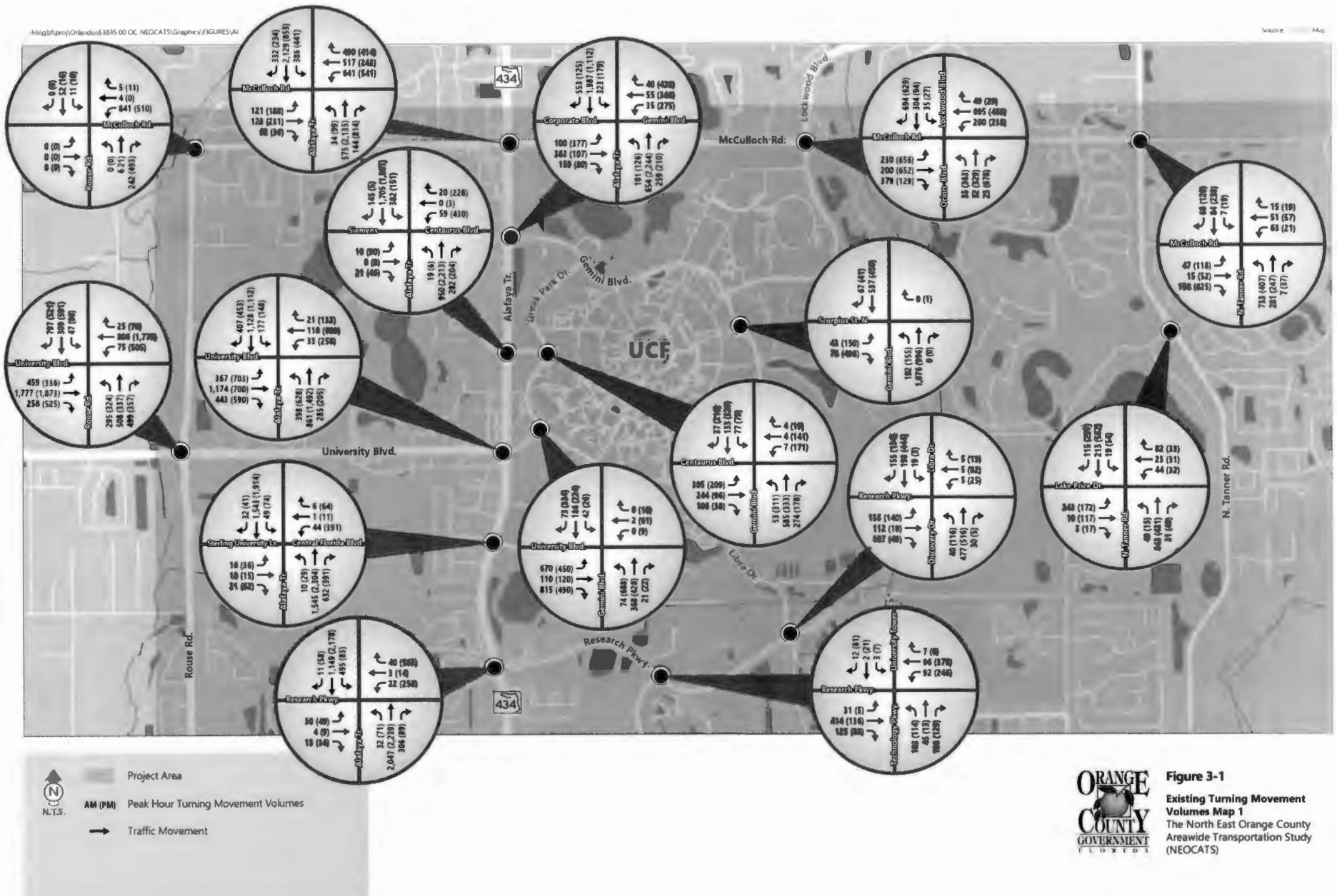


Figure 3-1

Existing Turning Movement Volumes Map 1
The North East Orange County Areawide Transportation Study (NEOCATS)

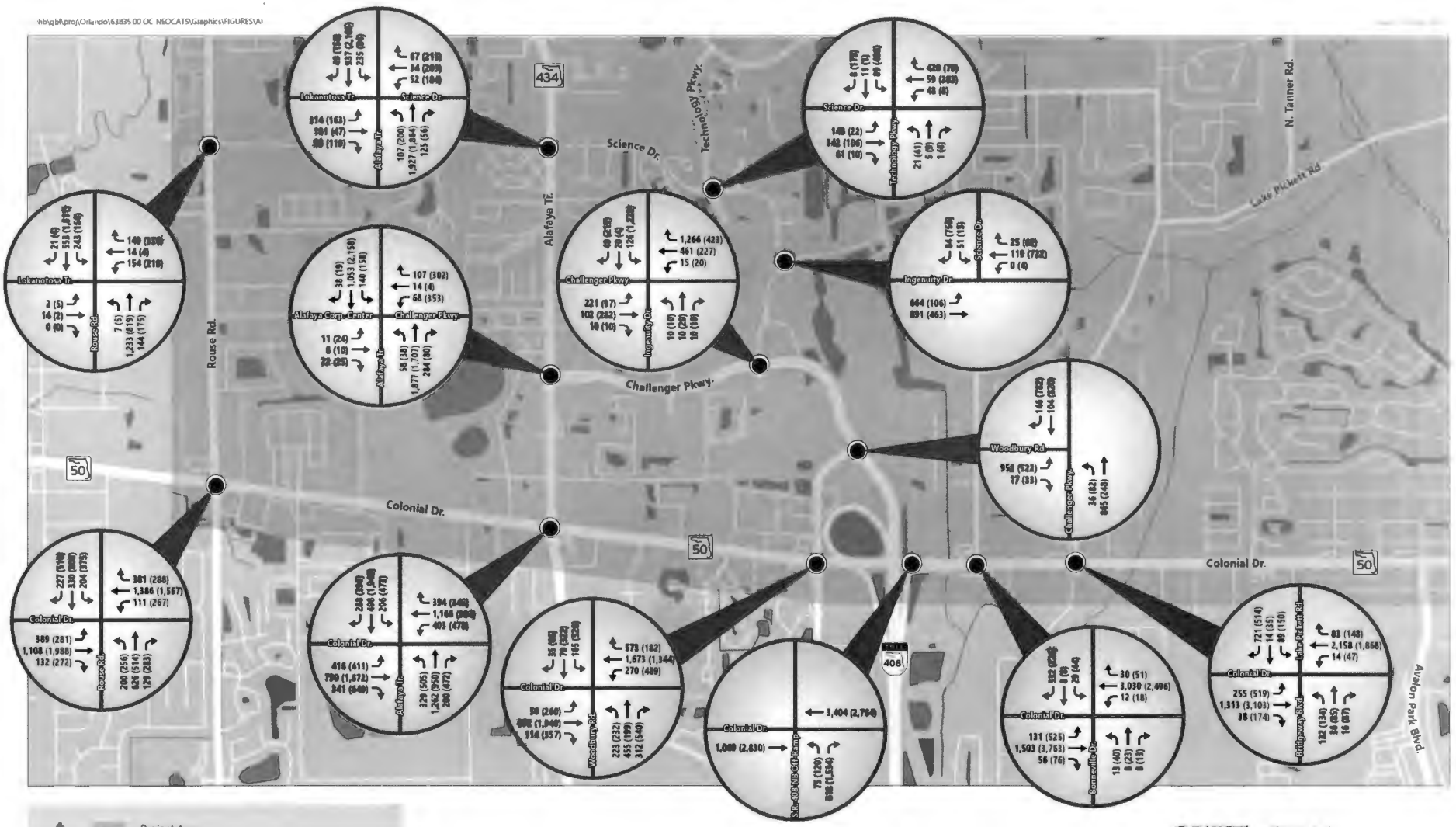


Figure 3-1

Existing Turning Movement Volumes Map 2
The North East Orange County Areawide Transportation Study (NEOCATS)

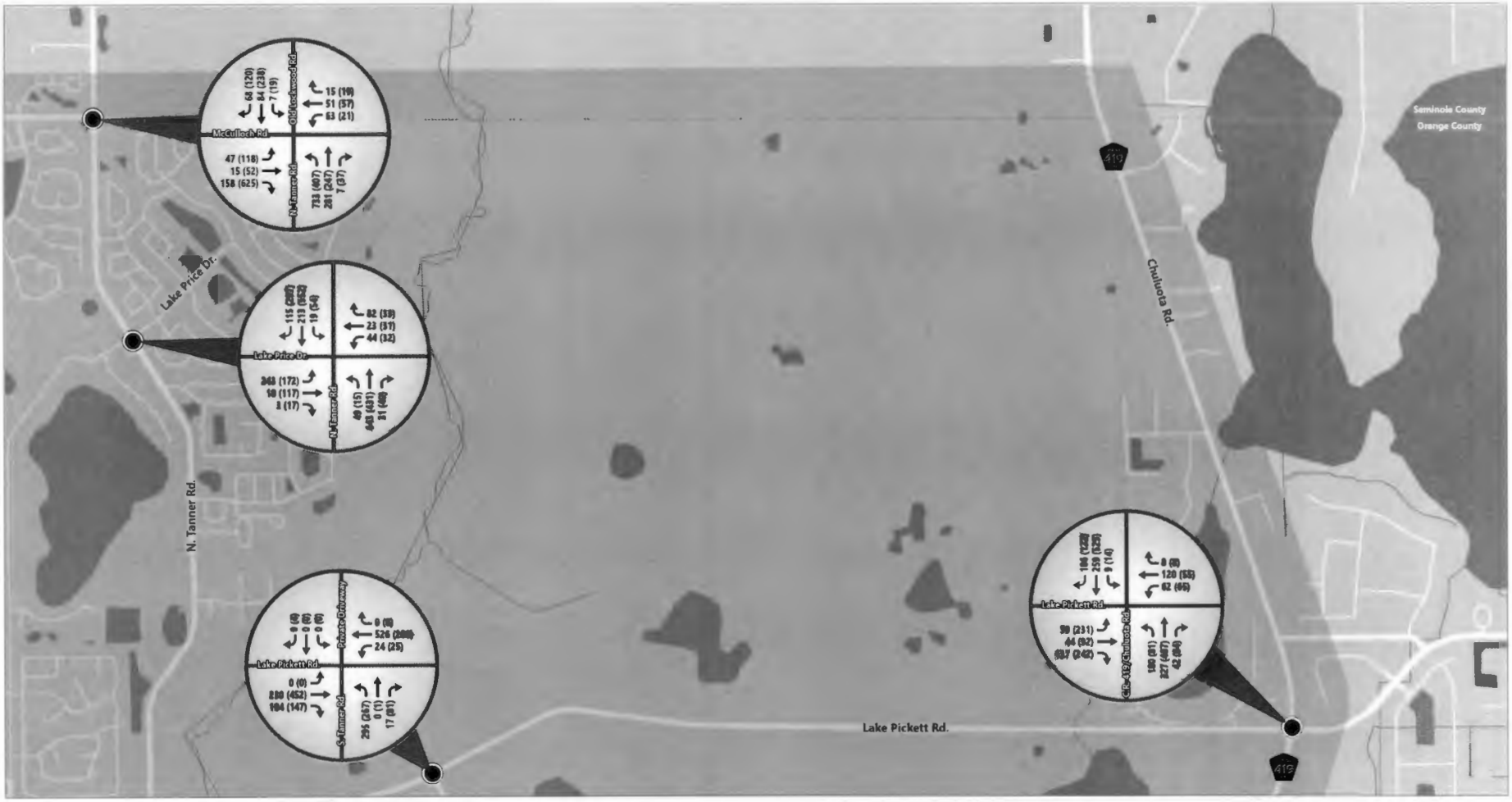
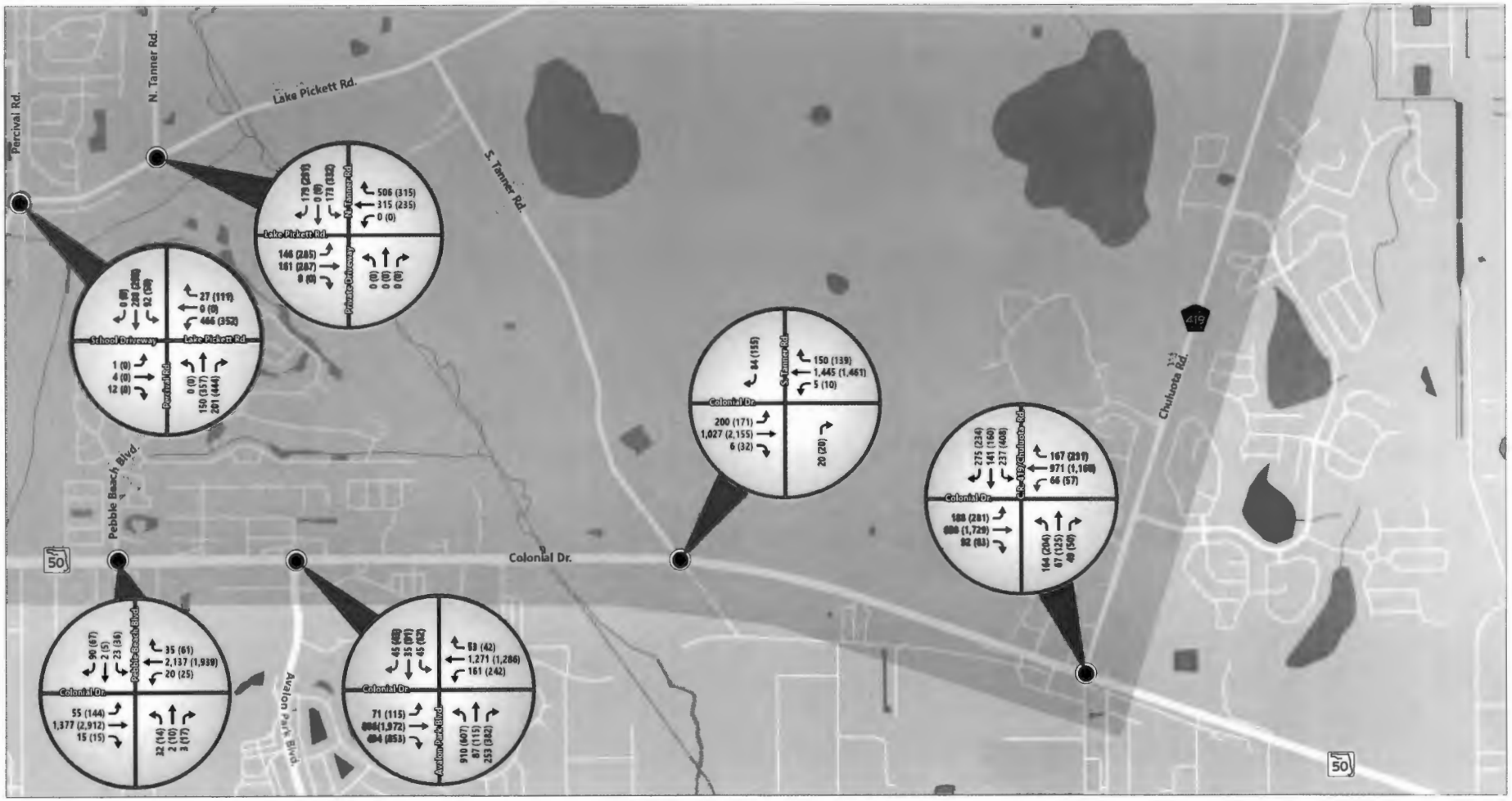


Figure 3-1

Existing Turning Movement Volumes Map 3
The North East Orange County Areawide Transportation Study (NEOCATS)



Project Area

AM (PM) Peak Hour Turning Movement Volumes

Traffic Movement

Figure 3-1

Existing Turning Movement Volumes Map 4
The North East Orange County Areawide Transportation Study (NEOCATS)

3.4 TRAFFIC FACTORS DEVELOPMENT

Traffic factors that will be carried into future year analysis include K factors, Directional Distribution (D) factors, and Design-Hour-Truck (DHT) factors.

Measured K and D factors were developed using the field-collected count data. This data was supplemented with K and D factors obtained from the latest available FTO database (2020 data). A full table including factors and sources for each roadway segment is provided in **Appendix E**.

The design hour truck factor, DHT, is the percentage of truck traffic during the peak hour and is recommended as one-half of the T factor in the *2019 FDOT PTF Handbook*.

For analysis purposes, DHT factors were developed from the TMC data for each individual intersection movement. A full table demonstrating the truck counts and percentages at each intersection is provided in **Appendix E.**

The recommended design K and D factors are based on the evaluation of the existing measured characteristics and historical characteristics. The T factors were obtained from available FTO Cosites, and field collected TMC.

3.5 EXISTING MULTIMODAL LEVEL OF SERVICE (LOS) ANALYSIS

Synchro 11 software was used to perform the LOS operational analyses for automobile (auto), pedestrian, and bicycle modes at the study intersections. Signal timing data used in the analysis were obtained from the Orange County Traffic Management Center and are provided in **Appendix F**.

Auto LOS analysis was conducted for both the signalized and unsignalized study intersections. Pedestrian and bicycle LOS analysis was conducted at signalized study intersections. Synchro-based results are provided for the signalized intersections and Highway Capacity Manual (HCM) 6th Edition-based analysis results are provided for the unsignalized intersections. Roadway segment LOS for the auto mode was computed using Orange County Concurrency Management System (CMS) roadway capacities. Pedestrian, bicycle, and transit LOS for the study corridor were provided based on the criteria outlined in the latest FDOT 2020 Quality/Level of Service (Q/LOS) Handbook.

3.5.1 Intersection LOS

Table 3-1 shows overall delay and LOS information for signalized intersections and worst movement delay and LOS for unsignalized intersections, both based on HCM 6th Edition. If HCM 6th Edition results are not available, then HCM 2000 results are provided. The HCM based Synchro analysis results are provided in **Appendix G.** Per the Orange County Concurrency Management System (CMS) database, the LOS minimum acceptable standards vary from D to E and are specific to each roadway. Minimum LOS is assumed as E for roadways not in the CMS database. The intersections which are operating at LOS E and LOS F are highlighted in the table.

TABLE 3-1: INTERSECTION LOS ANALYSIS

Intersections	Minimum LOS Standard	2020 AM		2020 PM	
		Delay	LOS	Delay	LOS
SR 50 at Alafaya Trail	E	78.6	E	123.5	F
Alafaya Trail at Challenger Parkway	E	37.0	D	45.1	D
Alafaya Trail at Science Drive	E	80.0	E	48.0	D
Alafaya Trail at Research Parkway	E	36.2	D	34.5	C
Alafaya Trail at Central Florida Boulevard	E	14.0	B	27.1	C
Alafaya Trail at University Boulevard	E	63.9	E	108.4	F
Alafaya Trail at Centaurus Boulevard#	E	27.2	C	48.3	D
Alafaya Trail at Gemini Boulevard	E	58.9	E	67.1	E
Alafaya Trail at McCulloch Road	E	64.8	E	83.6	F
SR 50 at Woodbury Road	E	70.5	E	142.1	F
SR 50 at SR 408 NB Ramps	E	2.6	A	4.6	A
SR 50 at Bonneville Drive	E	63.6	E	66.1	E
SR 50 at Lake Pickett Road	E	103.3	F	80.6	F
SR 50 at Pebble Beach Boulevard	E	43.5	D	27.3	C
SR 50 at Avalon Park Boulevard	E	59.4	E	90.5	F
SR 50 at Chuluota Road	D	48.4	D	81.8	F
McCulloch Road at Orion Boulevard/Lockwood Boulevard#	E	61.6	E	71.1	E
McCulloch Road at N Tanner Road	E	53.1	D	61.6	E
Technology Parkway at Research Parkway	E	14.6	B	15.8	B
Technology Parkway at Science Drive	E	20.9	C	25.9	C
Lake Pickett Road at S Tanner Road	D	13.5	B	14.5	B
N Tanner Road at Lake Price Drive	E	27.2	C	28.6	C
Gemini Boulevard at University Boulevard	E	23.2	C	46.0	D
Gemini Boulevard at Centaurus Boulevard#	E	41.9	D	53.9	D
Gemini Boulevard at Scorpius Street (North)#	E	15.9	B	24.4	C
Lake Pickett Road at Percival Road (All Way Stop)	E	46.8	E	154.8	F
Lake Pickett Road at N Tanner Road	D	13.4	B	27.3	C
Lake Pickett Road at Chuluota Road	D	33.3	C	48.2	D
McCulloch Road at Rouse Road (All Way Stop)	E	89.2	F	24.8	C
SR 50 at Rouse Road	E	63.0	E	88.5	F
University Boulevard at Rouse Road	E	129.7	F	112.6	F
SR 50 at S Tanner Road*	D	33.7/20.2	D/C	21.3/24.3	C/C
Rouse Road at Lokanotosa Road	E	3.7	A	3.7	A
Science Drive at Ingenuity Drive*	E	10.2/>300.0	B/F	10.1/44.7	B/E
Research Parkway at Discovery Drive	E	21.8	C	29.3	C
Woodbury Road at Challenger Parkway	E	17.1	B	28.3	C
Challenger Parkway at Ingenuity Drive#	E	76.1	E	65.0	E

Notes:

*1. *Majors street/minor street delay and LOS for two-way stop-controlled intersections.*

2. Minimum LOS source: Orange County CMS

3. #HCM2000 results are reported since HCM 6th Edition results are not available

3.5.2 Roadway Segment LOS

The roadway segment LOS for the auto mode was performed using roadway capacities from the Orange County CMS database, provided in **Appendix H**, except for Alafaya Trail for which the LOS was based on average speeds and (LOS) criteria from HCM 6th Edition Exhibit 18-1. The peak hour peak directional volumes were obtained from the TMVs (maximum of AM and PM) shown in **Figure 3-1** and compared with the CMS roadway capacities. The roadway segment analysis is provided in **Table 3-2**, which includes the Maximum Service Volume (MSV) LOS thresholds, the directional capacities, and the minimum acceptable LOS standards per the Orange County CMS database. **Table 3-3** shows the average speeds and HCM 6th Edition-based LOS for Alafaya Trail. The HCM based Synchro analysis results are provided in **Appendix G.** The roadway segments which are operating at LOS F are highlighted in the below tables.

TABLE 3-2: ROADWAY SEGMENT LOS ANALYSIS

Roadway / Segment	Peak Hour Peak Direction Vol	Orange County CMS							Segment LOS
		# of Lanes	LOS B	LOS C	LOS D	LOS E	Min LOS	Capacity	
SR 50									
West of Rouse Road	2,541	6	0	2,940	3,020	3,020	E	3,020	C
Rouse Road to Alafaya Trail	2,732	6	0	2,940	3,020	3,020	E	3,020	C
Alafaya Trail to Woodbury Road	2,617	6	0	2,940	3,020	3,020	E	3,020	C
Woodbury Road to Lake Pickett Road	3,820	6	0	2,940	3,020	3,020	E	3,020	F
Lake Pickett Road to Pebble Beach Road	3,340	6	0	2,940	3,020	3,020	E	3,020	F
Pebble Beach Road to Avalon Park Boulevard	2,965	6	0	2,940	3,020	3,020	E	3,020	D
Avalon Park Boulevard to S Tanner Road	2,416	4	0	1,530	1,580	1,580	D	1,580	F
S Tanner Road to CR 419/Chuluota Road	2,175	4	0	1,530	1,580	1,580	D	1,580	F
East of CR 419/Chuluota Road	2,187	4	1,340	2,100	2,660	3,020	D	2,660	D
McCulloch Road									
Rouse Road to Alafaya Trail	883	2	0	830	880	880	E	880	F
Alafaya Trail to Lockwood Boulevard	1,648	4	0	1,910	2,000	2,000	E	2,000	C
Lockwood Boulevard to Worchester Drive	1,357	2	0	830	880	880	E	880	F
Worchester Drive to N Tanner Road	852	2	0	830	880	880	E	880	D
East of N Tanner Road	129	2	0	830	880	880	E	880	C
CR 419/Chuluota Road									
SR 50 to Lake Pickett Road	832	2	0	670	740	740	D	740	F
Lake Pickett Road to Seminole County Line	661	2	240	430	740	1,490	D	740	D
Avalon Park Boulevard									
South of SR 50	1,250	4	0	1,910	2,000	2,000	E	2,000	C
Lake Pickett Road									
SR 50 to Percival Road	824	2	0	830	880	880	E	880	C
Percival Road to N Tanner Road	552	2	0	670	740	740	D	740	C
N Tanner Road to S Tanner Road	821	2	0	670	740	740	D	740	F
S Tanner Road to CR 419/Chuluota Road	565	2	240	430	740	1,490	D	740	D
South Tanner Road#									
North of SR 50	350	2	0	830	880	880	E	880	C
North Tanner Road									
Lake Pickett Road to Lake Price Drive	723	2	0	830	880	880	E	880	C
Lake Price Drive to McCulloch Road	1,021	2	0	830	880	880	E	880	F

Roadway / Segment	Peak Hour Peak Direction Vol	Orange County CMS							Segment LOS
		# of Lanes	LOS B	LOS C	LOS D	LOS E	Min LOS	Capacity	
Percival Road									
Lake Pickett Road to Sussex Drive	468	2	0	370	750	800	E	800	D
Lake Price Drive, 0.05 Mi. E. of N Tanner Road	343	2	0	370	750	800	E	800	C
Research Parkway#									
Alafaya Trail to Technology Parkway	835	4	0	730	1,630	1,700	E	1,700	D
Technology Parkway to Discovery Drive	630	4	0	730	1,630	1,700	E	1,700	C
Challenger Parkway									
Alafaya Trail to Ingenuity Drive	659	4	0	730	1,630	1,700	E	1,700	C
Ingenuity Drive to Woodbury Road	1,742	4	0	730	1,630	1,700	E	1,700	F
Gemini Boulevard#									
Central Florida Boulevard to University Boulevard	1,138	4	0	730	1,630	1,700	E	1,700	D
University Boulevard to Centaurus Boulevard	1,038	4	0	730	1,630	1,700	E	1,700	D
North of Centaurus Boulevard	894	4	0	730	1,630	1,700	E	1,700	D
South of Scorpius St (North)	1,268	4	0	730	1,630	1,700	E	1,700	D
East of Alafaya Trail	945	4	0	730	1,630	1,700	E	1,700	D
Orion Boulevard#*									
South of McCulloch Road	716	4	0	730	1,630	1,700	E	1,700	C
Corporate Boulevard#									
West of Alafaya Trail	709	2	0	830	880	880	E	880	C
Libra Drive#*									
North of Research Parkway	398	4	0	730	1,630	1,700	E	1,700	C
Woodbury Road									
South of SR 50	1,168	2	0	370	750	800	E	800	F
North of SR 50	1,078	4	0	730	1,630	1,700	E	1,700	D
Bonneville Drive									
North of SR 50	599	2	0	830	880	880	E	880	C
Science Drive#									
Alafaya Trail to Technology Parkway	602	2	0	830	880	880	E	880	C
Technology Parkway to Ingenuity Drive	763	2	0	830	880	880	E	880	C
Ingenuity Drive#									
Challenger Parkway to Science Drive	1,555	4	0	730	1,630	1,700	E	1,700	D
Science Drive to Discovery Drive	942	3	0	780	1,255	1,290	E	1,290	D
Technology Parkway#									
Research Parkway to Science Drive	584	4	0	730	1,630	1,700	E	1,700	C

Roadway / Segment	Peak Hour Peak Direction Vol	Orange County CMS							Segment LOS
		# of Lanes	LOS B	LOS C	LOS D	LOS E	Min LOS	Capacity	
Discovery Drive#									
Research Parkway to Ingenuity Drive	832	2	0	830	880	880	E	880	D
Rouse Road									
North of University Boulevard	1,192	4	0	1,910	2,000	2,000	E	2,000	C
University Boulevard to Lokanotosa Trail	1,669	4	0	1,910	2,000	2,000	E	2,000	C
Lokanotosa Trail to SR 50	1,730	4	0	1,910	2,000	2,000	E	2,000	C
South of SR 50	1,347	4	0	1,910	2,000	2,000	E	2,000	C
University Boulevard									
Gemini Boulevard to Alafaya Trail	1,636	6	0	2,940	3,020	3,020	E	3,020	C
Alafaya Trail to Rouse Road	2,323	6	0	2,940	3,020	3,020	E	3,020	C
West of Rouse Road	2,734	6	0	2,940	3,020	3,020	E	3,020	C

Notes:
*1. * Peak hour peak direction volume based on AADT*K(9%)*D(53%)*
2. # Capacities were obtained from similar roadways

TABLE 3-3: ARTERIAL ROADWAY SEGMENT LOS ANALYSIS

Roadway / Segment	2021 AM Peak Hour		2021 PM Peak Hour		2021 AM Peak Hour		2021 PM Peak Hour	
	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS
Alafaya Trail	**NB/EB Direction**		**NB/EB Direction**		**SB/WB Direction**		**SB/WB Direction**	
SR 50 to Challenger Parkway	27.1	C	24.1	D	12.3	F	9.8	F
Challenger Parkway to Science Drive	22.8	D	23.3	D	36.5	B	32.0	C
Science Drive to Research Parkway	22.4	D	18.0	E	23.8	D	14.9	F
Research Parkway to Central Florida Boulevard	36.6	B	18.0	E	28.5	C	18.2	E
Central Florida Boulevard to University Boulevard	21.9	D	20.6	D	33.3	C	19.7	E
University Boulevard to Centaurus Boulevard	23.4	D	19.9	E	13.4	F	13.3	F
Centaurus Boulevard to Gemini Boulevard	20.0	D	16.2	E	23.7	D	21.8	D
Gemini Boulevard to McCulloch Road	27.5	C	12.0	F	15.7	E	21.2	D

3.5.3 Pedestrian, Bicycle, and Transit LOS Analysis

The pedestrian and bicycle LOS values reported at the signalized study intersections are based on the HCM 6th Edition methodologies. Pedestrian LOS at a signalized intersection is based on factors such as number of traffic lanes crossed, disturbance caused by motorized vehicle traffic (traffic volumes, turning types, etc.), and presence of channelized right turns. The bicycle LOS at a signalized intersection is based on factors such as presence of bicycle lanes and/or paved shoulders, separation from motorized vehicle traffic, traffic volumes and speeds, and heavy vehicle percentage.

The multimodal LOS including pedestrian, bicycle, and transit LOS for the study corridor is based on the Generalized Service Volume Table 1 of the 2020 Q/LOS Handbook (included in **Appendix G**). The bicycle and pedestrian mode LOS for most of the study corridors are within LOS F, except for segments where there either no bicycle or pedestrian facilities or the existing volumes are high or both. Transit LOS is F for a segment if there are no bus routes on that segment.

3.6 TRAVEL DEMAND MODEL

The Central Florida Regional Planning Model (CFPRM) Version 7 was used for this study. The model is an evaluation tool that represents land use and transportation interaction to assess the capability of the region's highway and transit networks to support anticipated growth. The subarea model validation is discussed in Future Conditions section of the report.

3.7 ORIGIN – DESTINATION (OD) STUDY

StreetLight Data was used to understand travel patterns between origins and destinations within the study area. StreetLight Data uses location-based service data from cell phones and navigation devices to give insights into vehicle, bicyclist, and pedestrian travel patterns. StreetLight uses machine learning algorithms to process and validate the data using traffic counters and sensors.

The OD locations were initially provided by Orange County and refined based on coordination between the project team and the county.

The objective of the OD study is to develop an OD matrix to show distribution patterns of traffic. This distribution is intended to help with the base year model validation for the study area. The idea is to compare the trip percentages for specific OD pairs (external to the study area) between the travel demand model and StreetLight Data. Traffic flow characteristics such as average speeds and trip durations will also help replicate current conditions in the sub area travel demand model. The OD data can also be used to examine potential new roadway connections that can relieve traffic on major roadways within the study area.

The OD trip matrix (42X42) in percentages for daily conditions is provided in the **Appendix I**.

3.8 AVERAGE SPEED AND TRIP DURATION – AM & PM PEAK HOURS

Table 3-4 shows the average speed and trip duration for four of the major study segments:

TABLE 3-4: AVERAGE SPEED AND TRIP DURATION SUMMARY

Roadway Segment	Direction	Average Trip Duration (min)		Average Speed (mph)		LOS	
		AM	PM	AM	PM	AM	PM
SR 434 from south of SR 50 to north of McCulloch Road	NB	9.2	14.3	25	18	C	E
	SB	9.7	13.7	26	19	C	E
SR 50 from west of Rouse Road to east of CR 419	EB	11.4	22.2	36	20	B	D
	WB	21.4	17.8	20	24	D	D
CR 419 from north of SR 50 to north of Lake Pickett Road	NB	5.2	5.8	43	41	A	A
	SB	5.8	6	42	40	A	A
Lake Pickett Road from north of SR 50 to east of CR 419	EB/NB	8.5	10.1	34	31	B	C
	WB/SB	11.4	8.3	29	35	C	B

4 EXISTING CONDITIONS

4.1 ROADWAY FEATURES

Table 4-1 provides a summary of the posted speed, median type, and median width along the study segments based on 2021 Google Earth aerial data.

TABLE 4-1: ROADWAY SEGMENT SUMMARY

Roadway	From	To	Median Type	Typical Median Width	Lanes	Speed
Alafaya Trail	SR 50	McCulloch Road	Raised	30	6	45
Avalon Park Boulevard	SR 50	Faberge Drive	Raised	20	4	45
Bonneville Drive	SR 50	Sussex Drive	None	NA	2	35
Challenger Parkway	Alafaya Trail	SR 408	Raised	60	4	35
Chuluota Road	SR 50	Seminole County Line	None	NA	2	50
Corporate Boulevard	Alafaya Trail	Knights Circle	Raised	35	4	30
Corporate Boulevard	Knights Circle	Quadrangle Boulevard	Raised	13	2	30
Corporate Boulevard	Quadrangle Boulevard	Rouse Road	Raised	12	2	30
Gemini Boulevard	Centaurus Boulevard	Alafaya Trail	Raised	15	4	30
Ingenuity Drive	Challenger Parkway	Kaplan Entrance	Raised	25	4	30
Ingenuity Drive	Kaplan Entrance	Leidos Entrance	None	NA	4	30
Ingenuity Drive	Leidos Entrance	Discovery Drive	None	NA	2/1*	30
Lake Pickett Road	SR 50	Chuluota Road	None	NA	2	45
Libra Drive	Research Parkway	Ara Drive	None	NA	2/1*	25
Libra Drive	Ara Drive	Gemini Boulevard	None	NA	4	25
McCulloch Road	Rouse Road	N Alafaya Trail	None	NA	2	35
McCulloch Road	Alafaya Trail	Lockwood Boulevard	Raised	30	4	45
McCulloch Road	Lockwood Boulevard	N Tanner Road	None	NA	2	45

Roadway	From	To	Median Type	Typical Median Width	Lanes	Speed
N Tanner Road	Lake Pickett Road	McCulloch Road	None	NA	2	40
Orion Boulevard	Gemini Boulevard	McCulloch Road	Raised	15	4	30
Percival Road	Lake Pickett Road	N Tanner Road	None	NA	2	35
Research Parkway	Alafaya Trail	Discovery Drive	Raised	20	4	30
Rouse Road	SR 50	N of Corporate Boulevard	Raised	25	4	45
Rouse Road	N of Corporate Boulevard	McCulloch Road	None	NA	2	45
S Tanner Road	SR 50	Lake Pickett Road	None	NA	2	45
Science Drive	Alafaya Trail	Ingenuity Drive	None	NA	2	30
SR 408 Ramps	-	-	None	NA	1	25
SR 50	Rouse Road	Chuluota Road	Raised	30	6	45-55
Technology Parkway	Science Drive	Research Parkway	Raised	22	4	30
University Boulevard	Alafaya Trail	Rouse Road	Raised	20	6	20
Woodbury Road	Challenger Parkway	SR 50	Raised	20	4	40
Woodbury Road	SR 50	Waterford Lakes Parkway	None	NA	2	40

*No. of lanes provided by direction

4.2 CONTEXT CLASSIFICATION

The context classification of a road refers broadly to the characteristics of the land use and built environment around it and helps determine the roadway design components that are supportive of the land uses and the vision for how the corridor might evolve. The NEOCATS study area is primarily urban and suburban west of the Urban Service Area Boundary (USAB, also shared with the Econlockhatchee River) and mainly rural to the east.

Of the eight (8) context classifications established by FDOT, four (4) exist currently along the study roadways.

- **Suburban Residential (C3R)** refers to areas with mostly residential land uses grouped in large blocks with a disconnected or sparse roadway network.
- **Suburban Commercial (C3C)** refers to areas with mostly non-residential land uses and buildings and tend to have large footprints, may have large parking lots, and are grouped in large blocks with a disconnected or sparse roadway network.
- **Rural (C2)** reflects sparsely settled lands which may include agricultural land, grassland, woodland, and wetlands.
- **Rural Town (C2T)** includes small concentrations of developed area within rural land.

4.3 ACCESS MANAGEMENT

The access management classification obtained from the FDOT Straight Line Diagrams (provided in **Appendix H**) is summarized in **Table 4-2** for Alafaya Trail and SR 50. The required minimum distances (based on access management standards) between median openings as required by Florida Administrative Code Rule 14-97 and the Orange County Land Development Code for the access management classes on the project corridor are summarized in **Table 4-3**.

TABLE 4-2: ACCESS MANAGEMENT CLASSIFICATION

Roadway	From	To	Access Class
Alafaya Trail	SR 50	Centaurus Boulevard	5
Alafaya Trail	Centaurus Boulevard	McCulloch Road	3
SR 50	Rouse Road	Chuluota Road	3

Source: FDOT Straight Line Diagrams

TABLE 4-3: ACCESS MANAGEMENT STANDARDS

Roadway Access Class	FDOT Context Classification	Median Type	Connection Spacing (ft)		Median Opening Spacing (ft)		Minimum Signal Spacing (ft) ***
			<45mph Posted	>45mph Posted	Dir.	Full	
2	C1 Natural C2 Rural	Restrictive w/ Service Roads	660	1,320	1,320	2,640	2,640
3	C1 Natural C2 Rural C2T Rural Town C3R Suburban Residential C3C Suburban Commercial	Restrictive	440	660	1,320	2,640	2,640
4	C2T Rural Town	Non-Restrictive **	440	660	-	-	2,640
5	C4 Urban General	Restrictive	245	440	660	2,640/ 1,320 *	2,640/ 1,320 **
6	C5 Urban Center	Non-Restrictive **	245	440	-	-	1,320
7	C6 Urban Core	Both Median Types **	125		330	660	1,320

*Spacing 1,320 feet when roadway speed limit is 45 mph or below.
**It is recommended that additional safety/operational analysis is completed for non-restrictive medians.
***Traffic signals proposed at intervals closer than the access management standard for the designated access class, will only be approved where the need for such signal(s) is clearly demonstrated for the safety and operation of the roadway through the signal warrant process.

4.4 RIGHT-OF-WAY (ROW) INFORMATION

ROW information was obtained using the data from the Orange County Property Appraiser (ocpaweb.ocpafl.org) for the NEOCATS study roadways.

4.5 FUNCTIONAL CLASS

The functional classification of all the study corridors along with the jurisdiction information, obtained from the Orange County's Concurrency Management System (CMS) (provided in **Appendix H**), is summarized in **Table 4-4**.

TABLE 4-4: EXISTING ROADWAYS FUNCTIONAL CLASSIFICATIONS

Road Name	From	To	Jurisdiction	Maintenance Agency	Functional Classification
Alafaya Trail	Seminole County Line	SR 50	State	State	Minor Arterial
	SR 50	Lake Underhill Road	State	County	Minor Arterial
SR 50	Dean Road	SR 520	State	State	Principal Arterial
McCulloch Road	Rouse Road	Lockwood Boulevard	County	Seminole County	Collector
	Lockwood Boulevard	N Tanner Road	County	County	Collector
CR 419/Chuluota Road	SR 50	Seminole County Line	County	County	Collector
Avalon Park Boulevard	SR 50	Waterford Chase Parkway	County	County	Collector
Lake Pickett Road	SR 50	Ft. Christmas Road	County	County	Collector
S Tanner Road*	SR 50	Lake Pickett Road	County	County	Collector
N Tanner Road	Lake Pickett Road	Seminole County Line	County	County	Collector
Percival Road	N Tanner Road	Lake Pickett Road	County	County	Collector
Research Parkway**	Alafaya Trail	Discovery Drive	County	Private	Collector
Challenger Parkway	SR 50	Woodbury Road	County	State	Collector
	Woodbury Road	Alafaya Trail	County	Private	Collector
Gemini Boulevard**	Alafaya Trail	Centaurus Drive	County	Private	Collector
Orion Boulevard**	Gemini Boulevard	McCulloch Road	County	Private	Collector
Corporate Boulevard*	Alafaya Trail	Rouse Road	County	County	Collector
Libra Drive**	Gemini Boulevard	Research Parkway	County	Private	Collector
Woodbury Road	Waterford Lakes Parkway	Challenger Parkway	County	County	Collector
Bonneville Drive**	SR 50	Aloho Way	County	County	Collector
Science Drive**	Alafaya Trail	Ingenuity Drive	County	Private	Collector
Ingenuity Drive**	Challenger Parkway	Discovery Drive	County	Private	Collector
Technology Parkway**	Science Drive	Research Parkway	County	Private	Collector
Rouse Road	Lake Underhill Road	Seminole County Line	County	County	Collector
University Boulevard	Dean Road	Alafaya Trail	County	County	Minor Arterial

Sources: Orange County 2019 Concurrency Management System (CMS) Update, 2021 FDOT Roadway Characteristics Inventory (RCI)
*Roadways that are not identified in the 2019 CMS Update, 2021 FDOT RCI is referenced instead
**Roadways that are not identified in the 2019 CMS Update or the 2021 FDOT RCI, details were inferred based on similar facilities

4.6 BICYCLE AND PEDESTRIAN FACILITIES

4.6.1 Bicycle Facilities

Three types of bicycle facilities are present in the corridor: bicycle lanes, paved shoulders, and multi-use paths. Bicycle lanes are a portion of a curbed roadway designated by a bicycle symbol pavement marking for the exclusive use of bicyclists. Paved shoulders are the portion of flush shoulder roadways contiguous with the travel lanes for errant vehicles, stopped vehicles, bicycle traffic, and emergency use. A multi-use path, or shared-use path, is physically separated from motor vehicle traffic, and is designed to serve pedestrians and cyclists. The presence of bicycle facilities within the study area is shown in **Figure 4-1**.

4.6.2 Pedestrian Facilities

Pedestrian facilities are typically paved paths available for use by people traveling on foot or in a wheelchair. The FDOT Design Manual also considers the following to be pedestrian facilities: sidewalks, curb ramps, crosswalks, at-grade railroad crossings, refuge islands, curb extensions, pedestrian signals, public transit loading zones, pedestrian bridges, shared use paths, and street furniture.

A summary of the locations and separation from the roadway of the sidewalks along study area roadways is illustrated in **Figure 4-2**.

FIGURE 4-1: BICYCLE FACILITIES

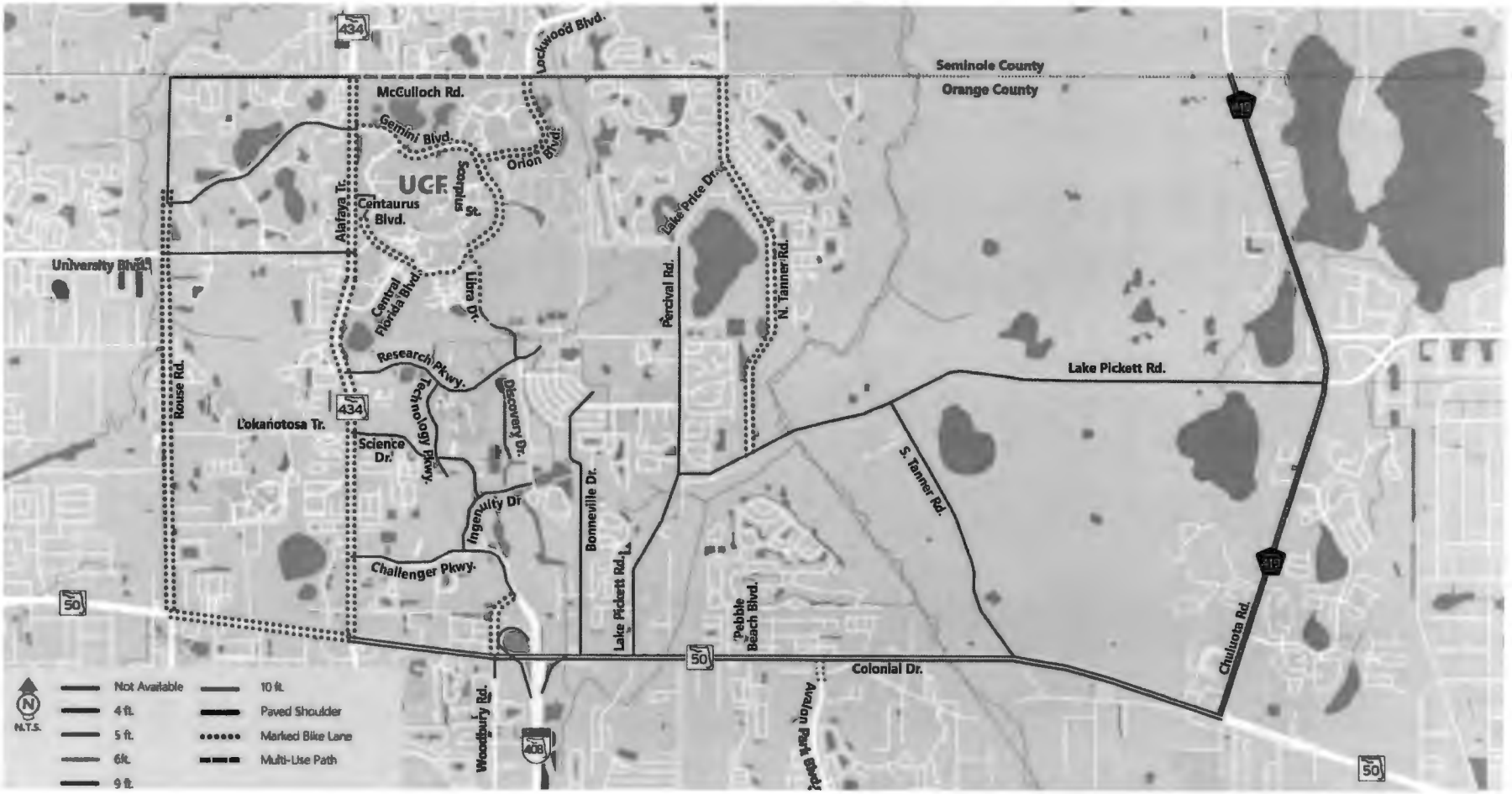
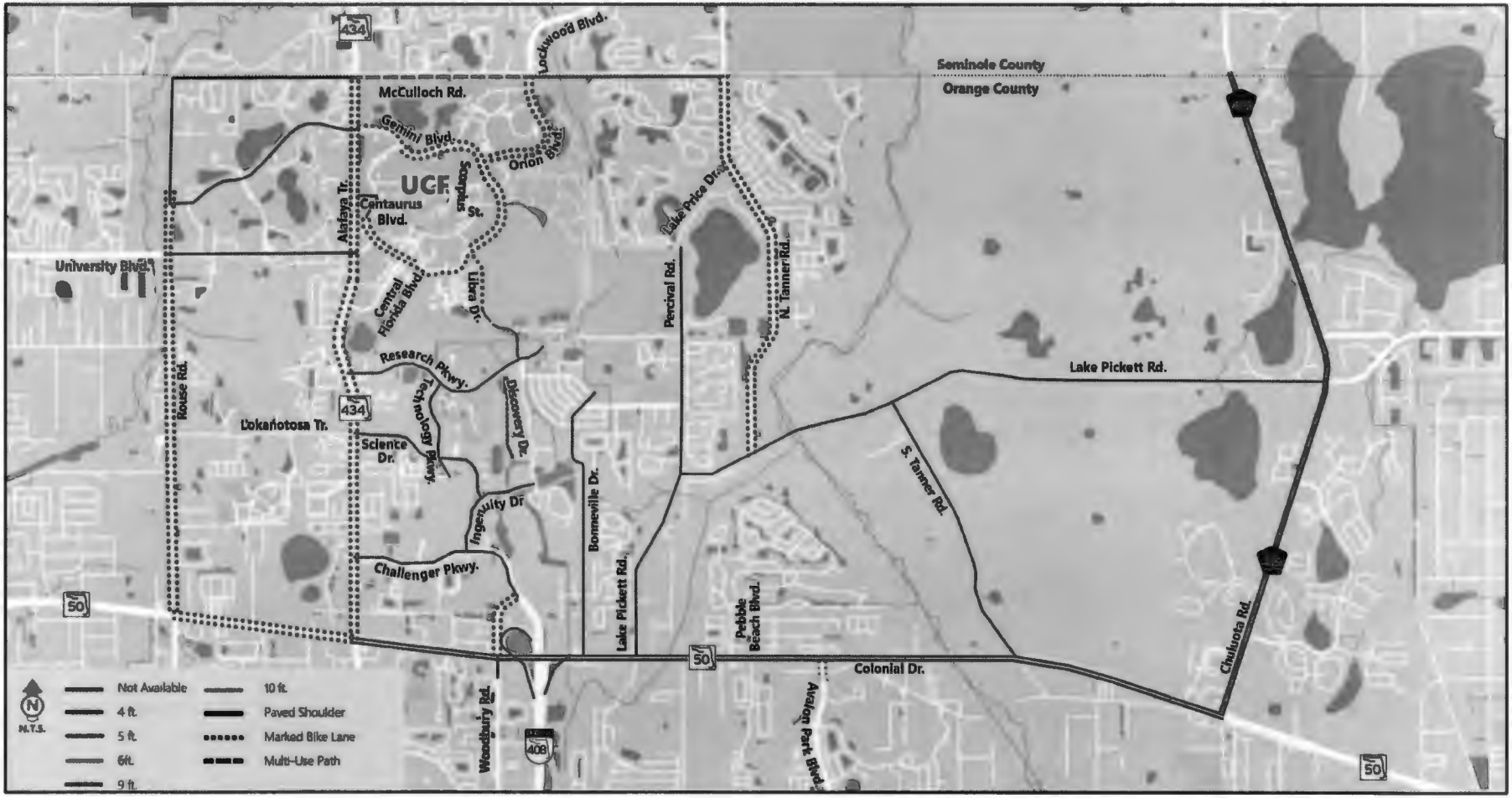


FIGURE 4-2: PEDESTRIAN FACILITIES



4.7 TRANSIT SERVICES

Information on transit services was obtained directly from the LYNX website (golynx.com) and through coordination with LYNX staff. The NEOCATS area is served by three LYNX routes. In addition, UCF provides shuttle service to students via On-Campus, Off-Campus, Grocery Shuttle, Rosen Campus, Health Sciences Campus, Gameday, Park and Ride, and UCF Downtown services. The ridership data provided by LYNX (GIS shapefile) is provided in figures in **Appendix L.**

- Route 104, East Colonial Drive/UCF, provides 30-minute service connecting the downtown LYNX Multimodal Center with Valencia College and UCF.
- Route 13, University Boulevard/UCF provides 60-minute service connecting UCF with the downtown LYNX Multimodal Center along University Boulevard through Winter Park, Baldwin Park, and Fashion Square.
- Route 434 provides 60-minute service and serves the majority of SR 434, with a major stop at the Oviedo Mall. This line terminates at the Seminole State College Altamonte Springs campus near the intersection of SR 434 and Maitland Boulevard.

Stops on all three lines are spaced typically 1/8 to 1/4 mile apart.

In addition, NeighborLink 621 is an on-demand circulator that provided a combination of fixed route connectivity with curb-to-curb accessibility within Wedgefield and Bithlo.

4.8 LIGHTING

The location of the lighting along the project corridor was determined based on desktop reviews of the area from Google Earth Aerials (2021). To provide adequate lighting at each signalized intersection, each crosswalk should have two lights, one on each end of the crosswalk. This generally means eight lights should be provided at each signalized intersection.

4.9 TRUCK, FREIGHT, STRATEGIC INTERMODAL SYSTEM, AND EVACUATION ROUTES

SR 50, which forms the southern border for the study area, is an evacuation route potentially funneling traffic from the coast inward. None of the roadways within the study area are part of the Strategic Intermodal System (SIS) or major freight routes. The Orange County evacuation route map and freight infrastructure map are included in the **Appendix M.**

4.10 INTELLIGENT TRANSPORTATION SYSTEMS FEATURES

The traffic signals within the study area are managed by a central Traffic Management Center (TMC) that provides video monitoring, signal timing control, and emergency monitoring throughout the Orlando region. The majority of the signals are connected to the TMC via fiber optic cable. There are a few exceptions which are connected via Miovision cell-based connection. An InSync Active Traffic Monitoring System generated by Rhythm Engineering is in place on Alafaya Trail and University Boulevard.

The County wide details on Intelligent Transportation Systems (ITS) features were retrieved from Orange County including information on fiber placement, Miovision locations, Rhythm, and Intelight Adaptive Intersection locations, PedSafe and CV locations, and Master Hut locations and are included in **Appendix N.**

5 CRASH DATA

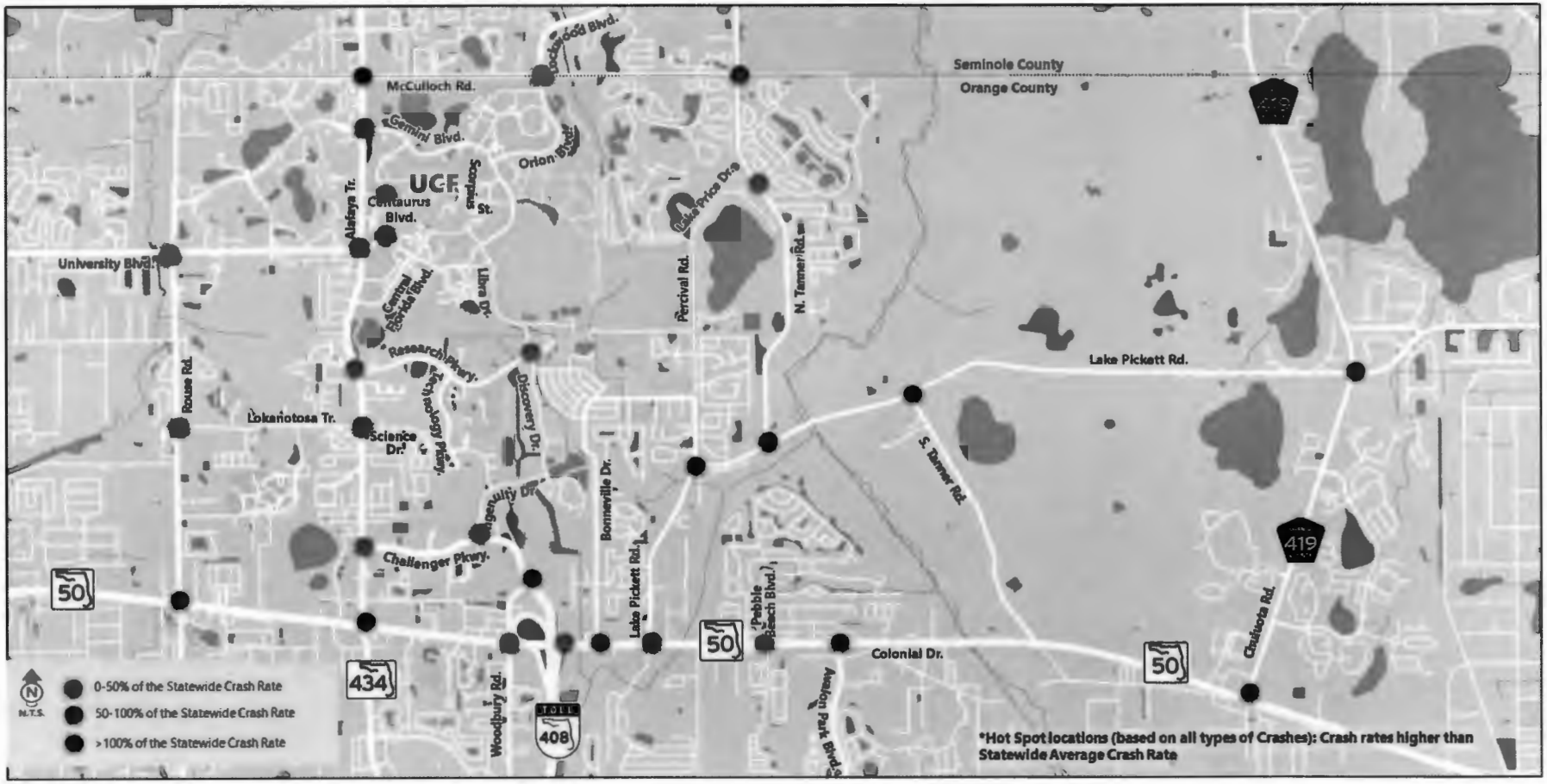
Due to the impact of the COVID-19 pandemic on traffic volumes in 2020 and 2021, the crash analysis considered only data from the years preceding the pandemic. The latest available three years of crash data within the study area, from January 1st, 2017, to December 31st, 2019, were extracted from the Signal 4 Analytics system. Based on the crash data obtained, a total of **4,875** crashes occurred within the entire study area in this time period. Of the 4,875 crashes – 3,511 crashes were reported as property damage, 1,345 resulted in injuries and 19 resulted in fatalities. The total number of crashes per year was observed to increase from 2017 to 2018, however the year 2019 had the lowest number of crashes. The raw crash data is provided in **Appendix O.**

5.1 CRASH SUMMARY – STUDY INTERSECTIONS

A detailed review of crashes was performed for study intersections. Out of the 4,875 crashes in the study area, 2,728 were found to have occurred within the influence areas of the 37 study intersections. Out of 2,728 intersection crashes, rear-end (55.2%), sideswipe (11.5%), left-turn (10.0%), and other (10.0%) crashes represent the great majority. Out of the 2,728 crashes, there was a total of 8 fatal crashes (0.3%), 709 injury crashes (26.0%), and 2,011 property damage only crashes (73.7%). A total of 1,891 crashes occurred during the daylight hours (69.3%), and 2,440 crashes occurred during dry roadway conditions (89.4%). Pedestrian and cyclist collisions accounted for 60 crashes (2.2%).

The crash rates of each intersection were compared to the latest available statewide average crash rates for each intersection category. It was found that most of the study intersections show crash rates higher than the statewide averages. 29 out of 37 study intersections have crashes rates higher than statewide averages for similar facilities and are depicted in **Figure 5-1**.

FIGURE 5-1: HOT SPOT LOCATIONS (2017-2019)



5.2 CRASH SUMMARY – STUDY SEGMENTS

A detailed review of crashes was performed for study segments. Out of the 4,875 crashes in the study area, 2,147 were found to have occurred within the segments, excluding the influence areas of the 37 study intersections.

Out of 2,147 segment crashes, rear-end (52.1%), left-turn (12.9%) and sideswipe (8.8%) crashes represent the great majority. Out of the 2,147 crashes, there was a total of 11 fatal crashes (0.5%), 636 injury crashes (29.6%), and 1,500 property damage only crashes (69.9%). A total of 1,468 crashes occurred during the daylight hours (68.4%), and 1,825 crashes occurred during dry roadway conditions (85.0%). Pedestrian and cyclist collisions account for 79 crashes (3.7%).

The crash rates of each segment were compared to the latest available statewide average crash rates for each crash segment category. The statewide crash rates and categories are provided in **Appendix O.** Two (2) segments including Alafaya Trail from Central Florida Boulevard to University Boulevard and Gemini Boulevard from University Boulevard to Libra Drive have crash rates higher than statewide averages for similar facilities.

5.3 FATALITY CRASH SUMMARY

Out of the 19 fatalities, there was a total of 10 pedestrian related crashes, 2 off road crashes, 2 roll-over crashes, 2 head-on crashes, 1 rear end crash, 1 angle crash, and 1 other crash. 8 out of 19 crashes were occurred under Driving under the influence (DUI).

Existing Environmental Conditions

6 INTRODUCTION

The Existing Environmental Conditions section documented the existing land uses, historical and/or archeological sites, cultural features, utilities, and identified potentially hazardous sites for the NEOCATS area. The natural environment includes soils, hydraulic and natural features and threatened endangered species. The report prepared explaining the existing environmental conditions is provided in **Appendix P.**

Public Involvement

7 PUBLIC INVOLVEMENT PLAN (PIP)

Public involvement includes communicating to, and receiving information from, all interested persons, groups, and government organizations regarding the development of a project. At the start of the study, a Public Involvement Plan (PIP) was developed to outline the processes taken to ensure the appropriate level of public involvement is fostered for this study. The PIP includes details on stakeholder identification and outreach methods. It was maintained as a living document, being updated throughout the study process, and summarizing the outreach events including copies of the exhibits, presentations, handouts, and comments or response letters. The following sections summarize the NEOCATS public outreach in chronological order.

Community Meeting 1

Community Meeting 1 was held on Monday, November 1, 2021, from 6:00-7:00 p.m. The purpose of this first of two meetings was to present the data collection findings for existing traffic conditions and 2045 traffic forecasts, and to obtain public feedback. The meeting was held via GoToWebinar (accessed by computer or smartphone and via phone). A video recording of the meeting and responses to all questions were posted on the project website (https://neocatstudy.com/documents.html). The PIP, in **Appendix Q**, includes the Community Meeting 1 public notification materials, presentation, and responses to questions.

Stakeholder Meeting 1

The first stakeholder coordination meeting for NEOCATS was held on Friday, January 21, 2022, via WebEx. The coordination included representatives from MetroPlan Orlando, Orange County

Public Schools (OCPS), Orange County Fire Rescue, Orange County Sheriff's Office, Florida Department of Transportation (FDOT), Central Florida Expressway Authority (CFX), LYNX, University of Central Florida (UCF), Central Florida Research Park, and Seminole County. The meeting summary for Stakeholder Meeting 1 is available in the PIP (**Appendix Q**).

Community Meeting 2

Community Meeting 2 was held on Wednesday, March 30, 2022, from 6:00-7:00 p.m. The purpose of this meeting, which is the second of two community meetings, was to present the findings and recommendations of the proposed future year 2045 transportation needs plan, and to obtain public feedback on the initial recommendations. The meeting was held via GoToWebinar (accessed by computer or smartphone and via phone). A video recording of the meeting and responses to all questions were posted on the project website (https://neocatstudy.com/documents.html). The PIP, in **Appendix Q**, includes the Community Meeting 2 public notification materials, presentation, and responses to questions.

Stakeholder Meeting 2

The second stakeholder coordination meeting for NEOCATS was held on Thursday, April 28, 2022, via WebEx. The coordination included representatives from MetroPlan Orlando, Orange County Fire Rescue, Florida Department of Transportation (FDOT), Central Florida Expressway Authority (CFX), LYNX, and Seminole County. The meeting summary for Stakeholder Meeting 2 is available in the PIP (in **Appendix Q**).

Local Planning Agency Work Session

A Work Session with the Orange County Planning and Zoning Commission (PZC), which is the Local Planning Agency (LPA), is expected to be conducted on September 15, 2022. **This section will be updated upon completion of the Work Session**.

Board of County Commissioners Work Session

A Work Session with the Board of County Commissioners (BCC) is expected to be conducted on September 27, 2022. **This section will be updated upon completion of the Work Session**.

Local Planning Agency Hearing

A Hearing with the Orange County PZC, which is the LPA, is expected to be conducted in the month of October 2022. **This section will be updated upon completion of the Hearing**.

Board of County Commissioners Hearing

A Hearing with the BCC is expected to be conducted in the month of October 2022. The final recommendations of the study will be presented for comment during the BCC Hearing. **This section will be updated upon completion of the Hearing**.

Future Traffic Forecasts

This section documents the subarea model validation information, year 2045 model development and traffic projections for the NEOCATS study area. The CFRPM7.0 was used for this study. The travel demand model is an evaluation tool that represents land use and transportation interaction to assess the capability of the region's roadway networks to support anticipated growth. The objective of model validation is to build a reliable subarea model that will reflect current traffic pattern distributions, travel demand, and travel times (average speeds) within the study area. To this effect, the subarea model calibration and validation followed the procedures outlined in FDOT's 2019 Project Traffic Forecasting Handbook (PTF) and Florida Standard Urban Transportation Model Structure (FSUTMS) Model Calibration and Validation Standards.

8 SUBAREA MODEL DEVELOPMENT

The model validation is performed to ensure that the model is accurate enough (per the FDOT's model validation standards) to reflect the year 2020 traffic conditions in the study area and to study the traffic flow patterns for the future year 2045. The roadway segments evaluated for the base year 2020 in the vicinity of the study area along with the base year model plots are included in **Appendix R**.

8.1 ORIGIN-DESTINATION DATA AND TRAVEL PATTERNS

Since the travel demand model has been validated to replicate the existing traffic counts within the study area, the next step is to adjust (if needed) the model to replicate the traffic flow characteristics observed in the field using the Origin-Destination (OD) data and travel patterns (see Section 3.7). The updated subarea model should reflect current traffic pattern distributions, travel demand, and congested speeds within the study area. It must be noted that the OD trips (%) were comparable and the CFRPM model traffic pattern distributions reflect the StreetLight OD field data.

8.2 CONGESTED SPEEDS

Furthermore, congested speeds for the following roadways were compared between StreetLight Data and the CFRPM7.0 model for the daily conditions.

- SR 434/Alafaya Trail from south of SR 50 to north of McCulloch Road
- SR 50 from west of Rouse Road to east of CR 419
- McCulloch Road from east of SR 434 to east of N Tanner Road
- CR 419 from north of SR 50 to south of Seminole County Line
- Lake Pickett Road from north of SR 50 to east of CR 419

It was determined that the StreetLight based congested speeds are comparable (within 80% to 120%) to the model-based congested speeds.

9 YEAR 2045 TRAVEL DEMAND MODEL

Based on the validation efforts performed, the model is considered acceptable for use in estimating future travel demand within the study area. The year 2045 subarea model was developed based on these calibration efforts to obtain future year volume forecasts for the No Build and Build alternatives.

9.1 NEOCATS TRAVEL DEMAND MODEL ALTERNATIVES

For future conditions, two model runs were run as described below.

- **No Build Alternative:** The No Build alternative represents the existing roadway configuration plus programmed (or committed) improvements within the NEOCATS area. Outside the study area, the Cost-Feasible (CF) 2045 roadway network from the CFRPM7.0 was used.
- **Build Alternative**: The Build alternative generally included programmed and planned improvements identified in Orange County's Long Range Transportation Plan (2030 LRTP) including all public-private partnership projects (PPP), 2045 Metropolitan Transportation Plan (MTP), and the 2040 Seminole County Master Plan. However, the final list of improvements included in the Build alternative was based on input from the County.

9.2 PROGRAMMED AND PLANNED IMPROVEMENTS

The future year travel demand model considered all the programmed and planned improvements in the vicinity of the study area that are consistent with the regional transportation plans including the following:

- MetroPlan Orlando FY 2021/22 - 2025/26 Orlando Urban Area Transportation Improvement Program, Adopted July 7, 2021
- MetroPlan Orlando 2045 Metropolitan Transportation Plan, updated June 9, 2021, and MetroPlan Orlando Online Data Viewer
- Seminole County 2040 Transportation Plan, updated February 23, 2018
- Orange County 2030 Long Range Transportation Plan - Map 1 revised 5/9/2017
- Input from Orange County

Table 9-1 summarizes the list of capacity improvement projects included in future model for No Build and Build alternatives.

TABLE 9-1: CAPACITY IMPROVEMENT PROJECTS INCLUDED IN THE 2045 TRAVEL DEMAND MODEL

Road Name	From	To	Improvement	Model Coding	
				No Build	Build
SR 50	Old Cheney Highway	Chuluota Road	Widening 4 to 6 Lanes	X	X
	Chuluota Road	SR 520		X	X
Chuluota Road	SR 50	Lake Pickett Road	Widening 2 to 4 Lanes		X
	Lake Pickett Road	Seminole CL			X
Fort Christmas Road	SR 50	West Christmas Road	Widening 2 to 4 Lanes		X
	West Christmas Road	Lake Pickett Road			X
Lake Pickett Road	SR 50	Percival Road	Widening 2 to 4 Lanes		X
	Percival Road	South Tanner Road			X
	South Tanner Road	Chuluota Road			X
	Chuluota Road	Fort Christmas Road			X
Lake Underhill Road	Chickasaw Trail	Econ Trail	Widening 2 to 4 Lanes		X
	Econ Trail	Rouse Road			X
McCulloch Road	North Orion Boulevard	North Tanner Road	Widening 2 to 4 Lanes		X
Richard Crotty Parkway (aka E/W Roadway)	SR 436	Goldenrod Road	New 4 Lane Roadway	X	X
	Goldenrod Road	Dean Road			X
	Dean Road	Rouse Road			X
	Rouse Road	Alafaya Trail			X
	Alafaya Trail	North Tanner Road			X
Woodbury Road	Lake Underhill Road	SR 50	Widening 2 to 4 Lanes		X

10 YEAR 2045 TRAFFIC FORECASTS

The development of traffic projections for the study area required the examination of historical growth, proposed development levels within the vicinity, and a basic understanding of local traffic circulation patterns and travel characteristics of the corridor. As such, the following sources were used to derive reasonable future traffic forecasts for the study corridor. The growth rates referred to in this report are linear growth rates.

- **Population Projections**: The population estimates obtained from the most current Bureau of Economic and Business Research (BEBR), Florida Population Studies, Volume 54 Bulletin 189, dated April 2021 was used.
- **Historical Traffic Trends Analysis:** Historical traffic trends analysis based on least squares regression analysis was conducted for the study roadways using traffic data from the 2020 Florida Traffic Online (FTO), and the 2020 Orange County Traffic Count Programs.
- **Travel Demand Models**: The CFRPM7.0 model was used in the traffic forecasting process.

The BEBR projection estimates are provided in **Appendix S** and the trends analysis sheets are provided in **Appendix T.** The future year 2045 model plots for both No Build and Build alternatives are included in **Appendix U.**

Based on the comparison of annual growth rates from the three primary sources (historical trends analysis, CFRPM7.0 models, and BEBR population estimates), **Tables 10-1** and **10-2** show the recommended growth rates and the future forecasted AADTs for No Build and Build alternatives, respectively.

10.1 FUTURE YEAR TURNING MOVEMENT VOLUMES

Turning movement volumes for the following analysis years were developed as part of this study.

- Year 2025
- Year 2035
- Year 2045

As the first step in developing the future year turning movement volumes, the Standard K and recommended D factors, existing and future year AADTs (or recommended growth rate) are used as inputs to calculate the future year design hour volumes for each roadway segment. In the next step, PTV Visum was used to determine future intersection turning movement volumes for the No Build and Build Alternatives for the design year using the existing turning movements. Finally, adjustments including volume balancing and turning volume adjustments were made based on whether the projected AADTs can be back calculated for each of the study roadways.

The year 2025 and the year 2035 turning movement volumes were derived using interpolation between the existing year and projected 2045 turning movement volumes.

Table 10-1 : Recommended Growth Rates and Future No Build 2045 AADT Volumes

Roadway/Segment	Existing Year 2020 AADT	Source for Growth Rates	Recommended Growth Rate	Year 2045 No Build Traffic Forecasts
Alafaya Trail				
South of SR 50	53,219	Avg of Model, TRENDS & BEBR Med	1.20%	69,650
SR 50 to Challenger Pkwy	59,187	Avg of Model, TRENDS & BEBR Med	1.20%	76,940
Challenger Pkwy to Science Dr	51,000	Avg of Model, TRENDS & BEBR Med	1.20%	66,300
Science Dr to Research Pkwy	60,228	Avg of Model, TRENDS & BEBR Med	1.20%	78,300
Research Pkwy to Central Florida Blvd	60,000	Avg of Model, TRENDS & BEBR Med	1.20%	78,000
Central Florida Blvd to University Blvd	49,100	Avg of Model, TRENDS & BEBR Med	1.20%	63,830
Centaurus Blvd to University Blvd	43,400	Avg of Model, TRENDS & BEBR Med	1.20%	56,420
Corporate Blvd/Gemini Blvd to Centaurus Blvd	45,478	Avg of Model, TRENDS & BEBR Med	1.20%	59,120
McCulloch Rd to Corporate Blvd/Gemini Blvd	50,000	Avg of Model, TRENDS & BEBR Med	1.20%	65,000
Chapman Rd to McCulloch Rd	60,648	Avg of Model, TRENDS & BEBR Med	1.20%	78,840
SR 50				
West of Rouse Rd	58,281	Avg of Model, BEBR Med & Trends	2.24%	90,900
Rouse Rd to Alafaya Trail	54,194	Avg of Model, BEBR Med & Trends	2.24%	84,520
Alafaya Trail to Woodbury Rd	47,758	Avg of Model, BEBR Med & Trends	2.24%	74,490
SR 408 Ramps to Lake Pickett Rd	70,664	BEBR Med	1.50%	97,160
Lake Pickett Rd to Pebble Beach Rd	56,235	Avg of Model, BEBR Med & Trends	2.24%	87,710
Pebble Beach Rd to Avalon Park Blvd	54,000	Avg of Model, BEBR Med & Trends	2.24%	84,220
Avalon Park Blvd to S. Tanner Rd	43,000	Avg of Model & Trends	3.59%	81,620
S. Tanner Rd to CR 419/Chuluota Rd	41,485	Avg of Model & Trends	3.59%	78,740
East of CR 419/Chuluota Rd	38,336	Avg of Model & Trends	3.59%	72,760
McCulloch Rd				
Rouse Rd to Alafaya Trail	12,612	Avg of Model & BEBR Med	1.29%	16,660
Alafaya Trail to Lockwood Blvd	31,341	Avg of Model	1.07%	39,730
Lockwood Blvd to Worchester Dr	24,784	Avg of Model & BEBR Med	1.29%	32,750
Worchester Dr to N Tanner Rd	17,300	Avg of Model & BEBR Med	1.29%	22,860
CR 419/Chuluota Rd				
SR 50 to Cypress Lake Glen Blvd	14,528	Avg of Model	2.32%	22,950
Cypress Lake Glen Blvd to Lake Pickett Rd	14,050	Avg of Model	2.32%	22,200
Lake Pickett Rd to Old Lake Pickett Rd	13,393	Avg of Model	2.32%	21,160
Old Lake Pickett Rd to Seminole County Line	12,520	Avg of Model	2.32%	19,780
Seminole County Line to Lake Mills Rd	11,090	Avg of Model	2.32%	17,520
Avalon Park Blvd				
South of SR 50	25,000	Avg of Model & BEBR Med	1.16%	32,230
Lake Pickett Rd				
SR 50 to Percival Rd	15,831	Avg of Model & BEBR Med	2.48%	25,630
Percival Rd to N Tanner Rd	10,300	Avg of Model	3.45%	19,180
N Tanner Rd to S Tanner Rd	11,505	Avg of Model	3.45%	21,430
S. Tanner Rd to CR 419/Chuluota Rd	8,998	Model	5.25%	20,810
South Tanner Rd				
North of SR 50	4,008	Avg of Model	3.49%	7,500
South of Lake Pickett Rd	4,100	Avg of Model	3.49%	7,680
North Tanner Rd				
Lake Pickett Rd to Stonebriar Way	11,800	Highest of Model	2.06%	17,860
Stonebriar Way to Lake Price Dr	11,523	Highest of Model	2.06%	17,440
Lake Price Dr to McCulloch Rd	15,000	Highest of Model	2.06%	22,710
Percival Rd				
Lake Pickett Rd to Sussex Dr	6,647	Avg of Model	2.38%	10,600
Sussex Dr to Richard Crotty Pkwy (New Rd)	5,858	Avg of Model	2.38%	9,340
Richard Crotty Pkwy (New Rd) to N. Tanner Rd	5,858	Avg of Model	2.38%	9,340
SR 408 Ramps				
SR 408 NB Off ramp to SR 50	14,000	Avg of Model	0.79%	16,750
SR 408 SB On ramp from SR 50 EB	2,200	Avg of Model	0.79%	2,630
SR 408 SB On ramp from SR 50 WB	11,500	Avg of Model	0.79%	13,760
Research Pkwy/Richard Crotty Pkwy (New Rd)				
Dean Rd to Rouse Rd			-	
Rouse Rd to Alafaya Trail			-	
Alafaya Trail to Technology Pkwy	11,000	BEBR Med	1.50%	15,130
Technology Pkwy to Discovery Dr	8,500	BEBR Med	1.50%	11,690
Discovery Rd to Percival Rd			-	-
Percival Rd to N Tanner Rd	-		-	-
Challenger Pkwy				
Alafaya Trail to Ingenuity Dr	8,610	Avg of Model	1.90%	12,700
Ingenuity Dr to Woodbury Rd	28,000	BEBR Low	0.50%	31,500
Gemini Blvd				
Central Florida Blvd to University Blvd	18,408	Avg of Model	1.19%	23,900
University Blvd to Centaurus Blvd	12,942	Avg of Model & BEBR Med	2.37%	20,610
North of Centaurus Blvd	13,100	Avg of Model & BEBR Med	2.01%	19,690
N Orion Blvd to Scorpius St (North)	23,067	Avg of Model	1.19%	29,940
South of Scorpius St (North)	20,807	Avg of Model	1.19%	27,010
East of Alafaya Trail	16,453	Avg of Model	1.19%	21,360
Orion Blvd				
South of McCulloch Rd	15,000	Avg of Model	0.94%	18,510
Corporate Blvd				
West of Alafaya Trail	12,100	BEBR Med	1.50%	16,640
Libra Dr				
North of Research Pkwy	8,337	Avg of Model	2.12%	12,760
Woodbury Rd				
South of SR 50	19,000	Avg of Model	1.46%	25,960
North of SR 50	15,499	Avg of Model	1.46%	21,170
Bonneville Dr				
North of SR 50	9,500	BEBR Med	1.50%	13,060
Science Dr				
Alafaya Trail to Technology Pkwy	10,600	Avg of Model	0.98%	13,190
Technology Pkwy to Ingenuity Dr	10,100	Avg of Model	0.98%	12,570
Ingenuity Dr				
Challenger Pkwy to Science Dr	24,000	Avg of Model	0.62%	27,740
Science Dr to Discovery Dr	13,800	Avg of Model	0.62%	15,950
Technology Pkwy				
Research Pkwy to Science Dr	7,400	BEBR Med	1.50%	10,180
Rouse Rd				
South of SR 50	21,260	Avg of Model & BEBR Med	1.40%	28,690
SR 50 to Lokanotosa Trail	28,617	Avg of Model & BEBR Med	1.40%	38,620
Lokanotosa Trail to Richard Crotty Pkwy (New Rd)	25,000	Avg of Model & BEBR Med	1.40%	33,740
Richard Crotty Pkwy (New Rd) to University Blvd	25,000	Avg of Model & BEBR Med	1.40%	33,740
North of University Blvd	24,000	Avg of Model & BEBR Med	1.40%	32,390
University Blvd				
West of Rouse Rd	66,670	Model	0.31%	71,770
Rouse Rd to Quadrangle Blvd	55,640	Avg of Model	0.71%	65,580
Quadrangle Blvd to Alafaya Trail	54,868	Avg of Model	0.71%	64,670

Table 10-2 : Recommended Growth Rates and Future Build 2045 AADT Volumes

Roadway/Segment	Existing Year 2020 AADT	Source for Growth Rates	Recommended Growth Rate	Year 2045 Build Traffic Forecasts
Alafaya Trail				
South of SR 50	53,219	Avg of Build Model & TRENDS	1.00%	67,080
SR 50 to Challenger Pkwy	59,187	Avg of Build Model & TRENDS	1.00%	73,980
Challenger Pkwy to Science Dr	51,000	Avg of Build Model & TRENDS	1.00%	63,750
Science Dr to Research Pkwy	60,228	Avg of Build Model & TRENDS	1.00%	75,290
Research Pkwy to Central Florida Blvd	60,000	Avg of Build Model & TRENDS	1.00%	75,000
Central Florida Blvd to University Blvd	49,100	Avg of Build Model & TRENDS	1.00%	61,380
Centaurus Blvd to University Blvd	43,400	Avg of Build Model & TRENDS	1.00%	54,250
Corporate Blvd/Gemini Blvd to Centaurus Blvd	45,478	Avg of Build Model & TRENDS	1.00%	56,850
McCulloch Rd to Corporate Blvd/Gemini Blvd	50,000	Avg of Build Model & TRENDS	1.00%	62,500
Chapman Rd to McCulloch Rd	60,648	Avg of Build Model & TRENDS	1.00%	75,810
SR 50				
West of Rouse Rd	58,281	Avg of Build Model & BEBR Med	0.98%	72,530
Rouse Rd to Alafaya Trail	54,194	Avg of Build Model & BEBR Med	0.98%	67,450
Alafaya Trail to Woodbury Rd	47,758	Avg of Build Model & BEBR Med	1.05%	60,260
SR 408 Ramps to Lake Pickett Rd	70,664	Avg of Build Model & BEBR Med	0.98%	87,950
Lake Pickett Rd to Pebble Beach Rd	56,235	Avg of Build Model & BEBR Med	0.98%	69,990
Pebble Beach Rd to Avalon Park Blvd	54,000	Avg of Build Model & BEBR Med	0.98%	67,210
Avalon Park Blvd to S. Tanner Rd	43,000	Avg of Build Model	2.46%	69,490
S. Tanner Rd to CR 419/Chuluota Rd	41,485	Avg of Build Model	2.46%	67,040
East of CR 419/Chuluota Rd	38,336	Avg of Build Model	2.46%	61,950
McCulloch Rd				
Rouse Rd to Alafaya Trail	12,612	Avg of Build Model & BEBR Med	1.29%	16,680
Alafaya Trail to Lockwood Blvd	31,341	Avg of Build Model	1.08%	39,820
Lockwood Blvd to Worchester Dr	24,784	Avg of Build Model & BEBR Med	1.29%	32,780
Worchester Dr to N Tanner Rd	17,300	Avg of Build Model & BEBR Med	1.29%	22,880
CR 419/Chuluota Rd				
SR 50 to Cypress Lake Glen Blvd	14,528	Avg of Build Model	4.50%	30,890
Cypress Lake Glen Blvd to Lake Pickett Rd	14,050	Avg of Build Model	4.50%	29,870
Lake Pickett Rd to Old Lake Pickett Rd	13,393	Avg of Build Model	4.50%	28,470
Old Lake Pickett Rd to Seminole County Line	12,520	Avg of Build Model	4.50%	26,620
Seminole County Line to Lake Mills Rd	11,090	Avg of Build Model	4.50%	23,580
Avalon Park Blvd				
South of SR 50	25,000	Avg of Build Model & BEBR Med	1.07%	31,660
Lake Pickett Rd				
SR 50 to Percival Rd	15,831	Avg of Build Model & BEBR Med	4.43%	33,350
Percival Rd to N Tanner Rd	10,300	Avg of Build Model	7.35%	29,240
N Tanner Rd to S Tanner Rd	11,505	Avg of Build Model	7.35%	32,660
S. Tanner Rd to CR 419/Chuluota Rd	8,998	Avg of Build Model	7.35%	25,540
South Tanner Rd				
North of SR 50	4,008	Avg of Build Model	4.62%	8,640
South of Lake Pickett Rd	4,100	Avg of Build Model	4.62%	8,840
North Tanner Rd				
Lake Pickett Rd to Stonebriar Way	11,800	Avg of Build Model	1.69%	16,790
Stonebriar Way to Lake Price Dr	11,523	Avg of Build Model	1.69%	16,400
Lake Price Dr to McCulloch Rd	15,000	Avg of Build Model	1.69%	21,340
Percival Rd				
Lake Pickett Rd to Sussex Dr	6,647	Avg of Build Model	8.76%	21,200
Sussex Dr to Richard Crotty Pkwy (New Rd)	5,858	Avg of Build Model	8.76%	18,680
Richard Crotty Pkwy (New Rd) to N. Tanner Rd	5,858	Avg of Build Model	5.95%	14,570
SR 408 Ramps				
SR 408 NB Off ramp to SR 50	14,000	Avg of Build Model	1.38%	18,840
SR 408 SB On ramp from SR 50 EB	2,200	Avg of Build Model	1.38%	2,960
SR 408 SB On ramp from SR 50 WB	11,500	Avg of Build Model	1.38%	15,480
Research Pkwy/Richard Crotty Pkwy (New Rd)				
Dean Rd to Rouse Rd	-	Build Model	-	37,520
Rouse Rd to Alafaya Trail	-	Build Model	-	31,240
Alafaya Trail to Technology Pkwy	11,000	Build Model		31,150
Technology Pkwy to Discovery Dr	8,500	Build Model	-	29,030
Discovery Rd to Percival Rd		Build Model	-	37,280
Percival Rd to N Tanner Rd	-	Build Model	-	16,160
Challenger Pkwy				
Alafaya Trail to Ingenuity Dr	8,610	Avg of Build Model	0.74%	10,200
Ingenuity Dr to Woodbury Rd	28,000	BEBR Low	0.50%	31,500
Gemini Blvd				
Central Florida Blvd to University Blvd	18,408	Avg of Build Model	1.34%	24,560
University Blvd to Centaurus Blvd	12,942	Avg of Build Model	1.34%	17,270
North of Centaurus Blvd	13,100	Avg of Build Model	1.34%	17,480
N Orion Blvd to Scorpius St (North)	23,067	Avg of Build Model	1.34%	30,770
South of Scorpius St (North)	20,807	Avg of Build Model	1.34%	27,760
East of Alafaya Trail	16,453	Avg of Build Model	1.34%	21,950
Orion Blvd				
South of McCulloch Rd	15,000	BEBR Med	1.50%	20,630
Corporate Blvd				
West of Alafaya Trail	12,100	BEBR Med	1.50%	16,640
Libra Dr				
North of Research Pkwy	8,337	Build Model	3.17%	14,950
Woodbury Rd				
South of SR 50	19,000	Avg of Build Model	1.69%	27,010
North of SR 50	15,499	Avg of Build Model	1.69%	22,040
Bonneville Dr				
North of SR 50	9,500	BEBR Med	1.50%	13,060
Science Dr				
Alafaya Trail to Technology Pkwy	10,600	BEBR Med	1.50%	14,580
Technology Pkwy to Ingenuity Dr	10,100	BEBR Med	1.50%	13,890
Ingenuity Dr				
Challenger Pkwy to Science Dr	24,000	BEBR Low	0.50%	27,000
Science Dr to Discovery Dr	13,800	BEBR Low	0.50%	15,530
Technology Pkwy				
Research Pkwy to Science Dr	7,400	BEBR Med	1.50%	10,180
Rouse Rd				
South of SR 50	21,260	Avg of Build Model	1.22%	27,770
SR 50 to Lokanotosa Trail	28,617	Avg of Build Model	1.22%	37,370
Lokanotosa Trail to Richard Crotty Pkwy (New Rd)	25,000	Avg of Build Model	1.22%	32,650
Richard Crotty Pkwy (New Rd) to University Blvd	25,000	Avg of Build Model	1.22%	33,650
North of University Blvd	24,000	Avg of Build Model	1.22%	31,340
University Blvd				
West of Rouse Rd	66,670	Avg of Build Model	0.10%	68,360
Rouse Rd to Quadrangle Blvd	55,640	Avg of Build Model & BEBR Low	0.30%	59,820
Quadrangle Blvd to Alafaya Trail	54,868	Avg of Build Model & BEBR Low	0.30%	58,990

Evaluation of Scenarios and Needs Plan

11 BACKGROUND

This section explains the evaluation of alternatives, future years that were analyzed as part of each alternative, methodology for the year 2045 operational analysis considering the inclusion of Autonomous /Connected vehicles (AV/CVs) in the traffic mix, and finally how the short-term, mid-term, and long-term improvements were derived for the Build alternatives.

The goal of this study is to develop the future year 2045 Transportation Needs Plan for the NEOCATS area. Keeping this in mind, a long-range transportation plan was developed by creating the basis for a decision-making framework through which needed projects can be evaluated and ranked. The main objective of the study is to identify and analyze potential transportation projects that would improve network connectivity and provide relief to constrained corridors. As such, a prioritized list of roadways, intersections, safety, bicycle/pedestrian/Americans with Disabilities Act (ADA), trail, transit, and ITS projects were developed. This study followed a tiered approach to determine short-term/Tier 1 (2022-2025), mid-term/Tier II (2026-2035) and long-term/Tier III (2036-2045) roadway and intersection improvements. The projects were evaluated and prioritized for each of the tiers considering safety, mobility, connectivity, multimodal, and stakeholder input.

The NEOCATS future alternatives include a No Build Alternative, and two Build Alternatives. The No Build Alternative represents the existing roadway configuration plus one programmed improvement on SR 50. Based on the information from the County and FDOT, SR 50 from Avalon Park Boulevard to SR 520 is programmed to be widened around the year 2027.

The Build 1 Alternative included programmed and planned roadway improvements, as defined by Orange County, that will be in place by the year 2045. However, Build 1 Alternative considered intersection turn lane improvements to meet target LOS E, except where additional turn lanes cannot be provided because of the lack of receiving lanes. As such, Build 1 Alternative (in terms of roadway improvements) can be dubbed as the Cost-Feasible Plan for the NEOCATS area.

Build 2 Alternative includes other roadway improvements in addition to the improvements included as part of Build 1 Alternative. These improvements were identified to accommodate the anticipated travel demand in the NEOCATS area through the year 2045 and based on the roadway and intersection operational results of the No-Build and Build 1 alternatives, other factors including the ability to implement transportation demand management (TDM) strategies, and coordination with the project stakeholders. Build 2 Alternative can be dubbed as the Needs Plan for the NEOCATS area. More details about the Build alternatives are provided in the later part of this section after the discussion of the No-Build operational analysis results.

It should be noted that a target LOS E and not the minimum LOS standard (as listed in Table 3-1) is considered for the future roadway and intersection analyses to determine the needed capacity improvements within the study area.

12 FUTURE NO BUILD ALTERNATIVE OPERATIONAL ANALYSIS

The following analysis years were evaluated as part of the future year conditions.

- Year 2025
- Year 2035
- Year 2045

The year 2025 analysis results will be used to determine the short-term needs of the study area, the year 2035 analysis results will be used to determine the mid-term needs of the study area, and the year 2045 analysis results will be used to determine the long-term needs of the study area. However, based on the anticipated roadway impacts and urgency of a specific improvement (for example safety and public input will be given priority), a mid-term improvement may be pushed to the short-term improvement list.

As mentioned before, the No Build Alternative represents the existing roadway configuration plus the widening of SR 50 between Avalon Park Boulevard to SR 520 after the year 2025. As such, the No Build Alternative will serve as a benchmark for comparison with the Build Alternatives. The No Build Alternative was evaluated using the No Build volumes (see Section 10). The following years are evaluated as part of the No Build Alternative:

- **Year 2025:** With the projected 2025 turning movement volumes and the existing roadway and intersection configuration along with two additional programmed intersection improvements shown below, but without the programmed SR 50 widening from Avalon Park Boulevard to SR 520.
    - Additional EBL at Alafaya Trail and Corporate Boulevard
    - Additional EBL at Rouse Road and University Boulevard
- **Year 2035:** With the projected 2035 turning movement volumes and the above mentioned 2025 intersection configuration and the programmed SR 50 widening from Avalon Park Boulevard to SR 520.
- **Year 2045:** With the projected 2045 turning movement volumes and the above mentioned 2025 intersection configuration and the programmed SR 50 widening

12.1 NO BUILD ANALYSIS

No Build Intersection Analysis

Table 12-1 shows overall delay and LOS information for signalized intersections and worst movement delay and LOS for unsignalized intersections, both based on HCM 6th Edition. If HCM 6th Edition results are not available, then HCM 2000 results are provided. The HCM based Synchro analysis results are provided in **Appendix V**. **Figure 12-1** depicts the 2045 intersection levels of service for the No Build Alternative.

The two all-way stop controlled intersections are expected to operate at LOS F (either during AM or PM peak hours) from the year 2025. The two-way stop-controlled intersections are expected to operate at LOS E or F on the minor street during AM or PM peak hour conditions from the year 2025. 16 out of the 37 study intersections were found to operate at LOS F in the year 2025.

By the year 2035, 19 out of the 37 study intersections were found to operate at LOS F. The number of failing intersections with LOS F increases to 22 by the year 2045 traffic conditions.

No Build Segment Analysis

The year 2045 roadway segment analysis summary provided in **Table 12-2** and depicted in **Figure 12-2** was performed using roadway capacities from the Orange County CMS database. Please note that the segment analysis was conducted only for the 2045 conditions since it was the only period that was used to identify the roadway improvements in the Needs Plan. The 2045 peak hour peak directional volumes were obtained based on 2045 AADTs and recommended K and D factors. As shown in **Table 12-2** and **Figure 12-2**, most of the roadway segments within the study area exceed the target LOS standard by the year 2045.

12.1.1 Conclusion

The roadway and intersection analysis results summarized in this section for the No-Build indicates that additional roadway improvements will be necessary to support the anticipated future traffic demand in the NEOCATS area and provide improved intersection safety and performance as demonstrated in the Build Alternative.

TABLE 12-1: NO BUILD INTERSECTION LOS SUMMARY

Intersections	2025 No Build AM		2025 No Build PM		2035 No Build AM		2035 No Build PM		2045 No Build AM		2045 No Build PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR 50 at Alafaya Trail	80.8	F	161.4	F	97.7	F	199.4	F	130.1	F	269.6	F
Alafaya Trail at Challenger Parkway	38.7	D	46.8	D	43.3	D	57.4	E	48.8	D	69.1	E
Alafaya Trail at Science Drive	83.9	F	56.6	E	102.7	F	80.9	F	138.0	F	121.0	F
Alafaya Trail at Research Parkway	41.6	D	42.7	D	43.5	D	47.0	D	44.1	D	77.0	E
Alafaya Trail at Central Florida Boulevard	18.8	B	28.2	C	19.7	B	33.5	C	20.7	C	66.8	E
Alafaya Trail at University Boulevard	71.0	E	112.5	F	74.8	E	130.3	F	85.2	F	150.7	F
Alafaya Trail at Centaurus Boulevard#	29.5	C	51.0	D	32.3	C	63.3	E	46.4	D	82.3	F
Alafaya Trail at Gemini Boulevard/Corporate Boulevard	65.2	E	78.5	E	79.1	E	132.7	F	105.7	F	164.5	F
Alafaya Trail at McCulloch Road	75.7	E	104.4	F	110.8	F	126.6	F	151.9	F	160.8	F
SR 50 at Woodbury Road	71.1	E	155.9	F	72.8	E	195.8	F	84.5	F	258.6	F
SR 50 at SR 408 NB Ramps	2.6	A	4.7	A	3.3	A	4.7	A	37.1	D	14.3	B
SR 50 at Bonneville Drive	76.4	E	81.0	F	128.3	F	131.9	F	178.3	F	198.4	F
SR 50 at Lake Pickett Road	126.7	F	87.5	F	144.6	F	113.9	F	196.1	F	143.7	F
SR 50 at Pebble Beach Boulevard	45.8	D	29.0	C	51.3	D	33.3	C	55.8	E	35.8	D
SR 50 at Avalon Park Boulevard	60.6	E	116.1	F	58.4	E	52.2	D	68.5	E	63.6	E
SR 50 at Chuluota Road	62.2	E	125.1	F	55.6	E	89.5	F	100.8	F	191.1	F
McCulloch Road at Orion Boulevard/Lockwood Boulevard#	70.1	E	74.7	E	95.7	F	88.5	F	116.1	F	106.2	F
McCulloch Road at N Tanner Road	54.0	D	62.4	E	57.8	E	67.4	E	60.4	E	76.4	E
Technology Parkway at Research Parkway	15.1	B	16.7	B	16.6	B	19.6	B	18.7	B	27.0	C
Technology Parkway at Science Drive	24.1	C	28.6	C	47.1	D	36.8	D	114.7	F	57.0	E
Lake Pickett Road at S Tanner Road	18.2	B	19.6	B	33.5	C	43.2	D	106.5	F	127.2	F
N Tanner Road at Lake Price Drive	32.5	C	35.8	D	49.8	D	53.3	D	72.8	E	75.4	E
Gemini Boulevard & University Boulevard	23.8	C	53.7	D	27.0	C	64.2	E	31.3	C	78.5	E
Gemini Boulevard & Centaurus Boulevard#	54.3	D	60.7	E	58.0	E	61.1	E	70.0	E	71.0	E
Gemini Boulevard & Scorpius St (North)#	16.8	B	25.0	C	20.2	C	27.3	C	27.8	C	32.2	C
Lake Pickett Road at Percival Road (All Way Stop)	81.8	F	212.0	F	189.9	F	>300.0	F	296.9	F	>300.0	F
Lake Pickett Road at N Tanner Road	15.5	B	46.9	D	26.4	C	120.9	F	51.8	D	214.9	F
Lake Pickett Road at Chuluota Road	45.3	D	74.8	E	92.2	F	130.5	F	156.2	F	199.1	F
McCulloch Road at Rouse Road (All Way Stop)	112.4	F	31.0	D	177.7	F	59.3	F	245.9	F	98.0	F
SR 50 at Rouse Road	65.3	E	96.5	F	72.3	E	99.5	F	75.7	E	113.6	F
University Boulevard at Rouse Road	139.4	F	116.9	F	172.5	F	141.2	F	209.3	F	169.1	F
SR 50 at S Tanner Road*	26.3/86.7	D/F	34.1/41.0	D/E	77.6/>300.0	F/F	256.7/>300.0	F/F	255.5/>300.0	F/F	>300.0/>300.0	F/F
Rouse Road at Lokanotosa Road#	6.2	A	3.8	A	9.5	A	4.1	A	15.8	B	4.3	A
Science Drive at Ingenuity Drive*	10.4/>300.0	B/F	10.3/52.0	B/F	10.9/>300.0	B/F	10.6/59.1	B/F	11.5/>300.0	B/F	11.0/72.1	B/F
Research Parkway at Discovery Drive	22.6	C	32.4	C	25.6	C	45.0	D	32.3	C	75.6	E
Woodbury Road at Challenger Parkway	17.8	B	31.3	C	19.9	B	38.9	D	25.7	C	56.1	E
Challenger Parkway at Ingenuity Drive#	82.6	F	72.1	E	101.2	F	87.1	F	121.5	F	108.6	F

Notes:

*1. *Major street/minor street delay and LOS for two-way stop-controlled intersections*

2. A target LOS E is considered for future analysis

3. #HCM2000 results are reported since HCM 6th Edition results are not available

TABLE 12-2: 2045 NO BUILD ROADWAY SEGMENT LOS SUMMARY

Roadway / Segment	2045 No Build				
	Peak Hour Peak Direction Vol	# of Lanes	Capacity	V/C	Segment Condition
Alafaya Trail					
South of SR 50	3,450	6	3,020	1.14	Over Capacity
SR 50 to Challenger Pkwy	3,810	6	3,020	1.26	Over Capacity
Challenger Pkwy to Science Dr	3,280	6	3,020	1.09	Over Capacity
Science Dr to Research Pkwy	3,880	6	3,020	1.28	Over Capacity
Research Pkwy to Central Florida Blvd	3,860	6	3,020	1.28	Over Capacity
Central Florida Blvd to University Blvd	3,160	6	3,020	1.05	Over Capacity
Centaurus Blvd to University Blvd	2,790	6	3,020	0.92	Reaching Capacity
Corporate Blvd/Gemini Blvd to Centaurus Blvd	2,930	6	3,020	0.97	Reaching Capacity
McCulloch Rd to Corporate Blvd/Gemini Blvd	3,220	6	3,020	1.07	Over Capacity
Chapman Rd to McCulloch Rd	3,900	6	3,020	1.29	Over Capacity
SR 50					
West of Rouse Road	4,070	6	3,020	1.35	Over Capacity
Rouse Road to Alafaya Trail	3,790	6	3,020	1.25	Over Capacity
Alafaya Trail to Woodbury Road	3,340	6	3,020	1.11	Over Capacity
Woodbury Road to Lake Pickett Road	4,350	6	3,020	1.44	Over Capacity
Lake Pickett Road to Pebble Beach Road	3,930	6	3,020	1.30	Over Capacity
Pebble Beach Road to Avalon Park Boulevard	3,770	6	3,020	1.25	Over Capacity
Avalon Park Boulevard to S Tanner Road	3,660	6	3,020	1.21	Over Capacity
S Tanner Road to CR 419/Chuluota Road	3,530	6	3,020	1.17	Over Capacity
East of CR 419/Chuluota Road	3,260	6	3,020	1.08	Over Capacity
McCulloch Road					
Rouse Road to Alafaya Trail	900	2	880	1.02	Over Capacity
Alafaya Trail to Lockwood Boulevard	2,150	4	2,000	1.08	Over Capacity
Lockwood Boulevard to Worchester Drive	1,770	2	880	2.01	Over Capacity
Worchester Drive to N Tanner Road	1,230	2	880	1.40	Over Capacity
East of N Tanner Road	0	2	880	0.00	Within Capacity
CR 419/Chuluota Road					
SR 50 to Lake Pickett Road	1,140	2	740	1.54	Over Capacity
Lake Pickett Road to Seminole County Line	1,050	2	740	1.42	Over Capacity
Avalon Park Boulevard					
South of SR 50	1,600	4	2,000	0.80	Within Capacity
Lake Pickett Road					
SR 50 to Percival Road	1,270	2	880	1.44	Over Capacity
Percival Road to N Tanner Road	950	2	740	1.28	Over Capacity
N Tanner Road to S Tanner Road	1,060	2	740	1.43	Over Capacity
S Tanner Road to CR 419/Chuluota Road	1,030	2	740	1.39	Over Capacity

Roadway / Segment	2045 No Build				
	Peak Hour Peak Direction Vol	# of Lanes	Capacity	V/C	Segment Condition
South Tanner Road#					
North of SR 50	450	2	880	0.51	Within Capacity
North Tanner Road					
Lake Pickett Road to Lake Price Drive	880	2	880	1.00	Reaching Capacity
Lake Price Drive to McCulloch Road	1,120	2	880	1.27	Over Capacity
Percival Road					
Lake Pickett Road to Sussex Drive	520	2	880	0.59	Within Capacity
Lake Price Drive, 0.05 Mi. E. of N Tanner Road	460	2	800	0.58	Within Capacity
Research Parkway#					
Alafaya Trail to Technology Parkway	860	4	1,700	0.51	Within Capacity
Technology Parkway to Discovery Drive	680	4	1,700	0.40	Within Capacity
Challenger Parkway					
Alafaya Trail to Ingenuity Drive	740	4	1,700	0.44	Within Capacity
Ingenuity Drive to Woodbury Road	1,840	4	1,700	1.08	Over Capacity
Gemini Boulevard#					
Central Florida Boulevard to University Boulevard	1,270	4	1,700	0.75	Within Capacity
University Boulevard to Centaurus Boulevard	1,090	4	1,700	0.64	Within Capacity
North of Centaurus Boulevard	1,050	4	1,700	0.62	Within Capacity
South of Scorpius St (North)	1,430	4	1,700	0.84	Within Capacity
East of Alafaya Trail	1,130	4	1,700	0.66	Within Capacity
Orion Boulevard#					
South of McCulloch Road	1,120	4	1,700	0.66	Within Capacity
Corporate Boulevard#					
West of Alafaya Trail	960	2	880	1.09	Over Capacity
Libra Drive#					
North of Research Parkway	630	4	1,700	0.37	Within Capacity
Woodbury Road					
South of SR 50	1,690	2	800	2.11	Over Capacity
North of SR 50	1,370	4	1,700	0.81	Within Capacity
Bonneville Drive					
North of SR 50	730	2	880	0.83	Within Capacity
Science Drive#					
Alafaya Trail to Technology Parkway	750	2	880	0.85	Within Capacity
Technology Parkway to Ingenuity Drive	810	2	880	0.92	Reaching Capacity
Ingenuity Drive#					
Challenger Parkway to Science Drive	1,670	4	1,700	0.98	Reaching Capacity
Science Drive to Discovery Drive	960	3	1,290	0.74	Within Capacity
Technology Parkway#					
Research Parkway to Science Drive	600	4	1,700	0.35	Within Capacity

Roadway / Segment	2045 No Build				
	Peak Hour Peak Direction Vol	# of Lanes	Capacity	V/C	Segment Condition
Discovery Drive#					
Research Parkway to Ingenuity Drive	936	2	880	1.06	Over Capacity
Rouse Road					
North of University Boulevard	1,600	4	2,000	0.80	Within Capacity
University Boulevard to Lokanotosa Trail	1,670	4	2,000	0.84	Within Capacity
Lokanotosa Trail to SR 50	1,910	4	2,000	0.96	Reaching Capacity
South of SR 50	1,420	4	2,000	0.71	Within Capacity
University Boulevard					
Alafaya Trail to Rouse Road	3,270	6	3,020	1.08	Over Capacity
West of Rouse Road	3,550	6	3,020	1.18	Over Capacity

Notes:

*1. Peak hour peak direction volume based on AADT*K*D*

2. # Capacities are from similar roadways

3. A target LOS E is considered for future analysis

FIGURE 12-1: 2045 NO BUILD CONDITIONS – INTERSECTIONS

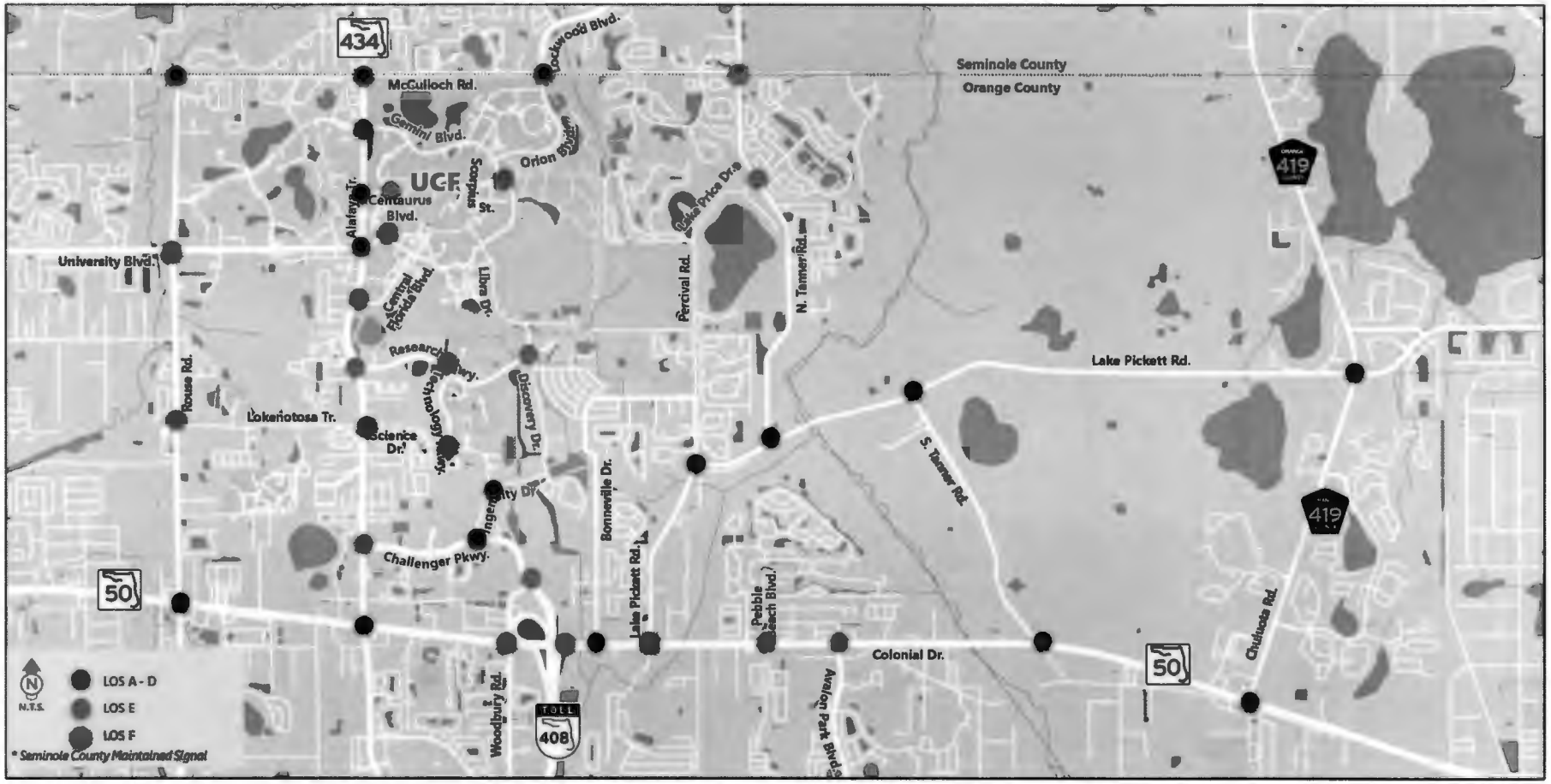
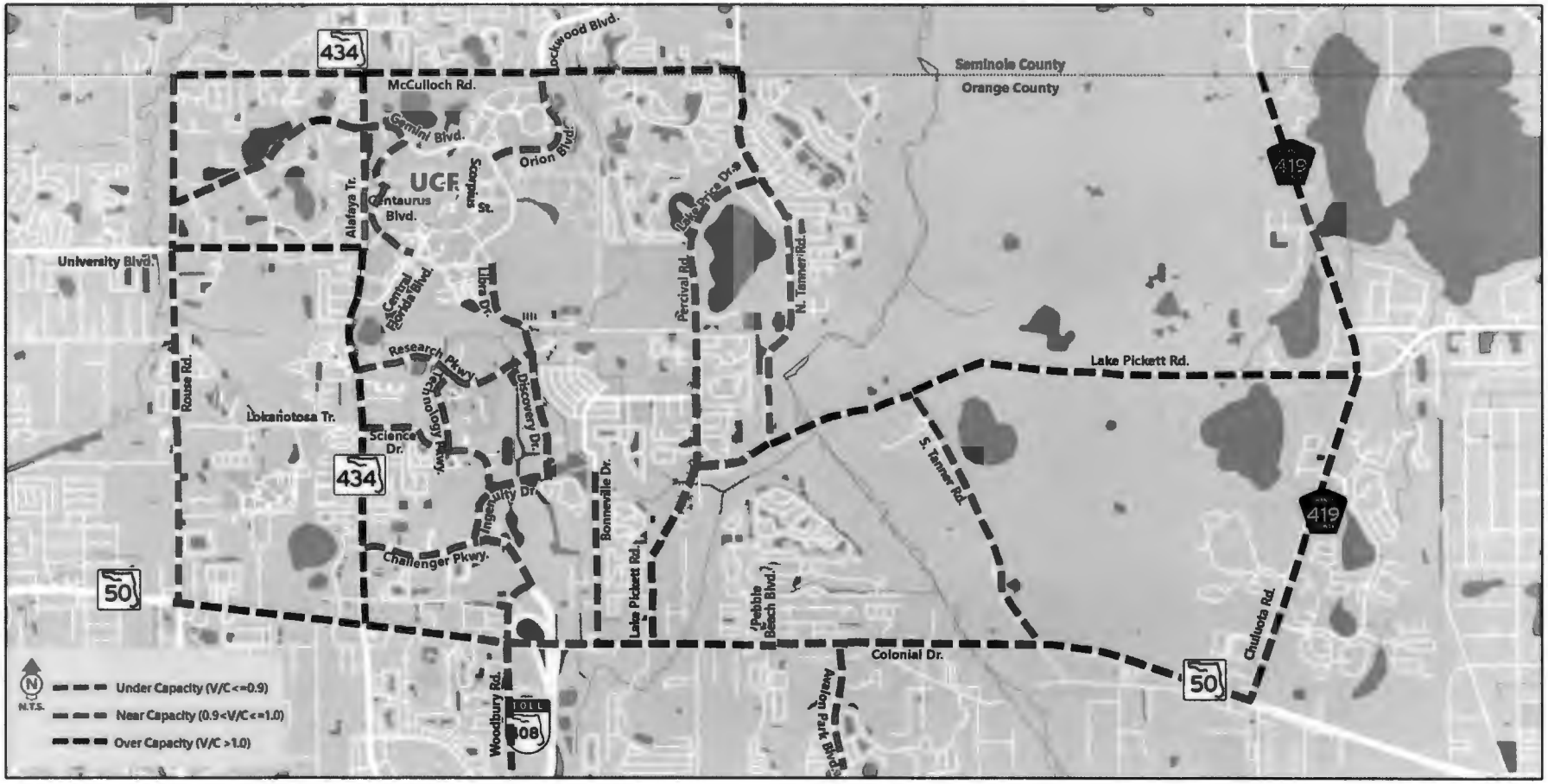


FIGURE 12-2: 2045 NO BUILD CONDITIONS – SEGMENTS



13 UNDERSTANDING OF CORRIDOR ISSUES AND OPPORTUNITIES

This study considered the corridor issues and opportunities and then identified a toolbox of potential strategies to help address these needs and achieve the goals for the short-term (on or before 2025), mid-term (2026-2035), and long-term (2036-2045). To help with this approach and determine recommended improvements, the following key elements will be considered:

Key Elements

- Roadway data
  - Major developments
  - Pedestrian/bicycle facility gaps
  - Transit routes
  - Lighting
  - ITS
- Historical crash data
- Traffic data
  - Traffic volumes
  - OD study
  - Multimodal operational analysis
  - Connected Autonomous Vehicles (CAV) impacts based on guidance from the latest HCM 7th Edition
- Stakeholder input
- Programmed and planned projects
- Orange County, FDOT, and Federal Highway Administration (FHWA) guidelines
- Similar projects

Special consideration was given to safety and stakeholder input. The proposed improvements encompassed an array of options with consideration given to both the auto and non-motorized modes and both traditional and innovative measures. The sections that follow describe this process in further detail.

Based on the collection and synthesis of existing conditions data in combination with future conditions analysis and stakeholder input, the following primary areas are identified to address challenges and improve conditions for all road users along the corridor:

- Enhance traffic operational efficiency along the study corridor and intersections with traditional and innovative improvements.
- Improve safety for all road users via the use of innovative yet easily implementable countermeasures.
- Provide a pedestrian/bicycle facility that complements the existing roadway elements of the study area roadways.

- Identify multimodal improvements in line with the long-range vision of the County for the study corridor.
- Identify high-level lighting recommendations.
- Identify high-level ITS recommendations.
- Promote safer operating speeds within the corridor.

13.1 TOOLBOX OF POTENTIAL STRATEGIES

A comprehensive set of potential strategies was developed for the corridor to address the goals described in the previous section. In developing these strategies, specific focus was placed on safety and stakeholder input. The identified strategies include:

- Extension or addition of turn lanes
- Operational improvements
    - Signal coordination
    - Phasing improvements
- Long-term operational analysis (2045)
    - Inclusion of factors that account for Automated Vehicles (AV)/Connected Vehicles (CV) penetration in the traffic stream by the year 2045
- Innovative intersection types
    - Restricted Crossing U-turn (RCUT)
    - Displaced Left Turn (DLT)
    - Roundabout
    - Quadrant Roadway Intersection (QRI)
    - Single Point Urban Interchange (SPUI)
- Safety
    - Retroreflective back plates
    - High-friction surface treatment
    - Signing
- Multimodal/ADA
    - Shared-use path
    - Reduced corner radii
    - ADA upgrades
    - Special emphasis crosswalk markings
    - Pedestrian-friendly signal operations
    - Hardened centerlines/pedestrian refuge
    - Near Perpendicular right turns
    - Curb extensions
    - Raised median islands
- Transit
    - Additional bus service
    - Bus Rapid Transit (BRT)

  - Enhanced bus service with increased frequency
  - Strategies to improve bus travel reliability including Transit Signal Priority (TSP)
- Lighting
  - Intersection/corridor-wide enhancements
- ITS
  - Real-time traffic information & detour routing
  - Connected Vehicle (CV) technology-ready corridors
- Planning Strategies
  - Transportation Demand Management (TDM) measures to reduce the dependance on auto travel
  - New roadway connections based on stakeholder input and travel demand modeling

13.2 CAPACITY/OPERATIONAL IMPROVEMENTS TOOLBOX

A comprehensive set of potential traffic operational strategies were developed for the corridor to address the goals described in the previous section. Targeted strategies were identified at specific locations throughout the corridor based on No Build analysis and historical crash review; additionally, particular attention was placed on improving safety and stakeholder input. Some of the more notable strategies recommended throughout the corridor include:

13.2.1 Extension or Addition of Turn Lanes

Extension and addition of turn lanes is one of the low cost/quick-fix or Transportation Systems Management and Operations (TSM&O) strategies to address congestion and safety issues in the near-term of a project. In the information guide for signalized intersections published by FHWA, addition of turn (left or right) lanes is identified as one of the treatments for vehicle movements at intersections to address an overrepresentation of rear-end collisions under congested conditions and an excessive queueing and/or delay for one (or more) approach movements. Extension of turn lanes is also widely used for the same purposes. Based on the Florida specific crash reduction factors published by FDOT, the extension and addition of turn lanes have the following safety benefits:[2]

- Exclusive right turn lane: 11% reduction (all crash types)
- Additional left turn lane: 4% reduction (all crash types)
- Extend storage: 11% reduction (all crash types)

13.2.2 Operational Improvements

Signal coordination helps minimize delay along a corridor with closely spaced signals. Signal coordination helps intersections respond to traffic demand in an efficient manner by keeping the vehicle platoons move through adjacent intersections with minimal delay. In other words, signal coordination will provide smooth progression along an arterial. There is no specific crash

reduction factor for signal coordination, but several studies have shown both safety and operational benefits of regular signal retiming projects.

Phasing improvements such as changing permissive mode to protected plus permissive mode will also help improve traffic operations of certain movements. For example, a side street left turn under permissive mode with significant opposing traffic movement will have better operations after protected mode is introduced. For example, replacing a permissive-only left turn with a protected phase is anticipated to reduce all crash types by 6% (source: FDOT Crash Reduction Factors).

13.2.3 Innovative Intersection Types

FDOT now requires intersection control evaluation (ICE) when planning for a new or modified intersection. The purpose of ICE is to consistently consider multiple context-sensitive control strategies. As part of ICE, several innovative or alternative intersection types such as RCUT, DLT, Median U-turn (MUT), and Roundabout were evaluated at the study intersections using FDOT's CAP-X tool. It is to be noted that a full ICE analysis was not conducted for this planning study but provided a high-level screening analysis using CAP-X at select intersections based on 2045 No Build Alternative analysis results.

Innovative intersections provide both safety and operational benefits for all road users. DLT intersections, for example, provide operational benefits while also helping to reduce all crash types by 12% (Source: FDOT).

13.3 MULTIMODAL/SAFETY TOOLBOX

A comprehensive set of potential safety-related strategies were developed for the corridor to address the goals described in the previous section. Targeted strategies were identified at specific locations throughout the corridor based on documented crash histories; additionally, particular attention was placed on improving bicycle and pedestrian accommodation along and across the corridor, given the general severity of crashes involving vulnerable users. Some of the more notable strategies recommended throughout the corridor include:

- Retroreflective back plates to signal heads
- Hardened centerlines/pedestrian refuge
- High-friction surface treatment
- High emphasis crosswalks
- Lighting improvements
- Advance traffic signs
- High-intensity Activated crossWalK (HAWK)/Pedestrian Hybrid Beacon
- Detectable warning surfaces on curb ramps
- Tighten corner radii

Each of these strategies is discussed in further detail in the subsections that follow.

13.3.1 Lighting

Properly designed roadway lighting improves visibility and conspicuity for pedestrians, and bicyclists allowing each to see one another in addition to other physical elements along the roadway. Installation of lighting at intersections has been linked to a 38 percent reduction in dark condition crashes and a 42-59 percent reduction in vehicle/pedestrian crashes under dark conditions.[4]

[4] *Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Elsevier Science Ltd., Oxford, UK: 2004.*

13.3.2 Hardened Centerlines/Intersection Refuge Islands

Hardened Centerlines are the extension of a traffic separator or centerline past the crosswalk at signalized intersections. They improve pedestrian safety by reducing the turning speeds of left-turning vehicles and increase visibility of pedestrians in the crosswalks.

13.3.3 Near Perpendicular Right Turn Lane

The FDOT Design Manual recommends the consideration of corner islands where paved areas are excessively large. An improved design has been recently introduced in the FDOT Design Manual, the near perpendicular right turn lane. This design, characterized by reduced corner radii and angles of entry into the intersecting roadway aid in reducing turning speeds, improving pedestrian visibility, and improving sight lines for motorists.

13.3.4 High Friction Surface Treatment

High friction surface treatment (HFST) is a long-lasting skid-resistant overlay that can help motorists maintain better control of their vehicles in dry and wet conditions. Friction is one of twenty of FHWA's proven safety countermeasures. Application of this treatment has been linked to 52% reduction in wet road crashes and 24% reduction in curve-related crashes.

13.3.5 Retroreflective Back plates

Retroreflective backplates are one of FHWA's proven safety countermeasures and have been shown to reduce total crashes by 15%. These backplates are added to traffic signals and are framed by a retroreflective border.

13.3.6 Reduced Corner Radii

Reducing the corner radii at intersections provides several benefits that enhance pedestrian safety. Tighter corner radii often shorten crosswalk lengths, reducing the exposure of pedestrians to areas of conflict with motor vehicles. Also, the reduced corner radii force motorists to reduce speeds for right-turning movements, allowing for improved reaction times for both the motorist and the pedestrian or bicyclist to avoid a potential conflict. Finally, tighter corner radii also improve the visibility of pedestrians waiting to cross the street and provide a larger envelope to incorporate curb ramp and pedestrian signal improvements to meet ADA requirements.

13.3.7 Pedestrian-Friendly Signal Operations

Several minor modifications can be incorporated into signal operations that can improve pedestrian safety.

- **Leading Pedestrian Intervals (LPIs)** are a low-cost measure that give pedestrians a 3-7 second head start at an intersection, providing an advance "walk" signal indication before a concurrent green signal indication is provided to vehicles.
- **Use of Blank-out signs to restrict right-turn on red movements** when a pedestrian crosswalk signal is activated, eliminating the right-turn conflict between vehicles and pedestrians/bicycles. The Blank-out sign word message "NO TURN ON RED" should be used when right turns are prohibited. When right turn on red is permitted and pedestrian crosswalks are marked, the word message "TURNING TRAFFIC MUST YIELD (or STOP) TO PEDESTRIANS" should be used.
- **Protected only left turn phasing** by the time of day or when the pushbutton is activated can be used to reduce conflicts between left turning vehicles and pedestrians crossing in the crosswalk.
- **National Cooperative Highway Research Program (NCHRP) Research Report 969 (Traffic Signal Control Strategies for Pedestrians and Bicyclists)** published in 2022 is a useful resource to identify strategies to integrate non-motorized users into signal design and operations process. This Report explores treatments to improve safety as well as operations for non-motorized users at signalized intersections.

13.3.8 Roundabout

Roundabouts are a circular intersection configuration that feature channelized approaches and a center island. On approaches to a roundabout, entering traffic yields to vehicles already circulating within the roundabout. This intersection configuration results in lower speeds and fewer conflict points. Roundabouts can provide substantial safety benefits compared to other intersection types, most notably in the reduction of severe crashes. Conversion of a two-way stop-controlled intersection to a roundabout has been shown to reduce severe injury crashes by 82%, and conversion of a signalized intersection to a roundabout has been shown to reduce severe injury crashes by 78%.

Roundabouts can also provide speed management benefits, serving as an effective transition from high-speed contexts to lower speed contexts.

13.3.9 Advance Traffic Signs

Advance traffic signs, placed according to FDOT guidance, give drivers additional time to make necessary lane changes and route selection decisions. They have been shown to reduce rear-end and sideswipe crashes by 20%.

13.3.10 Midblock Pedestrian Crossings

Generally, pedestrians will not travel out of their way to cross a roadway at signalized intersections, instead opting for the most direct and convenient route. This is particularly true in urban corridors like SR 50 or Alafaya Trail with a concentration of pedestrian-generating land uses. Midblock crosswalks supplement pedestrian crossings in the areas between signalized intersections, providing formalized crossing opportunities that organize pedestrian crossing volumes and reduce the occurrence of random or unpredictable pedestrian crossings.

Pedestrian signals and pedestrian hybrid beacons are pedestrian-actuated enhancements for pedestrians and bicyclists. These devices have shown to reduce pedestrian/vehicle crashes by 57%.

13.3.11 Americans with Disabilities Act (ADA) Upgrades

The ADA prohibits discrimination against people with disabilities in employment, public accommodation, communications, governmental activities, and transportation. Specific to the study corridors, these requirements apply to sidewalks, transit stops, and pedestrian crossing locations.

13.3.12 Special Emphasis Crosswalk Markings

Special emphasis crosswalk markings are a strategy to bring added attention to pedestrian crossings at signalized or unsignalized locations. These pavement markings demarcate the pedestrian right-of-way and alert drivers to yield to pedestrians in crosswalks. This strategy can be applied throughout the corridor at all signalized intersections and midblock crossings and across side streets and heavily used driveways. This could entail restriping crosswalks that are worn or outdated or striping crosswalks in crossing locations where none currently exist.

13.4 CAP-X ANALYSIS

The FDOT-modified Capacity Analysis at Junctions (CAP-X) tool, which provides generalized capacity information for selected intersection alternatives, was used to conduct a high-level screening analysis for the 2045 traffic conditions at select study intersections. It is to be noted that the CAP-X is one of the tools that was used to evaluate and develop the recommended intersection improvements. For this high-level analysis, the existing traffic control (signal or stop) and a roundabout were always considered. The other options were chosen based on the future volumes, context of the surrounding roadway network (existing and future land uses).

13.5 DEVELOPMENT OF SAFETY RECOMMENDATIONS

The development of safety recommendations was based on several activities: review of the documented crash history at each study intersection, a desktop review of each of the study intersections, and a review of the analysis guidance from the latest FDOT Project Development and Environmental Manual, Part 2, Section 2.2.8 and FHWA's proven safety countermeasures.

A Safety Analysis Memorandum developed to identify the countermeasures is included in **Appendix W** of this report. It should be noted that the countermeasures listed in this

memorandum were further refined and shown as recommended countermeasures at each study intersection.

13.6 AV/CV IMPACTS FOR THE YEAR 2045

It is mandated by Florida Statute (F.S. 339.64), passed during 2017 Legislative session, that the Strategic Intermodal System (SIS) Plan must provide for infrastructure and technological improvements necessary to accommodate advances in vehicle technology, such as automated driving systems and other developments. As such, it is assumed in this study that these emerging trends will affect the study roadways by the year 2045.

For the purposes of this study, approximately 10% increase in through lane capacity (or the Base Saturation Flow Rate) representing 33% of Connected Automated Vehicles (CAVs) in the traffic stream was assumed based on input from the County. This capacity adjustment was considered for the Build alternatives.

14 BUILD ALTERNATIVES

14.1 BUILD 1 ALTERNATIVE

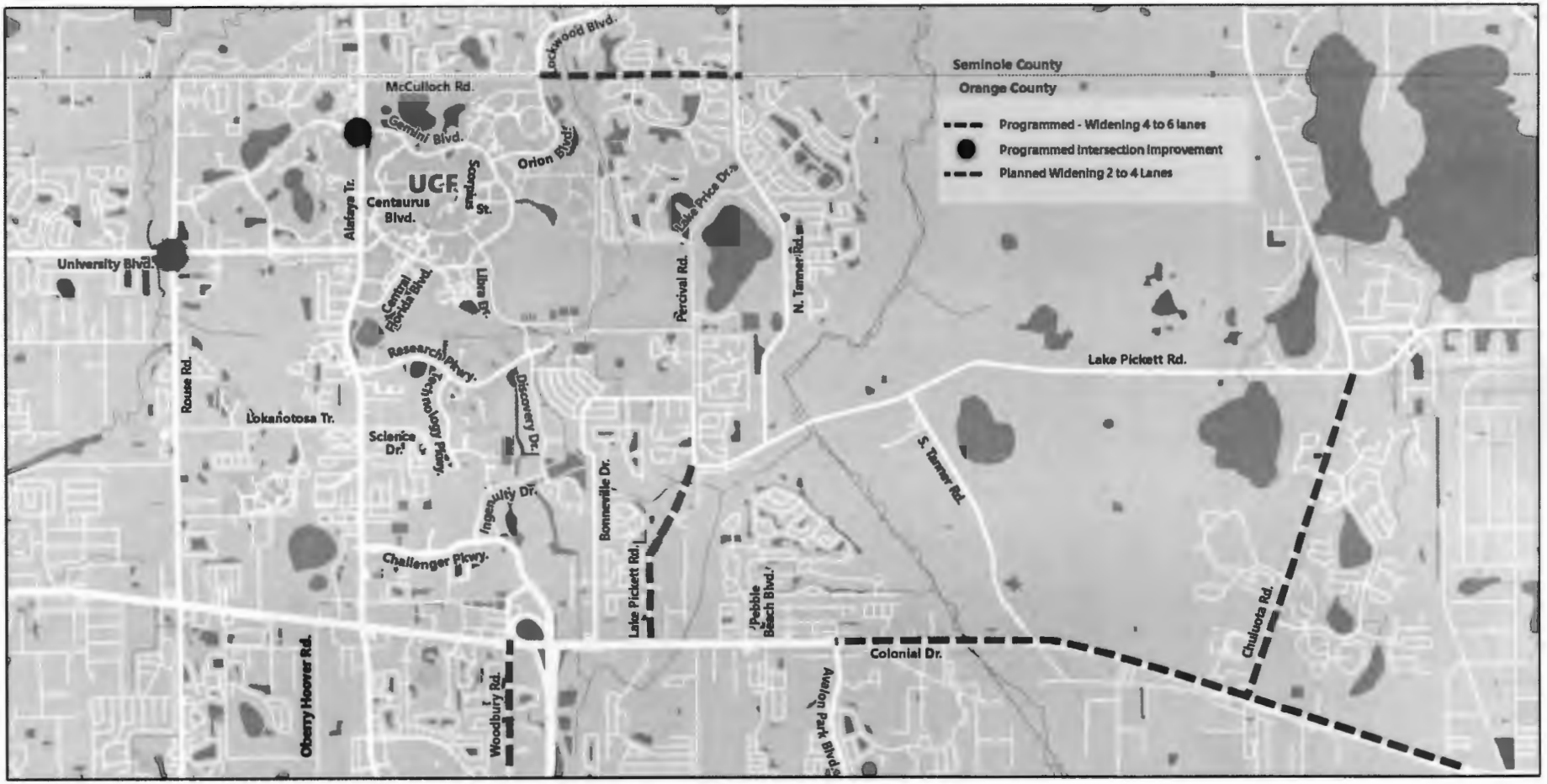
As mentioned before, NEOCATS future alternatives include a No Build Alternative and two Build Alternatives. The Build 1 Alternative includes programmed and planned improvements, as defined by Orange County, that will be in place by the year 2045. Build 1 Alternative can be considered as the Cost-Feasible Plan for the NEOCATS area.

The planned improvements included in this study are based on input from the County and are a subset of what were identified in Orange County's Long Range Transportation Plan (2030 LRTP) including all public-private partnership projects (PPP), MetroPlan Orlando 2045 Metropolitan Transportation Plan (MTP), and 2040 Seminole County Master Plan. The planned improvements within the study area as depicted in **Figure 14-1** include:

- CR 419 widening (2 to 4 lanes) from SR 50 to Lake Pickett Road
- Lake Pickett Road widening (2 to 4 lanes) from SR 50 to Percival Road
- McCulloch Road widening (2 to 4 lanes) from North Orion Boulevard to North Tanner Road
- Woodbury Road widening (2 to 4 lanes) from Lake Underhill Road to SR 50

Since the planned roadway widening projects will not be constructed before 2035, traffic conditions at the study intersections were evaluated for the years 2035 and 2045 as part of the Build Alternative 1 analysis. The Build 1 Alternative was evaluated using the No Build volumes. The reason was that the improvements in Build 1 Alternative added capacity for specific smaller segments and did not consider the new East/West roadway, which is a major parallel roadway to relieve congestion on SR 50 within the NEOCATS area.

FIGURE 14-1: PROGRAMMED/PLANNED IMPROVEMENTS FOR NEOCATS AREA AS IDENTIFIED BY ORANGE COUNTY



The Build 1 intersection geometry is shown in **Figure 14-2**. It should be noted the figure depicts geometry needed for each study period (with the exception of through lanes) to maintain the target LOS E at the study intersections and AV/CV adjustments for the year 2045 were considered.

Build 1 Intersection Analysis

Table 14-1 shows overall delay and LOS information for the study intersections based on HCM 6th Edition. If HCM 6th Edition results are not available, then HCM 2000 results are provided. The HCM based Synchro analysis results are provided in **Appendix Y**. **Figure 14-3** depicts the 2045 intersection levels of service for the Build 1 Alternative. By the year 2035, 3 out of 37 study intersections are expected to operate at LOS F. The number of failing intersections rises to 8 by the year 2045 traffic conditions.

Build 1 Segment Analysis

The year 2045 roadway segment analysis summary provided in **Table 14-2** and depicted in **Figure 14-4** was performed using roadway capacities from the Orange County CMS database. Please note that the segment analysis was reported for the 2045 conditions because this was the only period that was used to identify the roadway improvements in the Needs Plan. The 2045 peak hour peak directional volumes were obtained based on 2045 AADTs and recommended K and D factors. As shown in **Table 14-2** and **Figure 14-4**, roadway segments including SR 50 (entire segment), portions of Alafaya Trail, Lake Pickett Road from Percival Road to CR 419, CR 419 from Lake Pickett Road to Seminole County Line, N Tanner Road from Lake Price Drive to McCulloch Road, and Discovery Drive from Ingenuity Drive to Research Parkway within the study area all exceed the target LOS standard by the year 2045.

Build 1 2045 Roundabout Analysis

A roundabout was evaluated using SIDRA software at the existing stop-controlled intersections for the year 2045 to verify if a roundabout will operate within the target LOS E in lieu of a signal. Based on this analysis, a roundabout is expected to operate better than LOS E condition at the following intersections for the year 2045:

- McCulloch Road and Rouse Road
- Lake Pickett Road and Percival Road
- Ingenuity Drive and Science Drive

14.1.1 Conclusion

With the programmed and planned improvement projects and AV/CV impacts, the study roadways are expected to operate better than the No Build Alternative. However, there will still be several roadway segments with traffic demand exceeding capacity. As such, additional improvements including capacity enhancements and TDM strategies as determined in the Needs Plan must be considered to provide acceptable traffic operational conditions through the year 2045 within the study area.

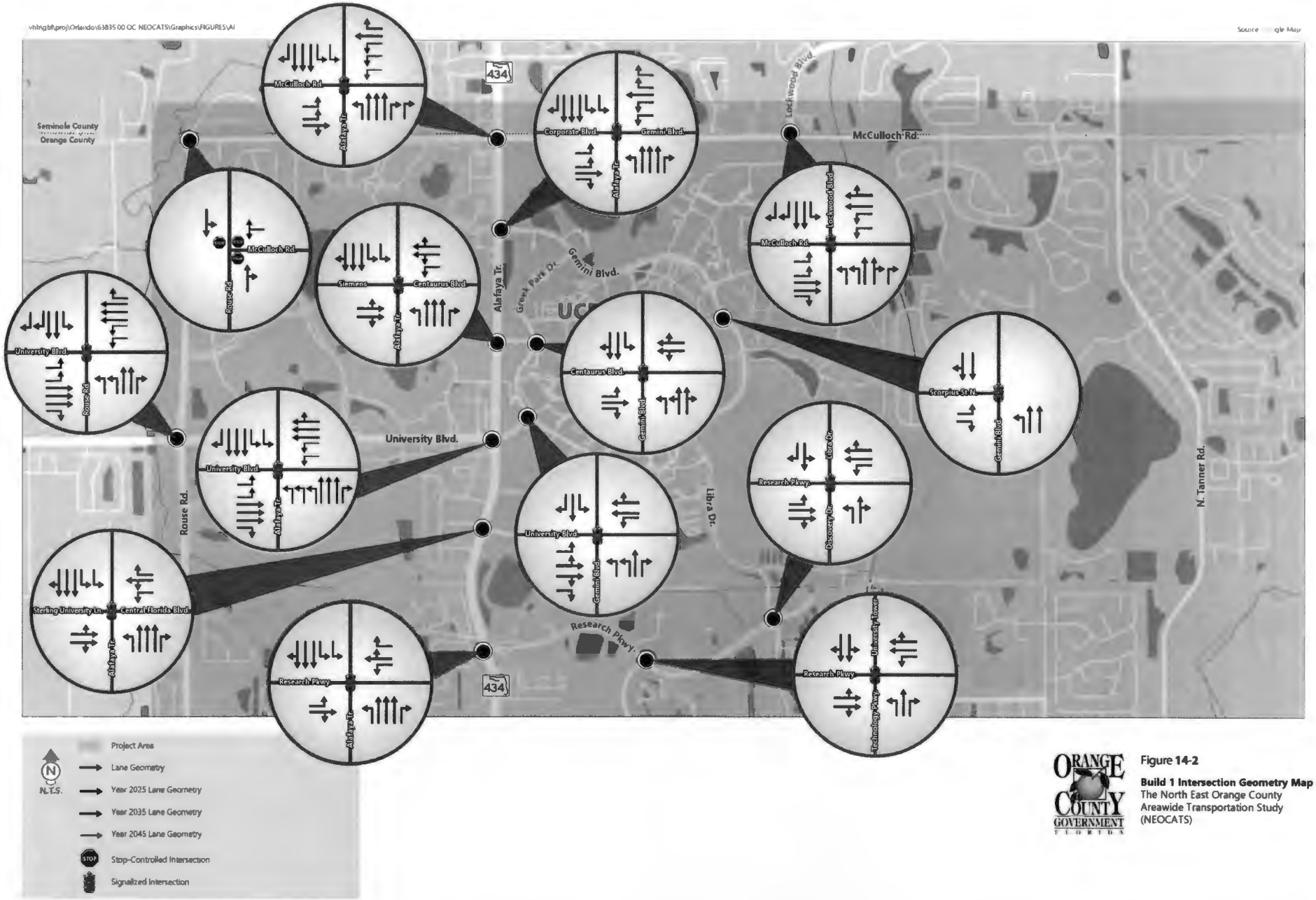


Figure 14-2

Build 1 Intersection Geometry Map 1
The North East Orange County
Areawide Transportation Study
(NEOCATS)

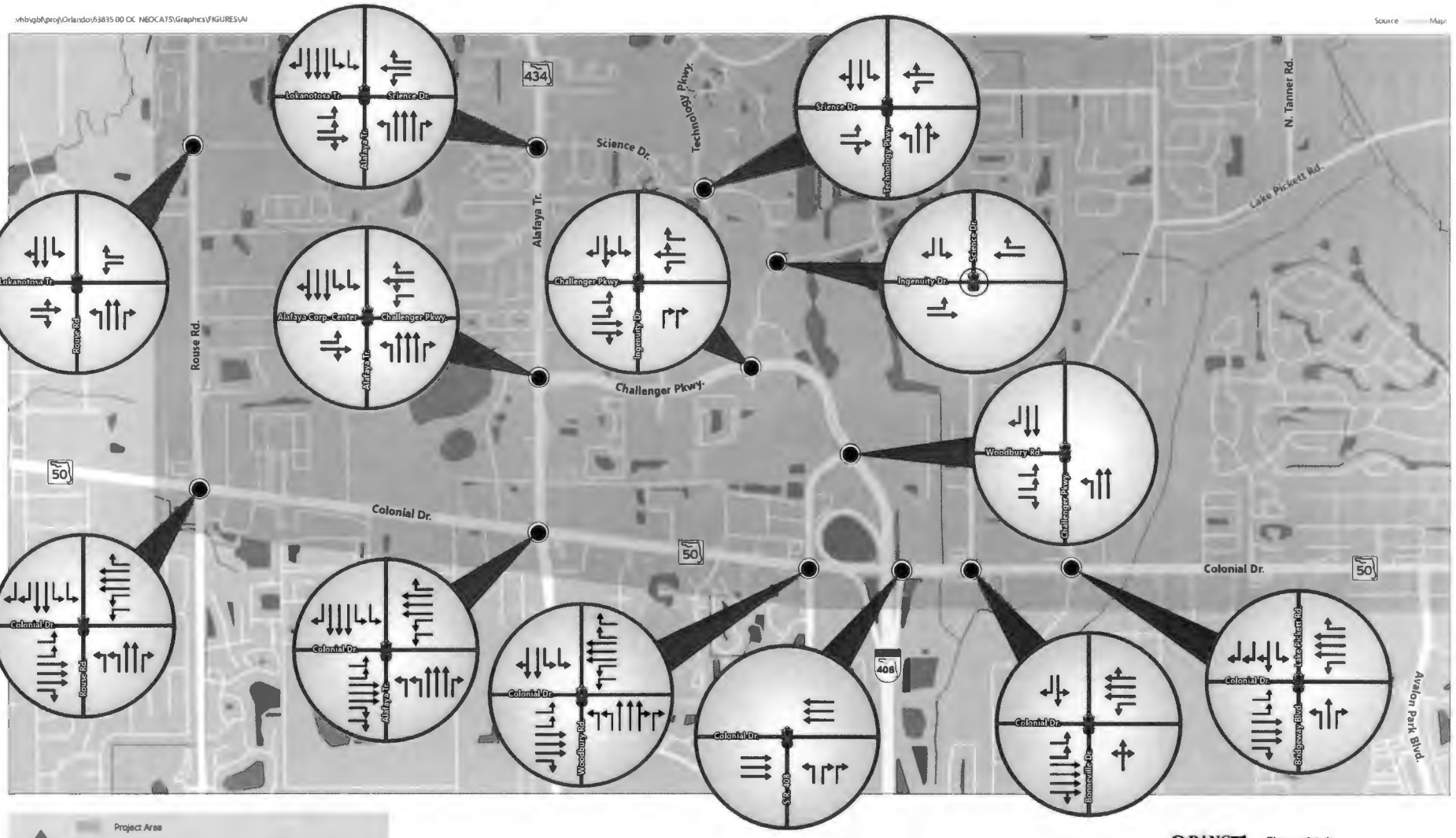


Figure **14-2**

Build 1 Intersection Geometry Map 2
The North East Orange County Areawide Transportation Study (NEOCATS)

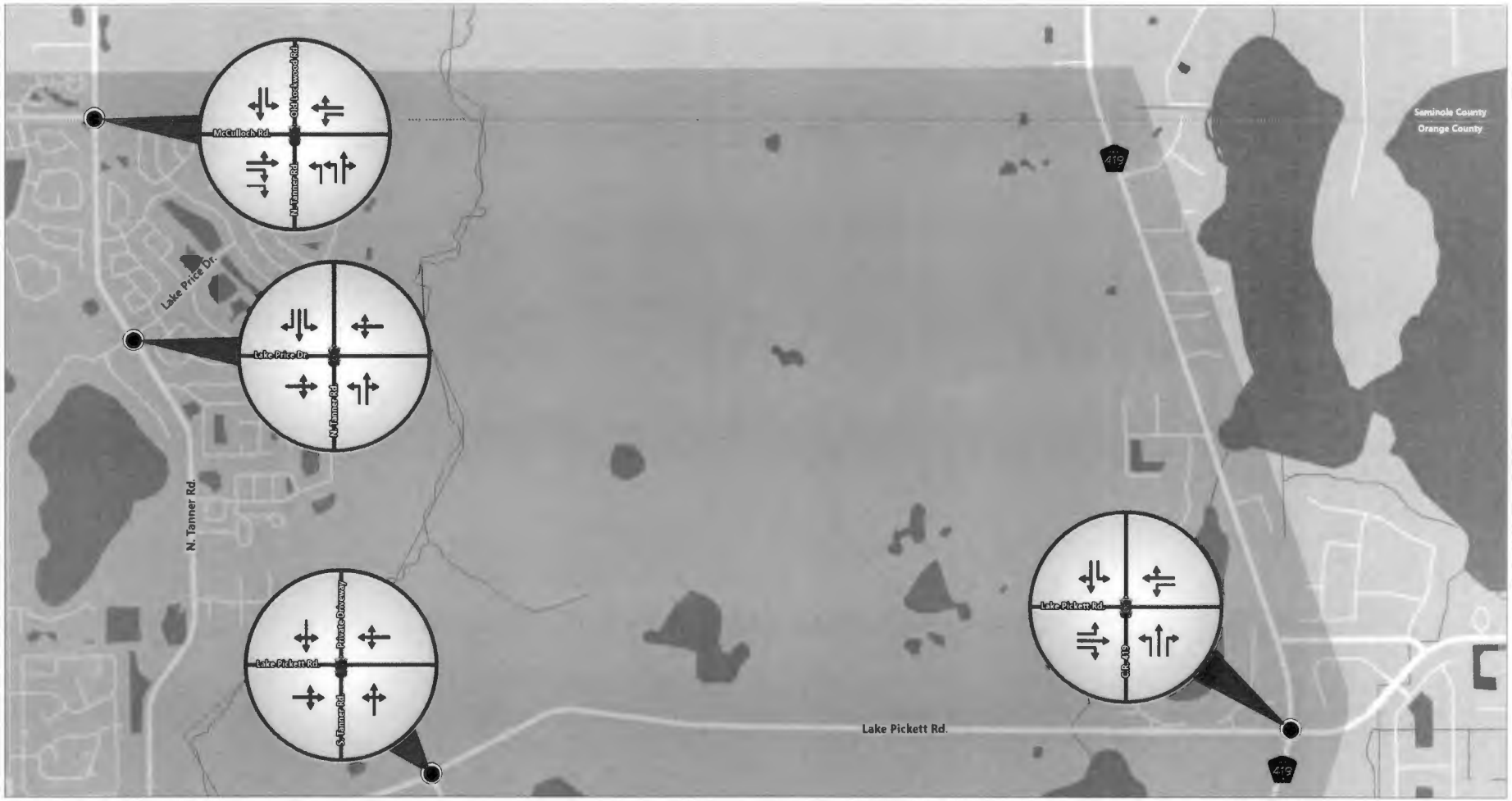


Figure 14-2

Build 1 Intersection Geometry Map 3
The North East Orange County Areawide Transportation Study (NEOCATS)

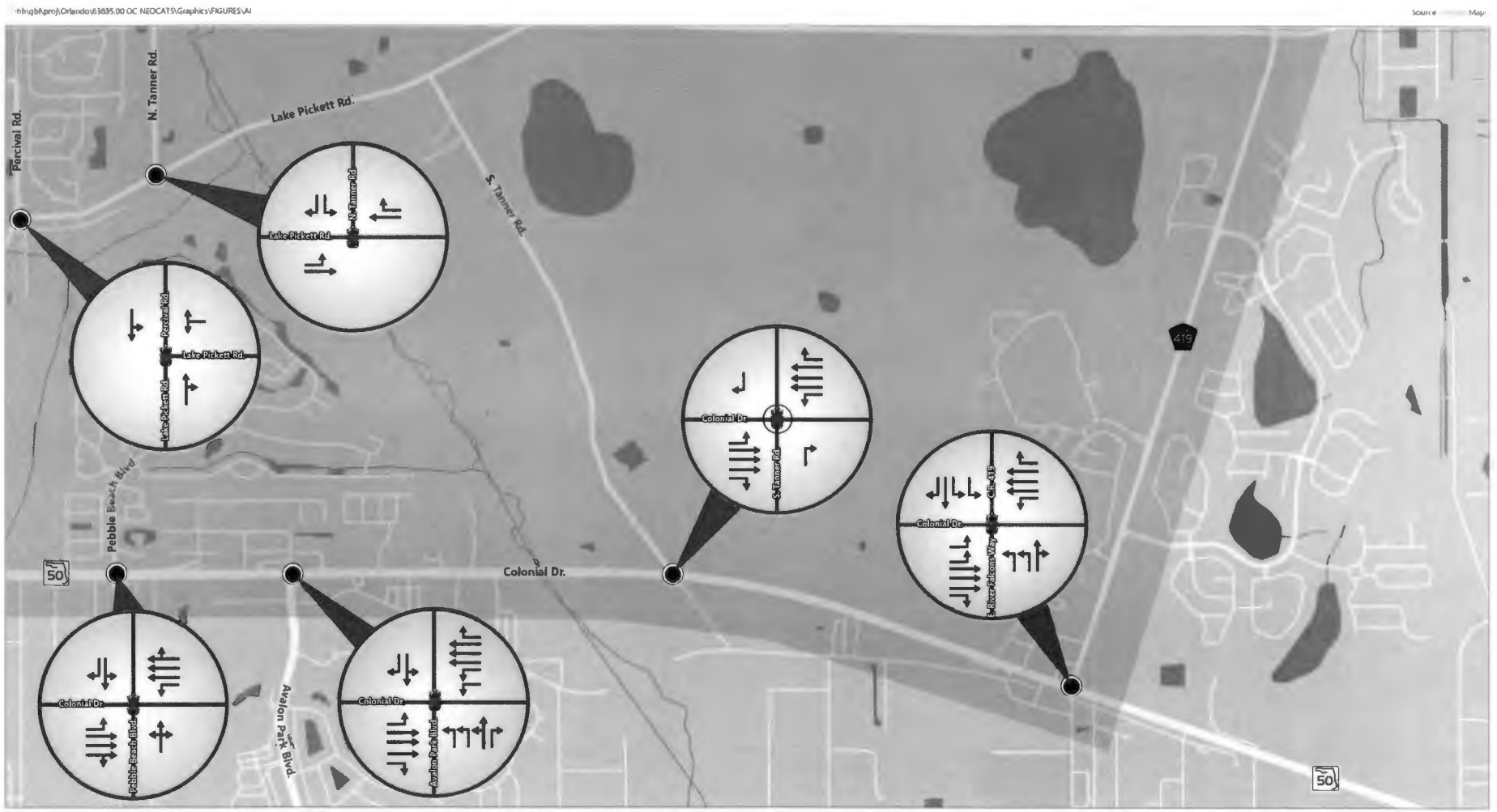


Figure 14-2

Build 1 Intersection Geometry Map 4
The North East Orange County Areawide Transportation Study (NEOCATS)

TABLE 14-1: BUILD 1 INTERSECTION LOS SUMMARY

Intersections	2035 Build 1 AM		2035 Build 1 PM		2045 Build 1 AM		2045 Build 1 PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR 50 at Alafaya Trail	56.8	E	108.0	F	67.2	E	113.2	F
Alafaya Trail at Challenger Parkway	24.5	C	55.6	E	20.6	C	62.4	E
Alafaya Trail at Science Drive	61.5	E	46.7	D	48.7	D	51.6	D
Alafaya Trail at Research Parkway	20.3	C	30.4	C	27.2	C	65.9	E
Alafaya Trail at Central Florida Boulevard	11.4	B	44.4	D	5.2	A	54.9	D
Alafaya Trail at University Boulevard	55.1	E	77.2	E	61.7	E	97.4	F
Alafaya Trail at Centaurus Boulevard#	25.2	C	62.3	E	26.9	C	56.7	E
Alafaya Trail at Gemini Boulevard/Corporate Boulevard	31.1	C	69.6	E	32.6	C	59.5	E
Alafaya Trail at McCulloch Road	55.3	E	93.1	E	45.1	D	58.4	E
SR 50 at Woodbury Road	34.5	C	45.8	D	43.1	D	55.0	D
SR 50 at SR 408 NB Ramps	3.4	A	5.0	A	5.6	A	5.0	A
SR 50 at Bonneville Drive	68.3	E	31.5	C	92.9	F	37.9	D
SR 50 at Lake Pickett Road	58.1	E	65.4	E	83.2	F	80.3	F
SR 50 at Pebble Beach Boulevard	25.6	C	37.3	D	25.2	C	58.1	E
SR 50 at Avalon Park Boulevard	38.4	D	46.4	D	69.9	E	54.1	D
SR 50 at Chuluota Road	61.7	E	75.3	E	99.9	F	113.4	F
McCulloch Road at Orion Boulevard/Lockwood Boulevard#	50.3	D	59.4	E	57.0	E	60.1	E
McCulloch Road at N Tanner Road	51.7	D	67.6	E	53.4	D	56.7	E
Technology Parkway at Research Parkway	16.9	B	19.6	B	20.6	C	17.9	B
Technology Parkway at Science Drive	31.2	C	30.5	C	37.3	D	35.0	D
Lake Pickett Road at S Tanner Road	22.3	C	23.0	C	30.6	C	28.9	C
N Tanner Road at Lake Price Drive	41.5	D	21.6	C	42.0	D	23.6	C
Gemini Boulevard at University Boulevard	26.8	C	46.9	D	30.9	C	64.1	E
Gemini Boulevard at Centaurus Boulevard#	53.0	D	50.7	D	55.3	E	52.6	D
Gemini Boulevard at Scorpius St (North)#	20.2	C	27.3	C	23.3	C	29.6	C
Lake Pickett Road at Percival Road*	33.9	C	42.0	D	63.5	E	89.6	F
Lake Pickett Road at N Tanner Road	18.8	B	25.1	C	22.4	C	35.8	D
Lake Pickett Road at Chuluota Road	33.5	C	52.2	D	39.7	D	60.2	E
McCulloch Road at Rouse Road*	25.8	C	28.9	C	40.2	D	51.4	D
SR 50 at Rouse Road	73.2	E	111.2	F	82.2	F	128.5	F
University Boulevard at Rouse Road	61.3	E	85.5	F	67.1	E	84.9	F
SR 50 at S Tanner Road	13.2	B	12.5	B	17.7	B	20.5	C
Rouse Road at Lokanotosa Road#	31.5	C	32.7	C	33.2	C	33.1	C
Science Drive at Ingenuity Drive*	9.8	A	12.5	B	10.2	B	10.9	B
Research Parkway at Discovery Drive	23.6	C	40.1	D	24.7	C	54.3	D
Woodbury Road at Challenger Parkway	19.9	B	38.9	D	22.0	C	17.4	B
Challenger Parkway at Ingenuity Drive#	41.7	D	52.4	D	48.2	D	60.6	E

Notes:

1. A target LOS E is considered for future analysis

2. #HCM2000 results are reported since HCM 6th Edition results are not available

*3. * Signal analysis results are provided for these intersections. A roundabout can be considered at these locations in lieu of a signal.*

TABLE 14-2: BUILD 1 SEGMENT LOS SUMMARY

Roadway / Segment	2045 Build 1				
	Peak Hour Peak Direction Vol	# of Lanes	Capacity	V/C	Segment LOS
Alafaya Trail					
South of SR 50	3,450	6	3,337	1.03	Over Capacity
SR 50 to Challenger Pkwy	3,810	6	3,337	1.14	Over Capacity
Challenger Pkwy to Science Dr	3,280	6	3,337	0.98	Near Capacity
Science Dr to Research Pkwy	3,880	6	3,337	1.16	Over Capacity
Research Pkwy to Central Florida Blvd	3,860	6	3,337	1.16	Over Capacity
Central Florida Blvd to University Blvd	3,160	6	3,337	0.95	Near Capacity
Centaurus Blvd to University Blvd	2,790	6	3,337	0.84	Within Capacity
Corporate Blvd/Gemini Blvd to Centaurus Blvd	2,930	6	3,337	0.88	Within Capacity
McCulloch Rd to Corporate Blvd/Gemini Blvd	3,220	6	3,337	0.96	Near Capacity
Chapman Rd to McCulloch Rd	3,900	6	3,337	1.17	Over Capacity
SR 50					
West of Rouse Road	4,070	6	3,337	1.22	Over Capacity
Rouse Road to Alafaya Trail	3,790	6	3,337	1.14	Over Capacity
Alafaya Trail to Woodbury Road	3,340	6	3,337	1.00	Over Capacity
Woodbury Road to Lake Pickett Road	4,350	6	3,337	1.30	Over Capacity
Lake Pickett Road to Pebble Beach Road	3,930	6	3,337	1.18	Over Capacity
Pebble Beach Road to Avalon Park Boulevard	3,770	6	3,337	1.13	Over Capacity
Avalon Park Boulevard to S Tanner Road	3,660	6	3,337	1.10	Over Capacity
S Tanner Road to CR 419/Chuluota Road	3,530	6	3,337	1.06	Over Capacity
East of CR 419/Chuluota Road	3,260	6	3,337	0.98	Near Capacity
McCulloch Road					
Rouse Road to Alafaya Trail	900	2	972	0.93	Near Capacity
Alafaya Trail to Lockwood Boulevard	2,150	4	2,210	0.97	Near Capacity
Lockwood Boulevard to Worchester Drive	1,947	4	2,210	0.88	Within Capacity
Worchester Drive to N Tanner Road	1,535	4	2,210	0.69	Within Capacity
East of N Tanner Road	0	2	972	0.00	Within Capacity
CR 419/Chuluota Road					
SR 50 to Lake Pickett Road	1,529	4	1,801	0.85	Within Capacity
Lake Pickett Road to Seminole County Line	1,050	2	818	1.28	Over Capacity
Avalon Park Boulevard					
South of SR 50	1,600	4	2,210	0.72	Within Capacity
Lake Pickett Road					
SR 50 to Percival Road	1,651	4	2,210	0.75	Within Capacity
Percival Road to N Tanner Road	950	2	818	1.16	Over Capacity
N Tanner Road to S Tanner Road	1,060	2	818	1.30	Over Capacity
S Tanner Road to CR 419/Chuluota Road	1,030	2	818	1.26	Over Capacity

Roadway / Segment	2045 Build 1				
	Peak Hour Peak Direction Vol	# of Lanes	Capacity	V/C	Segment LOS
South Tanner Road#					
North of SR 50	450	2	972	0.46	Within Capacity
North Tanner Road					
Lake Pickett Road to Lake Price Drive	880	2	972	0.90	Near Capacity
Lake Price Drive to McCulloch Road	1,120	2	972	1.15	Over Capacity
Percival Road					
Lake Pickett Road to Sussex Drive	520	2	972	0.53	Within Capacity
Lake Price Drive, 0.05 Mi. E. of N Tanner Road	460	2	884	0.52	Within Capacity
Research Parkway#					
Alafaya Trail to Technology Parkway	860	4	1,879	0.46	Within Capacity
Technology Parkway to Discovery Drive	680	4	1,879	0.36	Within Capacity
Challenger Parkway					
Alafaya Trail to Ingenuity Drive	740	4	1,879	0.39	Within Capacity
Ingenuity Drive to Woodbury Road	1,840	4	1,879	0.98	Near Capacity
Gemini Boulevard#					
Central Florida Boulevard to University Boulevard	1,270	4	1,879	0.68	Within Capacity
University Boulevard to Centaurus Boulevard	1,090	4	1,879	0.58	Within Capacity
North of Centaurus Boulevard	1,050	4	1,879	0.56	Within Capacity
South of Scorpius St (North)	1,430	4	1,879	0.76	Within Capacity
East of Alafaya Trail	1,130	4	1,879	0.60	Within Capacity
Orion Boulevard#					
South of McCulloch Road	1,120	4	1,879	0.60	Within Capacity
Corporate Boulevard#					
West of Alafaya Trail	960	2	972	0.99	Near Capacity
Libra Drive#					
North of Research Parkway	630	4	1,879	0.34	Within Capacity
Woodbury Road					
South of SR 50	1,869	4	2,210	0.85	Within Capacity
North of SR 50	1,370	4	1,879	0.73	Within Capacity
Bonneville Drive					
North of SR 50	730	2	972	0.75	Within Capacity
Science Drive#	0	0	0	0.00	Within Capacity
Alafaya Trail to Technology Parkway	750	2	972	0.77	Within Capacity
Technology Parkway to Ingenuity Drive	810	2	972	0.83	Within Capacity
Ingenuity Drive#					
Challenger Parkway to Science Drive	1,670	4	1,879	0.89	Within Capacity
Science Drive to Discovery Drive	960	3	1,425	0.67	Within Capacity
Technology Parkway#					
Research Parkway to Science Drive	600	4	1,879	0.32	Within Capacity

Roadway / Segment	2045 Build 1				
	Peak Hour Peak Direction Vol	# of Lanes	Capacity	V/C	Segment LOS
Discovery Drive#					
Research Parkway to Ingenuity Drive	1,018	2	972	1.05	Over Capacity
Rouse Road					
North of University Boulevard	1,600	4	2,210	0.72	Within Capacity
University Boulevard to Lokanotosa Trail	1,670	4	2,210	0.76	Within Capacity
Lokanotosa Trail to SR 50	1,910	4	2,210	0.86	Within Capacity
South of SR 50	1,420	4	2,210	0.64	Within Capacity
University Boulevard					
Alafaya Trail to Rouse Road	3,270	6	3,337	0.98	Near Capacity
West of Rouse Road	3,550	6	3,337	1.06	Over Capacity

Notes:

*1. Peak hour peak direction volume based on AADT*K*D*

2. # Capacities are from similar roadways

3. Roadway capacities are from Orange County CMS database and adjusted for CAVs in traffic stream.

4. A target LOS E is considered for future analysis

FIGURE 14-3: 2045 BUILD 1 CONDITIONS – INTERSECTIONS

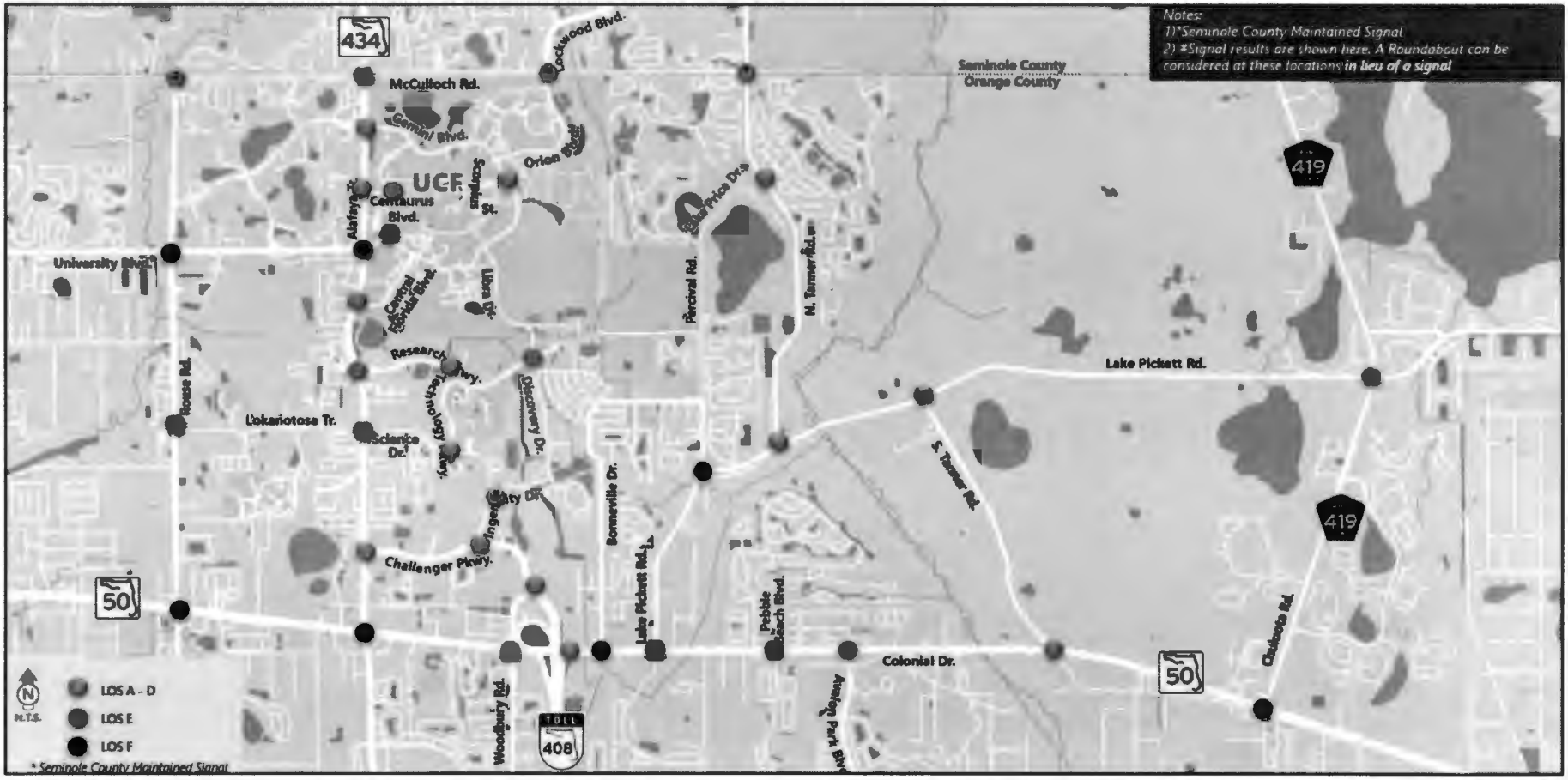
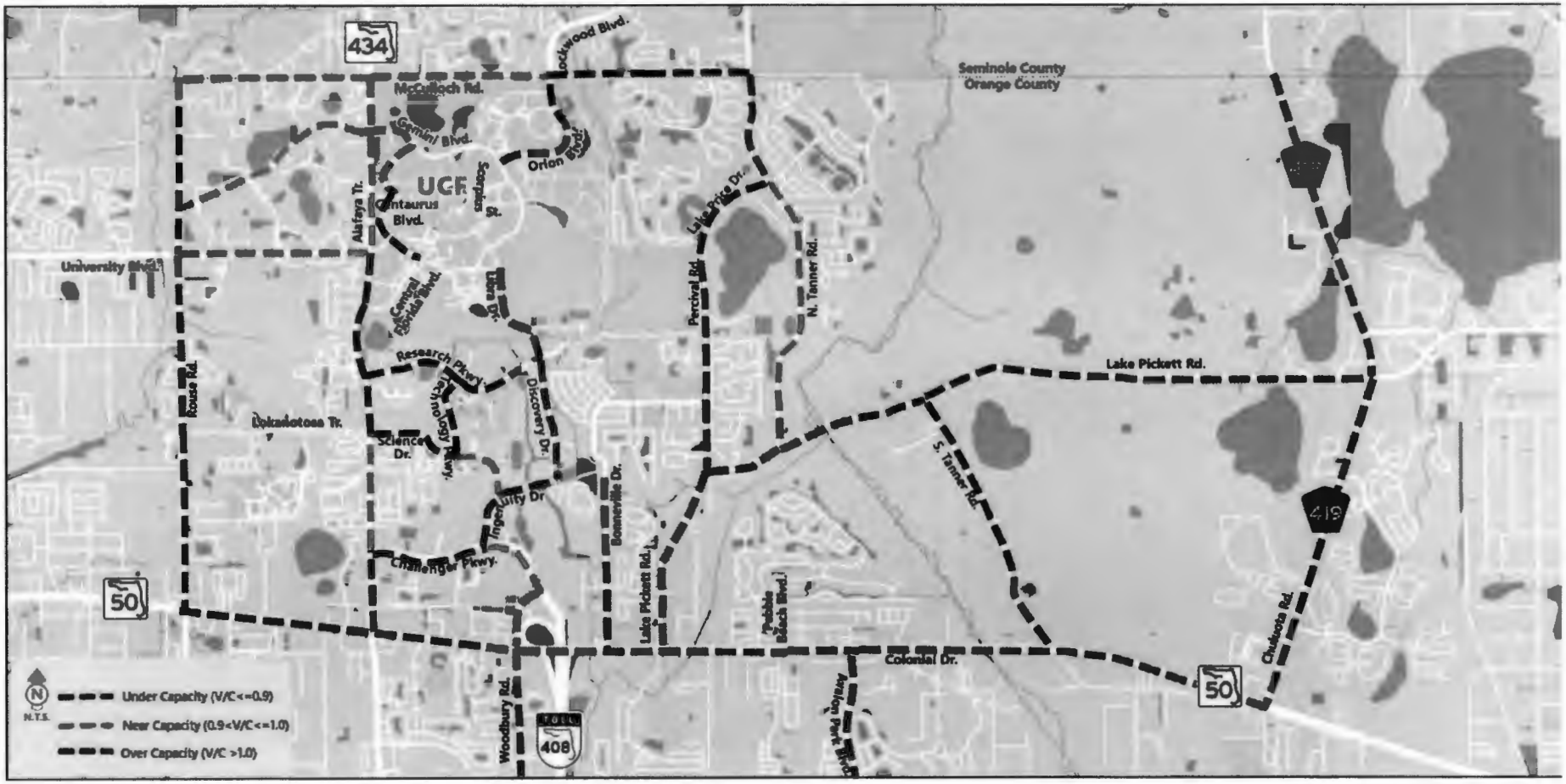


FIGURE 14-4: 2045 BUILD 1 CONDITIONS – SEGMENTS



15 BUILD 2 ALTERNATIVE (NEEDS PLAN)

Build 2 Alternative includes other roadway improvements in addition to the improvements included as part of Build 1 Alternative. These improvements were identified to accommodate the anticipated travel demand in the NEOCATS area through the year 2045 and based on the roadway and intersection operational results of the No Build and Build 1 alternatives, other factors including the ability to implement transportation demand management (TDM) strategies, and coordination with the project stakeholders. Build 2 Alternative can be dubbed as the Needs Plan for the NEOCATS area. Similar to Build 1 Alternative, since the planned and needs roadway widening projects will not be constructed before 2035, traffic conditions at the study intersections were evaluated for the years 2035 and 2045 in Build Alternative 2. The segment analysis in Build 2 Alternative is reported for the year 2045 traffic conditions. The Build 2 Alternative was evaluated using the Build volumes (see Section 10).

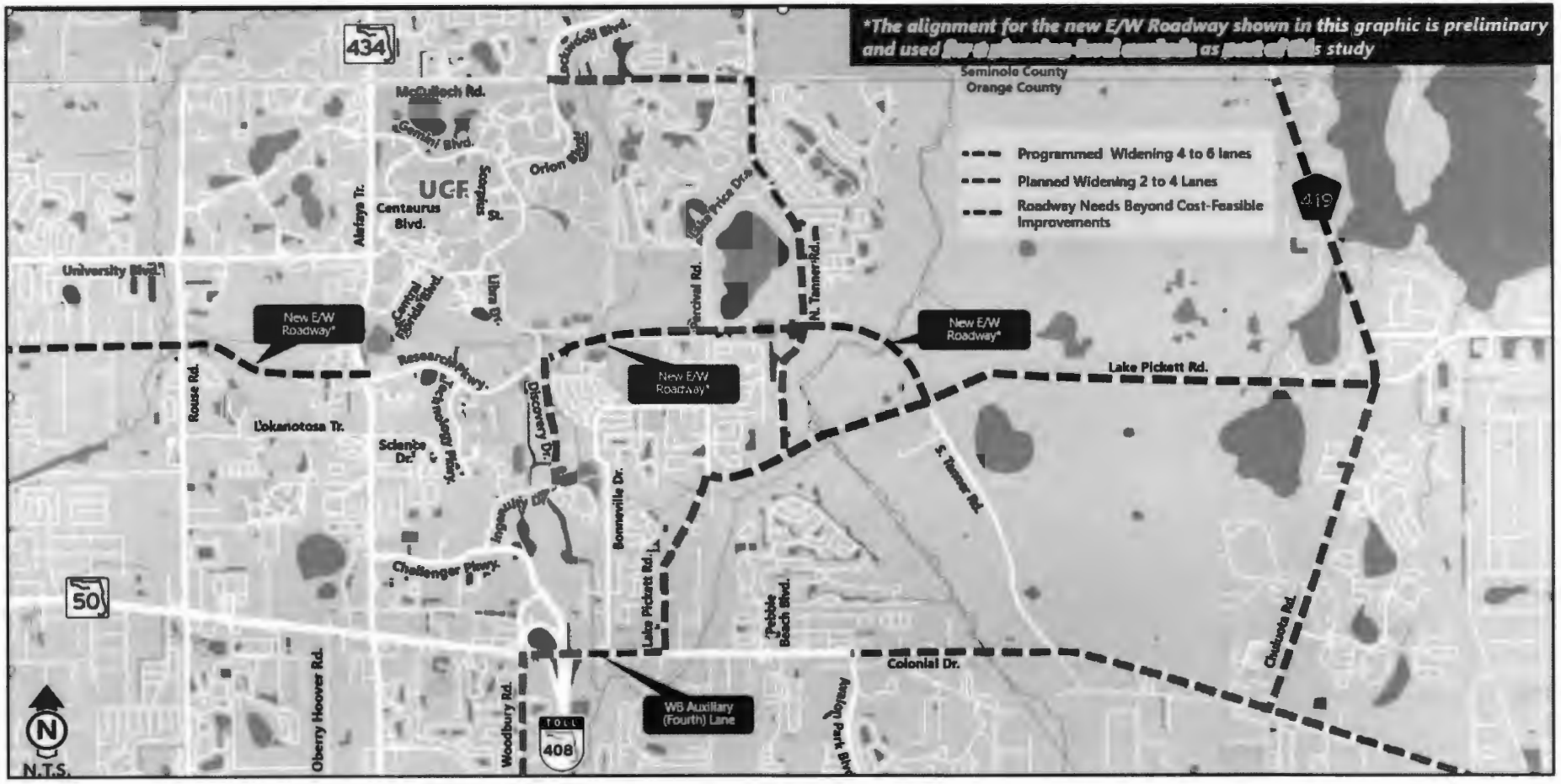
The additional needs improvements within the study area as depicted in **Figure 15-1** include:

- CR 419 widening (two to four lanes) from Lake Pickett Road to Seminole County Line
- Lake Pickett Road widening (two to four lanes) from Percival Road to CR 419
- New East/West four-lane roadway between Rouse Road and Lake Pickett Road
- N Tanner Road widening (two to four lanes) from Lake Pickett Road to McCulloch Road
- One additional lane (Fourth lane) in the westbound direction on SR 50 between Lake Pickett Road and Woodbury Road
- Discovery Drive widening (two to four lanes) from Ingenuity Drive to Research Parkway

It should be noted that although roadway segments of Alafaya Trail and SR 50 are expected to over capacity by the year 2045 in Build 1 Alternative, they are not identified as additional needs because of the following reasons:

- Alafaya Trail, with the implementation of TDM strategies, is expected to operate within capacity by the year 2045
- SR 50, with the consideration of the new East/West Roadway (which will relieve the congestion on SR 50), is anticipated to operate within capacity by the year 2045

FIGURE 15-1: ROADWAY NEEDS BY THE YEAR 2045



The Build 2 intersection geometry is shown in **Figure 15-2**. It should be noted the figure depicts the geometry needed to maintain the target LOS E at the study intersections for each study period and AV/CV adjustments for the year 2045 were considered.

Build 2 Intersection Analysis

Table 15-1 shows overall delay and LOS information for the study intersections based on HCM 6th Edition. If HCM 6th Edition results are not available, then HCM 2000 results are provided. The HCM-based Synchro analysis results are provided in **Appendix Z**. **Figure 15-3** depicts the 2045 intersection levels of service for the Build 2 Alternative. All the study intersections are expected to operate at LOS E or better through the year 2045. It should be noted that with the exception of the intersection at SR 50 and Alafaya Trail, all other study intersections are anticipated to operate at LOS E or better with traditional turn lane improvements. For the intersection at SR 50 and Alafaya Trail, a Single Point Urban Interchange (SPUI) is recommended as the preferred alternative to accommodate the year 2045 traffic volumes based on traffic operational analysis.

Build 2 Segment Analysis

The year 2045 roadway segment analysis summary provided in **Table 15-2** and depicted in **Figure 15-4** was performed using roadway capacities from Orange County CMS database. The 2045 peak hour peak directional volumes were obtained based on 2045 AADTs and recommended K and D factors. As shown in **Table 15-2** and **Figure 15-4**, all the study roadway segments are anticipated to operate at within roadway capacity through the year 2045. Please note that TDM measures with an anticipated trip reduction of 5-15% (10% was used in the study analysis) were considered for the roadway segment analysis for Alafaya Trail and University Boulevard. Additional information on the TDM strategies is provided in the later part of this section.

Build 2 2045 Roundabout Analysis

Similar to Build 1 Alternative, a roundabout was evaluated using SIDRA at the existing stop-controlled intersections for the year 2045 to verify if a roundabout will operate within the target LOS E in lieu of a signal.

- McCulloch Road and Rouse Road
- Lake Pickett Road and Percival Road
- Ingenuity Drive and Science Drive

Based on this analysis, a roundabout is expected to operate better than LOS E condition at these intersections for the year 2045.

15.1.1 Conclusion

With the Needs Plan improvements and AV/CV impacts and TDM strategies, the study roadways and intersections are expected to operate within the target LOS E. These improvements will improve safety, mobility, and connectivity for all the road users, while supporting future growth in the NEOCATS area.

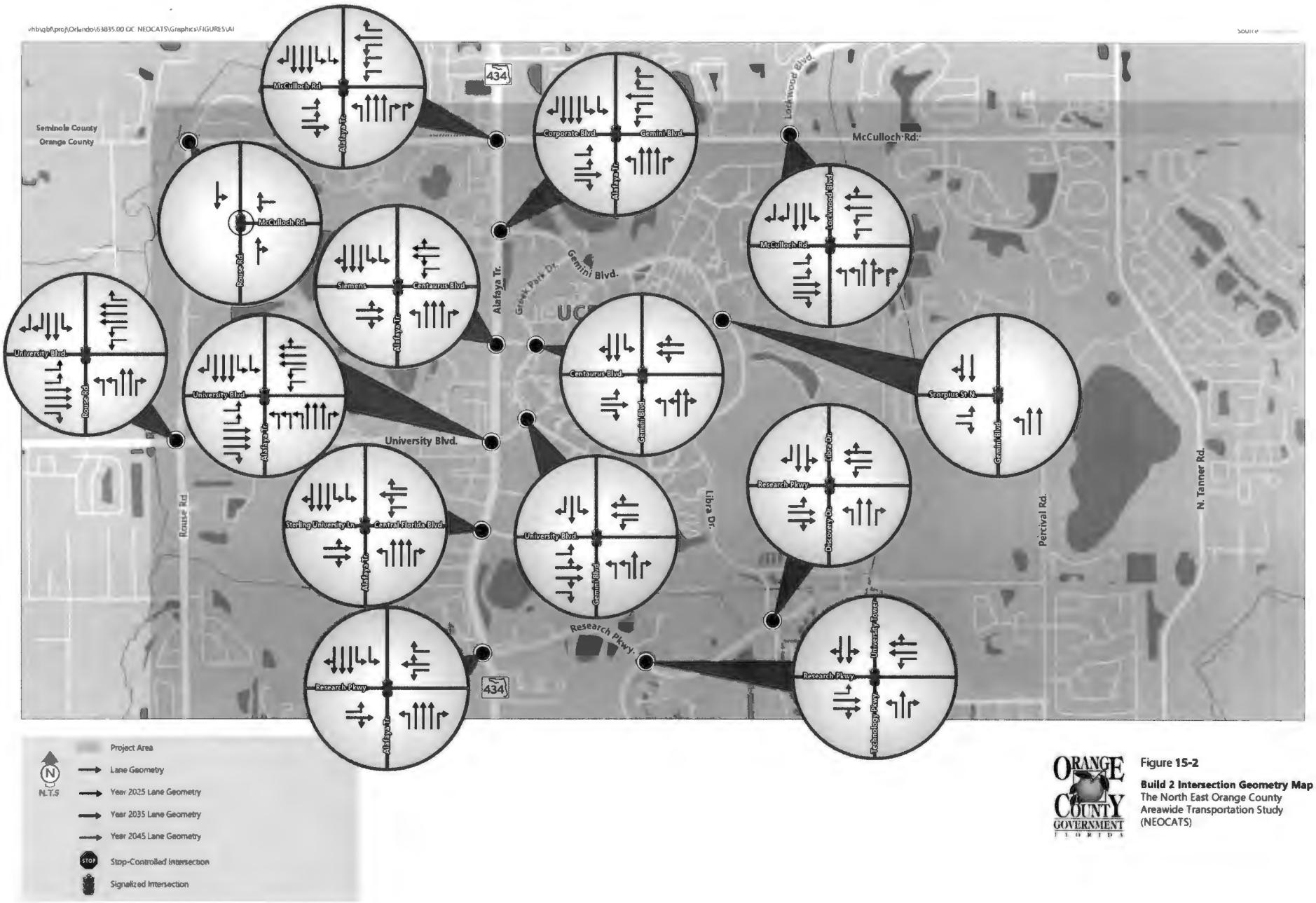


Figure 15-2

Build 2 Intersection Geometry Map 1
The North East Orange County Areawide Transportation Study (NEOCATS)

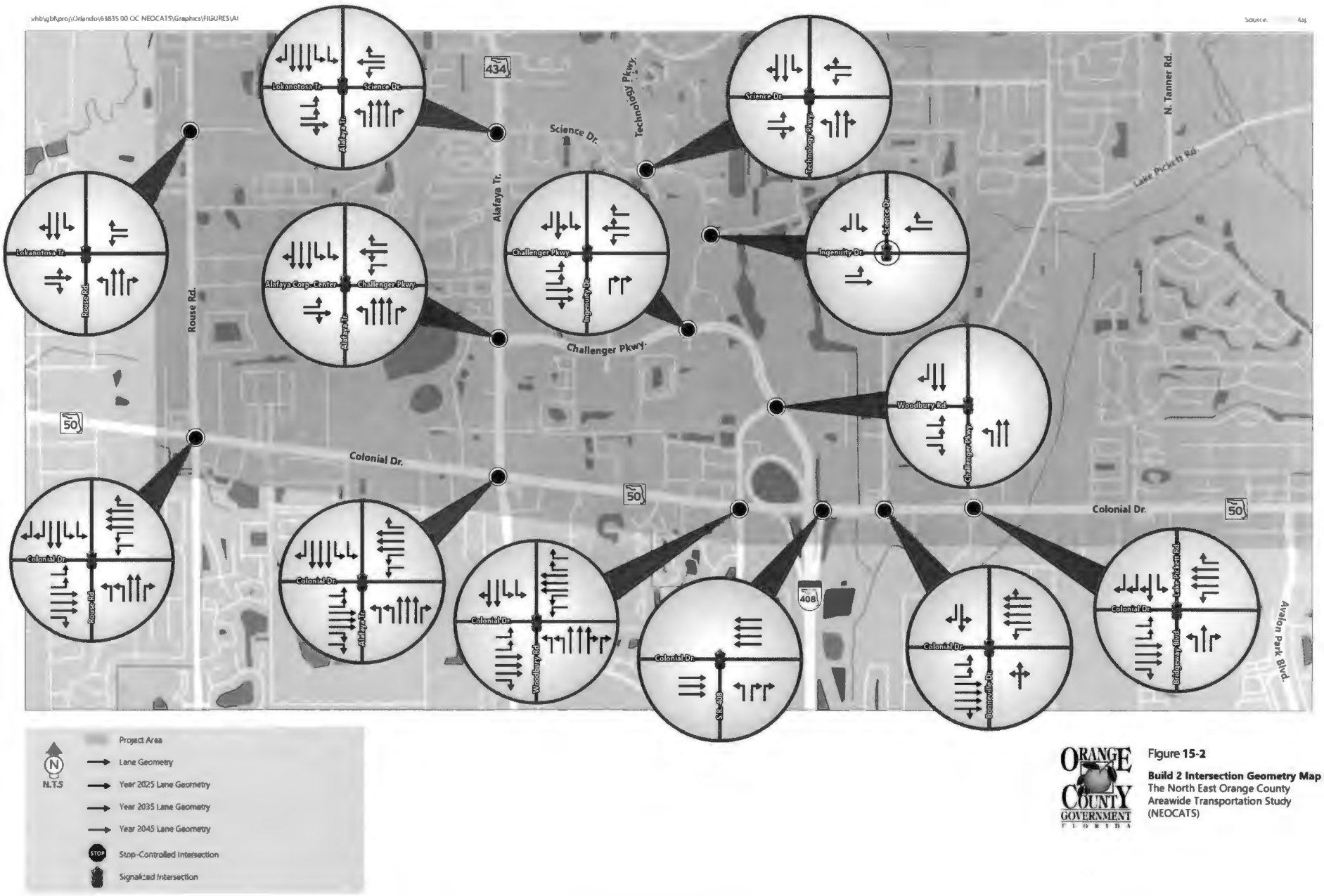


Figure **15-2**

Build 2 Intersection Geometry Map 2
The North East Orange County Areawide Transportation Study (NEOCATS)

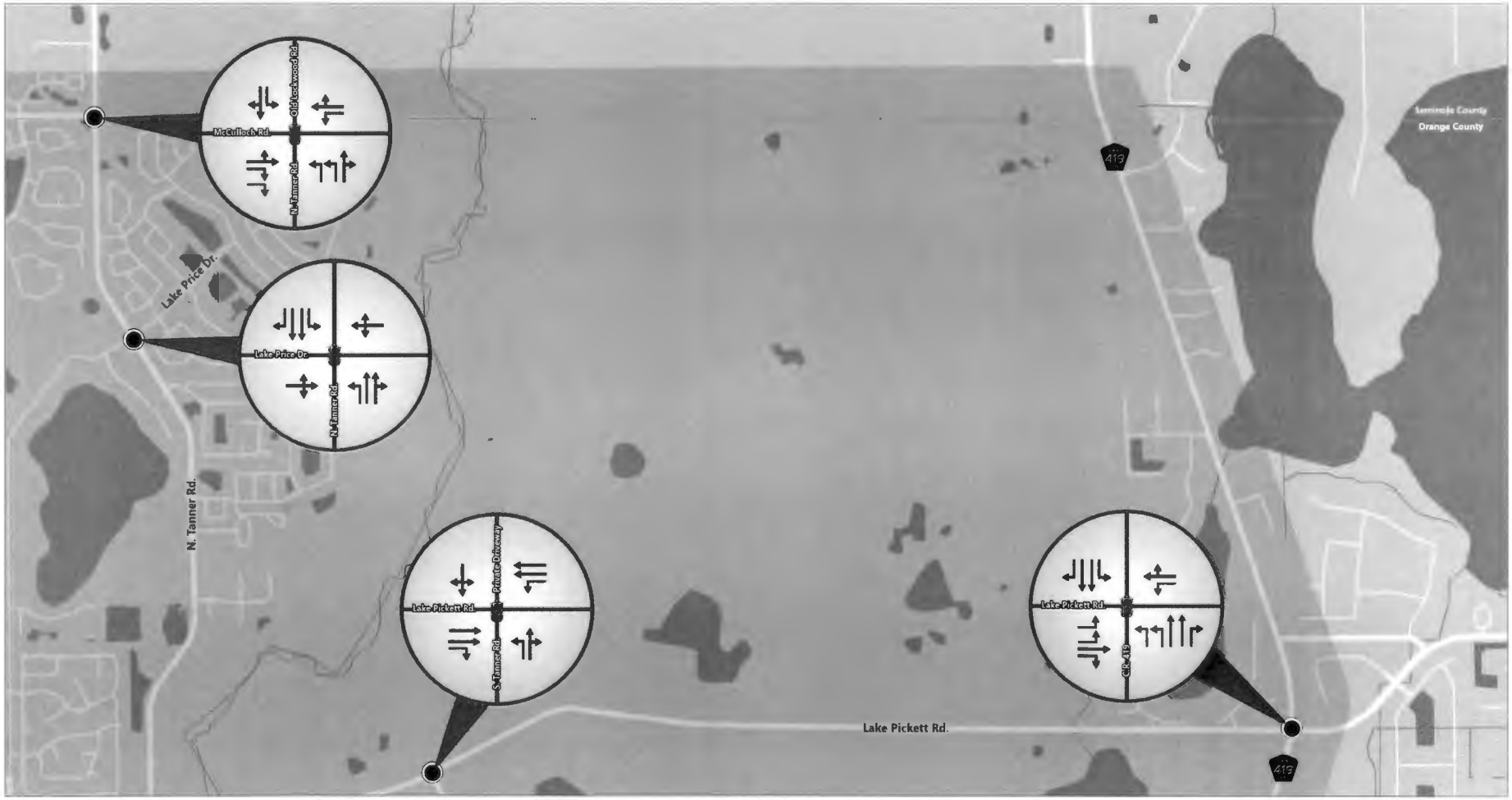


Figure **15-2**

Build 2 Intersection Geometry Map 3
The North East Orange County
Areawide Transportation Study
(NEOCATS)

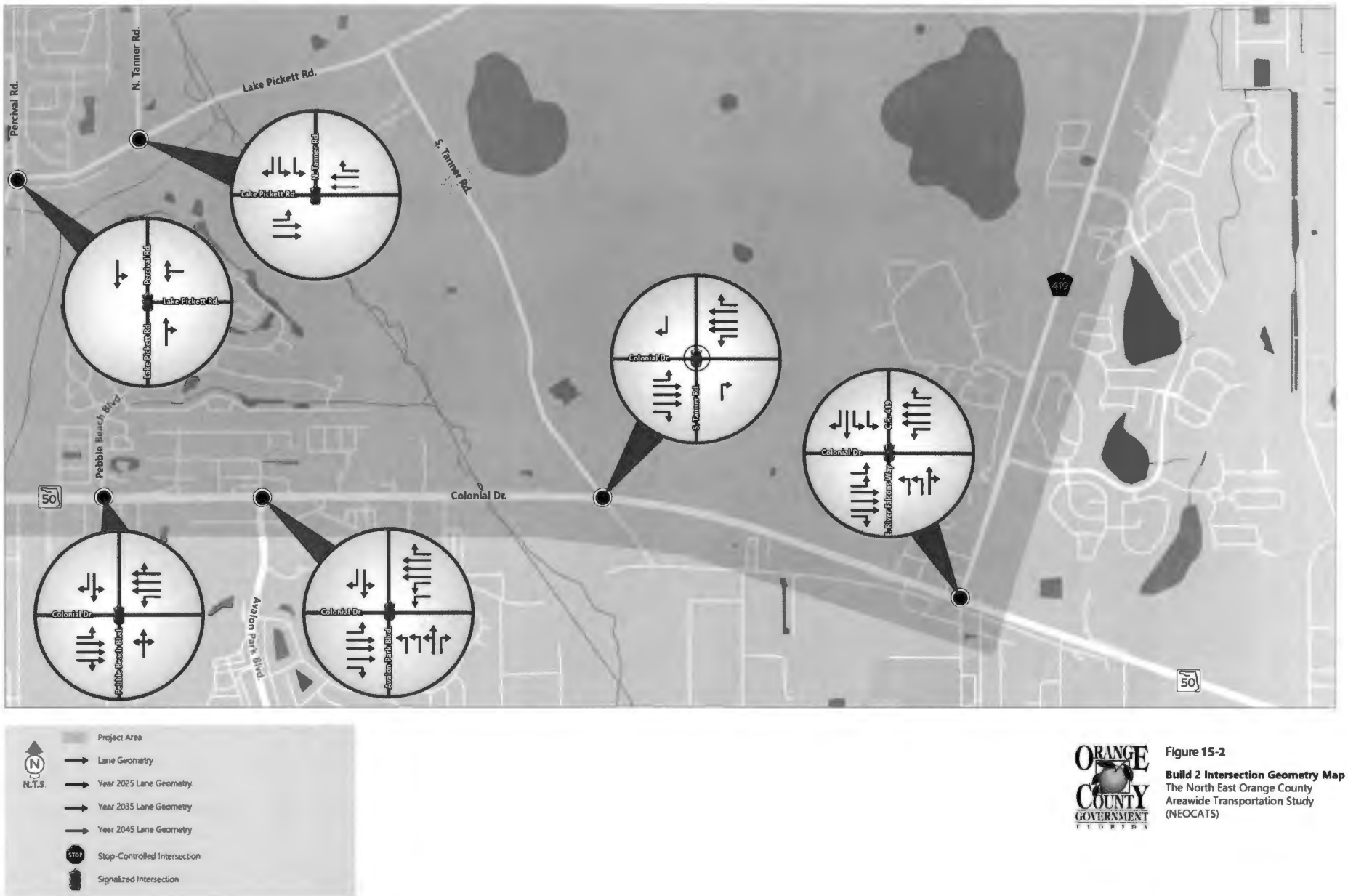


Figure 15-2

Build 2 Intersection Geometry Map 4
The North East Orange County
Areawide Transportation Study
(NEOCATS)

TABLE 15-1: BUILD 2 INTERSECTION LOS SUMMARY

Intersections	2035 Build 2 AM		2035 Build 2 PM		2045 Build 2 AM		2045 Build 2 PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR 50 at Alafaya Trail	31.1	C	33.0	C	48.8	D	58.6	E
Alafaya Trail at Challenger Parkway	23.3	C	49.2	D	23.5	C	50.6	D
Alafaya Trail at Science Drive	54.7	D	51.3	D	49.2	D	53.4	D
Alafaya Trail at Research Parkway	22.7	C	29.8	C	65.2	E	65.9	E
Alafaya Trail at Central Florida Boulevard	4.9	A	43.1	D	4.3	A	51.1	D
Alafaya Trail at University Boulevard	54.3	D	74.7	E	59.8	E	74.1	E
Alafaya Trail at Centaurus Boulevard#	25.5	C	43.7	D	27.4	C	52.5	D
Alafaya Trail at Gemini Boulevard/Corporate Boulevard	31.5	C	57.7	E	32.8	C	52.8	D
Alafaya Trail at McCulloch Road	55.9	F	66.2	E	47.6	D	51.5	D
SR 50 at Woodbury Road	34.6	C	49.2	D	38.5	D	53.4	D
SR 50 at SR 408 NB Ramps	3.2	A	5.1	A	3.4	A	5.1	A
SR 50 at Bonneville Drive	45.1	D	41.1	D	52.0	D	20.5	C
SR 50 at Lake Pickett Road	34.4	C	49.4	D	37.1	D	50.6	D
SR 50 at Pebble Beach Boulevard	27.2	C	15.4	B	26.8	C	16.3	B
SR 50 at Avalon Park Boulevard	41.4	D	46.0	D	57.5	E	50.4	D
SR 50 at Chuluota Road	54.0	D	61.1	E	57.6	E	69.0	E
McCulloch Road at Orion Boulevard/Lockwood Boulevard#	47.8	D	60.1	E	57.3	E	62.4	E
McCulloch Road at N Tanner Road	52.1	D	67.3	E	53.9	D	57.4	E
Technology Parkway at Research Parkway	16.9	B	19.6	B	48.7	D	38.4	D
Technology Parkway at Science Drive	35.1	D	32.0	C	47.9	D	37.5	D
Lake Pickett Road at S Tanner Road	16.7	B	17.3	B	22.2	C	21.0	C
N Tanner Road at Lake Price Drive	45.6	D	22.2	C	20.3	C	16.7	B
Gemini Boulevard at University Boulevard	27.2	C	47.0	D	31.8	C	61.2	E
Gemini Boulevard at Centaurus Boulevard#	52.1	D	48.2	D	53.1	D	49.4	D
Gemini Boulevard at Scorpius St (North)#	21.0	C	27.7	C	25.2	C	34.4	C
Lake Pickett Road at Percival Road (All Way Stop)	25.6	C	15.8	B	36.6	D	24.4	C
Lake Pickett Road at N Tanner Road	15.7	B	19.3	B	17.6	B	23.3	C
Lake Pickett Road at Chuluota Road	36.0	D	36.8	D	36.6	D	41.2	D
McCulloch Road at Rouse Road (All Way Stop)	25.5	C	24.7	C	37.9	D	40.4	D
SR 50 at Rouse Road	62.7	E	71.5	E	65.3	E	70.9	E
University Boulevard at Rouse Road	56.5	E	70.3	E	56.7	E	68.3	E
SR 50 at S Tanner Road	11.5	B	11.7	B	24.0	C	17.1	B
Rouse Road at Lokanotosa Road#	30.0	C	31.1	C	29.6	C	20.0	C
Science Drive at Ingenuity Drive*	9.8	A	12.5	B	21.1	C	10.9	B
Research Parkway at Discovery Drive	25.6	C	39.0	D	36.4	D	53.2	D
Woodbury Road at Challenger Parkway	22.4	C	25.2	C	26.9	C	17.0	B
Challenger Parkway at Ingenuity Drive#	43.1	D	49.2	D	53.6	D	50.5	D

Notes

1. A target LOS E is considered for future analysis

2. #HCM2000 results are reported since HCM 6th Edition results are not available

TABLE 15-2: BUILD 2 SEGMENT LOS SUMMARY

Roadway / Segment	2045 Build 2				
	Peak Hour Peak Direction Vol	# of Lanes	Capacity	V/C	Segment LOS
Alafaya Trail					
South of SR 50	3,320	6	4,038	0.82	Within Capacity
SR 50 to Challenger Pkwy	3,660	6	4,038	0.91	Near Capacity
Challenger Pkwy to Science Dr	3,160	6	4,038	0.78	Within Capacity
Science Dr to Research Pkwy	3,730	6	4,038	0.92	Near Capacity
Research Pkwy to Central Florida Blvd	3,710	6	4,038	0.92	Near Capacity
Central Florida Blvd to University Blvd	3,040	6	4,038	0.75	Within Capacity
Centaurus Blvd to University Blvd	2,690	6	4,038	0.67	Within Capacity
Corporate Blvd/Gemini Blvd to Centaurus Blvd	2,810	6	4,038	0.70	Within Capacity
McCulloch Rd to Corporate Blvd/Gemini Blvd	3,090	6	4,038	0.77	Within Capacity
Chapman Rd to McCulloch Rd	3,750	6	4,038	0.93	Near Capacity
SR 50					
West of Rouse Road	3,250	6	3,337	0.97	Near Capacity
Rouse Road to Alafaya Trail	3,020	6	3,337	0.90	Near Capacity
Alafaya Trail to Woodbury Road	2,700	6	3,337	0.81	Within Capacity
Woodbury Road to Lake Pickett Road	3,940	8	4,464	0.88	Within Capacity
Lake Pickett Road to Pebble Beach Road	3,140	6	3,337	0.94	Near Capacity
Pebble Beach Road to Avalon Park Boulevard	3,010	6	3,337	0.90	Near Capacity
Avalon Park Boulevard to S Tanner Road	3,110	6	3,337	0.93	Near Capacity
S Tanner Road to CR 419/Chuluota Road	3,000	6	3,337	0.90	Within Capacity
East of CR 419/Chuluota Road	2,780	6	3,337	0.83	Within Capacity
McCulloch Road					
Rouse Road to Alafaya Trail	901	2	972	0.93	Near Capacity
Alafaya Trail to Lockwood Boulevard	2,150	4	2,210	0.97	Near Capacity
Lockwood Boulevard to Worchester Drive	1,770	4	2,210	0.80	Within Capacity
Worchester Drive to N Tanner Road	1,236	4	2,210	0.56	Within Capacity
East of N Tanner Road	0	2	972	0.00	Within Capacity
CR 419/Chuluota Road					
SR 50 to Lake Pickett Road	1,529	4	1,801	0.85	Within Capacity
Lake Pickett Road to Seminole County Line	1,409	4	1,801	0.78	Within Capacity
Avalon Park Boulevard					
South of SR 50	1,567	4	2,210	0.71	Within Capacity
Lake Pickett Road					
SR 50 to Percival Road	1,651	4	2,210	0.75	Within Capacity
Percival Road to N Tanner Road	1,447	4	2,210	0.65	Within Capacity
N Tanner Road to S Tanner Road	1,617	4	2,210	0.73	Within Capacity
S Tanner Road to CR 419/Chuluota Road	1,264	4	2,210	0.57	Within Capacity

Roadway / Segment	2045 Build 2				
	Peak Hour Peak Direction Vol	# of Lanes	Capacity	V/C	Segment LOS
South Tanner Road#					
North of SR 50	505	2	972	0.52	Within Capacity
North Tanner Road					
Lake Pickett Road to Lake Price Drive	831	2	2,210	0.38	Within Capacity
Lake Price Drive to McCulloch Road	1,056	2	2,210	0.48	Within Capacity
Percival Road					
Lake Pickett Road to Sussex Drive	949	2	972	0.98	Near Capacity
Lake Price Drive, 0.05 Mi. E. of N Tanner Road	399	2	884	0.45	Within Capacity
Research Parkway#					
Alafaya Trail to Technology Parkway	1,654	4	2,210	0.75	Within Capacity
Technology Parkway to Discovery Drive	1,541	4	2,210	0.70	Within Capacity
Challenger Parkway					
Alafaya Trail to Ingenuity Drive	597	4	1,879	0.32	Within Capacity
Ingenuity Drive to Woodbury Road	1,843	4	1,879	0.98	Near Capacity
Gemini Boulevard#					
Central Florida Boulevard to University Boulevard	1,304	4	1,879	0.69	Within Capacity
University Boulevard to Centaurus Boulevard	917	4	1,879	0.49	Within Capacity
North of Centaurus Boulevard	928	4	1,879	0.49	Within Capacity
South of Scorpius St (North)	1,474	4	1,879	0.78	Within Capacity
East of Alafaya Trail	1,166	4	1,879	0.62	Within Capacity
Orion Boulevard#					
South of McCulloch Road	1,244	4	1,879	0.66	Within Capacity
Corporate Boulevard#					
West of Alafaya Trail	958	2	972	0.99	Near Capacity
Libra Drive#					
North of Research Parkway	740	4	1,879	0.39	Within Capacity
Woodbury Road					
South of SR 50	1,869	4	2,210	0.85	Within Capacity
North of SR 50	1,477	4	1,879	0.79	Within Capacity
Bonneville Drive					
North of SR 50	729	2	972	0.75	Within Capacity
Science Drive#					
Alafaya Trail to Technology Parkway	827	2	972	0.85	Within Capacity
Technology Parkway to Ingenuity Drive	828	2	972	0.85	Within Capacity
Ingenuity Drive#					
Challenger Parkway to Science Drive	1,628	4	1,879	0.87	Within Capacity
Science Drive to Discovery Drive	936	3	1,425	0.66	Within Capacity
Technology Parkway#					
Research Parkway to Science Drive	605	4	1,879	0.32	Within Capacity

Roadway / Segment	2045 Build 2				
	Peak Hour Peak Direction Vol	# of Lanes	Capacity	V/C	Segment LOS
Discovery Drive#					
Research Parkway to Ingenuity Drive	1,018	4	1,879	0.54	Within Capacity
Rouse Road					
North of University Boulevard	1,551	4	2,210	0.70	Within Capacity
University Boulevard to Lokanotosa Trail	1,666	4	2,210	0.75	Within Capacity
Lokanotosa Trail to SR 50	1,850	4	2,210	0.84	Within Capacity
South of SR 50	1,375	4	2,210	0.62	Within Capacity
University Boulevard					
Alafaya Trail to Rouse Road	3,270	6	3,671	0.91	Near Capacity
West of Rouse Road	3,384	6	3,671	0.92	Near Capacity

Notes:

*1. Peak hour peak direction volume based on AADT*K*D*

2. # Capacities are from similar roadways

3. Roadway capacities are from Orange County CMS database and adjusted for CAVs in traffic stream.

4. A target LOS E is considered for future analysis

FIGURE 15-3: 2045 BUILD 2 ALTERNATIVE CONDITIONS – INTERSECTIONS

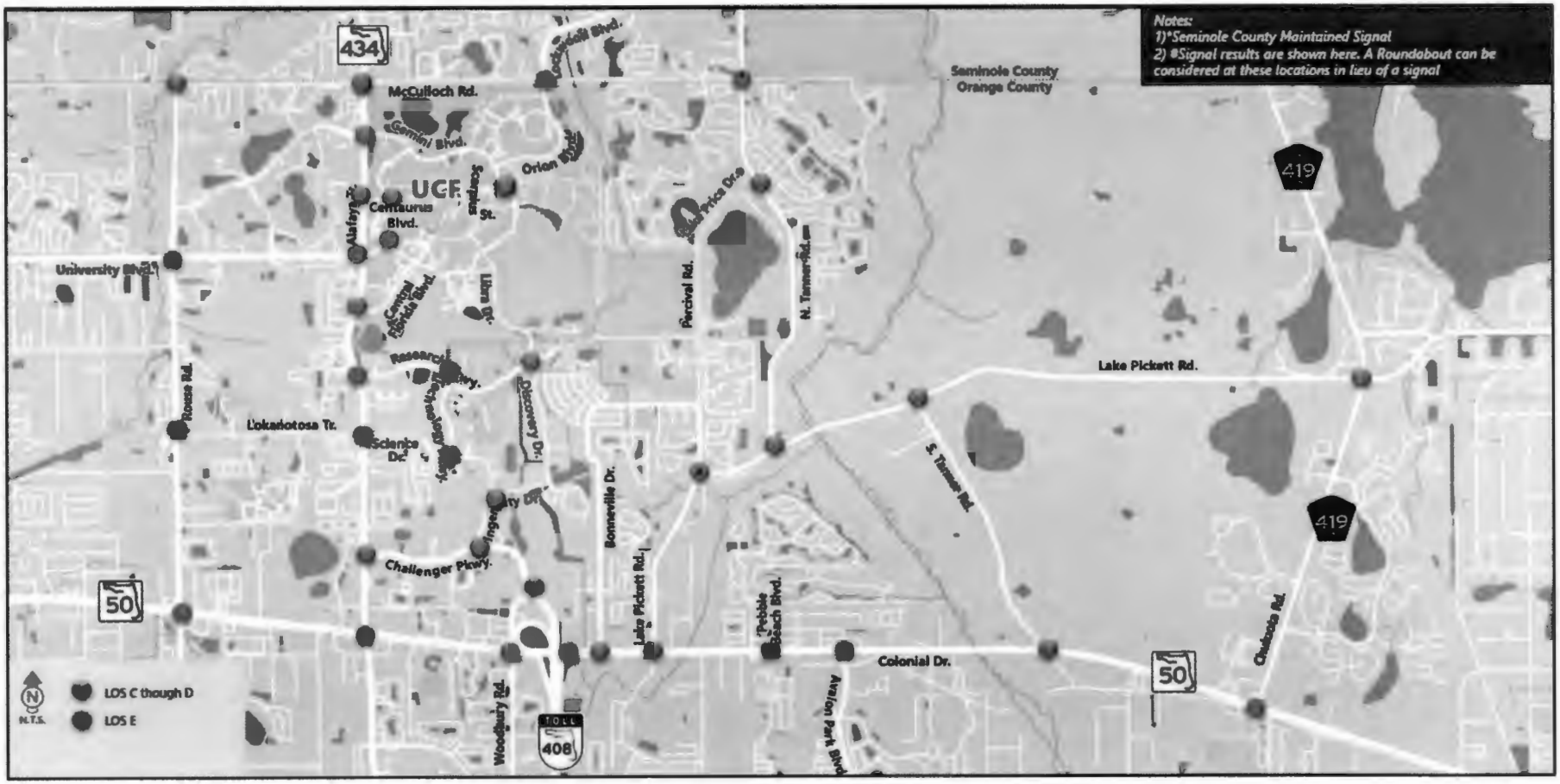
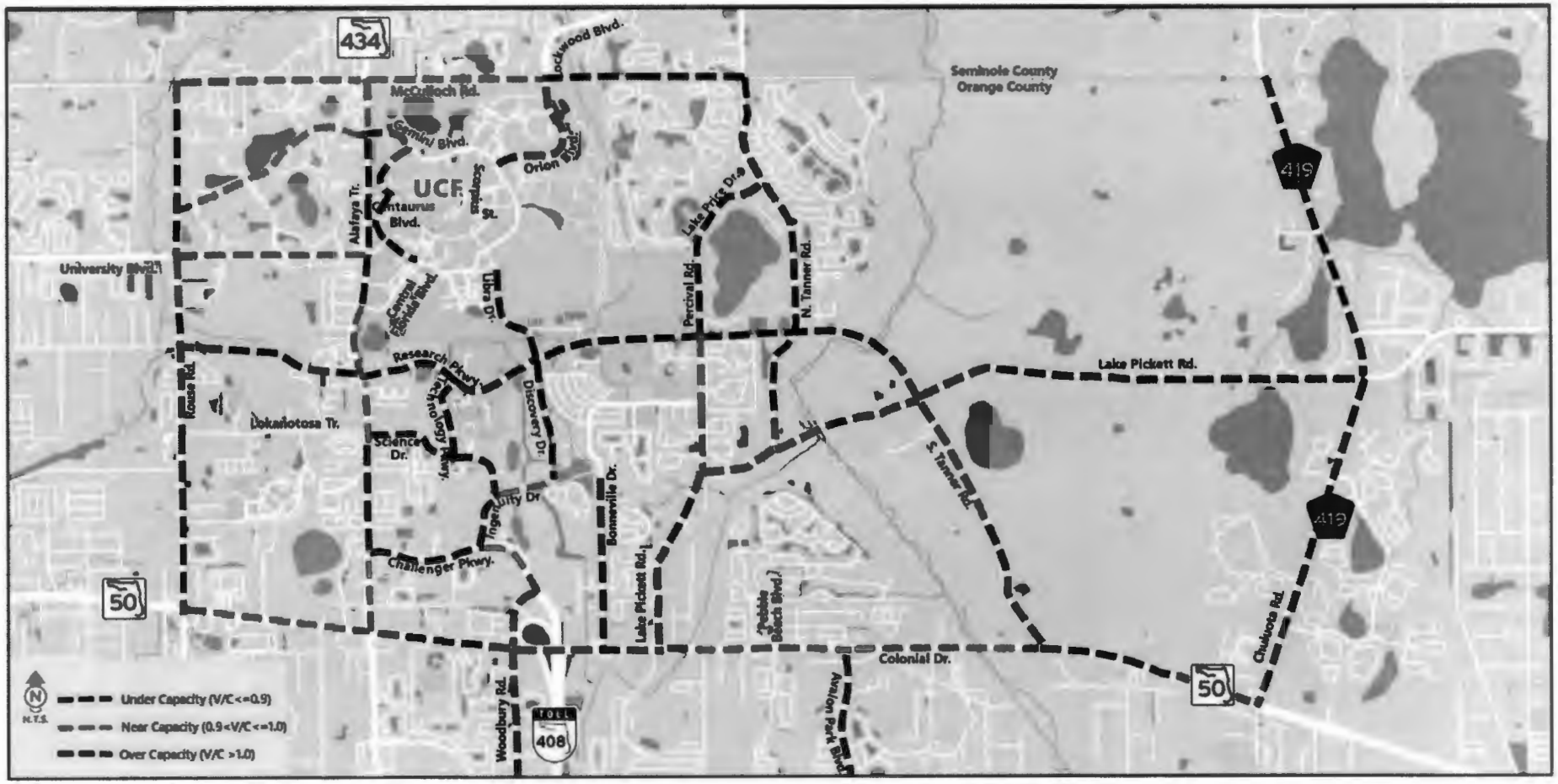


FIGURE 15-4: 2045 BUILD 2 CONDITIONS – SEGMENTS



16 PRIORITIZING IMPROVEMENTS FOR THE STUDY AREA

As mentioned, the main goal of this study is to prioritize improvements by different tiers based on what can be constructed but giving importance to public input and safety and overarching objectives including improving safety, mobility, and connectivity of the study area for all road users. The following tiered improvements were developed based on the above discussion.

16.1.1 Short-term Improvements

These improvements were based on the operational analysis results for the year 2025 No Build Alternative. In addition, field notes, desktop review of the Google aerials of the study roadways/intersections, historical safety analysis, and public input were used. The idea is to develop improvements that will alleviate safety, ADA, multimodal, and operational concerns until the year 2025 conditions.

16.1.2 Mid-term Improvements

These improvements were based on the operational analysis results for the year 2035 No Build, Build 1, and Build 2 alternatives and the recommended short-term improvements. The idea is to develop improvements that most likely will not be constructed before the year 2025 because of constraints such as ROW impacts and will alleviate safety, ADA, multimodal, and operational concerns until the year 2035 conditions. Most of the mid-term improvements are common to Build 1 and Build 2 alternatives but are different at locations where widening is not proposed in Build 1 Alternative.

16.1.3 Long-term Improvements

These improvements were based on the operational analysis results for the year 2035 No Build, Build 1, and Build 2 alternatives and the recommended mid-term improvements. All the needed improvements will be identified including those that most likely will not be constructed by the year 2035 conditions. The idea is to develop improvements that can treated as a road map to improve the safety, connectivity, and mobility of all the road users until the year 2045 conditions. Again, most of the long-term improvements are common to Build 1 and Build 2 alternatives but are different at locations where widening is not proposed in Build 1 Alternative.

Figures 16-1 through 16-37 show the list of operational, capacity, multimodal, safety and ADA improvements for the short-term (2025), mid-term (2035) and long-term (2045) conditions for the Build 2 Alternative developed based on discussion provided in the Evaluation of Scenarios and Needs Plan Chapter. The arranging of the proposed improvements by the short-, mid-, and long-term periods was based on factors including stakeholder input, safety concerns, potential ROW needs, County's input, and programmed and planned improvements.

Figure 16-1: SR 50 & Alafaya Tr Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Additional EB Right Turn Lane	▪ Re-stripe high emphasis crosswalk across south leg ▪ Evaluate intersection lighting to meet FDOT guidelines ▪ Revise strain pole configuration to improve signal head placement and visibility ▪ Revise the connectivity and access management layout for the existing closely spaced driveways ▪ Consider installing channelizing corner islands with near-perpendicular right turn lane design with truck aprons on the northwest and southeast intersection corners ▪ Reduce corner radii on the northeast and southwest corners
Mid-term Improvements		
Long-term Improvements	2 – Single Point Urban Interchange	

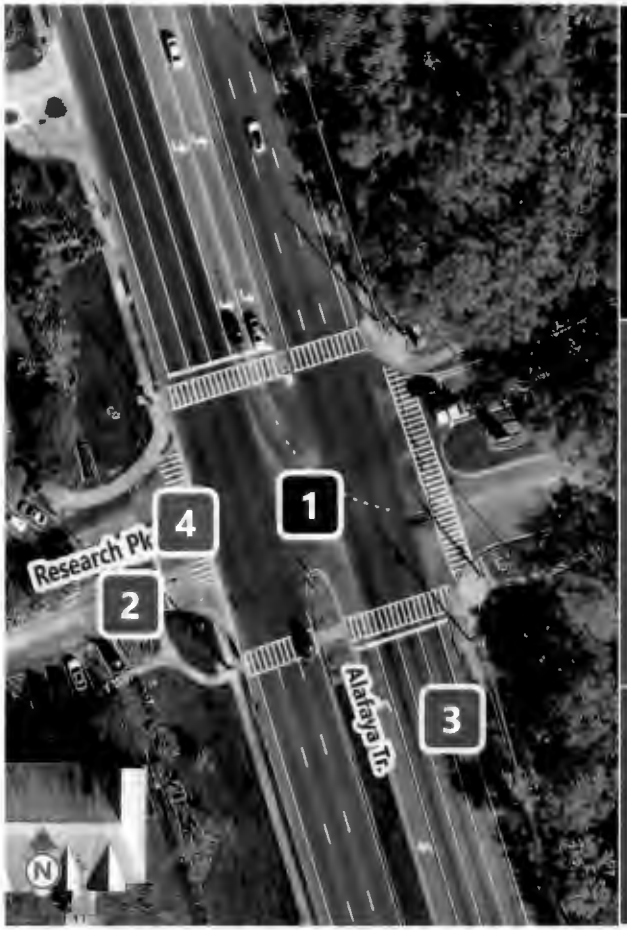
Figure 16-2: Alafaya Tr & Challenger Pkwy Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Consider removing Split Phase	▪ Implement high-friction surface treatment on Alafaya Tr ▪ Provide at least one signal head per approach lane ▪ Improve lane use and street name signing
Mid-term Improvements	2 - Exclusive NB Right Turn Lane	
Long-term Improvements	3 - Consider Right In Right Out for the EB approach	

Figure 16-3: Alafaya Tr & Science Dr Intersection Improvements

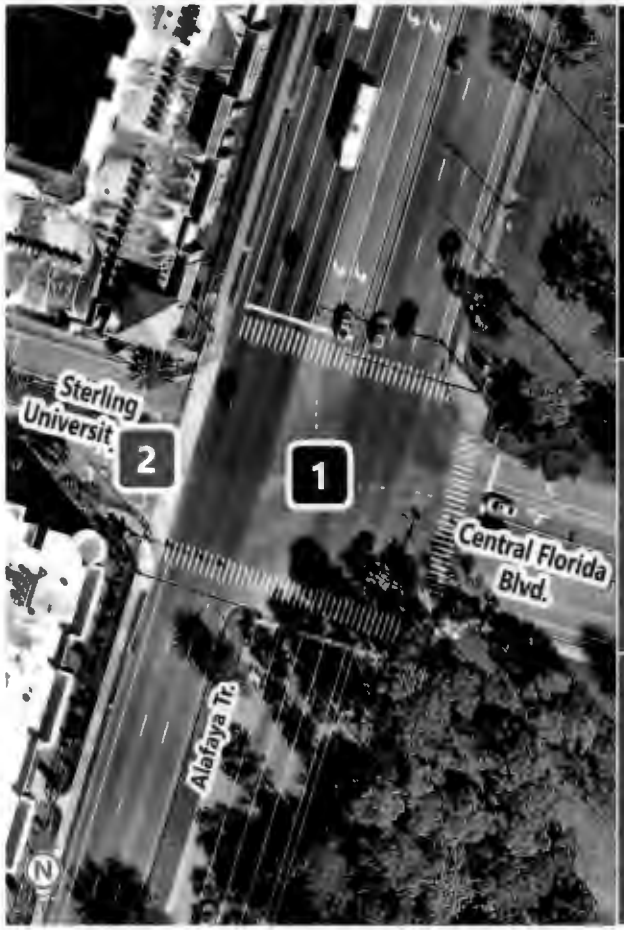
Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Additional EB Left Turn Lane 2 - Exclusive WB Right Turn Lane	▪ Add retroreflective back plates to signal heads ▪ Implement high-friction surface treatment on Alafaya Trail ▪ Provide special emphasis crosswalk markings ▪ Reduce corner radii on all intersection corners ▪ Provide hardened centerlines with pedestrian refuge on the north and south legs of the intersection ▪ Provide at least one signal head per approach lane ▪ Provide raised medians on the EB and WB centerlines to encourage slower right turns ▪ Revise strain pole configuration to improve signal head placement and visibility
Mid-term Improvements	3 - Exclusive SB Right Turn Lane 4 - Exclusive NB Right Turn Lane	
Long-term Improvements	5 – Additional SB Left Turn Lane	

Figure 16-4: Alafaya Tr & Research Pkwy Intersection Improvements



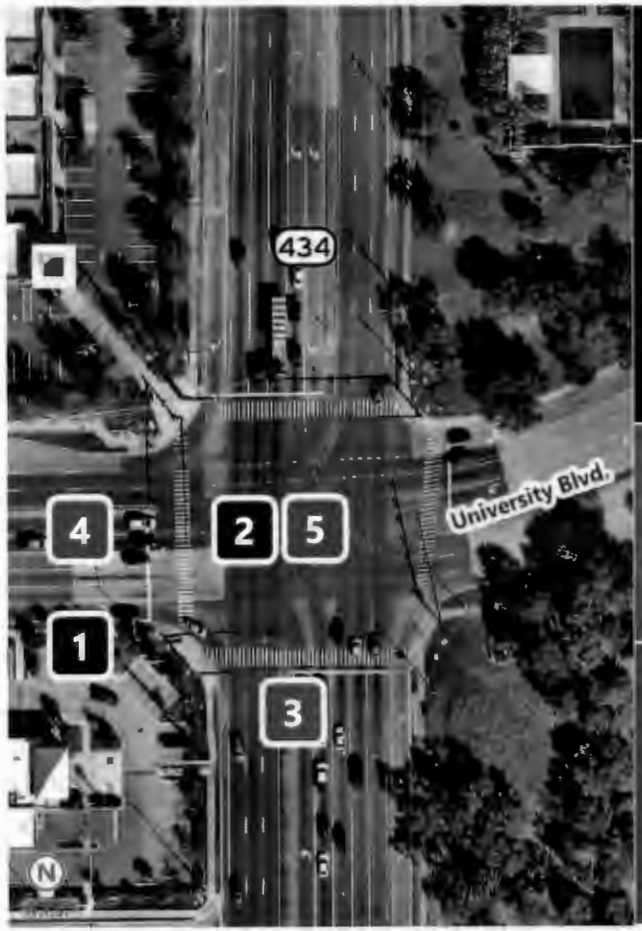
Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 - UCF and Alafaya Trail Pedestrian Safety Study Improvements	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Add retroreflective back plates to signal heads ▪ Provide special emphasis crosswalk markings ▪ Reduce curb radii on all intersection corners ▪ Install wayfinding signs providing directions to major destinations ▪ Consider improving delineation of the horizontal curves on Alafaya Tr north and south of the intersection ▪ Provide at least one signal head per approach lane
Mid-term Improvements	2- Additional Exclusive WB Right Turn Lane 3 - Exclusive NB Right Turn Lane 4 - Consider Right In Right Out for the EB approach	
Long-term Improvements		

Figure 16-5: Alafaya Tr & Central Florida Blvd Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 - UCF and Alafaya Trail Pedestrian Safety Study Improvements	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Add retroreflective back plates to signal heads ▪ Provide advance signal warning signs ▪ Install wayfinding signs providing directions to major destinations
Mid-term Improvements	2 - Consider Right In Right Out for the EB approach	
Long-term Improvements		

Figure 16-6: Alafaya Tr & University Blvd Intersection Improvements

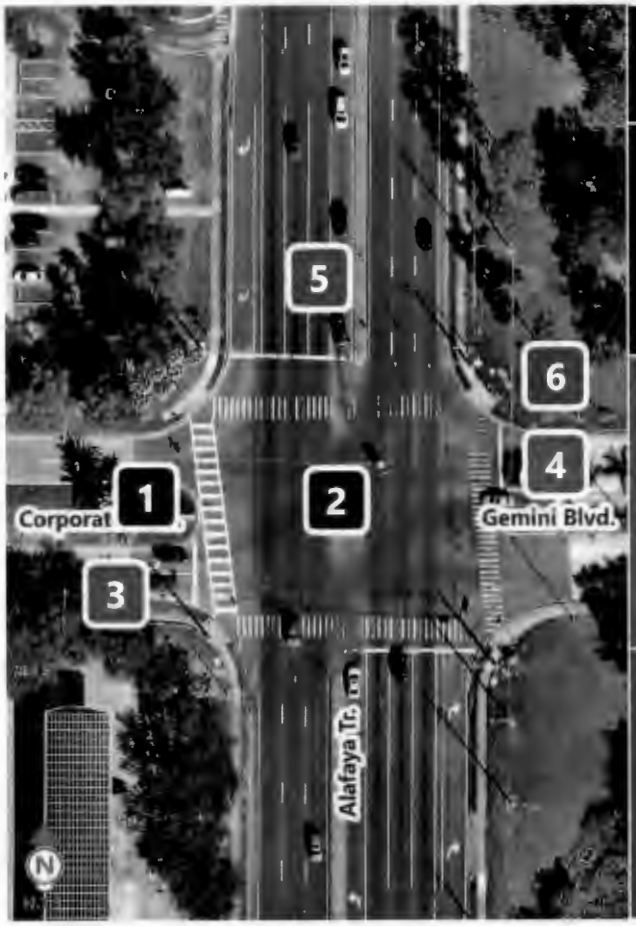


Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – EB, NB, and SB Right Turn Overlaps 2 – UCF and Alafaya Trail Pedestrian Safety Study Improvements	▪ Evaluate intersection lighting to meet FDOT guidelines ▪ Add retroreflective back plates to signal heads ▪ Provide special emphasis crosswalk markings ▪ Reduce curb radii on all intersection corners ▪ Install wayfinding signs providing directions to major destinations ▪ Consider providing a supplemental signal head for westbound traffic to mitigate horizontal curvature and obscured sight lines of signal heads ▪ Consider adding a Leading Pedestrian Interval and blank-out yield to pedestrian signs for all right turns at intersection
Mid-term Improvements	3 – Third NB Left Turn Lane	
Long-term Improvements	4 – Third EB Left Turn Lane (or) 5 – Consider Partial Displaced Left Turn Intersection	

Figure 16-7: Alafaya Tr & Centaurus Blvd Intersection Improvements

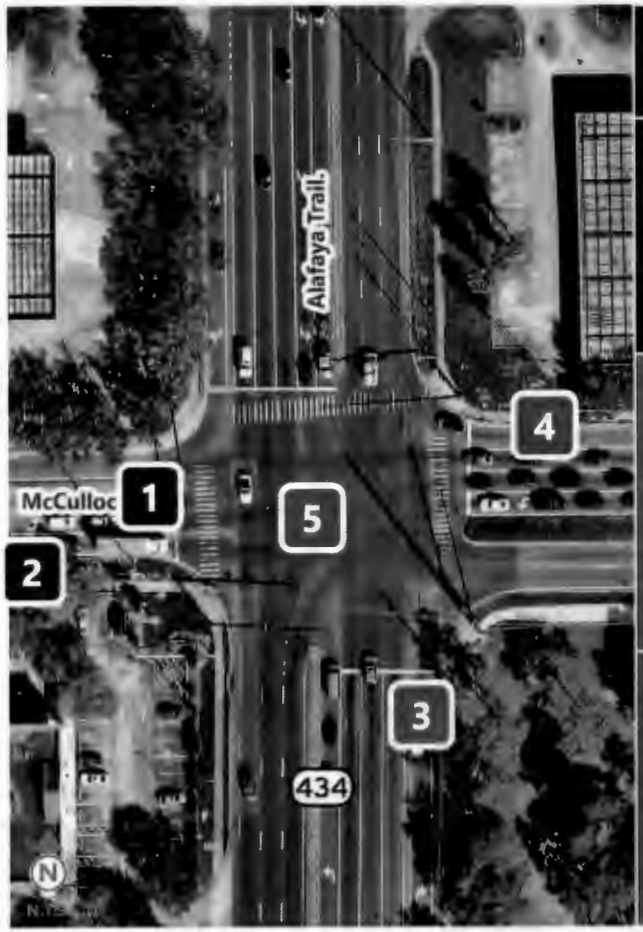
Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Add retroreflective back plates to signal heads ▪ Implement high-friction surface treatment on Alafaya Tr ▪ Provide at least one signal head per approach lane ▪ Provide advance 'Signal Ahead' warning signs and advance cross street name signs on the SB approach
Mid-term Improvements	1 – Exclusive NB Right Turn Lane	
Long-term Improvements		

Figure 16-8: Alafaya Tr & Gemini Blvd Intersection Improvements



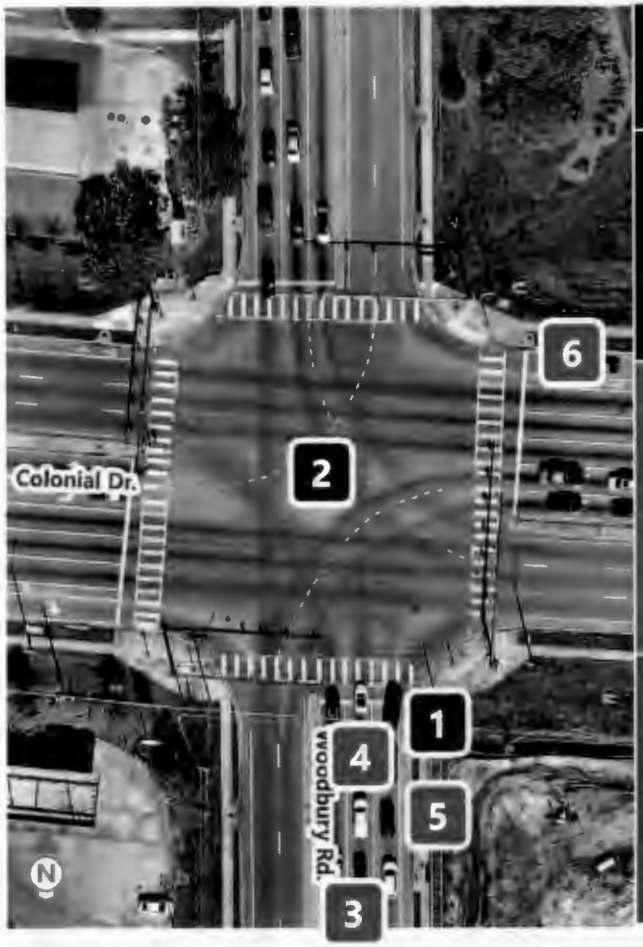
Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1- Additional EB Left Turn Lane (ongoing) 2 - UCF and Alafaya Trail Pedestrian Safety Study Improvements	▪ Update signing and pavement markings for the WB lane drop in accordance with FDOT Standard Index 711-001 ▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Add retroreflective back plates to signal heads ▪ Reduce corner radii on all intersection corners ▪ Implement high-friction surface treatment on Alafaya Tr ▪ Provide signal warning signs on the EB and WB approaches ▪ Install wayfinding signs providing directions to major destinations ▪ Provide at least one signal head per approach lane
Mid-term Improvements	3 – Exclusive EB Right Turn Lane 4 – Additional WB Left Turn Lane 5 – Additional SB Left turn Lane	
Long-term Improvements	6 – Additional WB Right Turn Lane	

Figure 16-9: Alafaya Tr & McCulloch Rd Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1- NB Right Overlap and Extend Inside WB Left to Maximum Extent Possible. 2 - Review if Eliminating WB Left for CVS is Feasible to Extend EB Left Lanes.	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Add retroreflective back plates to signal heads ▪ Implement high-friction surface treatment on Alafaya Tr ▪ Provide special emphasis crosswalk markings ▪ Reduce corner radii on all intersection corners ▪ Add high emphasis crosswalk across south leg to connect with the new shared use path on McCulloch Road
Mid-term Improvements	3 – Additional NB Right Turn Lane	
Long-term Improvements	4 – Additional WB Right Turn Lane 5 – Consider a Partial Displaced Left Turn Intersection	

Figure 16-10: SR 50 & Woodbury Rd Intersection Improvements

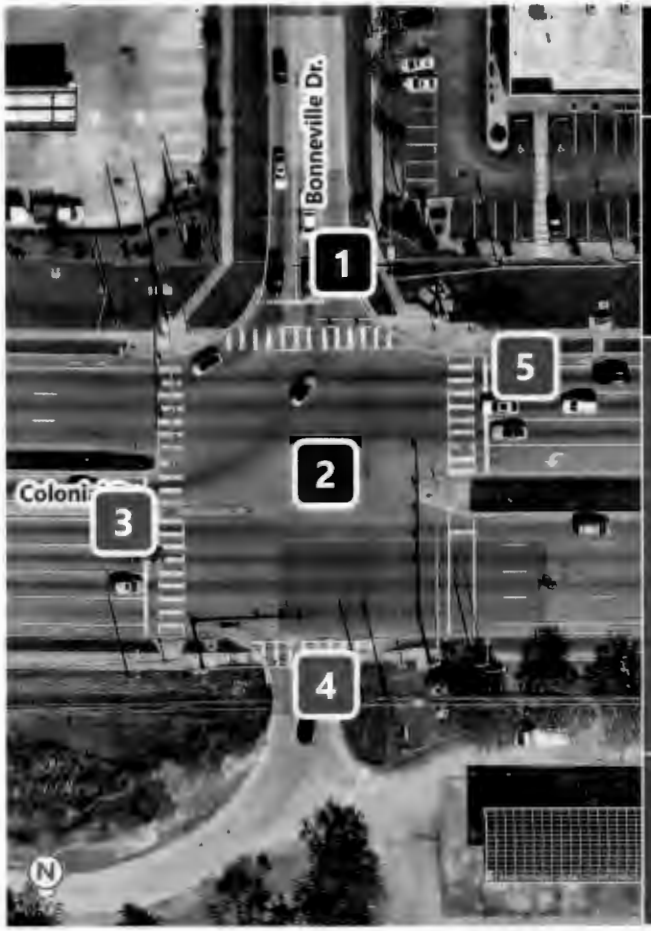


Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1- Exclusive NB Right Turn Lane/NB Right Overlap 2 – Adaptive Signal Control	▪ Reduce corner radii on all intersection corners ▪ Revise the connectivity and access management layout to limit driveways within the intersection influence area ▪ Install advance street name signs to support lane change decisions in advance of the intersection and EB pavement markings providing guidance for drivers accessing SR 408
Mid-term Improvements	3 – Four Lanes on Woodbury Road 4 - Additional NB Left Turn Lane 5 - Convert outside NBT to shared NBT/R Turn Lane 6 - Additional WB Right Turn Lane	
Long-term Improvements		

Figure 16-11: SR 50 & SR 408 Ramps Intersection Improvements

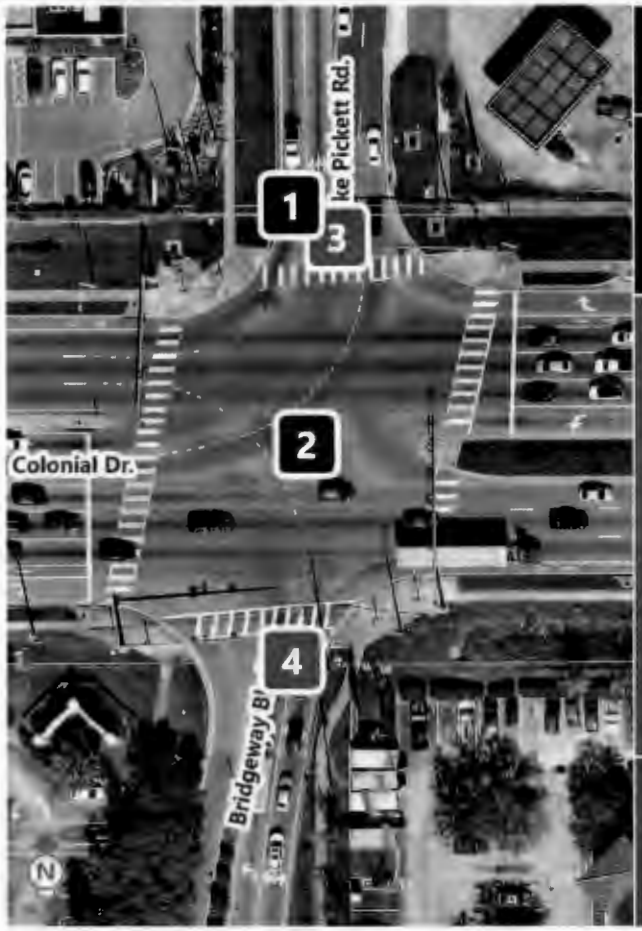
Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Adaptive Signal Control	• Implement rumble strips on the northbound approach • Provide more lane markings upstream on the northbound approach to indicate drivers to 'SLOW' their vehicles. • Provide signage indicating 'Signal Ahead' in combination with flashing LED beacons • Implement high-friction surface treatment
Mid-term Improvements	2 - Provide a Fourth WB Auxiliary Lane between Lake Pickett Road and Woodbury Road	
Long-term Improvements		

Figure 16-12: SR 50 & Bonneville Dr Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1- Split Phase on Side Street- Change SB Left to Shared SB Left & Through and Shared SB Through & Right to SB Right 2 – Adaptive Signal Control	▪ Reduce corner radii on the northeast, southeast, and northwest corners ▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Implement high-friction surface treatment on SR 50
Mid-term Improvements	3 – Additional EBL; Need two receiving lanes on Bonneville Drive that will merge to one 4 - Consider Right-in Right-out for the NB approach 5 - Provide a Fourth WB Auxiliary Lane between Lake Pickett Road and Woodbury Road	
Long-term Improvements		

Figure 16-13: SR 50 & Lake Pickett Rd Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1- Change SB approach to 2 SB Right, and shared SB Left & Through 2 – Adaptive Signal Control	▪ Revise the connectivity and access management layout for the existing closely spaced driveways ▪ Reduce corner radii on the northeast, southeast, and northwest corners ▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Implement high-friction surface treatment on SR 50
Mid-term Improvements	3 – Change the SB Left & Through to SB Through & Right and Add an Exclusive SB Left 4 - Change NB Left & Through to NB Left & Exclusive NB Right	
Long-term Improvements		

Figure 16-14: SR 50 & Pebble Beach Blvd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 - Adaptive Signal Control 2- Consider Split Phase for the Side Street	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Implement high-friction surface treatment on SR 50 ▪ Provide median lighting for enhanced crosswalk safety (pedestrian/bicyclist safety) on the SR 50 median islands
Mid-term Improvements		
Long-term Improvements		

Figure 16-15: SR 50 & Avalon Park Blvd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 - Adaptive Signal Control	▪ Reduce corner radii or consider installing channelizing corner islands with near perpendicular right turn lane design and truck aprons on the southwest and southeast intersection corners ▪ Provide curb extension on EB departure leg ▪ Upgrade intersection lighting to meet FDOT guidelines
Mid-term Improvements	2 – Additional NB Left Turn Lane 3 – Three EB Through Lanes as part of SR 50 Widening to Six Lanes	
Long-term Improvements	4 – Convert SB Approach to Right-out Only & Provide U-turn West of this Intersection	

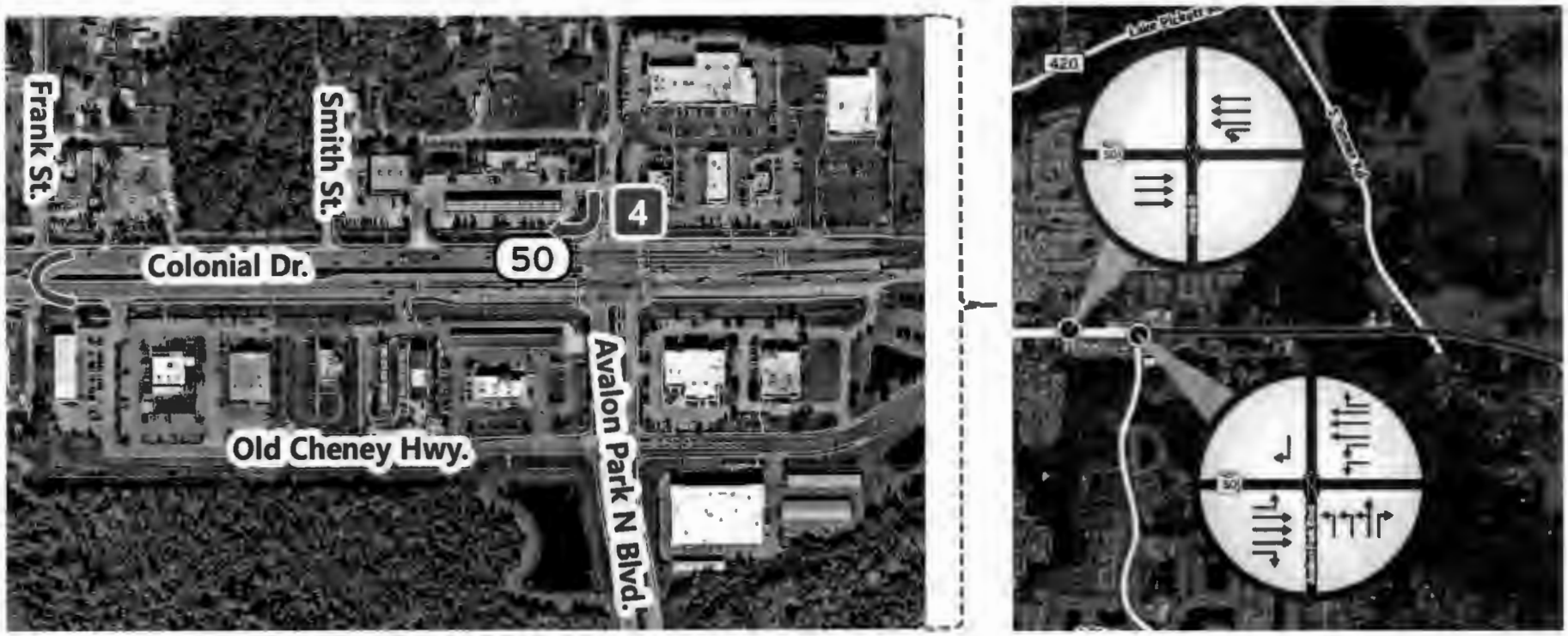
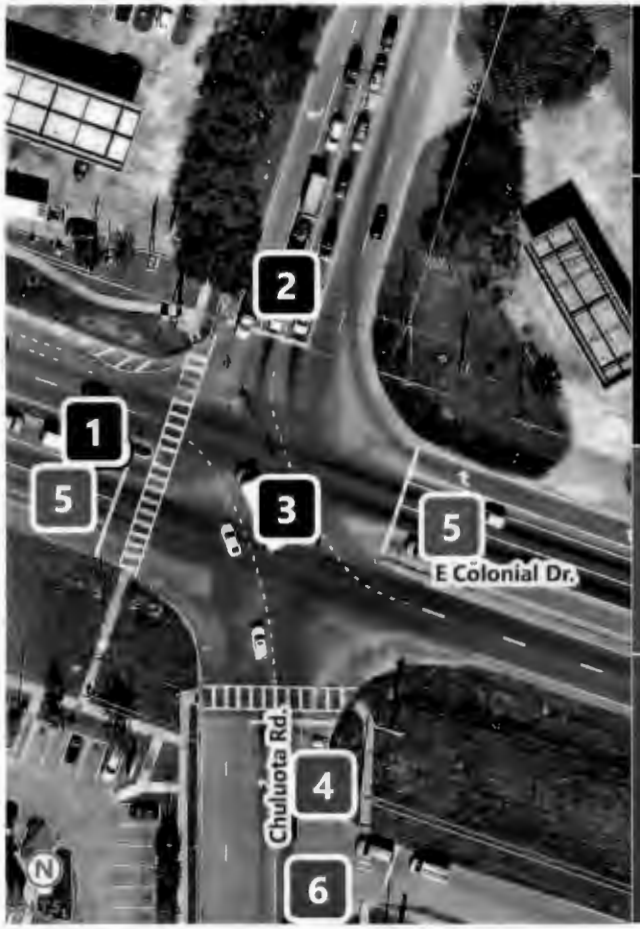

Frank St.
Smith St.
4
50
Colonial Dr.
Avalon Park N Blvd.
Old Cheney Hwy.
420

Figure 16-16: SR 50 & Chuluota Rd Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 - Second EB Left Turn Lane 2 - Change SB Approach to 2 SB Lefts, 1 SB Through and 1 SB Right 3- Adaptive Signal Control	▪ Consider LPI for southbound right turning movement ▪ Evaluate intersection lighting to meet FDOT guidelines ▪ Provide lane-line extensions to guide travel along the curved alignments through the intersection on both the SR 50 and Chuluota Rd approaches ▪ Revise strain pole configuration to improve signal head placement and visibility ▪ Reduce corner radii on the northwest and southeast intersection corners or provide corner islands with near-perpendicular right turn lane design ▪ Add retroreflective back plates to signal heads ▪ Consider crosswalks on the north and east legs and fill the sidewalk gap to the Gas Station driveway
Mid-term Improvements	4 – Change NB Approach to 2 NB Lefts and add 1 NB Through-Right Turn Lane 5 – Six Lanes on SR 50	
Long-term Improvements	6 – Convert NB Approach to Right-out Only & Provide U-turn East of this Intersection	

Figure 16-16: SR 50 & Chuluota Rd Intersection Improvements

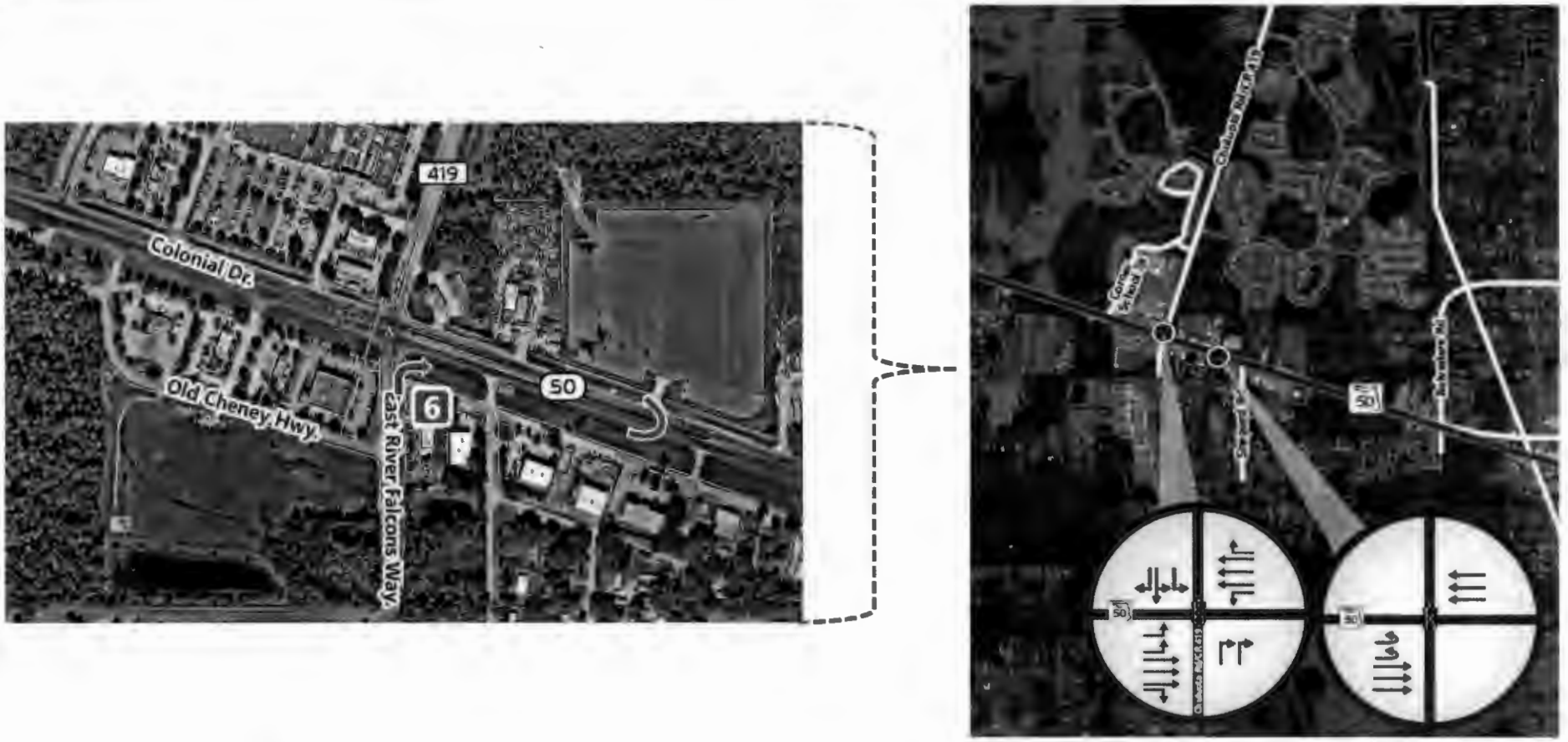
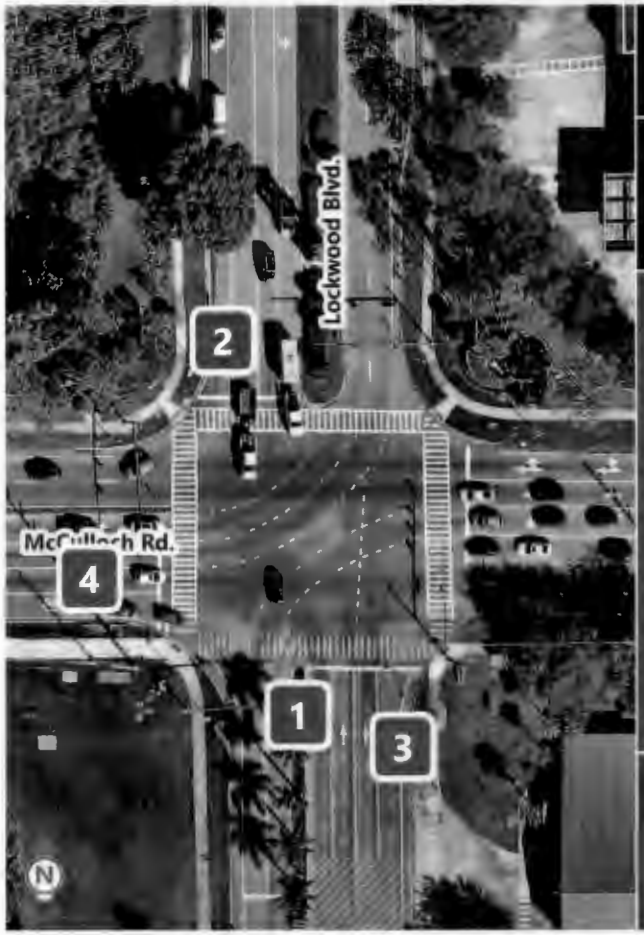


Figure 16-17: McCulloch Rd & Lockwood Blvd Intersection Improvements

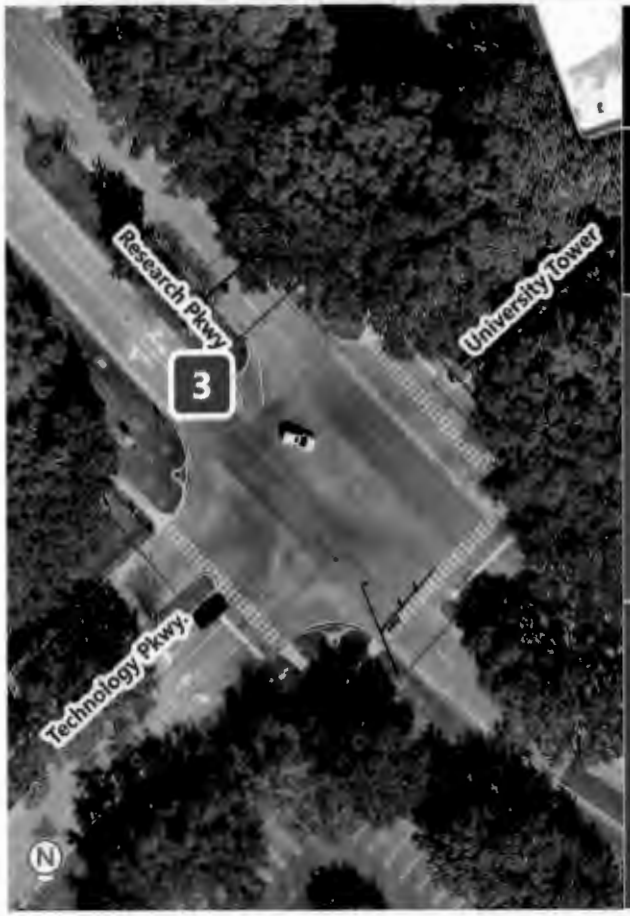


Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Revise the signal phasing from protected-permitted to protected-only during peak hours ▪ Provide at least one signal head per approach lane ▪ Consider an advance warning sign for restricted U-turns upstream of the fire station access ▪ Revise the layout to produce a positive offset for NB and SB left ▪ Improve lane use and street name signing on the NB approach ▪ Implement high-friction surface treatment
Mid-term Improvements	1 - Additional NB Left 2 – Additional SB Right 3 - Change Outside NB Through to shared NB Through & Right 4 - Additional EB Through Lane	
Long-term Improvements		

Figure 16-18: McCulloch Rd & N Tanner Rd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 - Additional NB Left Turn Lane	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Add high emphasis crosswalks across north and east legs with supporting sidewalks
Mid-term Improvements	2 – Four Lanes on McCulloch Rd	
Long-term Improvements	3 - Additional EB Right Turn Lane 4 – Four Lanes on N Tanner Rd & Turn Lane Improvements 5 - Consider Right-in Right-out for the WB approach	

Figure 16-19: Technology Pkwy & Research Pkwy Intersection Improvements

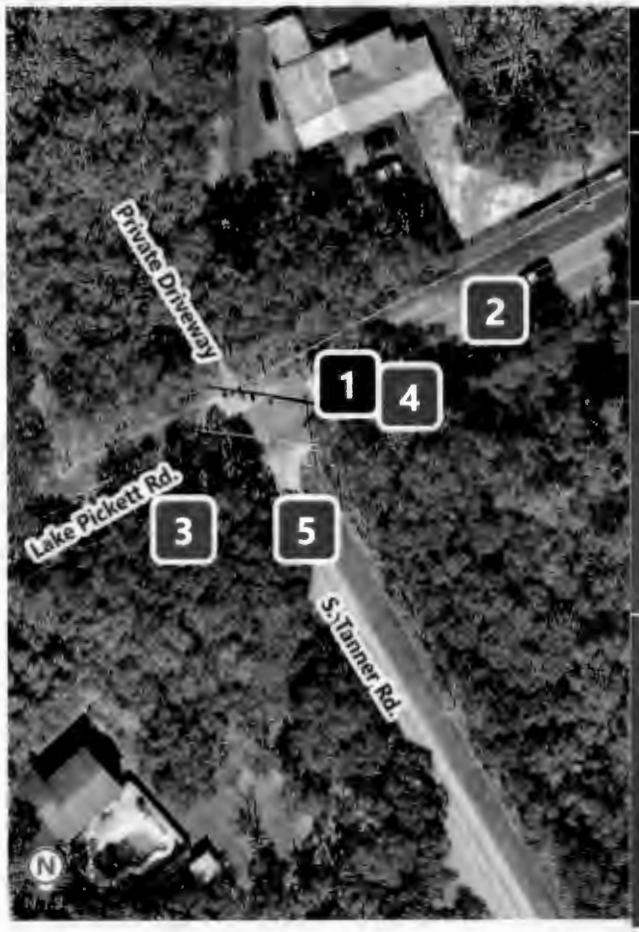


Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		• Provide a crosswalk on the north leg (along Research Pkwy) with hardened centerline • Ensure the approaches are adequately lit upstream and downstream of the intersection • Add retroreflective back plates to signal heads
Mid-term Improvements		
Long-term Improvements	1 – Exclusive EB Left Turn Lane	

Figure 16-20: Technology Pkwy & Science Dr Intersection Improvements

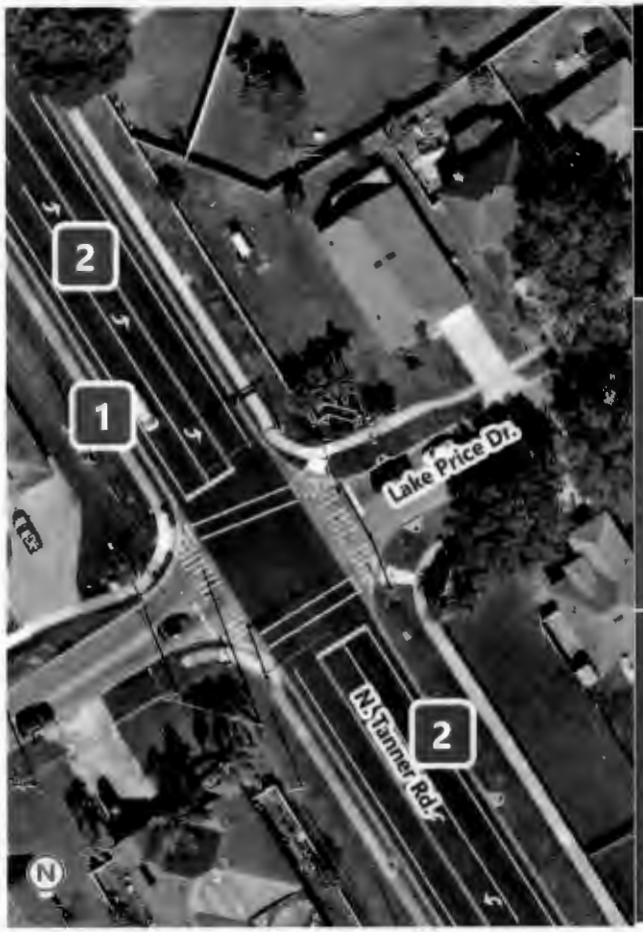
Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Add retroreflective back plates to signal heads ▪ Provide corner islands with near-perpendicular right turn lane design for the SE and NW corners
Mid-term Improvements		
Long-term Improvements		

Figure 16-21: Lake Pickett Rd & S Tanner Rd Intersection Improvements



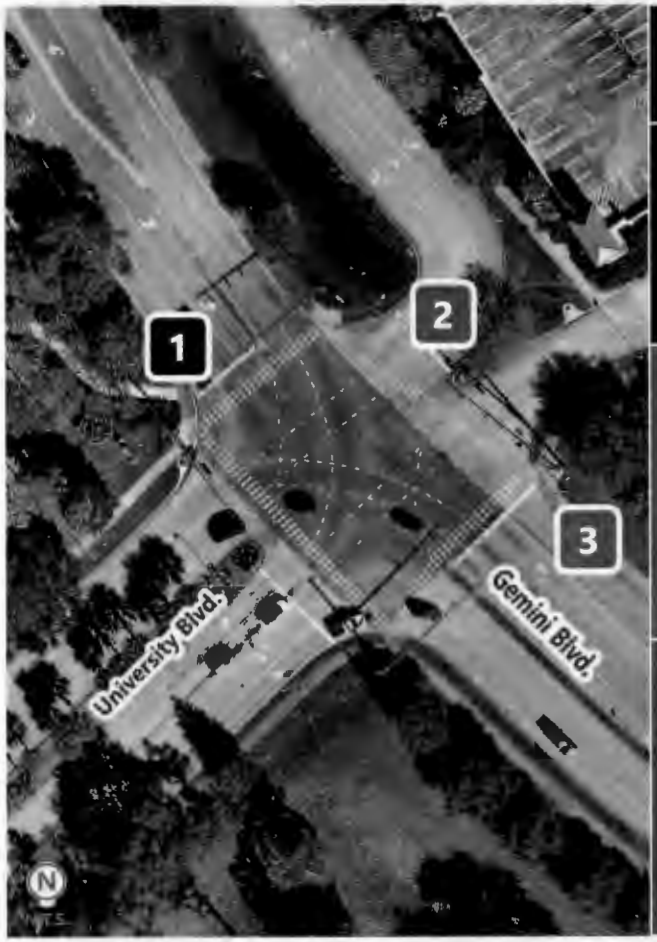
Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 - Protected+Permissive Phase for WB Left Turn	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Implementing advance 'Signal Ahead' warning signs and pavement markings and advance cross street ▪ Consider providing crosswalks on all legs with supporting sidewalks
Mid-term Improvements		
Long-term Improvements	2 – Four Lanes on Lake Pickett Road 3 – Exclusive EB Right Turn Lane 4 – Exclusive WB Left Turn Lane 5 – Exclusive NB Right Turn Lane	

Figure 16-22: N Tanner Rd & Lake Price Dr Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection
Mid-term Improvements	1 – Exclusive SB Right Turn Lane	
Long-term Improvements	2 – Four Lanes on N Tanner Road	

Figure 16-23: Gemini Blvd & University Blvd Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – SB Right Turn Overlap	▪ Improve lane use and street name signing ▪ Provide advance 'Signal Ahead' warning signs and advance cross street name signs - place these signs upstream of the curve to clarify lane use
Mid-term Improvements	2 - Consider Right In Right Out for the WB approach 3- Consider converting NB Right Lane on Gemini Blvd to Shared Through-Right Lane and extend it to Andromeda Loop N	
Long-term Improvements		

Figure 16-24: Gemini Blvd & Centaurus Blvd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 - Protected Phase for WB Left	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Provide overhead lane-use signs to guide access to the university buildings ▪ Provide crosswalks on all legs with supporting sidewalks along Gemini Blvd (b/w Centaurus Blvd and Aquarius Agora Dr) and Centaurus Blvd (b/w Alafaya Trail and Gemini Blvd)
Mid-term Improvements		
Long-term Improvements		

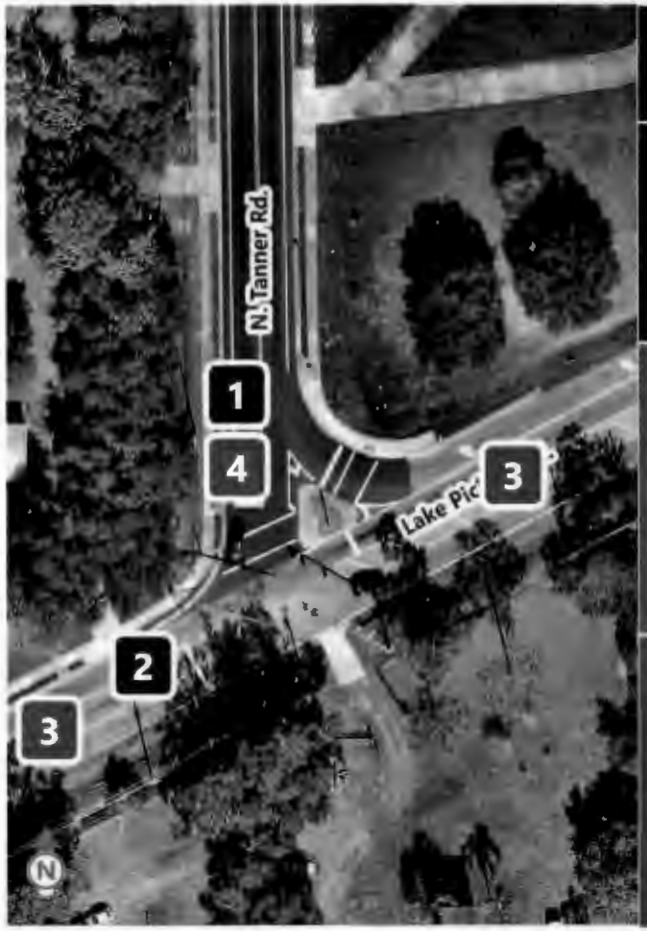
Figure 16-25: Gemini Blvd & Scorpius St (north) Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		
Mid-term Improvements		▪ Provide overhead lane-use signs to guide access to the university buildings ▪ Consider providing crosswalk on south leg along Gemini Blvd with supporting sidewalks
Long-term Improvements		

Figure 16-26: Lake Pickett Rd & Percival Rd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Signal or Roundabout	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Implement high-friction surface treatment ▪ Provide crosswalks on all legs along with traffic control improvements
Mid-term Improvements	2 - Four Lanes on Lake Pickett Road 3 – Exclusive WB Left Turn Lane	
Long-term Improvements	4 - Four Lanes on Lake Pickett Road 5 – Additional WB Left Turn Lane	

Figure 16-27: Lake Pickett Rd & N Tanner Rd Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Exclusive SB Left Turn Lane 2 - Protected+Permissive Phase for EB Left Turn	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Implement advance 'Signal Ahead' warning signs, pavement markings, and advance cross street signs ▪ Provide crosswalks on east and west legs with supporting sidewalks
Mid-term Improvements		
Long-term Improvements	3 - Four Lanes on Lake Pickett Road 4 – Additional SB Left Turn Lane	

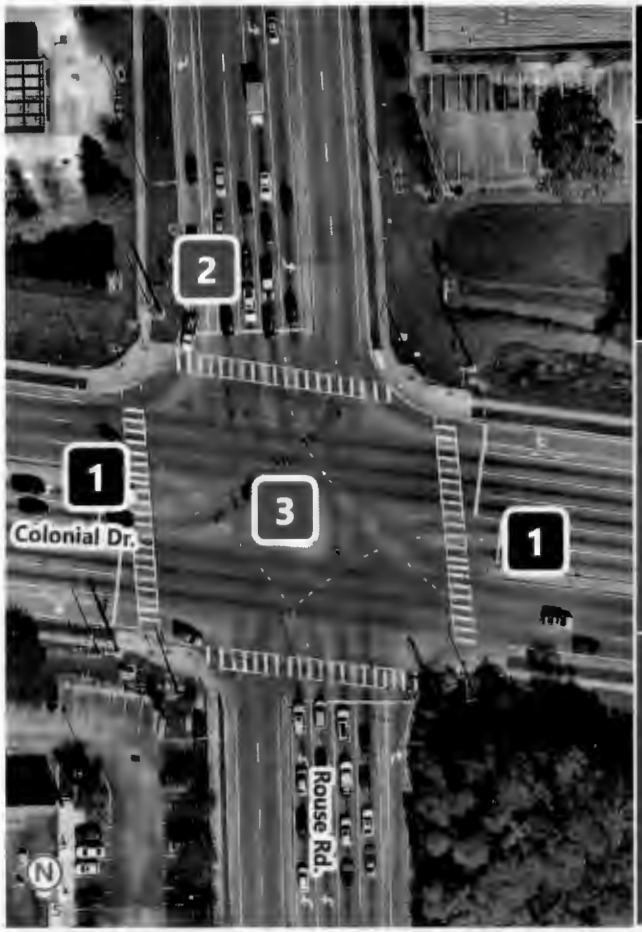
Figure 16-28: Lake Pickett Rd & Chuluota Rd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Exclusive EB Right Turn Lane 2 - Extend EB Left Turn Lane to 250 feet of queue length	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Implement advance 'Signal Ahead' warning signs, pavement markings, and advance cross street signs ▪ Provide crosswalks on all legs with supporting sidewalks
Mid-term Improvements	3 - Four Lanes on CR 419 4 – Exclusive SB Right Turn Lane	
Long-term Improvements	5 - Four Lanes on Lake Pickett Road 6 - Four Lanes on CR 419 7 – Additional EB Left Turn Lane 8 – Additional NB Left Turn Lane	

Figure 16-29 McCulloch Rd & Rouse Rd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Signal or Roundabout	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Implement high-friction surface treatment ▪ Consider providing crosswalk on all legs with supporting sidewalks
Mid-term Improvements		
Long-term Improvements		

Figure 16-30: SR 50 & Rouse Rd Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Extend EB Left /WB Left Storage Lengths	▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Reduce corner radii on all intersection corners ▪ Revise strain pole configuration to improve signal head placement and visibility ▪ Revise the connectivity and access management layout to limit driveways within the intersection influence area ▪ Install advance street name signs to support lane change decisions in advance of the intersection
Mid-term Improvements	2 – Additional SB Right Turn Lane	
Long-term Improvements	3 – Consider a Partial Displaced Left Turn or Quadrant Roadway Intersection	

Figure 16-31: University Blvd & Rouse Rd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 – Additional EB Left Turn Lane 2 - Change outside SB Through to shared SB Through & SB Right Turn Lane	▪ Reduce corner radii or install channelizing corner islands with near-perpendicular right turn lane design and truck aprons ▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Implement high-friction surface treatment
Mid-term Improvements	3 – Additional SB Right Turn Lane	
Long-term Improvements	4 – Consider a Partial Displaced Left Turn Intersection	

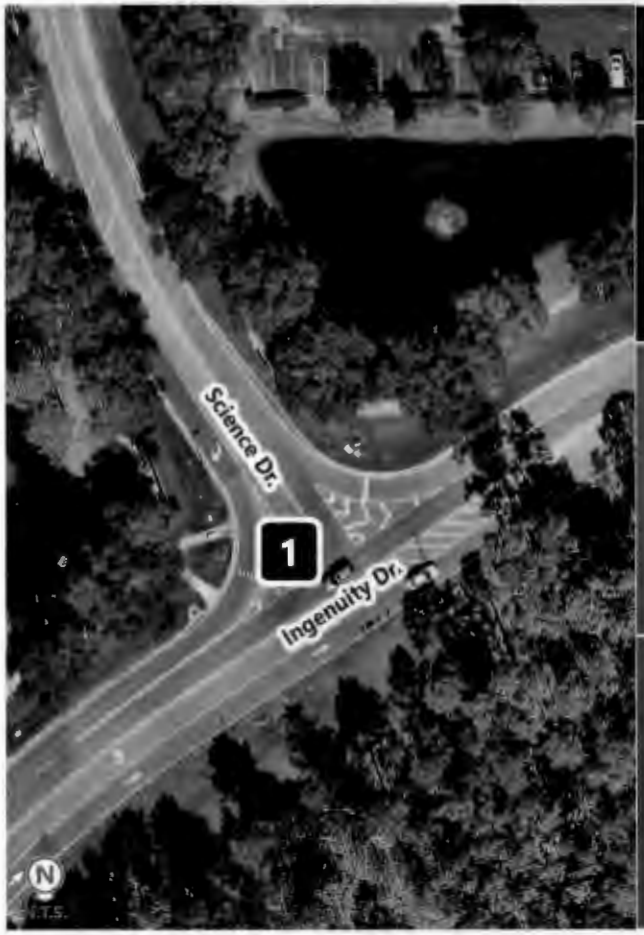
Figure 16-32: SR 50 & S Tanner Rd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		
Mid-term Improvements	1 – Signalized Restricted Crossing U-turn Intersection 2- Six Lanes on SR 50	▪ Provide a raised channelizing island on the SB approach as well as to extend the receiving (WB) taper to a full receiving lane ▪ Upgrade intersection lighting to meet FDOT guidelines
Long-term Improvements		

Figure 16-33: Rouse Rd & Lokanotosa Rd Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Revise the layout to produce a positive offset for NB left and SB left ▪ Implement high-friction surface treatment ▪ Consider implementing LPI for the westbound right turn movement ▪ Provide crosswalk on south leg
Mid-term Improvements		
Long-term Improvements		

Figure 16-34: Science Dr & Ingenuity Dr Intersection Improvements



Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1- Signal or Roundabout	▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Implement high-friction surface treatment ▪ Provide crosswalk on all legs with supporting sidewalks
Mid-term Improvements		
Long-term Improvements		

Figure 16-35: Research Pkwy & Discovery Dr Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		• Provide advance 'Signal Ahead' warning signs and advance cross street name signs • Ensure the approaches are adequately lit upstream and downstream of the intersection • Upgrade intersection lighting to meet FDOT guidelines
Mid-term Improvements		
Long-term Improvements	1 – Four Lanes on Discovery Drive 2 – Exclusive NB Right Turn Lane	

Figure 16-36: Woodbury Rd & Challenger Pkwy Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements		
Mid-term Improvements		▪ Provide advance left and right 'Signal Ahead' warning signs closer to the intersection ▪ Install wayfinding signs providing directions to major destinations and roadways ▪ Minimize crossing distances by extending curbs or reducing corner radii ▪ Upgrade intersection lighting to meet FDOT guidelines ▪ Implement high-friction surface treatment
Long-term Improvements	1 – Exclusive SBR	

Figure 16-37: Challenger Pkwy & Ingenuity Dr Intersection Improvements

Period	Intersection Improvements	Safety/ADA/ Multimodal Improvements
Short-term Improvements	1 - Consider Right In Right Out on NB Approach	▪ Provide advance 'Signal Ahead' warning signs and advance cross street name signs ▪ Provide overhead lane-use signs to guide access to Alafaya Trail and SR 408 ▪ Ensure the approaches are adequately lit upstream and downstream of the intersection ▪ Evaluate intersection lighting to meet FDOT guidelines ▪ Provide crosswalks on east and west legs with supporting sidewalks
Mid-term Improvements		
Long-term Improvements		

17 OTHER IMPROVEMENTS

This section provides a discussion of other recommended improvements including pedestrian/bicycle, transit, and trails, TDM strategies that can be combined with enhanced transit to encourage travelers to use alternative modes of transportation, and ITS recommendations/Emerging Technologies. The relevant excerpts for this section are provided in **Appendix AA**.

17.1 PEDESTRIAN/BICYCLE FACILITIES

The programmed (or committed) improvements for pedestrian/bicycle facilities are illustrated in **Figure 17-1**. These were developed as part of the recently completed UCF/Alafaya Trail Pedestrian Safety Study. They include sidewalk improvements on Alafaya Trail between Challenger Parkway and McCulloch Road and University Boulevard between Quadrangle Boulevard and Alafaya Trail, two new mid-block crosswalks, pedestrian/bicycle friendly intersection improvements at Alafaya Trail and University Boulevard such as enhanced crosswalks, landscaping, corner radii reduction to reduce vehicle speeds, and UCF branding and other improvements at Alafaya Trail and Gemini Boulevard, Alafaya Trail and Central Florida Boulevard, and Alafaya Trail and Research Parkway.

Figure 17-2 illustrates the planned improvements that were identified by the County, Seminole County, FDOT and MetroPlan. Most of them will be constructed when some of the study roadways will be widened or will be part of future Complete Streets projects.

In addition, the study identified several facilities that need improvements based on the existing sidewalk/bicycle lane gaps (**Figure 17-3**). The study identified additional crossing opportunities that can be tied with specific intersection improvements such the mid-block crossing opportunities on SR 50 when the intersection improvements at SR 50/Avalon Park Boulevard and SR 50/Chuluota Road are completed.

17.2 PLANNED TRAIL IMPROVEMENTS

Figure 17-4 illustrates the planned trails recommended near and within the study area in the latest Orange County Trails Master Plan (2021 Report). As part of the planned improvements for trails, East Orange and Innovation Way North Trails will be extended.

FIGURE 17-1: PEDESTRIAN/BICYCLE FACILITIES – PROGRAMMED IMPROVEMENTS

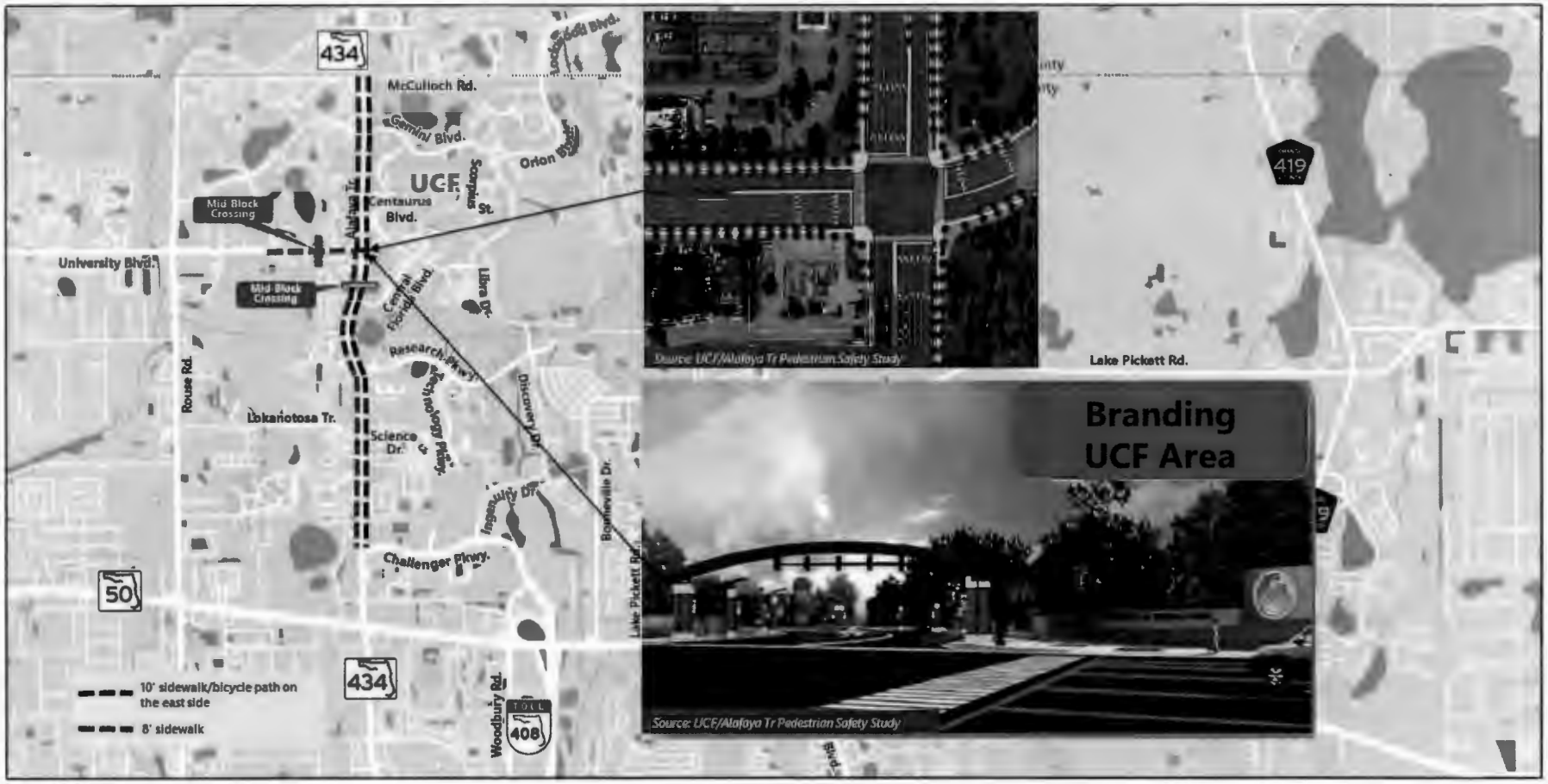


FIGURE 17-2: PEDESTRIAN/BICYCLE FACILITIES – PLANNED IMPROVEMENTS

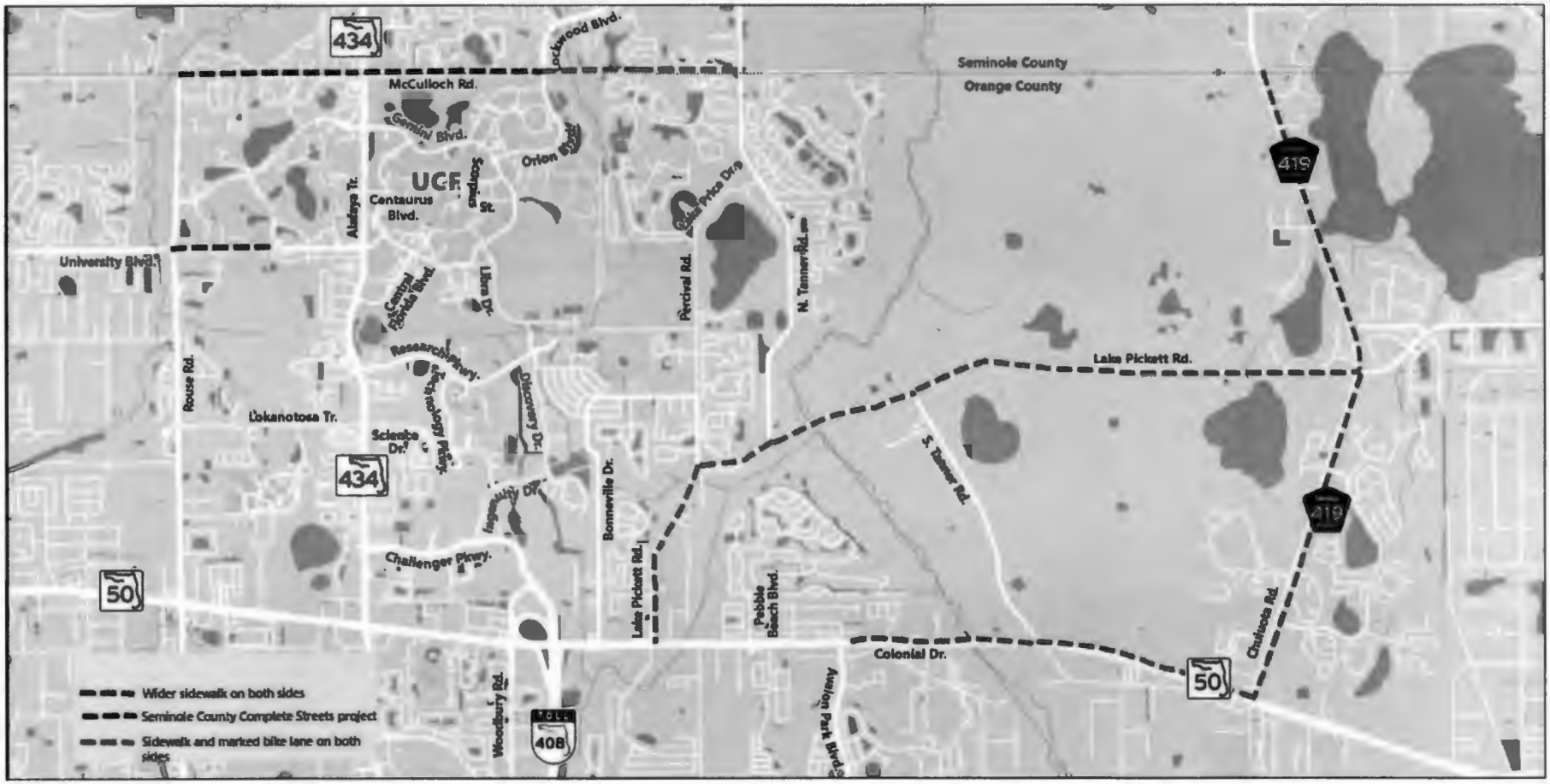


FIGURE 17-3: PEDESTRIAN/BICYCLE FACILITIES – NEEDS

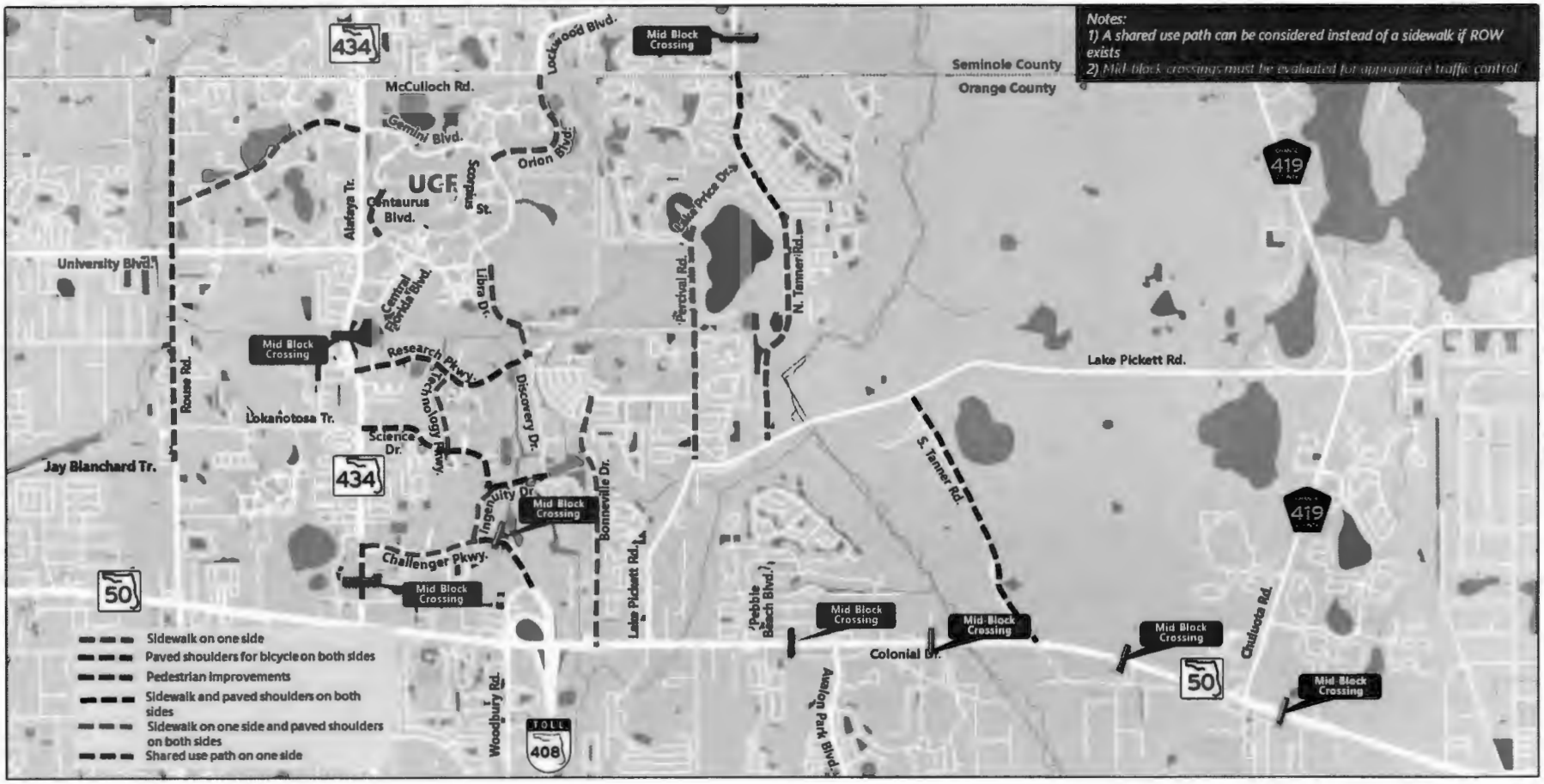
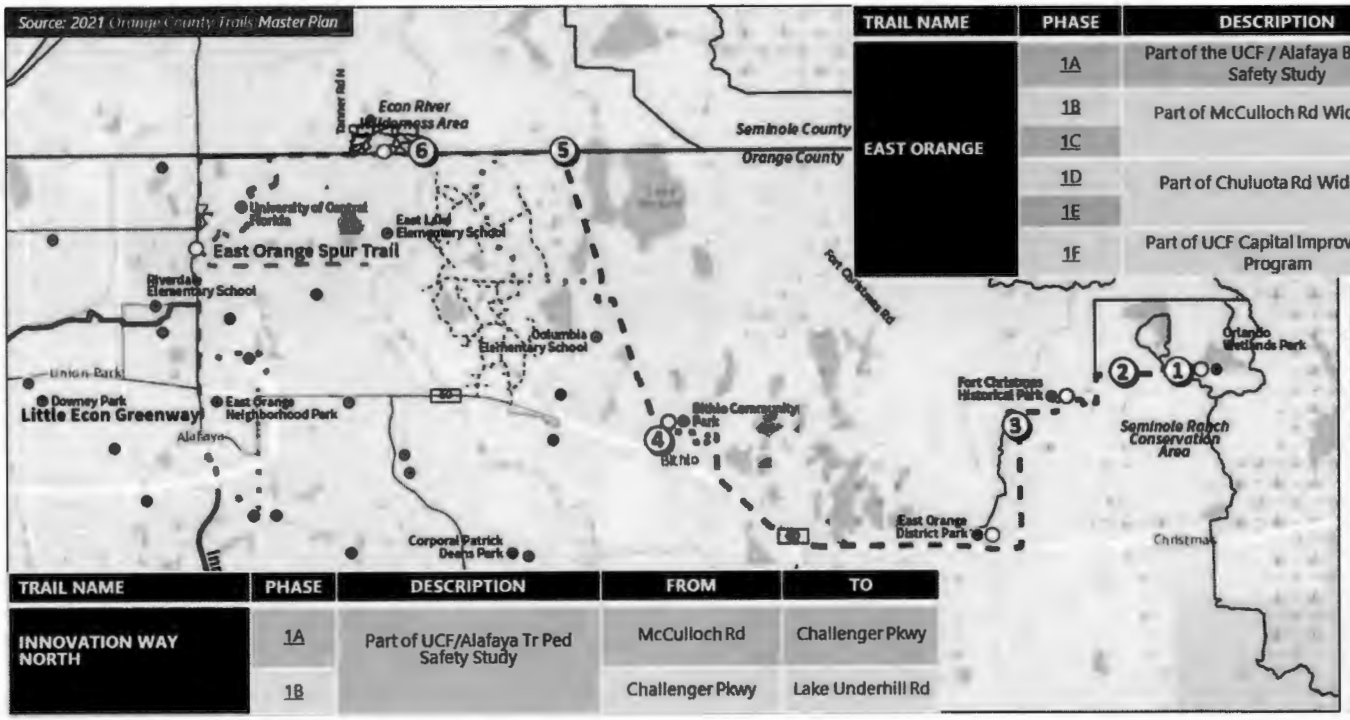


FIGURE 17-4: PLANNED TRAIL IMPROVEMENTS



TRAIL NAME	PHASE	DESCRIPTION	FROM	TO
EAST ORANGE	1A	Part of the UCF / Alafaya Bike Ped Safety Study	N Alafaya Tr	Orion Blvd
	1B	Part of McCulloch Rd Widening	Orion Blvd	N Tanner Rd
	1C		N Tanner Rd	Chuluota Rd
	1D	Part of Chuluota Rd Widening	Chuluota Rd	Lake Pickett Rd
	1E		Lake Pickett Rd	Fort Christmas Park
	1F	Part of UCF Capital Improvements Program	N Alafaya Tr	McCulloch Rd

TRAIL NAME	PHASE	DESCRIPTION	FROM	TO
INNOVATION WAY NORTH	1A	Part of UCF/Alafaya Tr Ped Safety Study	McCulloch Rd	Challenger Pkwy
	1B		Challenger Pkwy	Lake Underhill Rd

17.3 TRANSIT IMPROVEMENTS/TDM RECOMMENDATIONS

17.3.1 Planned Transit Improvements - LYNX

As shown in **Table 17-1**, the recently completed LYNX Transit Development Plan (TDP) for Orange County identified enhanced service in existing zones (curb to curb), new enhanced on-demand or flexible Neighbor Links including Bithlo NeighborLink and Waterford Lakes Road/Avalon Park Boulevard NeighborLink, four new express routes with a 30-min frequency, a BRT service along SR 50/Alafaya Trail between Ocoee and UCF, and a new route that connects UCF and Oviedo via Lockwood Boulevard.

As part of the 2013 SR 50/UCF Connector Alternatives Analysis, a preferred BRT corridor was identified that uses SR 50 from Ocoee to Alafaya Trail and then uses Alafaya Trail from north of SR 50 to UCF. Recently a Bus Station Area Analysis was completed which identified enhanced bus stations at Alafaya Trail/SR 50 and Alafaya Trail/Lokanotosa Trail intersections. Also, transit signal priority (TSP) was recommended for the entire Alafaya Trail study corridor.

TABLE 17-1: PLANNED TRANSIT ROUTES/IMPROVEMENTS WITHIN NEOCATS AREA

Route Number	Route Name	Frequency (Weekday)
104	SR 50 UCF-Downtown	20-30 min
204	SR 50 Limited Stop	20 min
308	UCF-Downtown Regional Express	30 min
311B	UCF-Medical City/Lake Nona – Meadow Woods Regional Express	30 min
401A	Waterford Lakes Commuter Express	30 min
401B	Waterford Lakes Commuter Express (Pattern of 401A)	30 min
506	Lake Underhill-UCF	30 min
522	UCF-SR 436/Aloma	30 min
600B	Red Bug Lake/Alafaya	60 min
601	Oviedo/Lockwood	60 min
821	Bithlo NeighborLink (On-Demand/Flex-Route Hybrid)	Flexible (30 min)
866	Waterford Lakes/Avalon Park (On-Demand/Flex Zone)	Flexible (30 min)

Source: LYNX TDP for Orange County (2022)

17.3.2 Transit Needs/TDM Recommendations

17.3.2.1 Transit Needs

The following recommendations are potential transit projects that could assist in alleviating congestion within the study area.

NeighborLink to UCF

LYNX currently operates a dozen NeighborLinks, which operate in service zones without specific bus stops. NeighborLink services are designed to connect residents in low-density areas to the larger fixed route transit network. This recommendation is to add a NeighborLink service that would connect UCF with the future development projects of Sustanee and The Grow. A potential

circulation path for this NeighborLink service could be from UCF to McCulloch Road, east to Old Lockwood Road/North Tanner Road to end at Lake Pickett Road. It is recommended that the service begin with one vehicle, and as demand grows, a second vehicle and more can be added. Ideally, each development would provide a central pick-up location that would allow for efficient service and a reliable timepoint. The location should offer amenities such as shelter/shade, seating, lighting, trash and recycling receptacles, bicycle parking, and shared micromobility options.

NeighborLink to Central Florida Research Park

A second NeighborLink service is recommended to connect the three future developments with the Central Florida Research Park (CFRP). Similar to the prior recommendation, it should start with one vehicle and grow to more vehicles as demand requires.

Mobility Hubs

On the infrastructure side, mobility hubs provide a facility for bus riders to transfer between buses or from a bus to another mode. The facilities are designed to encourage transit use by making transferring convenient and comfortable. It is recommended that mobility hubs be centrally located within UCF (potentially using the existing UCF Superstop) and CFRP. Given the size of UCF and CFRP, more than one mobility hub may be necessary.

The more comfortable the hubs are for riders, the more likely they will be used. Mobility Hubs at UCF should incorporate amenities desired by waiting students, faculty, and staff such as access to charging stations for electronic devices, food and drink, selfie backdrop, and entertainment (e.g., ping pong table).

For CFRP, the amenities might include charging stations, dry cleaning drop off and pick up, package services (e.g., Federal Express, United Parcel Service, and United States Postal Service boxes) and small rooms to facilitate work activities. Including amenities like electric vehicle charging stations can invite non-transit riders to visit the mobility hubs. In addition to the community-specific amenities, the following general amenities are recommended to be included in the mobility hubs:

- Bus bays for LYNX transit services, including fixed route and NeighborLink
- Micromobility options such as bicycle and scooter sharing programs
- Seating
- Temperature controlled waiting areas
- Charging stations for electronic devices
- Bus route signage and wayfinding signs
- Real-time transit information
- Vending machines
- Trash and recycling receptacles
- Entertainment options such as televisions, music, or games
- Electric vehicle charging stations

Express Bus Service to Brevard County

While many of the residents in Sustanee and The Grow may be destined for UCF or CFRP, many may also be headed east for work. Providing express bus service for those heading east to Brevard County could reduce single occupancy vehicle trips and thus alleviate traffic congestion.

An important transportation resource just east of the study area is the Chuluota Park & Ride Lot, located at the intersection of SR 50 and Chuluota Road (16622 East Colonial Drive, Orlando, FL 32820). Currently, this lot is only served by NeighborLink 621, which connects individuals parking in the lot to nearby destinations.

New Park & Ride Lot between SR 50 and SR 408

Under this recommendation, a new Park & Ride lot would be constructed at the intersection of SR 50 and SR 408 with the intention of capturing riders who are traveling west from the three new developments and using SR 408 to access downtown Orlando. Further analysis will be required to determine sizing and a location for the facility, but it should offer similar amenities to those recommended in the *FDOT District Five Park & Ride Master Plan*. Amenities from the master plan include covered seating areas, restrooms, shade, and lighting, among others.

Express Bus Service to Downtown Orlando

LYNX TDP recommends a UCF-Downtown Regional Express Route that connects UCF and Orlando Downtown using SR 408. This can be expanded to add this express bus service to the recommended Park & Ride lot at SR 50 and SR 408. The service is recommended to target commuters traveling between points east of the SR 50/SR 408 intersection and downtown Orlando. It is possible that the Park & Ride lot could be connected by NeighborLink service once express bus service is established.

17.3.2.2 Transportation Demand Management Recommendations

Various strategies can be implemented to inform and encourage travelers to use alternative modes of transportation. Collectivity, these strategies are known as Transportation Demand Management (TDM), with an overall goal to maximize the efficiency of the transportation system to improve mobility, reduce traffic congestion, and lower vehicle emissions. The following recommendations are potential TDM initiatives that encourage the use of non-single occupancy vehicle transportation. These recommendations go hand-in-hand with the transit recommendations.

UCF Parking Policy Review

Parking policies are a powerful tool influencing driving rates. They can be used to incentivize or disincentivize driving. UCF should consider a review of its parking policies to ensure they are designed to encourage alternative modes. One of the most influential parts of the parking policy is the price point. If set appropriately, UCF can incentivize alternative modes by disincentivizing driving alone to the campus. To do this, UCF must set parking fees such that parking is more

expensive than other modes, including the cost of inconvenience or perception of inconvenience associated with other modes.

Parking polices should acknowledge that a need for parking may arise from time to time for those who regularly use alternative modes. As such, providing a small number of free or inexpensive daily passes for those who use alternative modes on a regular basis can better support the continued use of alternative modes. Providing reduced parking pass rates and reserved preferential parking spaces for those who carpool can also incentivize sharing the ride among students, faculty, and staff. Other parking policies can apply to certain groups of drivers. For example, some universities limit first year students' access to parking on campus. This policy's effect is two-fold: (1) Not as many people can park on campus, and (2) first-year students learn to find other ways to access the campus without driving.

UCF should work with students, faculty, and staff who use alternative modes to ensure they are registered with the reThink Your Commute program in order to access the Reimbursable Rides reward. The reward provides reimbursement for the cost of transportation to or from work (or school) if their regular commute is not available. For example, if a child becomes ill, a parent who usually rides transit and is enrolled in the program can request reimbursement for the cost of a taxi to quickly get to their child.

UCF Parking and Transportation Department Messaging

It is recommended that UCF conduct a comprehensive review of its website and other marketing materials related to transportation on campus. There are opportunities to structure materials to better promote transit and other alternative modes as opposed to driving. The following observations provide a few ideas that could be considered in this review:

- Most of the quick-access buttons on the Parking and Transportation Department website are related to parking. Information on cycling or walking is much harder to find. This information could be restructured to promote all modes equally.
- Even the name of the department itself seems to elevate driving over other modes as parking is separated from transportation. This idea is reinforced when one goes to the parking portion of the website and finds that it only addresses automobile parking as opposed to bicycle parking.
- UCF provides a real-time map for tracking campus shuttle services through desktop and mobile phone applications. This is a great feature, but it is not integrated with LYNX services. Transit users must switch between LYNX and UCF shuttle service webpages/applications in order to plan and track their trip. Adding the ability to seamlessly trip plan and find real-time information related to transit service, regardless of operator, would make transit usage easier.
- UCF also provides a static map of all campus shuttle services that is useful for trip planning purposes. It is recommended that this static map be revised to include the transit routes to make it easier for users to understand the path of the various shuttles. The current map

requires the user to look up the services provided at each stop individually which can be time-consuming and confusing.

- The information regarding LYNX services should be rewritten and given more prominence on the UCF website. The language should be rewritten to be clearer and easier to understand. The current language reads "Parking and Transportation Services has partnered with Lynx, the Central Florida Transit Authority to provide complimentary access to routes on-board Lynx shuttles." It is recommended that this information be simplified and clarified, such as "UCF students, faculty, and staff ride LYNX for free with their UCF ID."

Transportation Management Organization (TMO)

Historically, CFRP has benefitted from a Transportation Management Organization (TMO), which is a public/private partnership formed between employers, developers, building owners, and others to work collectively on TDM strategies for the benefit of a specific area. It is recommended that the implementation of a new TMO in the CFRP would provide structure and accountability to assist in reducing traffic congestion. The creation of a CFRP and Quadrangle TMO to cover both the CFRP and Quadrangle DRI employment centers may be the most efficient way to launch this effort.

Transit Marketing

This recommendation is related to developing a comprehensive transit marketing program for the UCF/CFRP area. If a TMO were established, this effort could be undertaken by that organization.

Transit Service Streamlining

UCF and LYNX should work together to streamline transit services between the two providers, even considering the integration of service to one operator. It should also include a review of transfer timings between services to optimize connections.

Special Transit Benefits Zone

Providing free transit service encourages the use of public transportation and, typically, increases ridership. A fare-free zone in the UCF/CFRP area would make transit easier to use and encourage all UCF students, staff, faculty, and visitors to use it. Coupling the fare-free zone with other transit benefits, such as those under the UCF parking policy section, could encourage transit use.

Real-Time Transit Information

Real-time transit information is crucial to providing an efficient transit service experience for riders. Riders that have access to real-time tracking information can use the information to decrease their average wait times. Under this recommendation, real-time transit data would be provided for all LYNX and UCF Shuttles. At present, real-time data is provided for UCF shuttles via computer desktop or smart phone application, but this system does not include LYNX services. It is recommended that LYNX services be added to the system.

Integrate Micromobility Options

Micromobility options can assist in attracting riders to transit services. Connectivity between the transit vehicle and a rider's origin or ultimate destination can be difficult. Micromobility can be used to address these first mile/last mile issues. Examples include bicycle and scooter sharing programs. An expanded program to provide free bicycle or scooter sharing services for those who ride transit could encourage transit usage at and to UCF.

Improve LYNX Bus Facilities and Stations at UCF

LYNX bus facilities at UCF should serve as a focal point for the community. Having an attractive and welcoming facility encourages riders to spend time at the facility and use transit services. The LYNX Superstop on the UCF campus currently has some of these amenities. Under this recommendation, the following amenities are recommended for incorporation into LYNX bus facilities on UCF's campus:

- Charging stations
- Wi-Fi
- Vending machines and/or food vendors
- Increased protection from outside weather elements (e.g., inside waiting rooms with air conditioning)
- Real-time arrival information signs
- Lockers
- Other elements based on input from students, staff, and faculty

Active Transportation Commuter Stations

Similar in concept to a transit "SuperStop", a commuter station for active transportation users can make these modes more attractive and more likely to be adopted. Active transportation includes walking and biking, as well as any new transportation option that requires that the traveler be exposed to weather and other environmental elements. These Active Transportation Commuter Stations should include single-unit showers and lockers, as well as other amenities that make it easier to address personal hygiene before reporting to work or class. Individual memberships could be established to monitor and restrict access to the facility to assure security for those who use the stations regularly.

Dedicated Traffic Safety Instructor

Dangerous by Design found that Florida led the nation in pedestrian fatalities in 2021. The roads used to travel to UCF have some of the highest rates of traffic crashes and pedestrian fatalities, which contribute to the reoccurrence of Central Florida topping the *Dangerous by Design* list each year.

There are many engineering and enforcement strategies that can be used to combat this issue, but an additional educational strategy is for UCF and/or a TMO to fund an employee position

dedicated to educating faculty, staff, and students on transportation safety. Education should focus on all modes and should include education programs aimed at vulnerable users (pedestrian, cyclist, scooters) as well as those interacting with vulnerable users such as drivers. Care should be given to address safety conflicts between vulnerable users as well such as educating drivers on how to safely pass cyclists. This dedicated Traffic Safety Instructor can coordinate with the TMO to set goals and monitor outcomes of various safety education initiatives.

Dedicated Lanes/Paths for Cyclists/Scooters

Separated facilities for individuals using bicycles and scooters would provide a safer environment for those users as well as pedestrians. Separate facilities may also attract more users to these modes. Separated facilities could include separate paths as well as separate lanes on roadways.

Under this recommendation, a study should be conducted to determine the best location for protected paths and lanes for cyclists and scooters. Once locations have been identified, a network of protected lanes/paths can be implemented.

Wayfinding Signs

UCF students, faculty, staff, and visitors would benefit from increased wayfinding signs. Wayfinding signs help individuals navigate the complex campus by providing useful information. It is recommended that wayfinding signs be placed at every UCF Shuttle and LYNX bus stop to help disembarking passengers easily find their intended destinations. It is also important for signage at each stop to help individuals understand how to use the bus system to access other destinations.

Grocery Service Improvements for UCF Shuttle

UCF currently operates a grocery store shuttle once a week during active student sessions. This service is presumably primarily targeting individuals who live on campus. It may be beneficial to increase the frequency of this service or offer service to different shopping destinations throughout the week to encourage students not to bring their cars to campus.

Transit Signal Priority and Queue Jumps

In addition to Transit Signal Priority (TSP), Queue Jumps (QJ) serve as a tool to improve traffic flow for transit vehicles. Queue jumps have a short additional lane reserved for transit vehicles at traffic signals. Transit vehicles enter these lanes during the red-light cycle and that lane is given a green light sooner than the other lanes. This head start allows the transit vehicle to return to the regular travel lanes ahead of other traffic. Under this recommendation, a study of TSP and QJ opportunities could be undertaken for SR 50 and Alafaya Trail.

Based on national evidence provided by FHWA for moderate transit that has BRT and bus frequencies less than or equal to 20 minutes combined with TDM strategies can have a vehicle trip reduction of 5-15%.

17.4 ITS IMPROVEMENTS/EMERGING TECHNOLOGIES

Of the ITS improvements identified for the study area, implementation of an adaptive signal system for the SR 50 corridor within the study corridor in the short-term is expected to improve operations on SR 50.

For the mid-term (beyond 2025), the study recommended that Bluetooth or speed/volume devices be installed for use with Dynamic Message Signs on SR 50 and Alafaya Trail. The other recommendation is to make the major roadway corridors ready for AV/CV technologies.

The recommendations listed in **Table 17-2** illustrate both short-term and mid-term improvements and includes some of the improvements identified in the 2017 MetroPlan Orlando ITS Masterplan.

In addition, there is a current Initiative termed as "ATTAIN Central Florida" funded by FHWA and local matching funds to deploy smart technologies in Central Florida. Some of the programs of interest to the NEOCATS area are 1) PedSafe – which include Innovative pedestrian/bicycle collision avoidance system that will operate with CV technologies. There is a Pilot deployment at/between signals on Alafaya Trail adjacent to UCF; 2) Greenway – where CV technologies will be installed at 33 signals in Orange County. These will initially be used by UCF Transit/First Responder Vehicles; and 3) Smart Community – which includes FDOT District 5's first autonomous vehicles (AVs) that are currently being tested at UCF.

TABLE 17-2: ITS IMPROVEMENTS/EMERGING TECHNOLOGIES

Period	ITS Project	Description
Short-term	SR 50 Adaptive Signal System (Forsyth Rd to Avalon Park Blvd)	Install an adaptive signal system
	Intelligent Transportation Systems/Customer Information Systems/Travel Planning	Test upcoming transit technologies and real time transit dissemination applications
	Data Sharing Application	Access real-time information from other agencies (dashboard with performance measures, and tools to measure performance and communicate information)
	Active Arterial Management (AAM)	AAM is a collection of strategies for managed corridors and an integrated regional system. Strategies include traveler information, signal timing, and more.
Mid-term	Connected Vehicle Pilot Project	Test connected vehicle strategies
	UCF - Bicycle and Pedestrian Innovative ITS Solution	Install bicycle and pedestrian ITS technologies

Period	ITS Project	Description
	CAV Technology Ready Corridors	Vehicle-to-vehicle (V2V) & Vehicle-to-Infrastructure (V2I), Road-side Units & Communications Infrastructure Congestion alerts, collision avoidance, weather alerts, blind spot alerts, pedestrians nearby etc. Can be combined with adaptive traffic control system
	Install speed/volume sensors, Bluetooth devices, and Arterial DMS (ADMS)	Disseminate real-time traffic information, detour routing for incidents, construction & event information Measure near real-time/historic travel time & origin-destination information for performance reporting and optimization

18 COST ESTIMATES

Detailed cost estimates prepared for some projects were used when available. In all other cases, projects cost estimates were calculated using various sources of information. The cost for capacity improvements are based on average unit cost per lane mile provided by Orange County for the year 2021. As such, the cost estimates for this study are for the year 2021. The average cost per lane mile includes roadway conceptual analysis (RCA), design, mitigation, right-of-way, construction estimates. In addition, a 15% of average construction cost is added to get the total average unit cost per lane mile. This cost is used for both adding a through lane or a turn lane. For new roadways, shared use paths, sidewalks, mid-block crossings and other improvement types, the estimates are based on average unit costs per centerline mile by facility and improvement type and were calculated using Long Range Estimates (LRE) as identified by FDOT in October 2021, historic costs from FDOT Five Year Work Program, MetroPlan Orlando 2045 Metropolitan Transportation Plan (2045 MTP) (revised March 2022), UCF and Alafaya Trail Pedestrian Safety Study, Woodbury Road RCA Study (March 2021), and Orange County Trails Master Plan.

Costs per mile for safety improvements were developed based on high-level estimates using FDOT six month moving statewide averages of typical improvements such as lighting, installation of crosswalks, advance intersection warning signs, and signal improvements. Similarly, costs per mile for Intelligent Transportation Systems (ITS) improvements were developed based on costs provided in the latest 2017 MetroPlan Orlando ITS Masterplan.

When using FDOT LRE construction costs, standard percentage-based contingencies from the 2045 MTP are used for estimating Planning/Project Development and Environmental (PD&E), Preliminary Engineering/Design (PE) phase costs, Right of Way (ROW) acquisition, Environmental Mitigation (ENV), and Construction Engineering Inspection (CEI). To provide a uniform dollar value for the estimates, costs that are not from 2021 were adjusted based on published FDOT inflation factors (Source: Office of Work Program and Budget).

Cost estimates were prepared for the No Build and two Build alternatives for the roadway, intersection, and multimodal (pedestrian/bicycle) improvements. Relevant information for the cost estimates is in **Appendix AB. Table 18-1** provides a summary of the roadway, intersection, and multimodal (pedestrian and bicycle) improvement costs for the future alternatives.

TABLE 18-1: FUTURE ALTERNATIVES COST ESTIMATES SUMMARY

Alternative	Improvements	Cost (Millions)
No Build	• SR 50 widening (4 to 6 lanes) from Avalon Park Boulevard to CR 419 • 2) Intersection improvements at University Boulevard/Rouse Road and Alafaya Trail/Corporate Boulevard intersections • Programmed multimodal (pedestrian/bicycle) improvements	$70.0
Build 1 (Cost-Feasible Plan)	• No Build Improvements • CR 419 widening (2 to 4 lanes) from SR 50 to Lake Pickett Road • Lake Pickett Road widening (2 to 4 lanes) from SR 50 to Percival Road • McCulloch Road widening (2 to 4 lanes) from North Orion Boulevard to North Tanner Road • Woodbury Road widening (2 to 4 lanes) from Lake Underhill Road to SR 50 • Intersection-specific improvements • Planned multimodal (pedestrian/bicycle) improvements	$269.0
Build 2 (Needs Plan)	• Build 1 Improvements • CR 419 widening (two to four lanes) from Lake Pickett Road to Seminole County Line • Lake Pickett Road widening (two to four lanes) from Percival Road to CR 419 • New E/W four-lane roadway between Rouse Road and Lake Pickett Road • N Tanner Road widening (two to four lanes) from Lake Pickett Road to McCulloch Road • One additional (fourth) lane in the westbound direction on SR 50 between Lake Pickett Road and Woodbury Road • Discovery Drive widening (two to four lanes) from Ingenuity Drive to Research Parkway • Intersection-specific improvements • Multimodal (pedestrian/bicycle) needs	$452.0

Notes:

1. *Cost estimates, in general, are in 2021 dollars and based on information provided by Orange County, FDOT Cost Per Mile Models for Long Range Estimating (October 2021 estimates), 2045 MTP Cost Estimates, and FDOT Five Year Work Program reported costs*
2. *Costs from FDOT Five Year Work Program are for 2016-2021 and 2022-2027 periods*
3. *The costs include all phases of a project as defined by Orange County and FDOT*

19 EVALUATION OF ALTERNATIVES

A preliminary evaluation of the No Build, Build 1, and Build 2 Alternatives was performed to estimate travel service, potential community and environmental impacts, project costs, and Benefit/Cost (B/C) ratios for comparison. For the Build 1 and Build 2 Alternatives, an individual rating was determined for each project and an average was assigned for each alternative. An evaluation matrix, provided in **Table 19-1**, was prepared for a side-by-side assessment of each alternative and its estimated impacts. Each topic within the evaluation matrix is described in this section.

TABLE 19-1: NEOCATS ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Project Alternatives		
	No Build	Build 1	Build 2
Traffic Operations & Safety			
Accommodates future traffic demand[1]	Low	Moderate	High
Provides multimodal improvements (ranking)	Good	Better	Best
Improves safety (ranking)	Good	Better	Best
Potential Community Impacts			
Right-of-Way Potentially Needed (Low/Moderate/High)[2]	Low	Moderate	High
Potential Historic/Archaeological Impacts (Low/Moderate/High)[3]	Low	Low	Low
Potential Utility Impacts (Low/Moderate/High)[3]	Moderate	Moderate	Moderate
Potential Environmental Impacts			
Wetlands (Low/Moderate/High)[3]	Low	Moderate	Moderate
Floodplains (Low/Moderate/High)[3]	Moderate	Moderate	High
Threatened & Endangered Species (Low/Moderate/High)[3]	Low	Low	Low
Potential Contamination Sites (Low/Moderate/High)[3]	Moderate	Moderate	Moderate
Estimated Project Cost ($ Million)[4]			
Estimated Total Cost	70.0	269.0	452.0
B/C Ratio Relative to No Build Alternative[5]			
Value	-	11.7	7.6

Notes:

1. *Based on the number of failing study roadway segments and intersections*
2. *Based on available parcel data from Orange County Property Appraiser*
3. *Based on NEOCATS Existing Environmental Conditions Report*
4. *Based on cost estimates provided for the roadway, intersection and multimodal (pedestrian/bicycle) improvements*
5. *B/C ratio is calculated for operational benefits (time and fuel saved) of the two Build Alternatives relative to the No Build Alternative. Only roadway and intersection improvement costs are considered in the B/C ratio calculations*

19.1 TRAFFIC OPERATIONS & SAFETY

As summarized in this Chapter, the No Build Alternative will not meet the capacity needs and will not provide adequate LOS for the study roadways and intersections by the year 2045.

The Build 1 Alternative (Cost Feasible Plan) intersection-specific improvements are anticipated to mitigate the majority of the study intersections, however, several roadway segments and the majority of the study intersections on SR 50 will still exceed capacity.

The reason is that without the alternative route to SR 50 (new E/W roadway) and widening of CR 419, Lake Pickett Road, and N Tanner Road, the traffic demand on some of the study roadways in Build 1 Alternative significantly exceeds the available roadway capacity.

With the Build 2 Alternative (Needs Plan) improvements, the study roadways and intersections are expected to provide adequate capacity to meet the 2045 traffic demands. These improvements will improve safety, mobility, and connectivity for all the road users, while supporting future growth in the NEOCATS area.

19.2 POTENTIAL COMMUNITY IMPACTS

19.2.1 Right-of-Way

Each study alternative was analyzed utilizing Orange County Property Appraiser's data to determine the anticipated right-of-way needs. The No Build Alternative is anticipated to have low right-of-way impacts. It is anticipated a moderate level of right-of-way impacts will be associated with the Lake Pickett Road and McCulloch Road Build 1 Alternative projects, resulting in a moderate average rating for the Build 1 Alternative. The majority of Build 2 Alternative projects are anticipated to require a high level of right-of-way impacts, resulting in a high average rating for the Build 2 Alternative.

19.2.2 Historic/Archaeological

The historic and archaeological features for the study area were assessed and documented as part of the *NEOCATS Existing Environmental Conditions Report*, provided in **Appendix P**. The study alternatives were analyzed in the context of the documented historic and archaeological features within the study area to determine the potential impacts associated with each alternative.

The analysis concluded a low level of impacts to historic and archaeological features is anticipated for the three study alternatives: No Build, Build 1, and Build 2.

19.2.3 Utility

Existing utilities information was researched and compiled as part of the *NEOCATS Existing Environmental Conditions Report*, provided in **Appendix P**. Due to the size of the study area, research was performed with a focus on major utilities and existing utility facilities in easements or on property owned by the utility company. This approach allows for the identification of possible fatal flaws with existing utilities and potential additional costs due to reimbursable utility

relocations. Types of major utilities include transmission electric lines, power substations, transmission water/wastewater mains, municipal treatment facilities, water towers/tanks, booster pump stations, large natural gas pipelines, petroleum pipelines, cell towers, and large communication duct banks.

The study alternatives were analyzed in the context of the compiled existing utilities for the study area to determine potential impacts associated with each alternative. The analysis concluded a moderate level of impacts to existing utilities is anticipated for the three study alternatives: No Build, Build 1, and Build 2.

19.3 POTENTIAL ENVIRONMENTAL IMPACTS

19.3.1 Wetlands

The extent of wetlands and surface waters within the study area was determined as part of the *NEOCATS Existing Environmental Conditions Report*, provided in **Appendix P**, via a desktop Geographic Information System (GIS) analysis using a combination of the St. Johns River Water Management District (SJRWMD) Land Use/Land Cover data, U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data, and U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soils data.

The study alternatives were analyzed in the context of the identified wetlands and surface waters for the study area to determine potential impacts associated with each alternative. The No Build Alternative is anticipated to have a low wetland impact. It is anticipated a moderate level of wetland impacts will be associated with the Chuluota Road and McCulloch Road Build 1 Alternative projects, resulting in a moderate average rating for the Build 1 Alternative.

High impacts to wetlands are anticipated for the new E/W roadway segments under Build 2 Alternative. Moderate impacts to wetlands are anticipated for the N Tanner Road and Chuluota Road Build 2 Alternative projects. These assignments resulted in a moderate rating for the Build 2 Alternative.

19.3.2 Floodplains

The extent of floodplains and floodways within the project study area was determined as part of the *NEOCATS Existing Environmental Conditions Report*, provided in **Appendix P**, via a desktop GIS analysis using the Federal Emergency Management Agency (FEMA) Flood Hazard data from October 2020.

The study alternatives were analyzed in the context of the identified floodplain areas for the study area to determine potential impacts associated with each alternative. The No Build Alternative is anticipated to have a moderate impact to floodplains. It is anticipated a moderate level of floodplain impacts will be associated with the Chuluota Road and McCulloch Road Build 1 Alternative projects, resulting in a moderate average rating for the Build 1 Alternative.

For the Build 2 Alternative, high impacts to floodplains are anticipated with the N Tanner Road, Lake Pickett Road, and the two Research Parkway extension projects. Additionally, moderate impacts to floodplains are anticipated for the Chuluota Road Build 2 Alternative project. These assignments resulted in a high rating for the Build 2 Alternative.

19.3.3 Threatened & Endangered Species

A threatened and endangered species assessment was conducted as part of the *NEOCATS Existing Environmental Conditions Report*, provided in **Appendix P**, using GIS data collected from USFWS Wood Stork Colony Core Foraging Area Maps, USFWS Consultation Areas, Florida Fish and Wildlife Conservation Commission (FWC) Bald Eagle Nests, and FWC Imperiled and Managed Species Lists and Occurrence Data.

The study alternatives were analyzed in the context of the species assessment for the study area to determine potential impacts associated with each alternative. The analysis concluded a low level of impacts to threatened and endangered species is anticipated for the three study alternatives: No Build, Build 1, and Build 2.

19.3.4 Contamination Sites

Contaminated sites within the study area were identified as part of the *NEOCATS Existing Environmental Conditions Report*, provided in **Appendix P**, using data made available by the Florida Department of Health (DOH) and the Florida Department of Environmental Protection (FDEP). The study alternatives were analyzed in the context of the identified contamination sites for the study area to determine potential impacts associated with each alternative.

The analysis concluded a moderate level of contamination impacts for all three alternatives. This is primarily due to the concentration of contamination sites present along the SR 50 corridor.

19.4 B/C ANALYSIS

A B/C analysis was performed for the two Build Alternatives based on traffic operational benefits derived using time and fuel savings, and planning-level cost estimates. The time and fuel savings are calculated for the proposed improvements as part of the two Build Alternatives. Planning-level cost estimates are discussed in Section 18. For the B/C analysis, multimodal improvement costs are excluded from the total project costs discussed in Section 18.

Benefits are calculated for 20 years using Synchro-based networkwide measures of effectiveness (MOEs) including total delay (vehicle-hours) and fuel consumption (gallons) for the years 2025, 2035, and 2045 (as the anchor points) and interpolated values for the other years. The benefits are defined in terms of yearly cost savings associated with a reduction in the total delay values and fuel consumption. The benefits are calculated for six hours (3 AM and 3 PM hours) in a day and 300 days in a year accounting for reduced benefits anticipated due to lower traffic volumes during the off-peak hours and weekends. The latest value of delay time per hour ($20.17) for the year 2020 was obtained from "2021 Urban Mobility Report" published by Texas A&M

Transportation Institute. The price of one gallon of fuel ($3.53) was obtained from the website: gasprices.aaa.com on 08/24/2022.

The analysis yields B/C ratios of 11.7 and 7.6 for the Build 1 and Build 2 Alternatives, respectively. The calculated B/C ratio for each of the build alternatives indicates that the anticipated benefits outweigh the estimated costs for the proposed Build 1 and Build 2 modifications, with benefits derived through reduced costs associated with lower delay. Other benefits such as improved safety were not considered in the analysis. The operational annual user benefits and B/C calculations are provided in **Appendix AC**. As illustrated in **Table 19-1**, Build Alternative 1 provides a better B/C ratio compared with Build Alternative 2.

19.5 CONCLUSION

An analysis of the factors presented in the evaluation matrix (**Table 19-1**) revealed while there are no or minimum direct impacts associated with the No-Build Alternative, the study roadways under this alternative will exceed capacity for the majority of the study roadway segments by the year 2045, representing overcapacity conditions. Additionally, safety conditions will worsen without adequate improvements to support the increased traffic.

The intersection-specific improvements under Build 1 Alternative are anticipated to mitigate the majority of the study intersections, however, several roadway segments and some study intersections will still exceed capacity. As with the No Build Alternative, safety conditions will decrease without adequate improvements to support the increased traffic, especially on SR 50. Build 1 Alternative will cost approximately $199 Million more than the No Build Alternative and has an estimated B/C ratio of 11.7 (relative to the No Build Alternative).

With Build 2 Alternative (Needs Plan) improvements, the study roadways and intersections are expected to provide adequate capacity to meet the 2045 traffic demands. These improvements will improve safety, mobility, and connectivity for all the road users, while supporting future growth in the NEOCATS area. Build 2 Alternative will cost approximately $382 million and $183 million more than the No Build and Build 1 alternatives, respectively, and has an estimated B/C ratio of 7.6 (relative to the No Build Alternative). Also, Build 2 Alternative will have the highest community and environmental impacts to the surrounding area.

Conclusions/Next Steps will be added after LPA/BCC meetings are completed in September/October 2022.