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Chapter 1 Study Purpose and Scope

Purpose

The University of Central Florida (UCF), located in east Orange County, currently has the highest number of enrolled students in the U.S., with about 63,000 students as of 2016. UCF has grown significantly since 1963. Recent growth at UCF has increased enrollment from about 34,000 students in year 2000 to its present level. This growth has included the addition of classroom facilities, student dormitories, a football stadium (approximately 45,000 seats), and many other enhancements. With this growth, residential developments serving the housing of the students have been constructed nearby the UCF campus. Also, a number of commercial developments (retail centers and restaurants) have been established that serve UCF and the surrounding residences. This has resulted in a continued increase in pedestrian and bicycle traffic along the State and County roads adjacent to the UCF campus.

As shown in Figure 1-1, UCF is located adjacent to a number of major roadways, including Alafaya Trail (SR 434), McCulloch Road, and University Boulevard. These major roadways serve high volumes of vehicular traffic, as well as pedestrian and bicycle traffic (many with origins or destinations within UCF). As the mixture of the vehicular, pedestrian and bicycle traffic has grown, a number of crashes involving pedestrians or bicycles with vehicles have occurred along the roadways around UCF. Between 2006 and 2014, 259 crashes involving pedestrians or bicycles have occurred along Alafaya Trail, University Boulevard, and McCulloch Road, of which, 11 were fatalities and 207 were injuries.

Recognizing the importance of safety surrounding the University, the leadership of Orange County, the Florida Department of Transportation (FDOT) and UCF formed an alliance to initiate a safety study with a strong determination to fund data-driven recommendations. Orange County commissioned this Pedestrian Safety Study to analyze the conditions and causes of the vehicular crashes with pedestrians and bicycles and develop a plan of countermeasures to reduce the crashes and improve safety for people walking and riding bicycles.

Scope and Study Limits

The Orange County staff, with its consultant team Luke Transportation Engineering Consultants, Inc. (LTEC), developed a scope of tasks to complete the UCF/Alafaya Trail Pedestrian Safety Study. The scope included the following tasks:

1: Review of Existing Studies and Development Plans
2: Traffic Data Collection and Observations
3: Roadway Characteristics, Recent Roadway Plans and Crash Data
4: Evaluation of Data and Plans
5: Coordination/Meetings with County, Study Core Group and Stakeholders
6: Potential Pedestrian Crossing Facilities and Strategies
7: Recommendations and Report
Figure 1-1: Study Area
Study Limits

The initial scope of work developed for the UCF/Alafaya Trail Pedestrian Safety Study included approximately 2.7 miles of roadway, specifically:

- Alafaya Trail - between and including the intersections of Challenger Parkway and Gemini Boulevard
- University Boulevard - between and including the intersections of Systems Way and Alafaya Trail

After the initial coordination for the study, the study limits were expanded to include:

- Alafaya Trail- from Gemini Boulevard to and including McCulloch Road
- University Boulevard- from Systems Way to and including Rouse Road
- McCulloch Road- from Alafaya Trail to and including Orion Boulevard

This expansion added another 1.9 miles of roadway, resulting in a total study area of 4.6 miles. Figure 1-1 depicts the 4.6-mile study area limits.

The following summarizes the roadway characteristics within the study limits:

- Alafaya Trail is a six-lane principal arterial with sidewalks, has a posted speed limit of 45 mph and is served by nine (9) signalized intersections.
- University Boulevard is a six-lane minor arterial with sidewalks, has a posted speed limit of 45 mph and is currently served by two (2) additional signalized intersections.
- McCulloch Road, within the study limits, is a four-lane urban collector with a sidewalk on one side, has a posted speed limit of 45 mph and one (1) additional signalized intersection.

Scope Description and Approach

Review of Existing Studies & Development Plans

Reports completed previously for Alafaya Trail, University Boulevard, and McCulloch Road by Orange County and FDOT were obtained and reviewed. These included:

- Pedestrian and Bicycle Study for University Boulevard from SR 436 to SR 434 (Orange County- August 2013)
- SR 434 (Alafaya Trail) Access Management Study- From North of SR 50 to South Centaurus Dr/Westinghouse Dr (FDOT- July 2010)
- SR 434/Alafaya Trail Corridor Study (FDOT- February 2014)

The review focused on data, analysis and recommendations for the roadway corridors within the study area limits of the UCF/Alafaya Trail Pedestrian Safety Study. These studies contained counts of vehicle, and pedestrians at all of the study intersections along Alafaya Trail, University Boulevard, and McCulloch Road. In addition, representatives from UCF provided information from the UCF Master Plan pertinent to the UCF/Alafaya Trail Pedestrian Safety Study.
Traffic Data Collection and Observations
As part of the UCF/Alafaya Trail Pedestrian Safety Study, a field review of the study area roadways was completed to determine a plan to conduct counts of pedestrians and bicycles. The focus of the counts was the pedestrian and bicycle volumes and included the twelve (12) signalized intersections within the study limits. The counts were conducted to collect volumes and movements of all pedestrians and bicycles along the sidewalks and cross streets within the study limits of Alafaya Trail, University Boulevard, and McCulloch Road. The periods of the counts covered representative weekday and weekend conditions, including:

- Weekday morning, mid-day and afternoon peak periods
- Friday evening 8:00 pm to 2:00 a.m. Saturday
- Saturday in advance of a UCF football game (Homecoming October 24-26), from 2:00 pm to 5:00 pm
- Saturday after the UCF football game, from 8:00 pm to 2:00 a.m. Sunday morning

In addition, 48-hour directional vehicle volume/speed counts were conducted for two (2) segments on Alafaya Trail and University Boulevard. Also, video cameras were placed at McCulloch Road and Orion Boulevard to collect observations of operations.

Roadway Characteristics, Recent Roadway Plans and Crash Data
Historic crash data for more than eight (8) years was obtained from the University of Florida’s Signal 4 Analytics Statewide Crash Database. The crash data was reviewed, categorized and summarized. The crash data was evaluated to identify the crashes that involved pedestrians or bicycles. Detailed evaluation was completed of the pedestrian or bicycle crashes that involved fatalities. Also, through the field review and the review of the existing studies, an inventory of the critical elements of the cross-sections within the study limits was assembled.

Evaluation of Data and Plans
The study roadway limits were evaluated based on the information and data from existing studies, traffic data, crash data, and observations to identify critical roadway elements where operational issues occur. Based on this evaluation, a “toolbox” of potential countermeasures was developed.

Coordination Meetings with County, Study Core Group and Stakeholders
As part of the study effort, numerous meetings were held with County staff, a Core Group, and stakeholders. The Core Group was made up of representatives of the key agencies that were perceived by the County staff to have expert input into the identification of the issues and development of solutions for the UCF/Alafaya Trail Pedestrian Safety Study. The Core Group identified included representatives from FDOT, Orange County, UCF, Bike/Walk Central Florida, the Central Florida Research Park, Orange County Sheriff’s Office, Seminole County, MetroPlan Orlando, and others. A series of presentations and meetings were held with the Core Group. Also, Stakeholders were identified that included representatives from the major residential and commercial developments and properties within the Study Area. Stakeholders were interviewed to provide, primarily, input to identification of the operational issues and safety concerns.
Potential Pedestrian Crossing Facilities and Strategies
Based on the evaluation of the toolbox of potential countermeasures, along with input from the Core Group and County staff and the analysis of the data collected, alternative improvement plans were developed. The alternative plans were evaluated to estimate:

- Effectiveness to address the pedestrian and bicycle safety needs within the Study Area
- Schedule and costs to implement
- General impacts to traffic operations
- General potential funding sources and strategies to implement the alternative improvement plans

Recommendations and Report
Using the data compiled and analysis completed, conceptual plans and strategies were developed from the initial counter measures identified. These conceptual plans and strategies were developed in both the short-range and long-range context. The plans and strategies were discussed and reviewed with the Core Group and County staff, with a focus on input from FDOT and UCF.

Preliminary cost estimates were also prepared for the short-term plans and strategies. The next phase of tasks was also determined to advance the conceptual plans and strategies.

The study and work effort is summarized in this report.
Chapter 2 Public Outreach Activities

The study team worked closely with the area’s stakeholders, providing background information related to pedestrian and bicycle safety in the UCF area. The input received was used along with the collected data and the technical evaluations to make key decisions throughout the study. Outreach for this study focused on two activities: a Core Group of advisors and additional stakeholder interviews. The contributions of both activities are described here.

Core Group

The Core Group was created specifically for this study with the group serving as advisors to the study team. The group’s membership reflected the range of area stakeholders.

• University of Central Florida
  o Neighborhood Relations and Safety – Student Affairs
  o Student Government Association
  o Administration and Finance
  o Police Department
  o University Relations
  o Facilities
  o Board of Trustees Chairman – Marcos Marchena

• Florida Department of Transportation
  o Traffic Operations
  o Planning and Corridor Development
  o Infrastructure – Safety
  o Bicycle/Pedestrian

• Agencies
  o Florida Highway Patrol – Motors Team
  o MetroPlan Orlando
  o LYNX

• Advocacy Groups
  o Florida Highway Patrol
  o Central Florida Research Park
  o LYNX
  o Bike/Walk Central Florida
  o Pointe at Central (major residential community)
  o University House (major residential community)
  o Sterling Apartments (major residential community)

• Orange County
  o Traffic Engineering (including School Safety Coordinator)
  o Community, Environmental & Development Services (CEDS)
  o Environmental Protection Division (CEDS)
  o Commissioner Ted Edwards (District 5)
This group of advisors provided the study team with background corridor information, supplementing the other data collection activities. In addition, the group identified key safety issues, and proposed solutions. This group met four times throughout the study as key study decisions were being made. Meeting highlights are provided here with the meeting summaries located in Appendix A.

**Meeting 1 – October 6, 2014**
The purpose of this meeting was to introduce the study to the group and to listen to input. The study team provided a project overview and reviewed the study parameters. The Core Group discussion followed, providing additional background information and items for consideration as the study moved forward. It was noted that the University of Central Florida (UCF) was updating the campus master plan, crash data were available through MetroPlan Orlando, and LYNX has a super stop on the UCF campus. The group wanted the study team to consider: safety factors, design features, use of examples from other similar settings, and using this opportunity to create a sense of place as well as to integrate safety education with design elements.

**Meeting 2 – February 11, 2015**
This meeting focused on the data collection activities, which covered: stakeholder interview highlights; previous crash data analysis; data collection update; mitigation strategies/starter ideas; schedule; and next steps. The following design principles are to be used as a set of safety recommendations are developed: accessibility, connections, legibility, safety, and comfort. The group suggested that the following items be considered as solutions are being developed: account for new activity at UCF (including the proposed hotel/conference center along Alafaya Trail), complete the roadway network, expand the existing UCF night time shuttle, look at ways to create a gateway for the area and the UCF campus, and provide driveway signage due to the large number of crashes.

**Meeting 3 – August 17, 2015**
The purpose of this meeting was to: review the toolbox of approved countermeasures and solutions, review starter ideas and improvement concepts, and discuss recommendations and cost estimates. Starter ideas were shared, providing examples of how this area could transform into a safe, more balanced transportation corridor while also creating an identity for the UCF area. The implementation strategies and recommendations were vetted by UCF and FDOT before sharing with the Core Group and were generally accepted. The group wanted the study team to consider: east-west movement as well as north-south, look at short term and long term solutions and funding strategies, and include education as part of the recommendations.

**Meeting 4 – February 17, 2016**
At this final meeting of the Core Group, the following topics were covered: overview of public outreach, data analysis highlights, pedestrian channelization options, recommendations, review of capital and maintenance costs, and next steps.
Input from the Core Group included: 1) a Memorandum of Understanding (MOU) will need to be in place before moving forward into design, 2) need to have “bricks and mortar” projects among the short term solutions as visual cues that changes are underway, and 3) LYNX can only move bus shelters once every five years. Some short term solutions that were offered included: enhancing the UCF shuttle service, landscaping within the medians and edge of curb, pedestrian channelization (e.g. attractive fencing), pedestrian lighting, and enhanced or relocated bus shelters. Other improvements that can be made within three years would be signalization and median modifications. Intersection improvements would take longer to implement.

**Stakeholder Interviews**

To supplement the Core Group input and the data collection activities, the study team conducted six stakeholder interviews, from November 17, 2014 through November 21, 2014. The interviewed stakeholders were:

- Central Florida Research Park (research/office park located south of UCF);
- Knights Circle (largest single, off-site college residential complex in the US with 2500 residents);
- Northview (newer residential complex north of UCF with 600 residents, and home to two faith based community centers – Hillel and Catholic campus ministries);
- University Apartments (28-year old residential community not affiliated with UCF with 180 residents);
- Plaza on University (mixed use community with retail on the group level and 1,309 residents); and
- The Edge Orlando (930 residents with 100% occupancy).

The same questions were asked at each interview with discussion focusing on mobility issues and potential solutions. Individuals also provided additional observations for consideration as the study progresses. There was consensus on these issues:

- Alafaya Trail is dangerous for all modes, especially pedestrians; need for additional crosswalks with signals;
- Distracted pedestrians and drivers contribute to the dangerous traveling environment along Alafaya Trail;
- UCF shuttle is asset and is well used; would like expansion of service
- Need to fill in sidewalk gaps;
- Need to establish visual cues to convey that one is in a different setting (more pedestrians, less high speed vehicles);
- Mix of pedestrians trip purposes; recreational as well as travel to/from UCF;
- Need more lighting/reflective surfaces for safer night time environment; and
- Need broader education/awareness of setting as move through it (not a high speed raceway).
Public Meetings and Hearings

Community Public Meeting – May 18, 2016

The County hosted a public meeting on Wednesday, May 18, 2016 at the Union Park Middle School. The purpose of this public meeting was to present the findings of the data collection, along with observed challenges to pedestrians/bicyclists, and to engage the public to obtain their feedback on strategies for viable pedestrian safety countermeasures. Prior to the presentation, a two-part public questionnaire was conducted. Part A of the questionnaire gathered feedback on how the meeting participants traveled within the corridor and on what improvements or changes would be needed to encourage more drivers, bicyclists and pedestrians to adhere to traffic laws and the “rules of the road”. It also asked meeting participants to prioritize the top five improvements that they felt would more effectively improve safety along/across the study roads. Part B of the questionnaire asked participants to indicate whether or not they agreed with the locations of the two recommended mid-block crossings, provide alternative crossing locations if they disagreed, and identify on the display map the locations where they had experienced or witnessed near misses or where there is poor lighting and visibility. The results of the questionnaire received are summarized below:

Part A (4 questionnaires received):

- 2 of 4 travel within the study corridors daily via car. One daily traveler bikes.
- 1 of 4 travels within the corridor weekly by bike.
- 0 of 4 uses transit
- Suggestions to encourage better behavior: more enforcement, red light cameras, narrower turns, thicker/more colorful bike lanes, more signage at intersections to yield to pedestrians/share the road, flashing pedestrian lights at crossings, education to UCF students and via social media
- Priorities ranged but generally followed the suggestions provided for each questionnaire

Part B (2 questionnaires received): Neither agreed with the mid-block crossing locations and suggested alternative crosswalks were at the intersections along Alafya Trail and McCulloch Road. Four near miss locations were indicated on the display maps. Generally, the comments and recommendations obtained via the questionnaire and heard during the meeting support the recommendations of the study.

Local Planning Agency (LPA) Work Session and Public Hearing

The Study findings and recommendations were presented to the Local Planning Agency as a Work Session item on March 17, 2016 and as a public hearing item at the LPA’s July 21, 2016 and August 18, 2016 public hearings. Questions from the LPA Commission during the Work Session were relative to possible responses and actions by law enforcement. County staff solicited feedback/input from local law enforcement (including UCF Campus Police Department, Orange County Sheriff’s Office and Florida Highway Patrol) through the Core Group meetings. County staff also conducted follow up telephone interviews with Florida Highway Patrol and Orange County Sheriff’s Office regarding jurisdictional responsibility, availability and assignment of deputies toward traffic enforcement, response times, and how traffic complaints and incidents
are processed and tracked. Florida Highway Patrol (FHP) provides law enforcement on Alafaya Trail because it is a state facility. FHP assigns eight (8) troopers to Orange County. FHP indicated that UCF is not a high priority area for speed enforcement, and speed enforcement is provided when possible. The eight troopers predominantly respond to high crash areas: Interstate 4, toll facilities, Orange Blossom Trail, State Road 50 and State Road 436. FHP partners with the University Policy Department on UCF Safety Days to provide safety education focused on distracted driving. Orange County Sheriff’s Office (OCSO) provides law enforcement on all of University Boulevard and only the south side of McCulloch Road (complaints or issues occurring on the north side of McCulloch Road are handled by Seminole County Sheriff’s Office). OCSO’s Motors Unit assigns six (6) deputies in the East Squad (covering Seminole County line to UCF Campus) to respond to traffic, speeding and school bus issues. The Patrols Unit provides up to 20 deputies to respond to emergencies, traffic complaints and other services and to track traffic data.

At its July 21st public hearing, the Planning Commission did not identify any concerns with the Study Draft Final Report and Recommendations, but due to a technical error, the Study was continued to the LPA’s August 18th public hearing. At its August 18th public hearing, the Commission approved the Study Report findings and recommendations.

**Board of County Commissioners (BCC) Work Session and Public Hearing**

The Study findings and recommendations were presented to the Orange County Board of County Commissioners on May 10, 2016 as a Work Session item and on November 29, 2016 as a public hearing item. No concerns or questions were raised by the Board regarding the Final Draft Report. The Board approved the Study Report and Recommendations at its November 29th public hearing.

This final report documents the study activities, including all public involvement events and direction from the Orange County Local Planning Agency (Planning and Zoning Commission) and the Board of County Commissioners.

**Appendix A** provides the summaries of each of the Core Group Meetings and Stakeholder interviews as well as copies of the questionnaires.
Chapter 3 Data Collection and Existing Studies/Plans

This section describes the data collection for the UCF/Alafaya Trail Pedestrian Safety Study, which included extensive field surveys and data collection, as well as the review of previous studies and plans for the study area.

Existing Studies/Plans

Three studies have been recently completed for the UCF area. Each study provides safety recommendations for the area, which were considered during this pedestrian safety study:

- Pedestrian and Bicycle Study for University Boulevard from SR 436 to SR 434 (Orange County - August 2013)
- SR 434 (Alafaya Trail) Access Management Study- From North of SR 50 to South Centaurus Dr/Westinghouse Dr (FDOT - July 2010)
- SR 434/Alafaya Trail Corridor Study (FDOT - February 2014)

A related study was also completed in 2012 for McCulloch Road. The McCulloch Road Multimodal Operational Analysis (LTEC) was completed as part of the Orange County Continuing Professional Transportation Planning Engineering Services Contract. This analysis addressed existing roadway characteristics and multimodal traffic conditions for McCulloch Road from Orion Boulevard/Lockwood Boulevard and North Tanner Road/Old Lockwood Road (just east of the UCF/Alafaya Trail Pedestrian Safety Study limits).

Here are the highlights of each study.

**Pedestrian and Bicycle Study for University Boulevard from SR 436 to SR 434 – August 2013 (Orange County)**

GMB Engineers & Planners completed this study for Orange County, focusing on University Boulevard from SR 436 (S. Semoran Boulevard) to SR 434 (N. Alafaya Trail). This study focused on an evaluation of the corridor and to determine what measures could be taken to improve pedestrian and bicyclist safety within it. The following recommendations were developed, based on the results of pedestrian and vehicular volumes, crash analysis, and observations in the field.

- Construct bicycle facilities along both sides of University Boulevard from SR 436 to SR 434. Two bicycle facility options were proposed: installing bicycle lanes along both sides of University Boulevard (estimated cost of $5 million) or install wide curb lanes (estimated cost of $4 million).
- Construct a shared use path along the south side of University Boulevard from SR 436 to Lake Mirage Boulevard and from Quadrangle Boulevard/Collegiate Way to SR 434 (estimated cost of $1 million).
- Install detectable warnings on curb ramps (estimated cost of $360 each).
- Install concrete pads at bus stops to make them accessible and to provide connectivity between the sidewalk and the road edge (no cost estimate provided).
Trim shrubs to enhance visibility of certain advance guide signs (no cost estimate provided).
Replace pedestrian crossing signs with FTP-688-06 crossing signs to match existing countdown pedestrian signal heads (estimated cost of $335 each).

Additional recommendations were included for locations outside the study area for the UCF Pedestrian Safety Study.

- Install a mid-block crosswalk and Hybrid Beacon in front of Full Sail University (estimated cost of $85,000).
- Perform a traffic study to reduce westbound left turn queues at the Driggs Drive/University Park Drive intersection (estimated cost of $10,000).

Access Management Study for SR 434 (Alafaya Trail) from North of SR 50 (East Colonial Drive) to South of Centaurus Drive/Westinghouse Drive – July 2011 (Florida Department of Transportation)
Faller Davis & Associates, Inc. completed this study for the Florida Department of Transportation (FDOT), focusing on SR 434 (Alafaya Trail) from north of SR 50 (East Colonial Drive) to south of Centaurus Drive/Westinghouse Drive. Recommendations for access management along this corridor were based on results of analysis, field observations, and engineering judgment.

- The access management classification for SR 434 should remain Access Class 5.
- Median opening modifications should be made to comply with Class 5 spacing standards and to improve safety along the corridor.
- Full median openings are recommended to remain only at signalized intersection and directional median openings will be installed at regular intervals per spacing standards.
- The existing SR 434 typical section will be maintained; proposed left turn lanes at median openings and signalized intersections should be extended as feasible to accommodate additional U-turning vehicles and peak hour traffic demand.
- Proposed left turn lanes and directional median openings should be milled and resurfaced within the limits shown on the conceptual improvement diagram (provided in the study).
- Signing and pavement marking and traffic signal improvements should be installed as part of the proposed median modifications.
- The traffic signal timings along the corridor should be reviewed and optimized after construction to accommodate the modified traffic patterns.
- Signalized crosswalks should be installed across the south approach of Challenger Parkway and the north approach of Research Parkway.
- For the intersection of SR 434 and Challenger Parkway, restrict the westbound “right turn on red” movement when the east approach pedestrian phase is operating. If this does not alleviate the southbound bicycle versus westbound right turn collision trend, consideration should be given to implementing a westbound “right turn on red” restriction.
- The following improvements were recommended for the intersection of SR 434 and Science Drive/Lokanotosa Trail
o Short Term: Install updated special emphasis crosswalk pavement markings and R10-15 “Turning Traffic Must Yield to Pedestrians” signs on the signal structure facing eastbound and westbound motorist.

o Intermediate Term: Changing the eastbound lane assignment to an exclusive left turn lane and a shared through/right lane, and installing an eastbound protected-permissive left turn phase. This improvement will be implemented as part of this study.

o Long Term: Changing the eastbound lane assignment to an exclusive left turn lane and a shared through/right lane, construct a westbound left turn lane, and install eastbound/westbound protected-permissive left turn phases. If these improvements do not alleviate the side street left turn versus pedestrian collision trend, consideration should be given to installing eastbound and westbound protected-only left turn phasing.

SR 434/Alafaya Trail Corridor Study; Corridor Assessment Report – February 2014 (Florida Department of Transportation)

Ghyabi & Associates, Inc. completed this study for FDOT, in collaboration with Orange County, MetroPlan Orlando, UCF, LYNX, business owners, students, and residents. This study focused on SR 434 (Alafaya Trail) from SR 50 (Colonial Drive) to McCulloch Road/Seminole County line. The study’s purpose was to evaluate the corridor and to develop a set of recommendations for improving mobility within this corridor, thus, transforming this area using Complete Streets and Context Sensitive Design principles. The recommended alternative was based on alternatives evaluated and input received from the Project Visioning Team and other area stakeholders and citizens.

- Alternative D is recommended for Section 1 (from SR 50 to Science Drive). This alternative cross section includes: a 28-foot median; three 11-foot travel lanes in each direction; one 11-foot bus travel lane; two 4-foot bike lanes; an 8-foot sidewalk on one side with a 12-foot shared use path on the other side (buffered by a 3-foot planter strip). This alternative fits within the existing right-of-way of 122 feet.

- Alternative B is recommended for Section 2 (from Science Drive to McCulloch Road). This alternative cross section includes: a 28-foot median; three 11-foot travel lanes in each direction; one 11-foot bus travel lane; two 4-foot bike lanes; an 8-foot sidewalk on one side with a 12-foot shared use path on the other side (buffered by a landscaped natural buffer that varies in width). This alternative fits within the existing right-of-way of 122 feet.

Recommendations from the three (3) studies relating to proposed cross-sections were the most relevant to the UCF/Alafaya Trail Pedestrian Safety Study. Elements of the cross-sections for Alafaya Trail and University Boulevard (listed above with the summaries for the respective studies) that related to pedestrian and bicycle traffic were assessed as part of the development of the concepts for the UCF/Alafaya Trail Pedestrian Safety Study limits. As presented in Section 6 (Identification of Recommended Improvement Concept Plan), the recommended concepts for the UCF/Alafaya Trail Pedestrian Safety Study are consistent with elements from the three previous studies.
Additional Strategies

Additional strategies for this area were recommended as follow.

Parallel Facilities and Network Connectivity
- Parallel Roadways: Diverting traffic to parallel facilities has the potential to alleviate traffic conditions on SR 434 travel corridor; improvements to Rouse Road and McCulloch Road are recommended for further investigation.
- Driveway Connectivity: Land development standards or guidelines that encourage or require shared-use driveway connections and interconnections between adjoining parking areas should be considered.
- Sidewalk Connectivity: Complete sidewalk gaps and create better pedestrian linkages between adjacent land uses and the sidewalk system.
- Bicycle Facilities/Network Connectivity: Expand the network by including the widened pedestrian/bicycle path in the recommended typical section, include a sidewalk/path south of SR 50 and include a bicycle trail through the UCF campus.

Transit
- Service Frequency: Recommend increased service with headways of 10 to 15 minutes during peak periods and 20 to 30 minutes for off-peak periods.
- Transit Stations: Transit stations installed for BRT or Premium Bus (being evaluated for this corridor as part of a LYNX study) should also serve as transit stops for local bus service.
- Branding: Use branding as a means to attract choice riders as well as to identify BRT/Premium Bus service as separate from local bus service.
- Intelligent Transportation Systems (ITS): Make use of technology to communicate between transit vehicles and infrastructure to improve transit efficiency, operation, and safety.
- Transit Signal Priority (TSP): Use this strategy as another opportunity to increase transit attractiveness as a mobility option due to more efficient transit service.
- Queue Jump Lanes: Use this strategy as another opportunity to increase transit attractiveness as a mobility option due to more efficient transit service.

Streetside Design
- Include well-defined zones so that the pedestrian zone is clearly delineated and clear of obstacles such as utilities, signage, and landscaping.
- The furnishings zone (street furniture, street lighting, transit stops with shelters, bicycle racks, and landscaping) should be located so they are not obstacles for pedestrians.
- In locations where there is little or no adjacent commercial activity, expand the sidewalk to the curb line to provide additional space for pedestrian movement and the furnishings zone.
Land Uses

Existing Land Uses
Much of the study area is developed, with a mix of residential uses (single family neighborhoods along with student housing apartments) and commercial uses (hotels, commercial, and office). Figures 3-1, 3-2, and 3-3 illustrate the existing land uses. Two large office complexes have their main entry off of Alafaya Trail, Central Florida Research Park and The Quadrangle.

Future Land Uses
According to the adopted Orange County Future Land Use Map (FLUM) for 2010 - 2030, the future land uses are expected to mirror the existing land uses within the study area. These future land use designations are provided in Figure 3-4. The dominant land uses are Institutional (UCF campus) and Industrial (Central Florida Research Park). Commercial areas are at key intersections with Alafaya Trail and the office designation is The Quadrangle. Medium density residential is scattered throughout the area, reflecting the student housing communities. The Planned Development designations reflect the mixed use projects, such as Plaza on University.

Anticipated Future Developments
Much of future development will occur on the UCF campus. In 2015, the University updated the UCF Master Plan, covering years 2015 – 2025. The Plan’s Urban Design Plan, in Figure 3-5, shows the anticipated future projects. There are several specific projects listed in the Plan (numbers are tied to the specific projects). Some of these projects relate to pedestrian and bicycle safety, but are limited in scope. A hotel/conference center complex is going through the development approval process, which will be located at the northeast quadrant of University Boulevard and Alafaya Trail.
Figure 3-1: Major Land Uses

South Area
Figure 3-2: Major Land Uses
Central Area
Figure 3-3: Major Land Uses
North Area
Figure 3-4: Future Land Use Map (Orange Co, 2010-2030)
Figure 3-5: UCF Urban Design Plan Map
(UCF Master Plan, 2015-2025)
Other UCF projects include:

- **Gateways Master Plan** – This planning process is underway, which will unify the look for the campus’ six entrances. The University Boulevard/Alafaya Trail entry is considered the main campus entry. A pedestrian bridge at this intersection will not be considered due to its cost as well as the difficulty in directing pedestrians to cross Alafaya Trail at this single point.
- **Performing Arts Center** – This facility will be located on the east side of Alafaya Trail, north of the hotel/conference center project and behind Greek Row. The design for this facility is complete, and construction will begin once funding is available.
- **Landscaping Master Plan** – A landscaping master plan is underway for the entire campus, which will include furnishings, lighting, and plant palettes.
- **Transportation Projects**
  - Libra Drive is being 4-laned on UCF campus and will remain 2 lanes within Central Florida Research Park (a private road).
  - Dual right turn lanes will be added on N. Orion Boulevard, just south of McCulloch Road and in front of the fire station. Further evaluation and coordination with the County would be needed in order to determine feasibility as there is currently only one receiving lane.
  - UCF is incorporating a bike system throughout the campus which would include connections to surrounding roadways at the key entrances.

There are only a few large parcels remaining in Central Florida Research Park for future development. Beyond these parcels, future development will be vertical (rather than horizontal as in the past).

**Transit Service**

**Existing Service**

There are several transit service routes that connect UCF to the Central Florida Region, as shown in Figure 3-6; however, there are only two transit services provided in the UCF area that are intended to serve the campus population: the UCF Black and Gold shuttle service and the KnightLYNX.

- **UCF Black and Gold Shuttle Service**: This service is funded by Student Transportation Fees and is provided by UCF to only students and faculty. There are on-campus routes as well as several off-campus routes. Most of the routes end around 7pm. Headways are approximately 15 minutes.
- **KnightLYNX** is provided by LYNX through an agreement between LYNX and the UCF Student Government Association. Routes are open to the general public, but students with student identification can ride at no cost. It is comprised of LYNX Routes 210, 211 and 212. Per the Agreement, this service only operates on Friday and Saturday nights when school is in session. Details on each route are as follows:
  - **Route 210**: Runs from 6pm to 1am with headways of 40 minutes and connects UCF to the Waterford Area (headways increase to 15 minutes after 9pm)
- Route 211: Runs from 8pm to 3am with headways of 20 minutes and runs along University Boulevard to Rouse Road (headways increase to 15 minutes after 11pm)
- Route 212: Runs 9pm to 4am and connects UCF to Downtown Orlando via 4 out-bound trips and 3 in-bound trips at set times published in the Agreement

Figure 3-6: Existing LYNX Transit Service
Future Service
LYNX has sponsored an alternatives analysis (AA) study that examined premium transit options (including BRT) for SR 50, from the Orange/Lake County line to the UCF campus. The terminus would be at the Superstop on the UCF campus. The recommended alternative is provided in Figure 3-7. The recommended Phase 1 project is from Powers Drive to Goldenrod Road. Express bus service between Downtown Orlando and the UCF campus also is part of the overall recommendation. At this time, only the AA has been completed.
Figure 3-7: SR 50 / UCF Connector Alternatives Analysis Recommendation
Pedestrian and Bicycle Volumes Counts and Observations

A key component of the UCF/Alafaya Trail Pedestrian Safety Study involved extensive observations of pedestrian and bicycle volumes along Alafaya Trail, University Boulevard, and McCulloch Road within the study limits. These counts were supplemented with field observations, collection of video, and vehicular speed data along main road segments.

As part of this component of the study, existing characteristics of the roadway within the limits of UCF/Alafaya Trail Pedestrian Safety Study were assembled. These characteristics included the general existing elements of the roadway cross-sections and traffic controls.

Alafaya Trail (SR 434) is classified as a Principal Arterial by FDOT. Within the study limits, Alafaya Trail is a six-lane road with sidewalks and bike lanes. Alafaya Trail currently has a posted speed limit of 45 mph. There are currently nine (9) signalized intersections within the Alafaya Trail study limits. Additional characteristics are provided below:

- Urban cross-section with six 11-foot lanes
- 28-foot raised median
- 4-foot bike lanes
- 2-foot wide Type F curb and gutter with closed drainage system
- 5-foot sidewalks (both sides)
- Street lighting on both sides
- FDOT Access Class 5
- Pedestrian signals and painted crosswalks for all approaches of the nine signalized intersections

Figure 3-8 provides the locations of the signalized intersections and existing traffic volumes.

University Boulevard is classified as a Minor Arterial by FDOT. Within the study limits, University Boulevard is a six-lane road with sidewalks (no bike lanes). University Boulevard currently has a posted speed limit of 45 mph. There are currently two (2) signalized intersections within the University Boulevard study limits, west of Alafaya Trail. Additional characteristics are provided below:

- Urban cross-section with six 11-foot lanes
- Varied-width raised median
- 2-foot wide Type F curb and gutter with closed drainage system
- 5-foot sidewalks (south side) and 7-foot sidewalks (north side)
- Street lighting on both sides
- Pedestrian signals and painted crosswalks for all approaches of the three signalized intersections
Figure 3-8: Existing Signalized Intersections & Volumes
McCulloch Road is classified as an Urban Collector by FDOT. Within the study limits, McCulloch Road is a four-lane roadway with a 5-foot sidewalk. McCulloch Road currently has a posted speed limit of 45 mph. The only other signalized intersection within the McCulloch Road study limits east of Alafaya Trail is at Orion Boulevard/Lockwood Boulevard. Additional characteristics are provided below:

- Urban cross-section with four 12-foot lanes
- 24-foot raised median
- 2-foot wide Type F curb and gutter with closed drainage system
- 5-foot sidewalk - north side only
- No street lighting
- Pedestrian signals and painted crosswalks for all approaches of the signalized intersections

Data collected as part of the three (3) previous studies (described earlier in this section) were also inventoried. Both the Pedestrian and Bicycle Study for University Boulevard from SR 436 to SR 434 (Orange County - August 2013) and the SR 434 (Alafaya Trail) Access Management Study - from north of SR 50 to South Centaurus Drive/Westinghouse Drive (FDOT, July 2010) included extensive vehicle and pedestrian counts at all of the signalized intersections within their respective study limits. The SR 434/Alafaya Trail Corridor Study did not involve any traffic data collection. Based on coordination with County staff, the intersection traffic count (vehicles) data from the studies were applied in the UCF/Alafaya Trail Pedestrian Safety Study. Therefore, the data collected for the UCF/Alafaya Trail Pedestrian Safety Study involved, primarily, counts of pedestrian and bicycle volumes.

The limits of the pedestrian and bicycle volume counts included the full limits of the study:

- Alafaya Trail - between and including the intersections of Challenger Parkway and McCulloch Road
- University Boulevard - between and including the intersections of Rouse Road and Alafaya Trail
- McCulloch Road - between and including Alafaya Trail and Orion Boulevard

**Pedestrian and Bicycle Volumes Counts and Observations**

In advance of the data collection, the approach to the field work was determined in terms of data collection procedures, days and time durations of the counts. Based on initial field review, 24 Observation Zones were delineated along the limits of the roadways. These Observation Zones are depicted in Figures 3-9 through 3-11. Field data collection technicians were assigned to each Observation Zone in order to assemble comprehensive observations of all pedestrian and bicycle activities. The Observation Zones encompassed 12 signalized intersections, 53 minor cross-streets and driveways, and 26 mid-block areas.
Figure 3-9: Observation Zones
North Area
Figure 3-10: Observation Zones
Central Area
Figure 3-11: Observation Zones
South Area
In order to determine the days and time durations of the counts of pedestrian and bicycle volumes, input was received from the Core Group participants as part of the first Core Group Meeting. That input, which was provided primarily by representatives of the UCF Police and the Orange County Sheriff’s Office, was incorporated to identify the count periods during days of October 2014. Homecoming weekend was chosen to conduct the counts:

- 8:00 pm Friday, October 24, until 2:00 am Saturday October 25, 2014
- 2:00 pm Saturday October 25, until Sunday October 26 at 2:00 am (excluding the UCF football game from 5:00 pm to 8:00 pm)

Counts were also conducted on Monday, October 27, during the morning peak period (7:00 am to 10:00 am), mid-day (11:00 am to 1:00 pm), and afternoon peak period (3:00 to 6:00 pm). Field technicians collected volumes of pedestrians and bicycles travelling along sidewalks and crossing both the major streets and cross streets. In addition, the technicians identified volumes of pedestrians or bicyclists who did not follow pedestrian signal controls or who failed to stay within the crosswalks. This provided an estimate of the portion of the observed pedestrians and bicyclists who did not adhere to the existing traffic controls.

This resulted in collection of pedestrian and bicycle volumes over both sides of the 4.6 miles of roadways for time periods totaling twenty-one (21) hours. The data was reviewed and reduced so that summaries could be prepared. The summary is shown in Table 3-1. The “cross street” pedestrians and bikes were observed to cross either the major street or minor public roadway. The “cross driveway” pedestrians and bikes were observed to travel along sidewalks and bike paths, crossing driveways. The summary denotes the volumes (pedestrians and bicycles) by Observation Zone and time period. The summary also indicates percent of pedestrian and bicycle crossings that are in violation (not crossing at a designated crossing or in conflict with a traffic control device). All pedestrian and bicycle data collected was provided to the County separately, in advance of the report.

The pedestrian and bicycle data summarized were assessed in order to identify the areas with the highest volumes of pedestrians and bicycles data. These were assessed based on Friday and Saturday evenings (after 8:00 pm), pre-game and post-game periods (before 8:00 pm), and weekday peak periods. Figures 3-12, 3-13 and 3-14 indicate the areas within the UCF/Alafaya Trail Pedestrian Safety Study roadway limits where the volumes were the highest. The ranges of the pedestrian volumes from lowest to highest shown in these figures were determined based on the limits of total pedestrian and bicycle volumes observed during each respective period (Friday/Saturday night, pre-game/post-game, and Monday peak periods). Based on the assessments of the ranges of the observation pedestrian and bicycle volumes, the Low to Highest segment limits were selected based on the observed full ranges for each of the three defined periods. During the pre-game and post-game periods, there is a strong Florida Highway Patrol (FHP) presence combined with temporary lighting equipment at the major signalized intersections that serve pedestrian, bicycle and vehicular traffic. Under the direction of FHP, vehicular traffic flow is controlled and coordinated with pedestrian and bicycle volumes in a safe manner.
Table 3-1: Summary of Observed Pedestrians and Bicycles

<table>
<thead>
<tr>
<th>All Locations</th>
<th>Friday</th>
<th>Saturday Pre-Game</th>
<th>Saturday Post-Game</th>
<th>Monday</th>
<th>All Three Days</th>
</tr>
</thead>
<tbody>
<tr>
<td># Cross Street Peds</td>
<td>7</td>
<td>62</td>
<td>29</td>
<td>193</td>
<td>291</td>
</tr>
<tr>
<td># Cross Driveway Peds</td>
<td>1,803</td>
<td>4,292</td>
<td>4,335</td>
<td>1,664</td>
<td>12,094</td>
</tr>
<tr>
<td># Cross Street Bikes</td>
<td>2,194</td>
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<td># Cross Driveway Bikes</td>
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<td>37.3%</td>
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<tr>
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<td>0.9%</td>
<td>0.9%</td>
<td>2.4%</td>
<td>1.1%</td>
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</table>

October 24, 25 & 27th

<table>
<thead>
<tr>
<th>Alafaya Trail: South of University</th>
<th>Friday</th>
<th>Saturday Pre-Game</th>
<th>Saturday Post-Game</th>
<th>Monday</th>
<th>All Three Days</th>
</tr>
</thead>
<tbody>
<tr>
<td># Cross Street Peds</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>122</td>
<td>137</td>
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<tr>
<td># Cross Driveway Peds</td>
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<tr>
<td># Cross Street Bikes</td>
<td>1,472</td>
<td>355</td>
<td>1,828</td>
<td>1,180</td>
<td>4,835</td>
</tr>
<tr>
<td># Cross Driveway Bikes</td>
<td>221</td>
<td>106</td>
<td>72</td>
<td>573</td>
<td>972</td>
</tr>
<tr>
<td>% Violation Cross Street Bikes &amp; Peds</td>
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<td>62.9%</td>
<td>6.2%</td>
<td>94.2%</td>
<td>44.0%</td>
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<td>20.9%</td>
<td>9.8%</td>
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<td>22.7%</td>
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October 24, 25 & 27th

<table>
<thead>
<tr>
<th>Alafaya Tl: North of University Bv</th>
<th>Friday</th>
<th>Saturday Pre-Game</th>
<th>Saturday Post-Game</th>
<th>Monday</th>
<th>All Three Days</th>
</tr>
</thead>
<tbody>
<tr>
<td># Cross Street Peds</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>62</td>
<td>76</td>
</tr>
<tr>
<td># Cross Driveway Peds</td>
<td>294</td>
<td>817</td>
<td>365</td>
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<tr>
<td># Cross Street Bikes</td>
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<td>1,828</td>
<td>1,180</td>
<td>4,835</td>
</tr>
<tr>
<td># Cross Driveway Bikes</td>
<td>221</td>
<td>106</td>
<td>72</td>
<td>573</td>
<td>972</td>
</tr>
<tr>
<td>% Violation Cross Street Bikes &amp; Peds</td>
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<td>22.4%</td>
<td>15.9%</td>
<td>52.9%</td>
<td>31.0%</td>
</tr>
<tr>
<td>% Violation Cross Driveway Bikes &amp; Peds</td>
<td>24.3%</td>
<td>15.8%</td>
<td>18.3%</td>
<td>36.0%</td>
<td>23.2%</td>
</tr>
</tbody>
</table>

October 24, 25 & 27th

<table>
<thead>
<tr>
<th>University Bv: West of Alafaya Tl</th>
<th>Friday</th>
<th>Saturday Pre-Game</th>
<th>Saturday Post-Game</th>
<th>Monday</th>
<th>All Three Days</th>
</tr>
</thead>
<tbody>
<tr>
<td># Cross Street Peds</td>
<td>9</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td># Cross Driveway Peds</td>
<td>935</td>
<td>230</td>
<td>1,547</td>
<td>515</td>
<td>3,227</td>
</tr>
<tr>
<td># Cross Street Bikes</td>
<td>569</td>
<td>33</td>
<td>1,045</td>
<td>511</td>
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</tr>
<tr>
<td># Cross Driveway Bikes</td>
<td>111</td>
<td>62</td>
<td>64</td>
<td>296</td>
<td>533</td>
</tr>
<tr>
<td>% Violation Cross Street Bikes &amp; Peds</td>
<td>11.9%</td>
<td>42.9%</td>
<td>8.3%</td>
<td>91.5%</td>
<td>29.6%</td>
</tr>
<tr>
<td>% Violation Cross Driveway Bikes &amp; Peds</td>
<td>32.6%</td>
<td>20.5%</td>
<td>34.5%</td>
<td>37.7%</td>
<td>33.6%</td>
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</tbody>
</table>

October 24, 25 & 27th

<table>
<thead>
<tr>
<th>McCulloch Rd: Alafaya Tl to Orion Bv</th>
<th>Friday</th>
<th>Saturday Pre-Game</th>
<th>Saturday Post-Game</th>
<th>Monday</th>
<th>All Three Days</th>
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<tbody>
<tr>
<td># Cross Street Peds</td>
<td>48</td>
<td>9</td>
<td>48</td>
<td>57</td>
<td>105</td>
</tr>
<tr>
<td># Cross Driveway Peds</td>
<td>3,031</td>
<td>1,885</td>
<td>3,031</td>
<td>1,885</td>
<td>6,913</td>
</tr>
<tr>
<td># Cross Street Bikes</td>
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<td>761</td>
<td>145</td>
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</tr>
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<td>7.0%</td>
<td>9.4%</td>
<td>8.5%</td>
<td>17.9%</td>
</tr>
<tr>
<td>% Violation Cross Driveway Bikes &amp; Peds</td>
<td>28.9%</td>
<td>16.8%</td>
<td>28.9%</td>
<td>24.2%</td>
<td>53.1%</td>
</tr>
</tbody>
</table>
Figure 3-12: Observed Ped & Bike Volume Friday & Saturday Night
Figure 3-13: Observed Ped & Bike Volume Pre- and Post-Home Game

Observed Bike and Ped Volume Pre- and Post-Home Game

Low
Medium
High
Highest
Figure 3-14: Observed Ped & Bike Volume Weekday (Observed Monday)
In conjunction with the pedestrian and bicycle volume data effort, field observations were conducted by the UCF/Alafaya Trail Pedestrian Safety Study senior staff. Through these observations, operational issues and conditions were identified. These included the following:

- Friday and Saturday evenings, after the FHP presence ended, a number of conflicts were observed between drivers and pedestrians/bicycles. Consistent with input from the UCF Police and the Orange County Sheriff’s Office, impaired drivers and pedestrians contributed to the conflicts into the evening.
- In many instances, pedestrians were not adhering to traffic controls

As shown, the highest pedestrian/bicycle activity locations included the intersection of Alafaya Trail and University Boulevard and the adjacent or nearby segments. These are also the areas where conflicts were observed.

**Vehicular Speed Counts**

Over the periods of the pedestrian and bicycle volume counts, mechanical vehicle speed and volume counts were conducted on Alafaya Trail, University Boulevard, and McCulloch Road. Figure 3-15 indicates the locations of the vehicle speed counts. The vehicle speed data collected is provided in Appendix B. A summary of the observed vehicular speeds is provided:

<table>
<thead>
<tr>
<th>Location</th>
<th>Over Full Observation Period (Friday, Saturday, Monday)</th>
<th>Friday 8 pm - 12 am</th>
<th>Saturday 8 pm - 12 am</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alafaya Trail</td>
<td>53.0 mph</td>
<td>44.9 mph</td>
<td>42.8 mph</td>
</tr>
<tr>
<td>University Boulevard</td>
<td>49.3 mph</td>
<td>38.0 mph</td>
<td>35.3 mph</td>
</tr>
<tr>
<td>McCulloch Road</td>
<td>53.1 mph</td>
<td>49.1 mph</td>
<td>46.1 mph</td>
</tr>
</tbody>
</table>

Based on the collected vehicular speed data, the 85th Percentile Speeds exceeded the 45 mph posted speed over all periods collected over approximately four days surrounding the UCF Homecoming Weekend. Over the Friday and Saturday evenings (defined as 8:00 pm – 12:00 am), vehicle 85th Percentile Speeds on Alafaya Trail and McCulloch Road slightly exceeded the speed limit. Over the full observation periods (24-hour periods over Friday, Saturday and Monday), the observed speeds were found to be higher than Friday and Saturday evenings. It should be noted that, on average, vehicles traveled between 4 to 9 mph over the posted speed limit.

It should be noted that FDOT completed a study this year that determined that posted speeds on Alafaya Trail north of McCulloch Road be reduced from 50 mph to 45 mph.
Crash Data

Crash data was compiled from the University of Florida Signal 4 Analytics online crash interface database and imported into GIS software of records from January 2006 to June 2014 (approximately 8.5 years) was compiled within the limits of the UCF/Alafaya Trail Pedestrian Safety Study. The crash data was reviewed to identify all crashes that involved pedestrians or bicycles. **Table 3-2** provides an overall summary of the crash data.

The review of the crash determined the following results:
- There were a total 259 vehicle crashes involving a pedestrian or a bicycle
- 207 of the crashes resulted in an injury and 11 of the crashes resulted in a fatality
- 41% or the crashes involved pedestrians and 59% of the crashes involved bicycles
- 74% of the crashes occurred within the Alafaya Trail limits
- 21% of the crashes occurred within the University Boulevard limits
- 5% of the crashes occurred within the McCulloch Road Trail limits

To further evaluate the crash characteristics, the locations of the crashes were superimposed on the study roadway limits to understand where the crashes were occurring. **Figure 3-16, 3-17 and 3-18** show the locations of highest occurrences of crashes that involved injuries and all the locations of crashes that involved fatalities. **Figure 3-19** provides a summary of the conditions when the crashes occurred.
Figure 3-15: Speed Observation Point
### All Crashes

<table>
<thead>
<tr>
<th>By Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014*</th>
<th>Total (06-14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alafaya</td>
<td>16</td>
<td>19</td>
<td>21</td>
<td>22</td>
<td>18</td>
<td>21</td>
<td>28</td>
<td>26</td>
<td>20</td>
<td>191</td>
</tr>
<tr>
<td>McCulloch</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>University</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>11</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td>10</td>
<td>6</td>
<td>55</td>
</tr>
<tr>
<td>All Segments</td>
<td>21</td>
<td>21</td>
<td>28</td>
<td>33</td>
<td>22</td>
<td>31</td>
<td>36</td>
<td>41</td>
<td>26</td>
<td>259</td>
</tr>
</tbody>
</table>

*through July 23, 2014

### Crashes with Fatalities

<table>
<thead>
<tr>
<th>By Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014*</th>
<th>Total (06-14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alafaya</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>McCulloch</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>University</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>All Segments</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>

### Crashes with Injuries

<table>
<thead>
<tr>
<th>By Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014*</th>
<th>Total (06-14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alafaya</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>20</td>
<td>24</td>
<td>16</td>
<td>156</td>
</tr>
<tr>
<td>McCulloch</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>University</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>42</td>
</tr>
<tr>
<td>All Segments</td>
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<td>18</td>
<td>23</td>
<td>21</td>
<td>19</td>
<td>24</td>
<td>26</td>
<td>37</td>
<td>19</td>
<td>207</td>
</tr>
</tbody>
</table>

*through July 23, 2014
Figure 3-16: Historic Crash Locations

Historic Crash Locations
Pedestrians and Bicycles
(2006 - 2014)

Crashes by Type

- Pedestrian Fatality
- Pedestrian Injury Area
- Bicyclist Injury Area
- Study Area

South Area
Figure 3-17: Historic Crash Locations Central Area

HISTORIC CRASH LOCATIONS PEDESTRIANS AND BICYCLES (2006 - 2014)

Crashes by Type
- Pedestrian Fatality
- Pedestrian Injury Area
- Bicyclist Injury Area
- Study Area
Crashes by Type
- Pedestrian Fatality
- Pedestrian Injury Area
- Bicyclist Injury Area
- Study Area

Historic Crash Locations
Pedestrians and Bicycles (2006 - 2014)

Figure 3-18: Historic Crash Locations
North Area
Figure 3-19: Causes & Conditions - Statistics

<table>
<thead>
<tr>
<th>Condition</th>
<th>Ped</th>
<th>Bike</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occurred at Intersection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occurred at Night</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver Impaired (Alcohol or Drugs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver Distracted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wet Weather</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian or Bicyclist at fault</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Most
- Many
- Some
- Very Few

<table>
<thead>
<tr>
<th>Condition</th>
<th>Ped/Bike</th>
<th>Ped</th>
<th>Bike</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Daylight</td>
<td></td>
<td>69.1%</td>
<td>52.4%</td>
</tr>
<tr>
<td>% Driver Drug/Alc</td>
<td></td>
<td>5.0%</td>
<td>11.4%</td>
</tr>
<tr>
<td>% Driver Distracted</td>
<td></td>
<td>12.4%</td>
<td>8.6%</td>
</tr>
<tr>
<td>% Wet Weather</td>
<td></td>
<td>7.7%</td>
<td>8.6%</td>
</tr>
<tr>
<td>% Driver at fault</td>
<td></td>
<td>21.2%</td>
<td>16.2%</td>
</tr>
<tr>
<td>% at intersection</td>
<td></td>
<td>66.0%</td>
<td>57.1%</td>
</tr>
</tbody>
</table>
A detailed review of those crash reports that involved fatalities revealed that pedestrians were reported to be at fault in all of the crashes except one. In almost all of these crashes, the pedestrian was reported to have failed to yield right-of-way to the vehicle. The driver was found to be at fault in only one crash with a fatality. In this case, the driver lost control of the vehicle and struck the pedestrian off of the roadway.
Chapter 4 Evaluation of Existing Bicycle and Pedestrian Data

The following five components of data and characteristics were collected and evaluated to form the basis of an evaluation safety issues and conditions:

- Pedestrian and bicycle volumes along the study roadway limits for weekend evenings, Saturday football game day, and weekday peak periods
- Observations of pedestrians and bicyclists interactions with vehicles within the study roadway limits
- Data for crashes involving pedestrians or bicyclists
- Vehicle speed and volume data within the study roadway limits
- Existing physical characteristics of roadways, sidewalks, bike-lanes, and pedestrian crosswalks

This data, combined with an understanding of the key land uses that make up the major origins and destinations for pedestrian and bicycle traffic, were used to identify the primary issues and areas of concern relating to pedestrian and bicycle safety within the UCF/Alafaya Trail Pedestrian Safety Study limits. The critical locations within the study area, reflecting 1) Friday and Saturday night, 2) pre-game and post-game periods, and 3) weekday are shown in Figures 3-12, 3-13, and 3-14 (previous section).

Based on the evaluation of the data and observations, the focus areas shown in Figure 4-1 were identified as the locations of immediate concern. These areas exhibited a combination of high pedestrian and bicycle volumes and a history of the higher crash frequencies. This is illustrated in Figure 4-2. These focus areas were also within the routes connecting the major land use origins and destinations. Residential areas both within the UCF campus and along Alafaya Trail are served by the sidewalks and bikeways within these focus areas. In addition, commercial destinations (restaurants and retail areas) along University Boulevard west of Alafaya Trail were observed to be popular destinations - particularly during the weekend evening observations. The focus areas were the subject of the assessment of countermeasures to improve safety for pedestrian and bicyclists in the short-term. These assessments are discussed in Sections 5 and 6.

Roadway limits outside the focus areas should also include enhancements to pedestrian and bicycle safety but were not identified as the areas of the most immediate concern:

- Alafaya Trail north of University Boulevard currently serves lower volumes of pedestrian and bicycle traffic. There is also limited development along these frontage areas of Alafaya Trail that generate pedestrian and bicycle traffic compared to the identified focus areas. The signalized intersection of Alafaya Trail and Gemini Boulevard does serve a higher volume of pedestrians crossing Alafaya Trail than the adjacent segments. Therefore, this intersection was included within the focus area but for long-term improvements to sidewalks, bike lanes and other multimodal enhancements.
Figure 4-1: Focus Areas

- This area experiences high volumes of pedestrians and bicycles, combined with higher occurrences of crashes.
- The land uses on both sides of the street encourage cross-street flow of pedestrians and bicycles.
- The area surrounds the primary UCF entrances.
Figure 4-2: Crashes Involving Pedestrians or Bicyclists
• Similarly, the limits of Alafaya Trail south of Research Parkway (to Challenger Parkway) contains limited development along the east frontage areas that generate pedestrian and bicycle traffic compared to the identified focus areas. This area should be included for the long-term improvements to sidewalks, bike lanes and other multimodal enhancements.

• The observed pedestrian and bicycle traffic volumes on University Boulevard west of Quadrangle Boulevard were lower than those to the east. Also, the pedestrian and bicycle traffic observed crossing University Boulevard occurred primarily at or east of Quadrangle Boulevard. This area should be included for the long-term improvements to sidewalks, bike lanes and other multimodal enhancements.

• The highest volumes of pedestrian and bicycle traffic on McCulloch Road were observed to occur during the time immediately before and after the Saturday football game. As indicated earlier, during the pre-game and post-game periods there is a strong FHP presence directing traffic. Under the direction of FHP, the vehicular, pedestrian and bicycle traffic flow on McCulloch Road is controlled in a safe manner. Over the long-term, improvements to sidewalks, bike lanes and other multimodal enhancements should be considered for this area.
After an evaluation of the data and information compiled and evaluation of the pedestrian and bicycle operational conditions and issues, potential safety countermeasures were identified to improve safety through the area. These countermeasures were identified based on a toolbox of design principles related to goals to improve safety for pedestrians and bicyclists. These goals involved making the area:

- More accessible - improving streets, sidewalks and transit
- Connected - integrating sidewalks and bicycle facilities
- More recognizable as a pedestrian-scale environment - improving identification, views and signage
- Safe - improving security, visibility, and lighting
- Comfortable - providing scale, shade and appropriate street setbacks

**Identification of Safety Focus Areas**

To apply the “toolbox” of design principles to the study area, different Potential Improvement Strategies were developed for four context types: Major Intersections, Midblock Crossings, Minor Roads/Driveway Intersections, and Overall. Each of these contexts require a different mix of Potential Improvement Strategies to create an accessible, connected, comfortable, safe, and recognizable pedestrian-scale environment for all users.

**“Toolbox” of Potential Improvement Strategies**

**Intersection Improvements Concepts**

Major intersections are large traffic signal-controlled, at-grade intersections that are characterized by having wide turn radii that encourage drivers to drive at high speeds through the intersection, long crossing distances for pedestrians, narrow sidewalks, and poor pedestrian visibility at the corners. Five major intersections were identified for improvements:

- Alafaya Trail/Research Parkway
- Alafaya Trail/Central Florida Boulevard
- Alafaya Trail/University Boulevard
- Alafaya Trail/Gemini Boulevard
- University Boulevard/Quadrangle Boulevard

Major intersections can be improved with a combination of physical and operational treatments. Physical treatments rearrange the built infrastructure at a site while operational treatments change the rules that impact the way a site works. Physical treatments like reducing the turn radii to approximately 25 feet can improve the safety and comfort of the intersection by requiring drivers to slow down while negotiating right turns. These tighter turns will increase the size of the pedestrian landings at each corner which can improve the pedestrian visibility and improve the legibility of the intersection. Additionally, major intersections are ideal locations to introduce
pedestrian refuge islands in the medians. To achieve a pedestrian refuge of approximately 12 feet wide, this would require realigning the roadway or removing a turn lane. If properly designed, these pedestrian refuge islands can reduce the distance pedestrians must walk in the intersection, so the corners will feel better connected at a human scale. However, as further described later in this report, due to the cost and right-of-way requirements for realigning the roadway, the removal of a turn lane will not be a recommendation moving forward into Design.

Other intersection treatments include providing textured/colored pavements for crosswalks to improve pedestrian visibility and overall legibility, strategic placement of pedestrian channelization fencing and plantings of trees in the medians and on the street edges to encourage pedestrians to cross in the correct locations and to slow traffic by providing better points of reference for speed. Figure 5-1 depicts an example of how these intersection design principles could be applied to an intersection.

Operational treatments change the way the intersections operate to better control the movement of pedestrians and vehicles through the intersection. One way to improve the operation of major intersections is to provide flashing yellow arrow signals for right-turn only lanes. These signals bring the driver’s attention to the traffic operation of the corner and require the driver to yield to pedestrians, bicyclists and other vehicles.

Leading Pedestrian Intervals (LPI) is another treatment that was contemplated during this Study. These LPI signals can allow better pedestrian protection at crosswalks by allowing the creation of leading pedestrian intervals. This is when the “walk” phase is given several seconds ahead – before the right-turning traffic is permitted to go – so that pedestrians will be half-way across the crosswalk before cars are permitted to turn, making pedestrians more visible to turning vehicles. However, following further engineering review and coordination with FDOT, this treatment was determined to not be feasible along the Study corridor.

Mid-Block Crossing Concepts
Mid-block crossings are places where a safe pedestrian crosswalk could be installed away from an intersection due to high volumes of pedestrian crossings or facilities such as bus stops, which encourage pedestrian crossings despite the lack of a crosswalk. Two mid-block crossing locations were identified. These locations, which contain wide, high-speed stretches of road, are on:

- Alafaya Trail near Salon Drive
- University Boulevard near Turbine Drive

Pedestrian Hybrid Beacons/HAWKs, Rectangular Rapid Flashing Beacons (RRFBs), pedestrian signals and pedestrian bridges were considered at these locations to provide safer pedestrian crossings. Each of these treatments is described below.

- Pedestrian Hybrid Beacons, also known as HAWK (High-Intensity Activated crossWalk) beacons, operate much like a full pedestrian signal. These devices are used to stop road traffic and allow pedestrians to cross safely. The intent is to stop road traffic only as needed and can be an alternative traffic control device when standard traffic signal
“warrants” do not justify the installation of a standard three-color traffic signal. These traffic devices are relatively new in their application in Central Florida.

- RRFBs are bright yellow flashing lights attached to pedestrian crossing signs next to crosswalks that pedestrians can activate by pushbutton. They are a lower cost alternative to traffic signals and hybrid signals. They draw attention to pedestrians in crosswalks and have been found to substantially increase driver yielding behavior at crosswalks with appropriate signage. This may be considered on University Boulevard but has been determined to not be suitable on Alafaya Trail, which is maintained by FDOT, whose policy prohibits the use of RRFPs on 6-lane roadways.

- Pedestrian signals are regular signals that are activated by pedestrians/bicyclists only. They provide full protection of pedestrians in the crosswalk and can be coordinated with nearby traffic signals. They stay green when there are no pedestrians/bicyclists.

All three of these treatments include textured pavement crosswalks and pedestrian lighting to improve pedestrian visibility and overall legibility. Figure 5-2 provides an example of some of these design principles from the toolbox.

- Pedestrian bridges are bridges designed for pedestrian/bicycle uses that traverse over a roadway. A pedestrian bridge was evaluated at the Alafaya Trail near Salon Drive location. However, due to issues relative to the amount of right-of-way required, cost and likelihood that the bridge would not be used because of the longer crossing distances, the concept of a pedestrian bridge did not advance into the final recommendation. Instead of investing over $5 million on construction of a single bridge, significant pedestrian improvements with much greater impact could be built along substantial portions of the study corridors with many crossing locations along each corridor.
Figure 5-1: Safe Crosswalks: Marked Pavement / Large Landings
Figure 5-2: Safe Crosswalks: Mid-block Crossings
Figure 5-3: Comfortable Sidewalk: Wide / Protected and Pedestrian-Scale
Figure 5-4: Comfortable Sidewalk: Materials / Public & Private Realm
Minor Roads and Driveways Crossing Concept
Driveways and minor intersections (unsignalized intersections serving limited cross-street traffic) are also locations that play an important role in pedestrian safety and comfort. Within the study area, 13 driveways or minor intersections were evaluated and found to have wide turn radii that encourage high speeds, creating a hostile pedestrian environment. Eight of these were along that ¾ quarter mile segment of Alafaya Trail from Research Parkway to University Boulevard. Crash history data reported eight crashes involving pedestrians/bicyclists within this segment. The other five driveways/minor intersections were along that half mile segment of University Boulevard from Alafaya Trail to Quadrangle Boulevard. Crash history data reported five crashes involving pedestrians/bicyclists within this segment. When sidewalks cross these locations, they frequently lack marked crosswalks or anything to indicate that pedestrians have right-of-way. This creates confusion between the pedestrian and the motorist and can cause a situation in which both drivers and pedestrians have incorrect expectations about what the other will do at the conflict point, which causes near-misses and crashes (e.g. “right-hook” crashes where the drivers are looking left for on-coming cars and pedestrians/bicyclists are moving into the roadway from the right).

Conflicts like this can be resolved with textured crosswalks, tighter turn radii (maximum of 25 feet) to reduce speeds and appropriate signage for both drivers and pedestrians/bicyclists to clarify right-of-way. These improvements can be done in coordination with other landscaping or sidewalk enhancement projects. Additionally, the effort to consolidate driveways to keep the number of this type of conflict location to a minimum should continue.

UCF Area Branding and Pedestrian-Scale Environment
Area branding improves the recognizability of a space and a sense of arrival to a place by helping people identify an area through landmarks, signage, monuments, and design details. This allows the users to be able to create positive associations to the area and allows people to think of the area as a place distinct from other locations or corridors. Drivers are more likely to use care when they feel that they have arrived at a place where heavy pedestrian and bicycle activity is expected, even if they are just passing through. Pedestrians are more likely to feel comfortable in locations where pedestrian-scale design features and elements are installed that slow drivers down to a human scale.

Area-wide, there should be an emphasis on multi-modal connectivity and design features such as 8-foot minimum width sidewalks throughout the study area, except that the east side of the Alafaya Trail segment is planned for a wide sidewalk path, consistent with previous studies and the Orange County Trails Master Plan. Throughout the study area, it is recommended that sidewalks be set or moved eight (8) feet away from the curb to separate pedestrians from vehicular traffic and create a more comfortable environment for pedestrians. This concept would also provide enough space for placement of shade trees for additional pedestrian channelization, protection and comfort.

The ability for drivers to see pedestrians and bicyclists is also critical to promoting safety. Pedestrian-scale lighting should be appropriately designed and installed along the roadway and at intersection crosswalks and mid-block crossings in such a way that does not back-light the
person or bicyclist crossing or waiting to cross the roadway. They should also be appropriately spaced along the roadway to illuminate pedestrians/bicyclists traveling along the corridor to enhance the sense of safety.

Implementing the “toolbox” of design principles throughout the corridor create an area that is accessible, connected, comfortable, safe and recognizable to all mode users. Figures 5-3 and 5-4 provide examples of pedestrian-scale environments and comfortable walk zones.

Safety Policy and Education
Land use regulations applicable to this area should reflect the more walkable nature of the corridor and should encourage the creation of a more robust, pedestrian-scaled grid of streets as parcels are developed or redeveloped. Access management should continue to be a strategy to promote safe vehicular access into parcels without reducing the safety and comfort of the area to pedestrians and bicyclists. The circulator bus system should be supported and expanded to serve a greater portion of the area. New student orientations and new employee orientations at UCF should be updated to inform students and staff/faculty of their responsibilities as drivers, pedestrians and bicyclists to improve behavior by all parts. These types of programs, policies and projects will require the continued collaboration between Orange County, UCF, FDOT, property owners, and other stakeholders within the study area to ensure the long-term success of the program.
Chapter 6 Identification of Recommended Improvement Plan

Through the UCF/Alafaya Trail Pedestrian Safety Study, a recommended plan was developed based on an evaluation of the data collected, input from the stakeholders, coordination with Core Group members, and assessment of short-term and long-term strategies. The countermeasures evaluated included:

- Design concepts that would provide for safer pedestrian and bicycle flows along and across the study roadways, at the signalized intersections and within mid-block areas
- Corridor transformation to achieve more pedestrian- and bicycle-friendly environments
- Enhancements of network connectivity to provide better vehicular and non-vehicular connectivity to allow a redesign existing highway corridors to better serve other modes of transportation
- Improvements to safety programs and orientations to educate UCF students, staff and faculty about their roles and responsibilities to promote safe walking and biking activities throughout the area
- Changes to planning for new development and traffic operations policies that will result in improved pedestrian and bicycle safety

The Study resulted in recommendations that provided Orange County with a plan that could be implemented in two (2) phases. This plan was developed to create an identifiable, interconnected, and multimodal environment that promotes equal emphasis to vehicular, bicycle and pedestrian movements for the study area. The plan focuses on the high-priority areas of Alafaya Trail and University Boulevard shown in Figure 4-1 as implemented in the locations identified in Figure 6-1. This chapter describes the complete list of recommended improvements, and Chapter 7 describes the two phases of improvements.

**Recommended Improvements**

**Major Intersections**

*Figure 6-2* provides locations of the major intersections that are recommended for improvements, specifically:

- Intersection 1: Alafaya Trail & Gemini Boulevard
- Intersection 2: Alafaya Trail & University Boulevard
- Intersection 3: Alafaya Trail & Central Florida Boulevard
- Intersection 4: Alafaya Trail & Research Parkway
- Intersection 5: University Boulevard & Quadrangle Boulevard

Design concepts for the major intersections were identified that could be implemented subject to engineering and cost evaluations. The design concepts also acknowledged the need to meet applicable FDOT and Orange County design standards. It is anticipated that implementation of these concepts may increase vehicular congestion during peak periods. The design concepts include:
Reduced turn radii on all corners to approximately 25 feet (subject to engineering and cost evaluation) and increased landscaped pedestrian landing areas

- Provide 12-foot wide textured pavement crosswalks
- Installation of trees and shrubs in medians and between sidewalk and curb near intersections to guide pedestrians to cross at safer crosswalk locations
- Sidewalks widened to 8-foot minimum (12-foot minimum on east side of Alafaya Trail) and moved 8 feet away from the curb to allow greater separation from traffic (subject to availability of sufficient right-of-way)
- Installation of pedestrian fencing in the existing medians with additional landscaping to direct or channel pedestrians/bicyclists to designated crosswalks (see FDOT Index D804: [http://www.fdot.gov/roadway/DS/Dev/IDDS/IDDS-D00804.pdf](http://www.fdot.gov/roadway/DS/Dev/IDDS/IDDS-D00804.pdf))
- Installation of pedestrian lighting to bring driver attention and awareness to people walking or bicycling across the road
- Improve LYNX bus stop adjacent to crossing, add standard bus shelter and add 5-foot minimum width sidewalk from shelter to curb.

The original concept also included the removal of the dedicated right-turn lane and realignment of the roadway, where feasible, in order to create a pedestrian refuge by extending and widening the medians. Of the five major intersections, three have dedicated right-turn lanes, specifically Intersections 1, 2 and 3 as listed on page 6-1. This original concept was applied to the University Boulevard at Alafaya Trail intersection as a design example to graphically depict what an improved intersection would look like. As shown in Figure 6-3, the current conditions for the Alafaya Trail and University Boulevard intersection include wide turn radii that encourage high speed turns by motorists, long pedestrian crossing distances, narrow sidewalks, poor pedestrian visibility, and limited pedestrian landing areas at the corners. As shown in Figure 6-4, the original concept as applied to University Boulevard at Alafaya Trail intersection contemplated:

- University Boulevard (west)
  - 17-foot width with a 34-foot extension
  - Created by removing right-turn only lane and shifting lanes to the right
- Alafaya Trail (south)
  - 21-foot width with a 25-foot extension
  - Created by shifting northbound traffic lanes 12’ to the right, tapering to original alignment over next 500’
- Alafaya Trail (north)
  - 18-foot width with a 26-foot extension
  - Created by removing right-turn only lane and shifting lanes to the right

However, a preliminary engineering and design analysis was conducted to determine the feasibility and effects or implications of removing the dedicated right-turn lanes. The analysis determined that the dedicated right-turn lanes would need to remain in place to serve vehicular traffic and resulted in the following signalization improvement recommendations for the three intersections with dedicated right turn lanes:
• At Alafaya Trail and University Boulevard: Protected Overlap Right Turns (No Right Turn on Red) or Protected/Permissive Overlap (Flashing Yellow Arrow Right Turn with Yield to Pedestrian sign) in the eastbound, northbound and southbound right turn lanes and the prohibition of U-turns in the northbound, eastbound and westbound left turn lanes;
• At Alafaya Trail and Gemini Boulevard: Protected Overlap Right Turns or Protected/Permissive Overlap (Flashing Yellow Arrow Right Turn with Yield to Pedestrian sign) in the northbound and southbound right turn lanes and the prohibition of U-turns in the eastbound and westbound left turn lanes; and
• At Alafaya Trail and Central Florida Boulevard: Protected Overlap Right Turns or Protected Permissive Overlap (Flashing Yellow Arrow Right Turn with Yield to Pedestrian sign) in the northbound and westbound right turn lanes and the prohibition of U-turns in the westbound and southbound left turn lanes.

The above signal improvements recommendations add a pedestrian phase into the traffic signal cycle and create a situation where, in the dedicated right-turn only lane, the vehicles are caused to be stopped or paused by a right-turn red arrow while the pedestrian crosses the street safely, in the case of the Protected Overlap. In the Protected/Permissive case, drivers in the dedicated right-turn lane desiring to turn right are required to yield to pedestrians before making the right turn and to turn with caution. These signal treatments allow safe crossing conditions for pedestrians and bicyclists with minimal, negligible impacts to the operational function or efficiency of the traffic signal for vehicular movement/traffic volumes.

For the two intersections without dedicated right-turn lanes (Intersections 4 and 5), the preliminary analysis recommended:

• All four (4) approaches become shared through right-turn movements, and
• Right Turn Flashing Yellow Arrow with Circular Green (FYA w/ CG) ball and Yield to Pedestrians sign.

This signalization treatment would allow through vehicular movement with the green ball but would also require drivers desiring to turn right to yield to pedestrians and turn with caution.

Graphic depictions of the above signalization improvements recommendations are available in Appendix D.

Following the preliminary engineering and design analysis, revisions to the original concept was developed based on the retention of the dedicated right turn lanes. Figure 6-5 provides an illustrative example of a revised recommended intersection design concept. This design concept was developed to be implemented within the available right-of-way (ROW) along Alafaya Trail and University Boulevard.
Figure 6-1: Summary of All Improvement Treatments
Figure 6-2: Major Intersection Operational Treatments
Figure 6-3: Existing Conditions
Alafaya Tr & University Bv
Figure 6-5: Revised Intersection Concept - Alafaya Tr & University Bv
Major Mid-Block Crossings

Figure 6-6 provides locations of two (2) recommended mid-block crossings along Alafaya Trail and University Boulevard.

Design concepts were identified for the minor roadways/driveways that could be implemented, subject to engineering and cost evaluations, within the available right-of-way (ROW). Both mid-block crossings would need to meet Orange County design standards; however, the mid-block crossing along Alafaya Trail would also need to meet applicable FDOT design standards. The design concepts for the crossing included:

- Addition of midblock crossing with 12-foot wide textured pavement crosswalks controlled by signal, Pedestrian Hybrid Beacon (also known as a HAWK) or RRFB (subject to engineering and design review). Based on discussions with FDOT, the Design approach will be to warrant test for a pedestrian signal.
- Relocation of LYNX bus stop adjacent to the pedestrian crossing with standard bus shelter and 5-foot minimum width sidewalk from shelter to curb
  - Add standard bus shelter
  - Add 5-foot minimum width sidewalk from shelter to curb
- Reduction of turn radii to maximum of 25 feet
  - Widen and realign sidewalk near crossing for about 115 feet at the east and west side of Alafaya Trail
  - 8-foot minimum width
  - 8-foot minimum distance from curb
- Widening and realignment of sidewalk near crossing at the east and west side of Alafaya Trail with 8-foot minimum width and 8-foot minimum distance from curb to allow greater separation from traffic (subject to availability of sufficient right-of-way)
- Planting of trees and shrubs in median and between sidewalk and curb near the crosswalks to encourage lower driving speeds, increase shade/comfort for pedestrians/bicyclists and guide pedestrians to cross at new crosswalks
- Installation of pedestrian lighting (edge of road) and fencing (within the median) to guide pedestrians/bicyclists to crosswalk locations

Figure 6-7 shows the current conditions for the crossing area on Alafaya Trail near Solon Drive and Pasteur Drive. This location was observed to serve some of the highest pedestrian and bicycle crossings within the UCF/Alafaya Trail Pedestrian Safety Study limits. Two LYNX bus stops are located here, increasing the number of pedestrian crossings. Figure 6-8 provides an example of the recommended design concepts applied to the mid-block on Alafaya Trail.
Figure 6-6: Major Mid-block Crossing Improvement Locations
Figure 6-7: Existing Mid-block Crossing Conditions
Minor Cross Streets and Major Driveways

Figure 6-9 depicts the recommended minor cross-street and driveway locations along Alafaya Trail and University Boulevard that are recommended for pedestrian crossing treatments. Figure 6-10 shows the current conditions typical for the major driveways on Alafaya Trail near Solon Drive and Pasteur Drive. As shown, the driveways and minor cross-streets often have wide turning radii, thus encouraging high speeds that create a hostile pedestrian environment. The sidewalks also often cross these locations without marked crosswalks, allowing motorists to forget that they are crossing a pedestrian space.
Design concepts were identified for the major driveways and minor cross-streets that could be implemented subject to engineering and cost evaluation. These design concepts were developed to be implemented within the available right-of-way (ROW) and recognized the need to meet applicable FDOT and Orange County design standards. The design concepts for the crossing included:

- Provide textured pavement crosswalks or continuous sidewalk over minor road/driveway
- Reduce turn radius on all corners to a maximum of 25 feet

Improvements can be done in coordination with landscaping and sidewalk enhancement projects. Figure 6-10 provides an example improvement utilizing the recommended design concepts.
Corridor-wide Pedestrian Safety Enhancements
Based on the traffic analysis, the study recommends the installation of pedestrian-scale lighting throughout the study corridors, installation of pedestrian channelization/fencing within the medians of University Boulevard and Alafaya Trail (based on Design) and the widening of existing sidewalks. The sidewalk improvements include:

- Widen sidewalks to 12 feet on east side of Alafaya Trail (pedestrian/bicycle path)
- Widen sidewalks to 8-foot minimum on west side of Alafaya Trail (south of University Boulevard) and both north and south sides of University Boulevard from Alafaya Trail to Quadrangle Boulevard
- Widen sidewalk to 12 feet on south side of McCulloch Road

The study also recommends widening the green spacing distance between street and sidewalk to 8-foot minimum where possible as well as creating a UCF gateway at University Boulevard and branding a pedestrian-scale environment along Alafaya Trail and University Boulevard.

Figure 6-12 shows the locations of the sidewalk improvements.
Figure 6-12: Recommended Sidewalk Locations
Other Recommendations
In addition to the design concepts identified, other strategies include:

- Enhancements of network connectivity
- Improvements to safety programs to educate UCF students
- Changes to planning for new development and traffic operations policies to improve pedestrian and bicycle safety
- Evaluation of expansions to the existing LYNX bus and UCF Shuttle services

Figure 6-13 indicates potential corridors where better vehicular connectivity could facilitate existing highway corridors to be redesigned to better serve multiple modes of transportation.

Figure 6-14 provides examples of branding that could be incorporated into the limits of Alafaya Trail and University Boulevard within the UCF area.
Figure 6-14: Branding the UCF Area
Core Group Input to Recommended Improvements

The recommended plan relating to Major Intersections, Major Mid-block Crossings, and Minor Cross-Streets and Major Driveways was presented to the UCF/Alafaya Trail Pedestrian Safety Study Core Group. Generally, the Core Group supported the UCF/Alafaya Trail Pedestrian Safety Study recommended plan as presented. It should also be noted that the strategies and recommendations were presented to UCF and FDOT representatives in advance of the Core Group presentation and were generally acceptable.

Additional input from the Core Group is provided below:

- Continue to improve east-west connectivity as well as north-south,
- Consider the planned hotel/conference center at the northeast corner of Alafaya Trail and University Boulevard,
- Estimate the short term and long term maintenance costs and consider private partners for funding,
- Consider creating a Transportation Management Association (TMA) to address the improvements, and
- Continue to consider countermeasures involving education during student orientation and enforcement of traffic controls with UCF students.

Consistency of Current Recommendations with Recommendations from Previous Studies

As part of the Florida Department of Transportation’s two previous studies for Alafaya Trail and the County’s previous study for University Boulevard, recommendations were developed. The recommendations from this Pedestrian Safety Study were evaluated against these previous recommendations, and such evaluation is provided below.

1) FDOT State Road (SR) 434/Alafaya Trail Corridor Study (2014): The FDOT SR 434 Study included recommendations relating to modifications to the Alafaya Trail cross section. For that section of SR 434/Alafaya Trail that is within the limits of this Pedestrian Safety Study, the following cross section elements were recommended for Alafaya Trail by the FDOT SR 434 Study, as follows:
Challenger Parkway to Science Drive:

- 8-foot sidewalk
- 2-foot curb and gutter
- 4-foot bike lane
- Three 11-foot travel lanes
- 28-foot landscaped median
- Three 11-foot travel lanes
- 4-foot bike lane
- 2-foot curb and gutter
- 3-foot planter strip
- 12-foot multi-use trail
- 5-foot planter strip

Science Drive to McCulloch Drive:

- 8-foot sidewalk
- 2-foot curb and gutter
- 4-foot bike lane
- Three 11-foot travel lanes
- 28-foot landscaped median
- Three 11-foot travel lanes
- 4-foot bike lane
- 2-foot curb and gutter
- 3-foot planter strip
- 5-foot sidewalk
- Natural buffer
- 12-foot multi-use trail

Illustrations of the recommended Alafaya Trail cross sections from the FDOT SR 434/Alafaya Trail Corridor Study are included in Appendix C.

The recommendations developed through this UCF/Alafaya Trail Pedestrian Safety Study include most of the elements from the FDOT study recommendations, including an 8-foot sidewalk and a 12-foot multi-use trail. However, based on the amount of right-of-way donated from the University and further discussion with FDOT, FDOT recommended that the 12-foot multi-use trail be reduced to a 10-foot widened sidewalk. However, for purposes of this study, the recommended improvement continues to be a 12-foot wide trail off-campus. It is also important to note that a pedestrian bridge was not recommended as part of the FDOT SR 434/Alafaya Trail Corridor Study. Specifics about the final cross section of the Alafaya Trail corridor will be evaluated and further refined during engineering and design, which will occur in coordination with the FDOT Design and Traffic Operations Units and the University.

Additionally, the long-term strategies developed in this UCF/Alafaya Trail Pedestrian Safety Study relating to parallel facilities and network connectivity, transit, and streetside design were generally consistent with recommendations from the FDOT SR 434/Alafaya Trail Corridor Study.

2) **Orange County Pedestrian and Bicycle Study for University Boulevard (SR 436 to SR 434) (August 2013):** Orange County’s University Boulevard Study included recommendations relating to modifications to the University Boulevard cross section. For that section of University Boulevard that is within the limits of this Pedestrian Safety Study, two optional cross section elements were recommended for Alafaya Trail by that County University Boulevard Study, as follows:

**Option 1- Bicycle Lanes:**
- 7-foot sidewalk
- Varying planter strip /curb and gutter

**Option 2- Wide Curb Lanes:**
- 7-foot sidewalk
- Varying planter strip /curb and gutter
4-foot bike lane
Three 11-foot travel lanes
Varying landscaped median
Three 11-foot travel lanes
4-foot bike lane
Varying I planter strip /curb and gutter
10-foot multi-use trail

One 14-foot, Two 11-foot travel lanes
Varying landscaped median
One 14-foot, Two 11-foot travel lanes
Varying I planter strip /curb and gutter
10-foot multi-use trail

The recommended design concepts from this Pedestrian Safety Study are generally consistent with the recommendations from the Orange County Pedestrian and Bicycle Study for University Boulevard. Same as with the FDOT SR 434 Study, the County’s University Boulevard Study also did not include recommendations to install a pedestrian bridge.

Recommended Improvements Implementation Phasing Plan

These improvements will be implemented in phases, depending upon the availability of sufficient right-of-way. Based on available funding and partnerships with the University of Central Florida and the Florida Department of Transportation, the first phase of improvements will occur on Alafaya Trail along the UCF frontage and along a portion of University Boulevard from Alafaya Trail to Quadrangle Boulevard. The second phase will cover the remainder of the study corridors. The Recommended Improvements Phasing Plan is below.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Recommended Improvements</th>
</tr>
</thead>
</table>
| Phase I (Portion of Alafaya Trail along UCF Frontage and University Blvd (Quadrangle Blvd to Alafaya Trl)) | • UCF Branding, signage and way finding  
• Pedestrian channelization/fencing within the median  
• Landscaping between sidewalk and edge of curb  
• Major intersection improvements at Alafaya Trail and University Boulevard  
• Pedestrian-scale lighting along Alafaya Trail along UCF frontage  
• 10-foot pedestrian/bicycle path (east side of Alafaya Trail)  
• Two signalized mid-block crosswalks with textured /colored pavement  
• Safety education (e.g. UCF Student Orientation) |
| Phase II (Remainder of the Project Corridors) | • 8’ sidewalks along the roadway separated as far from travel lanes as feasible within the available ROW  
• Textured crosswalks at minor roadways and driveways  
• Additional landscaping (outside UCF area)  
• Intersection enhancements at remaining Major Intersections  
• Pedestrian Lighting outside of UCF area |
Improvement Not Moving Forward

Pedestrian Bridge Alternative
As part of the UCF/Alafaya Trail Pedestrian Safety Study, a concept was developed that included an elevated pedestrian bridge. Figure 6-15 provides the potential design concepts. This option was included since it was discussed as a possible improvement in the initial stages of the UCF/Alafaya Trail Pedestrian Safety Study and raised as a potential improvement by some Core Group members through the process. The pedestrian bridge concept includes some of the elements of the Mid-block Crossing concept. Additional elements include the following:

- Pedestrian bridge over Alafaya Trail
- 14-foot width minimum
- 360-foot ramps
- 16-foot minimum clearance
- 140-foot main span
- 6-foot wide stairs on both side of bridge for more direct crossing

This alternative was determined not to be cost-effective. The concept for a pedestrian bridge shown in Figure 6-15 was the basis for the design and construction cost estimate. The cost for design and construction was estimated to be $5,000,000 to $6,000,000 per location. The concept would also require acquisition of a significant amount of right-of-way (ROW), which would be additional cost.

The cost to acquire ROW and construct a pedestrian bridge is very high compared to the potential benefits and return on investment as the Alafaya Trail is very “porous”, meaning that pedestrians/bicyclists can cross at any location. Also, it is anticipated that a large portion of pedestrians and bicyclists will cross at-grade since it is a shorter and more direct path than a bridge. The study data indicated that multiple bridges would be needed to meet the demands of the different pedestrian and bicycle crossing routes observed.

Therefore, the pedestrian bridge concept was determined to not be a cost-effective improvement for pedestrian and bicycle safety in the study area. This finding is also consistent with the recommendations from the Florida Department of Transportation’s SR 434/Alafaya Trail Corridor Study (February 2014), which also did not recommend the installation of a pedestrian bridge.
Preliminary Cost Estimates for the Recommended Improvements
Implementation Plan

Cost estimates were prepared for the different components of the recommended improvements plan. The recommended plan concepts were developed with an effort to limit the need for additional ROW. For concepts that required additional ROW, costs to acquire the ROW were not included in the estimates at this phase of the Study. The cost estimates provided herein are preliminary estimates for construction only and will be refined through the Design and Engineering process.

Improvements at Major Intersections
The original concept for the Major Intersections, which included the removal of the dedicated right-turn lane and subsequent realignment of the road, was estimated to be approximately $1,360,000 - $2,490,000 per intersection. The cost would vary based on the number and width of the approach or leg of the major intersections. The key components of the cost estimates for this original design concept are provided below:

- Reduce turn radii on all corners to 25\(^\circ\): $29,500 per corner

Figure 6-13: Pedestrian Bridge Concept (Not moving forward)
• Create pedestrian refuge by extending and widening medians; removing dedicated turn lane: $198,500 per leg (note: concept of removing right-turn lane no longer viable, thus associated cost also not moving forward)
• Realign roadway, shifting traffic lanes approximately 12 feet and tapering to original alignment over approximately 500 feet: $487,000 per leg
• Increase pedestrian landing area and 12-foot wide textured pavement crosswalks: $15,000 per crossing
• Provide Flashing Yellow Arrow for right turn only lanes: $25,000 – $75,000 each

However, with the change in the design concept to retain the dedicated right-turn lane (thus no widening/extension of medians and no road realignment), the intersection design concept, as depicted in Figure 6-4, is estimated to be $555,000 - $755,000 per intersection. The major cost differential between the original and final recommended intersection design concepts was the cost associated with shifting and realigning the roadway:

• Original: Cost associated with realignment and shifting of roadway to create wider median refuge - $487,000 per leg
• Final: Cost associated with mobilization, MOT, milling and resurfacing, and signalization - $75,000 per leg

These intersection improvement costs do not include the costs associated with pedestrian-scale lighting, pedestrian fencing and additional landscaping – which are described later in this Chapter.

Installation of Signalized Mid-block Crossings
The concept for Signalized Mid-Block Crossings shown in Figure 6-7 was the basis for the design and construction cost estimate. That cost was estimated to be $126,500 - $168,500 per crossing. The cost would vary based on the installation of a pedestrian signal, whether a Pedestrian Hybrid Beacon or RRFB. Installation of signalization with pedestrian controls would cost approximately $100,000.

Pedestrian Enhancements at Minor Cross-streets and Major Driveways
The concept for minor cross-streets and major driveways shown in Figure 6-9 was the basis for the design and construction cost estimate. The cost for design and construction was estimated to be $74,000 per minor cross-street or major driveway. The components of the cost estimates are provided below:

• Textured pavement crosswalks: $15,000 per crossing
• Reduce turn radii on all corners to 25-foot: $29,500 per corner

Pedestrian Safety Enhancements Along the Corridor (Lighting, Widened Path and Channelization)
The recommended improvements plan includes the installation of pedestrian-scale lighting throughout the study corridors, the widening of the existing sidewalk on the east side of Alafaya trail to a minimum of 12 feet and the installation of pedestrian fencing within the medians.
Cost estimates for the pedestrian-scale lighting were completed by Duke Energy for that segment of Alafaya Trail that fronts on the UCF property boundary. Duke Energy’s cost for lighting includes the costs associated with photometric layout, maintenance and replacement of the fixtures. Total monthly cost is per fixture and depends upon the selected lighting fixture type, pole type and height, and lighting source type (whether LED, high pressure sodium or metal halide). Duke Energy provides a gallery of product and service types on its Product Gallery website, but average costs for light fixtures range from $16 to $24 per fixture, and average costs for poles range from $9 to $22 per pole. Final costs will be developed by Duke Energy based on length and segment of roadway.

Cost estimate for sidewalk improvements was based on $110 per linear foot. Within the limits shown in Figure 6-12 (less the sidewalk improvement on the south side of McCulloch Road), the estimated cost for the recommended improvements is approximately $1.9 million.

Due to the porous nature of the Alafaya Trail corridor, the recommended improvements plan includes the installation of pedestrian fencing within the existing medians to guide or encourage pedestrians and bicyclist to cross at crosswalks and other safe crossing locations. A preliminary estimate, totaling approximately $2.2 million was calculated based on a unit cost of $194 per linear foot (applied to approximately 2,500 feet along University Boulevard and 8,900 feet along Alafaya Trail). However, specifics about the fencing, including location of placement, length, design and line of sight, will be refined during Design and Engineering.

Other Safety Enhancements
In addition to the improvements provided above, the recommended improvements plan also included the installation of trees and landscaping. In lieu of developing cost estimates for trees and landscaping, a line item budget amount will be allocated towards these costs following Design and Engineering of the major improvements.

Table 6-1 provides the cost estimates for the recommended improvements implementation plan (all improvements).
Currently, Orange County has approximately $358,000 allocated toward design of the UCF/Alafaya Trail Pedestrian Safety Study Recommended Plan and $4 million toward funding the installation and construction of the Phase I improvements, with the understanding that FDOT, UCF, or others will assist in the maintenance of the improvements. The County has completed coordination and negotiations with the University, and the results of that negotiation is embodied in the University’s updated Campus Development Agreement. The County continues to coordinate with the FDOT on funding and future maintenance of the widened pedestrian/bicycle path along the east side of Alafaya Trail as well as pedestrian-scale lighting along the west side of Alafaya Trail. Chapter 7 provides details of the phases of improvements moving forward based on coordination with both the University and the FDOT.

### Table 6-1: Cost Estimates for Improvements Concepts

<table>
<thead>
<tr>
<th>IMPROVEMENT (Construction Costs – Maintenance Not Included)</th>
<th>EST. COST (NO ROW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERSECTION PROJECTS</td>
<td></td>
</tr>
<tr>
<td>Alafaya Trail and University Boulevard (Assume new mast arm needed)</td>
<td>$755,000</td>
</tr>
<tr>
<td>Alafaya Trail and Gemini Boulevard (Assume new mast arm needed)</td>
<td>$755,000</td>
</tr>
<tr>
<td>Alafaya Trail and Central Florida Boulevard (Assume new mast arm needed)</td>
<td>$755,000</td>
</tr>
<tr>
<td>Alafaya Trail and Research Parkway</td>
<td>$555,000</td>
</tr>
<tr>
<td>University Boulevard and Quandrangle Boulevard</td>
<td>$555,000</td>
</tr>
<tr>
<td>INSTALLATION OF MID-BLOCK CROSSINGS</td>
<td></td>
</tr>
<tr>
<td>University Boulevard near Turbine Drive</td>
<td>$268,500</td>
</tr>
<tr>
<td>Alafaya Trail near Solon Drive</td>
<td>$268,500</td>
</tr>
<tr>
<td>SIDEWALKS (WITH LANDSCAPING AND PEDESTRIAN LIGHTING)</td>
<td></td>
</tr>
<tr>
<td>8-foot wide sidewalks along both sides of University Blvd.</td>
<td>$536,800</td>
</tr>
<tr>
<td>12-foot wide sidewalk along east side of Alafaya Trail</td>
<td>$968,000</td>
</tr>
<tr>
<td>PEDESTRIAN ENHANCEMENTS AT MINOR ROADS/DRIVEWAYS</td>
<td></td>
</tr>
<tr>
<td>Textured/colored pavement/concrete crossing ($15K each) (14 driveways/roads)</td>
<td>$210,000</td>
</tr>
<tr>
<td>Reduced turn radii on all corners to 25 feet ($29.5K/corner) (26 corners)</td>
<td>$767,000</td>
</tr>
<tr>
<td>PEDESTRIAN ENHANCEMENTS ALONG THE CORRIDORS</td>
<td></td>
</tr>
<tr>
<td>Pedestrian fencing</td>
<td>$2,211,600</td>
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<tr>
<td>Pedestrian-scale lighting (Initial Installation)</td>
<td>$174,000</td>
</tr>
<tr>
<td>Stylized signs</td>
<td>$50,000</td>
</tr>
<tr>
<td>GRAND ESTIMATED TOTAL CONSTRUCTION COSTS</td>
<td>$8,829,400</td>
</tr>
</tbody>
</table>
Chapter 7 Moving Towards Implementation

Chapter 6 provided descriptions and cost estimates for the complete list of recommended improvements resulting from this Pedestrian Safety Study. This chapter will describe the phasing plan and the next steps in the process.

As previously mentioned in Chapter 6, the County, FDOT and University of Central Florida officials have been in numerous discussions to determine which agency would be responsible for which improvements, in terms of both construction and maintenance. Since the University fronts the majority of the Alafaya Trail study corridor, County staff and University officials have negotiated a new updated Campus Development Agreement (CDA) which covers that east side of Alafaya Trail which fronts the University property. The updated CDA, which is statutorily required to implement the University’s Campus Master Plan, has been signed by the UCF Board of Trustees and includes Partnership Projects to improve bicycle/pedestrian safety and multimodal mobility in the UCF Study area. As documented in the CDA, the University of Central Florida has committed to the following Partnership Projects:

<table>
<thead>
<tr>
<th>Partnership Projects from Safety Study</th>
<th>Est. Cost*</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Provide a 5-foot right-of-way beyond existing FDOT right-of-way (for purposes of the widen pedestrian/bicycle path)</td>
<td>$286,867</td>
<td>Agreement in place no later than Design</td>
</tr>
<tr>
<td>2. Design/construct first phase of Gateway Project at entrance to campus at University Bv and Alafaya Tr (consistent with Study recommendations for signage, lighting, pedestrian landing areas, turn radii, and landscaping)</td>
<td>$1,900,000</td>
<td>Designed/constructed concurrent to County Capital Improvement Schedule</td>
</tr>
<tr>
<td>3. Pay for installation of 2 signalized mid-block crossings (one on Alafaya Tr near Salon and one on University Bv near Turbine)</td>
<td>$517,000</td>
<td>Funded upon completion of Design</td>
</tr>
<tr>
<td>4. Install pedestrian-scale lighting within right-of-way along UCF frontage of Alafaya Tr</td>
<td>$75,000</td>
<td>Funded as invoiced by Duke Energy</td>
</tr>
<tr>
<td>5. Contribute funds to traffic signalization changes at Alafaya Tr and University Bv</td>
<td>Not to Exceed (NTE) $100,000</td>
<td>Funded upon completion of Design</td>
</tr>
<tr>
<td>6. Provide way-finding and signage on Alafaya Tr and University Bv that UCF determines desirable for branding (with County and FDOT approval for content and stylization)</td>
<td>NTE $50,000</td>
<td>Funded upon completion of Design</td>
</tr>
<tr>
<td>7. Develop/provide Educational Programs related to pedestrian safety</td>
<td>NTE $167,000 per year</td>
<td>Funded yearly as needed</td>
</tr>
<tr>
<td>8. Pay monthly rental lease to Duke Energy (maintenance/utilities of lighting)</td>
<td>NTE $25,000 per year</td>
<td>Funded as invoiced by Duke Energy</td>
</tr>
</tbody>
</table>

* Totals: $2,928,867 (one time) and $192,000 (annual recurring)
The County continues to work and negotiate with the FDOT relative to the construction and maintenance of the wide pedestrian/bicycle sidewalk on the east side of Alafaya Trail (from McCulloch Road to Challenger Parkway) and the installation of pedestrian-scale lighting on the west side of Alafaya Trail in front of the University. The Department is currently reviewing the data collected as well as the County’s operational analysis (as it relates to signal displays) in order to finalize its comments relative to the mid-block crossing, operational improvements to signalization, reductions in turning radii and pedestrian fencing within the medians of Alafaya Trail, which is a state facility. The Department and County Legal staff is also working to finalize the terms of a Memorandum of Agreement between the County and the Department.

As efforts with FDOT continue, the Study findings and recommendations have been approved by the County Local Planning Agency at its August 18, 2016 public hearing. The updated Campus Development Agreement was approved at a public hearing with the Local Planning Agency/Planning and Zoning Commission (LPA/PZC) on Thursday, November 17, 2016. At its Tuesday, November 29, 2016, public hearing, the Orange County Board of County Commissioners approved both the Study Findings/Recommendations and the UCF Campus Development Agreement.

With the approval of the Board, the next steps to advance the Pedestrian Safety Study recommendations are:

- **Design and Engineering:** This will involve preparation of refined plans for the Alafaya Trail and University Boulevard intersection and other major intersections on Alafaya Trail, the mid-block crossing on Alafaya Trail, pedestrian fencing within the medians, pedestrian-scale lighting along the roadway and roadway typical sections. These refinements will be coordinated with FDOT, UCF and County design staff to ensure conformance with applicable standards. Engineering analysis of intersection modifications will also be completed as part of this effort. The impact of modifications of intersection lanes and signal operations on vehicular traffic conditions and levels of service (LOS) will be determined.

- **Construction:** After the intersection and roadway designs are developed from the conceptual plans, the construction cost estimates will be refined, and processes for construction can begin.

In addition to the pedestrian/bicycle safety recommendations coming out of this Study, the County is working on a project intended to improve east-west multimodal capacity along the McCulloch Road corridor, specifically:

- McCulloch Road Roadway Conceptual Analysis (RCA) (North Orion Boulevard to North Tanner Road which will also evaluate a multi-use trail along the south side of McCulloch Road).

The McCulloch Road RCA is part of the County’s *INVEST in Our Home for Life* Pedestrian Safety Initiative.
Appendix A – Public Involvement Summaries
SUMMARY
Core Group 1st Meeting
October 6, 2014
UCF/Alafaya Trail Pedestrian Safety Study
LOCATION: Orange County Administration Building
Cypress Meeting Rooms 1 and 2, 2nd Floor
201 South Rosalind Avenue, Orlando, Florida 32801
TIME: 1:30 pm

CORE GROUP
ATTENDEES: A.J. Range, UCF – Student Affairs
Chris Clemente, UCF – Student Government Association
David Zambri, UCF – Police Department
Fred Kittenger, UCF – University Relations
Lee Kernek, UCF – Facilities
Tony Nosse, FDOT – Safety
Chris Cairns, FDOT – Traffic Operations
Heather Garcia, FDOT – Planning
Mighk Wilson, MetroPlan Orlando
Laura Minns, LYNX
Amanda Day, Bike/Walk Central Florida
Kevin Miller, Orange County – Traffic Engineering
Mike Wilson, Orange County – Sheriff’s Office
Jon Weiss, Orange County – Community, Environmental and Development Services

OTHER
ATTENDEES: Deborah Tyrone, FDOT – Bicycle/Pedestrian
Lynette Rummell, Orange County Commissioner Ted Edwards (District 5)
Michael Brooks, Orange County – Environmental Protection Division
Chris Testerman, Orange County – Administration

PROJECT TEAM: Renzo Nastasi, Orange County
Brian Sanders, Orange County
Karen Maguire, Orange County
Tony Luke, LTEC
Paul Rhoads, LTEC
Heather Strong, LTEC
Laura Turner, Laura Turner Planning Services

PREPARED BY: Laura Turner, Laura Turner Planning Services Date: 10-6-14
Orange County has initiated a pedestrian safety study in the University of Central Florida (UCF) area. The study limits are along Alafaya Trail (from Challenger Parkway to McCulloch Road), University Boulevard (from Rouse Road to Alafaya Trail), and McCulloch Road (from Alafaya Trail to North Orion Boulevard). An important component of this study will be the input received from the area’s key stakeholders, coming together as the study’s advisors known as the Core Group.

Each Core Group member received a notebook with the meeting agenda and presentation slides. Here is a summary of the meeting.

**Welcome and Introductions**
Brian Sanders (Project Manager) welcomed the group on behalf of Orange County and the study team. Orange County has started the Countywide Safety Initiative to address pedestrian issues. This study will focus on the UCF area and the Core Group’s input will be important in developing a set of implementable solutions for this area.

**Project Overview**
Mr. Sanders provided a project overview, which included:
- Build on three previous studies in the area (Orange County Pedestrian and Bicycle Study for University Boulevard, FDOT Alafaya Trail Corridor Study, and FDOT Alafaya Trail Access Management Study);
- Core Group is represented by: UCF, FDOT, MetroPlan Orlando, LYNX, Central Florida Research Park, Bike/Walk Central Florida, and three largest UCF residential complexes;
- Purpose of the study is to improve and enhance pedestrian and bicycle safety in the area;
- Study scope covers review of existing conditions, identifying safety concerns, evaluating potential solutions, recommending solutions, providing an implementation plan;
- Land uses are a mixture of businesses (including Central Florida Research Park) and student-oriented housing; and
- Crash data from 2006 through mid-2014 show that there were 259 pedestrian and bicycle crashes for this area with 59% of the crashes involving pedestrians and 41% involving bicyclists, most of the crashes are on Alafaya Trail (74%) followed by University Boulevard (21%) and McCulloch Road (5%).

**Study Parameters**
- Complete traffic data collection
- Consider a range of strategies and options (pedestrian bridges, pedestrian islands, midblock crossings, pedestrian signals, road diet, intersection modifications, bike lanes, and multipurpose trails
- Stakeholder interviews, including: other student residential complexes, UCF Bicycle advocate, UCF fraternity and sorority life, Siemens, business centers (Tech Center, College Square, Weeks Plaza), College Station, University Commons
- Project will be completed by May 2015, involving three more Core Group meetings and two community meetings
Core Group Discussion
After the project presentation, the Core Group was encouraged to share their concerns and ideas about the pedestrian and bicycle safety in this area. Here are the highlights of that discussion.

Activities within the Study Area

**UCF** (Lee Kernek)
- UCF Master Plan is being updated and a draft document is on the project website (www.fp.ucf.edu). Of particular interest for this study will be the proposed hotel and conference center at Alafaya Trail and University Boulevard as well as a bike path throughout the campus that will tie into trails in Orange and Seminole Counties
- Traffic data from the Master Plan update will be shared
- Wayfinding program being developed
- UCF is looking at widening Libra Road

**MetroPlan Orlando** (Mighk Wilson)
- MetroPlan Orlando has crash data for 2012-2013 and will share this information with the study team

**LYNX** (Laura Minns)
- Existing LYNX super stop on UCF campus
- Alternatives Analysis along SR 50 and Alafaya Trail study is underway and ends at the UCF LYNX super stop
- This corridor has heavy transit use
- Schedules and stops are now accessible in Google maps
- KnightLYNX service – 60% increase from last year; 30 minute headways; plans for increasing frequency; three routes (UCF area, Waterford Lakes, and downtown Orlando); all three routes run until 3 am
- Bus accessibility study includes photos of every bus stop and that information will be shared with the study team

Items to Consider
- Students riding bicycles on sidewalks and the driveway interference (Kevin Miller)
- Need to understand the behaviors of pedestrians and bicyclists (Mighk Wilson)
- Need to understand who is using this corridor and why; motorists difficult to determine, but should be easier for pedestrians and bicyclists; series of roads in this area that are serving different purposes (Jon Weiss)
- Cut-through traffic on UCF campus (Lee Kernek)
- Observations at night – drunks; UCF cyclists without bike lights and wearing dark clothing (Mike Wilson)
- Tracking intoxications as a crash factor – shows up in crash report only if there’s a fatality (Dave Zambri)
- Seasonal pedestrians and bicyclists; more during cooler and drier weather and less during hot and wetter weather (Brian Sanders)
- Look at bus stops and accident data (Brian Sanders)
- For the University of Florida and the University of South Florida, 50% of funding comes from those universities (Laura Minns)
- Campus design sets up conflicts with vehicles and pedestrians; aesthetic features more than traffic (David Zambri)
- Look at incentives for pedestrian safety; lots of places but no place to walk (Chris Clemente)
- Need for UCF education about pedestrian and bicycle safety (Chris Clemente)
- Combine education with enforcement; need to focus on pedestrian behavior (Amanda Day)
• Consider what the area will look like in five years as safety is being studied (Amanda Day)
• Look at current pedestrian behaviors; UCF will wait to build sidewalks until after see the student walking patterns (Lee Kernek)
• Not a lot of bicycle/pedestrian paths on campus (Mighk Wilson)
• UCF Arena/Stadium area; pedestrians not crossing where they should (David Zambri)
• Special events there is drunkenness, lots of pedestrians; consider temporary lighting and lots of deputies (Mike Wilson)
• Concerns about the recent accidents; study is consistent with the County’s multimodal approach to transportation (Chris Testerman)
• Consider commuter desire lines and managing pedestrian access (Chris Cairns)
• Speed limits can be reduced if it improves safety; not if it’s an artificial reduction (Chris Cairns)
• Wants a solution that will work (Chris Cairns)
• Need to consider several factors together: FDOT design, education through Best Foot Forward, entry features into UCF, creating a sense of place for the corridor, corridor context in terms of traffic and aesthetics (Renzo Nastasi)
• Look at how other universities are addressing these similar issues (Jon Weiss)
• Consider focus groups for additional input (Fred Kittinger)

Questions
• For the University Boulevard study, were most of the crashes at Full Sail University? [Yes, and that area is outside of this study’s scope; however, the Full Sail area will be reviewed as part of the Countywide initiative]
• Will the study examine travel speeds and speed limits? [Yes]
• Football games no longer just on Saturdays; consider studying one game during the week and one Saturday game [will be looking at the upcoming Thursday night game as well as a Saturday game; look at three hours before and three hours after each football game; also studying a Friday evening activity; will consider that the daylight savings ends on November 1st]

Next Steps
• To complete the data collection activities before the next Core Group meeting
• Hold stakeholder interviews
• Hold the next Core Group meeting in November
• A project ftp site will be set up and instructions for accessing it will be sent to the Core Group

Attachments: agenda packet and presentation slides

cc: Attendees
Bill Merck, UCF – Administration and Finance
Jeff Reine, LYNX
Joe Wallace, Central Florida Research Park
Auntuell Mills, Pointe at Central
Michael McLamb, University House
Megan Edwards, Sterling Apartments Phases 1 & 2
Ruby Rozier, Orange County – Traffic Engineering
Purpose: To develop a common vision to inform development characteristics through land use and a supportive transportation strategy that promotes the safety of pedestrians, bicyclists and transit riders within the UCF vicinity.

Presentation Review:
1. Results of the stakeholder interviews: What we have heard.
2. Review of the data collected: What we have learned (Strengths, Weaknesses, Opportunities and Threats.)
3. Analysis of stakeholder interviews and collected data: “what does it mean”. “Where are the challenges and opportunities”.
5. Building consensus through visual preference using a variety of ‘toolbox’ strategies.
6. Starter ideas showing flexible opportunities for short, mid and long term solutions.
7. Group discussion (notes attached as a PDF)

Action Items:
1. Core Group facilitators to collaborate and establish date for next workshop meeting.
2. Stakeholders to provide feedback regarding ‘vision’ ideas. (Good / Bad / other ideas to explore?) Information will be taken to create a consensus vision.
3. Stakeholders to provide key words / a statement to be incorporated into a consensus vision statement for the area.

At the conclusion of the presentation we discussed next step action items. In order to keep this project moving forward, it is important for us to get timely feedback from the core group, which we will be able to document and present back to you in the form of a consensus vision. The
facilitation team presented several ‘high level’ visionary ideas during the workshop that applied several of the design principles. Each idea has components that can influence the ways we think about speed, capacity, design vehicles and access management.

1. A look at the Alafaya Trail and University Boulevard intersection
   a. Flexible phasing/implementation
   b. Turning Radii (reduce to appropriate context and accommodate appropriate vehicle size).
   c. Review of lane use. (2 left turns? 3 thru lanes?)
   d. Create opportunities for safe pedestrian refuge mid crossing.
   e. Utilize special pavement / large open landing areas that mark where pedestrians should be.
   f. Use landscape appropriately to help buffer pedestrians from vehicular use zones. Use vegetation to channel pedestrians to designated street crossings.

2. A vision for University Blvd that creates separate facilities for automobiles, bicyclists and pedestrians, while creating an address for the businesses and various uses along the corridor.
   a. Flexible phasing/implementation
   b. Addition of landscape
   c. Protected bike lanes
   d. Parking
   e. Wider sidewalks adjacent to the buildings rather than next to the street. (eliminating the conflict of motorists not looking for pedestrians as they make turning movements onto the street.)
   f. Using a connected frontage road to help control access management

3. A vision for a comprehensive regional network that utilizes roadway segments in the Research Park and UCF to create parallel network to Alafaya Trail, connecting SR 50 at 408 (south) to McCulloch Road (north).
   a. Flexible phasing/implementation
   b. Understand the major corridors and their capacity. (Alafaya Trail, Rouse Road, McCulloch Rd, University Blvd and SR 50.)
   c. Define the small grain road network that exists east of Alafaya Trail through the Research park and UCF.
   d. By utilizing the existing roadways and repurposing several of the intersections, we can define a parallel roadway network to Alafaya Trail (north/south). We can then create a fine grained network of 2 lane, livable streets that connect Alafaya Trail and the new north/south road east to west.
   e. The Vision for the new road is to keep them to the outside perimeter of the university. It is important to keep the character and maintain the functionality of the existing framework to encourage the pedestrian core created.
Framework for a vision: Starter ideas.

1. **Accessible**: Maximizing a barrier-free environment through a system of open space, great street networks and the appropriate balance of land use. Easily accessible. (Streets, Parking, Buildings & Facilities)

2. **Connected**: Smart growth conserves lands, promotes a high level of livability, and allows for transportation efficiency and walkability. Connectivity will improve and prove flexibility to access and route choice. Places need to be connected internally and externally, particularly for pedestrians and cyclists. The idea is to provide multiple routing options, to spread traffic loads and increase comfort. (Streets, Parks & Open Space, Sidewalks, Infrastructure and Land Uses)

3. **Comfortable & Engaging**: Comfort is created by being free of anxiety in one’s physical environment. It is about having a positive experience by developing engaging environments that sustain interest. Comfort is natural surveillance provided by legitimate activity, the right mix of enclosure and views, a human scale, and protection from harsh elements such as wind, rain and the hot sun. It creates a feeling of safety. (Shade, Appropriate pedestrian scale, Multi-spaces and Walking distances)

4. **Safe & Secure**: The design should evolve towards a calm, friendly, and attractive place where the context encourages people to feel unstressed. (Visibility, Lighting and Activated Spaces)

5. **Legible**: Legibility relates to comfort (knowing one’s location and way), accessibility (resources and places can be easily found), and connectedness (ability to take various routes). Legibility can be increased with prominent landmarks, architectural differentiation and preservation of views.
SUMMARY
Core Group 3rd Meeting
August 17, 2015
UCF/Alafaya Trail Pedestrian Safety Study

LOCATION:  Orange County Public Works Building
Main Conference Room, 1st Floor
4200 S. John Young Parkway, Orlando, Florida 32801

TIME:  2:00 pm to 4:00 pm

CORE GROUP ATTENDEES:
Chris Clemente, UCF – Student Government Association
Fred Kittinger, UCF – University Relations
Lee Kernek, UCF – Facilities
James Mangan, UCF – Police Department
Tony Nosse, FDOT – Safety
Heather Garcia, FDOT – Planning
Myles O’Keefe, LYNX
Kevin Miller, Orange County – Traffic Engineering
Christine Lofye, Orange County – Traffic Engineering
Ruby Rozier, Orange County – Traffic Engineering
Mike Wilson, Orange County – Sheriff’s Office
Jon Weiss, Orange County – Community, Environmental and Development Services

OTHER ATTENDEES:
Marcos Marchena, UCF Board of Trustees
Lynette Rummell, Orange County Commissioner Ted Edwards (District 5)
Chris Testerman, Orange County – Administration
Ann Marie Varga, Orange County – Communications
Natirua Mitchell, Orange County – Engineering
Cathy Evajelo, Orange County – Public Works
Ian Phyars, Orange County – Transportation Planning

PROJECT TEAM:  Renzo Nastasi, Orange County – Transportation Planning
Brian Sanders, Orange County – Transportation Planning
Karen Maguire, Orange County – Transportation Planning
Tony Luke, LTEC
Paul Rhoads, LTEC
Heather Strong, LTEC
Ben Lytle, AECOM
Laura Turner, Laura Turner Planning Services
Orange County has initiated a pedestrian safety study for the University of Central Florida (UCF) area. The study limits are along Alafaya Trail (from Challenger Parkway to McCulloch Road), University Boulevard (from Rouse Road to Alafaya Trail), and McCulloch Road (from Alafaya Trail to North Orion Boulevard). An important component of this study is the input received from the area’s key stakeholders, coming together as the study’s advisors known as the Core Group.

Each Core Group member received a copy of the meeting agenda, presentation slides, and cost estimates/potential implementation. Here is a summary of the meeting.

**Welcome and Introductions**
Brian Sanders (Orange County Project Manager) welcomed the group on behalf of Orange County and the study team. Orange County has been working on this UCF area study since last fall. The Core Group’s input continues to be important in as the study recommendations are finalized.

**Presentation**
The presentation covered: review of study limits and focus area; toolbox of FDOT approved countermeasures and solutions as well as previous studies; review of starter ideas and improvement concepts; and recommendations and estimated costs.

**Overview and Toolbox**
The study limits were reviewed, noting maintenance responsibilities for the existing roads. The study is focusing on Alafaya Trail (from Research Parkway to University Boulevard), University Boulevard (from Alafaya Trail to Quadrangle Boulevard), and the intersection of Alafaya Trail and Corporate/Gemini Boulevards. The following toolbox of design principles guided this study: accessibility, connectivity, legible signage, safety, and comfortable setting. Mr. Luke also reviewed the key items shared during stakeholder interviews that were held. Starter ideas were shared, providing examples of how this area could transform into a safe, more balanced transportation corridor while also creating an identity for the UCF area. The strategies and recommendations were vetted by UCF and FDOT before sharing with the Core Group and were generally acceptable.

**Implementation Strategies**
- Alafaya Trail and University Boulevard Crossing Treatments
  - Reducing the turn radii on all four corners to 25 feet
  - Create pedestrian refuges by extending and widening medians
  - Incorporate 12-foot wide textured pavement crosswalks
- Alafaya Trail and University Boulevard Crossing Treatments with Trees
  - Trees in medians and shoulders to encourage lower driving speeds and increase shade for pedestrians
  - Shrubs planted in median and between sidewalk and curb near intersections to guide desired crossings
- Alafaya Trail and University Boulevard Crossing Treatments with Improved Sidewalks
  - Sidewalks widened and moved away from curb
  - Improve LYNX bus stops adjacent to crossings
- Branding the UCF Area
  - Examples were shared with a range of simple steps to elaborate ones
- Intersection “Vision”
  - Looked at midblock crossings as well as minor road/driveway intersections
  - Phasing of improvements included: crossings with trees, as well as crossings with trees and improved sidewalks
• Estimated right-of-way needs were presented

Recommendations
• Major Intersections Physical Treatments
  o Reduce turning radii on all four corners to 25 feet
  o Create pedestrian refuges by extending and widening medians (remove dedicated turn lanes and realign roadway)
  o Increase pedestrian landing area
  o 12 foot-wide textured pavement crosswalks

• Major Intersections Operational Treatments
  o Provide flashing yellow arrows for right turn only lanes

• Midblock Crossings
  o Pedestrian hybrid beacon
  o Rectangular rapid flashing beacon (RRFB)
  o Bridge (Alafaya Trail/Solon Drive only)

• Minor Road/Driveway Improvements
  o Crosswalks – short term (sidewalks continue over driveways and textured pavement crosswalks)
  o Reduce turn radii on all four corners
  o Consolidate driveways and continue to provide internal connections and backage roads
  o Improvements should be made throughout the entire study area

• Overall Improvements
  o 5 major intersections
  o 2 midblock crossing treatments
  o 13 minor road/driveway treatments
  o Wider sidewalks throughout
  o Better lighting throughout

• Sidewalk Improvements
  o Pedestrian lighting throughout
  o Widen sidewalk to 12-foot minimum on east side of Alafaya Trail for multi-use trail
  o Widen sidewalk to 8-foot minimum on west side of Alafaya Trail and both sides of University Boulevard
  o Widen distance between street and sidewalk where possible

• Other Recommendations
  o Policy updates
  o Regulatory updates
  o Education programs (expansion of UCF program)
  o Continued collaboration among stakeholders
  o Funding sources – construction as well as maintenance

• Note that the pedestrian bridge is not a recommended option due to costs as well as multiple pedestrian crossings along Alafaya Trail

• Pedestrian lighting is recommended, even at mid-block crossings (similar to lighting found on International Drive)

• Draft cost estimates are provided on the presentation slides and in the costs handout
Core Group Discussion
After the project presentation, the Core Group was encouraged to share their concerns and ideas about the pedestrian and bicycle safety in this area. Here are the highlights of that discussion.

- Need to look at east-west connectivity as well as north-south (Jon Weiss)
- Few people are walking north-south; however, there are a lot of pedestrians crossing Alafaya Trail at McDonald’s (on Alafaya Trail) through the woods to Gemini Boulevard on UCF campus (Lee Kernek)
- Revisit the crossing at McDonald’s, especially with the planned hotel/conference center across the street (Jon Weiss)
- Need to consider the short term and long term of maintenance costs as well as looking for private partners (Fred Kittinger)
- Consider creating a Transportation Management Association (TMA) to address these improvements (Fred Kittinger)
- Helpful to have a range of maintenance costs (Fred Kittinger)
- Consider non-physical improvements such as education during student orientation (Chris Testerman)
- Enforcement with students is a key component [UCF campus and Orange County work closely together in terms of enforcement]
- Talk to property owners on the west side of Alafaya Trail about planned driveway and sidewalk improvements (Lee Kernek)

Questions
- Are some pedestrians not using existing crosswalks? [Yes. All kinds of walking patterns were observed.]
- Are there crossings at bus stops? [Yes, for the most part.]
- Any mid-block crossings identified along Alafaya Trail and north of University Boulevard? [No due to the density of signals]
- Can we keep the right turn lanes and have the pedestrian features? [It’s a possibility]
- Can you show us where right-of-way begins and ends? [Used aerial maps with property line overlays for the conceptual needs presented; more detailed study will be needed during the design phase]

Meeting Wrap Up
- Looking at funding sources for construction as well as maintenance
- Starting October 1, 2016, there will be $380,000 allocated for design (pedestrian crosswalks, landscaping, lighting, low end scale improvements)
- Orange County is willing to make capital improvements on state roads (Alafaya Trail), but DOT will need to maintain
- Orange County will install improvements (such as lighting and alternative crosswalk textures), spending $4 – $6 million; FDOT, UCF, or others will need to maintain these improvements; keep in mind for many of these improvements there is a 10-year life cycle so minimal maintenance will be required early on
• Orange County will meet with FDOT related to permitting; there will be active coordination during design; want to make sure that what is designed is acceptable to FDOT

Next Steps
• Core Group should submit to the study team any comments on recommendations and costs
• One more meeting either with the Core Group or individual meetings with agencies that will be involved in project funding
• Finalize recommendations

Attachments: agenda, presentation slides, and cost estimates/potential implementation

cc: Attendees; Core Group Members not in attendance
SUMMARY
Core Group 4th Meeting
February 17, 2016
UCF/Alafaya Trail Pedestrian Safety Study

LOCATION: Orange County Public Works Building
Main Conference Room, 1st Floor
4200 S. John Young Parkway, Orlando, Florida 32801

TIME: 1:30 pm to 3:00 pm

CORE GROUP
ATTENDEES:
Fred Kittinger, UCF – University Relations
Lee Kernek, UCF – Facilities
Tony Nosse, FDOT – Safety
Jeff Reine, LYNX
Kevin Miller, Orange County – Traffic Engineering
Mike Wilson, Orange County – Sheriff’s Office
Jon Weiss, Orange County – Community, Environmental and Development Services

OTHER
ATTENDEES: Chris Testerman, Orange County – Administration
Ann Marie Varga, Orange County – Communications
Ian Phyars, Orange County – Transportation Planning

PROJECT TEAM: Renzo Nastasi, Orange County – Transportation Planning
Brian Sanders, Orange County – Transportation Planning
Anoch Whitfield, Orange County – Transportation Planning
Tony Luke, LTEC
Heather Strong, LTEC
Laura Turner, Laura Turner Planning Services

PREPARED BY: Laura Turner, Laura Turner Planning Services Date: 2-19-16

Orange County has initiated a pedestrian safety study for the University of Central Florida (UCF) area. The study limits are along Alafaya Trail (from Challenger Parkway to McCulloch Road), University Boulevard (from Rouse Road to Alafaya Trail), and McCulloch Road (from Alafaya Trail to North Orion Boulevard). An important component of this study is the input received from the area’s key stakeholders, coming together as the study’s advisors known as the Core Group.
Welcome and Introductions
Brian Sanders (Orange County Project Manager) welcomed the group on behalf of Orange County and the study team. Orange County has been working on this UCF area study since last fall. The Core Group’s input continues to be important in as the study recommendations are finalized.

Presentation
Mr. Sanders made the presentation about the project, which covered: overview of public outreach, data analysis highlights, pedestrian channelization options, recommendations, review of capital and maintenance costs, and next steps. Each Core Group member was provided a copy of the presentation slides, which are attached for reference. A report is being drafted, documenting the study activities. Once the draft report is compiled, the study’s recommendations will go before the Orange County Local Planning Agency (Planning and Zoning Commission) and the Board of County Commissioners for adoption.

Core Group Discussion
The Core Group was encouraged to share their thoughts about the study and that discussion is highlighted here.

- Note that the sidewalk widths and buffers are approximations and may change during design.
- Watch the fencing (especially within the medians) in terms of sight distances and the visual impacts.
- At Alafaya Trail and University Boulevard, pedestrians will cross during the “through” movement phase and “U” turns will be prohibited.
- A Memorandum of Understanding (between Orange County, FDOT, and UCF) will need to be in place before moving forward into design.
- Consider holding a work session with the Board of County Commissioners after the community meeting and before the public hearing.
- There is a need to educate UCF students about safety; physical improvements alone will not create a safer environment.
- “Bricks and mortar” projects need to be among the short term solutions so that is apparent that changes have been made. Median improvements (fencing and landscaping) and intersection improvements can be done in the short term.
- Stakeholders support the UCF shuttle service and enhancing this service could be a short term improvement.
- Short term solutions can include: landscaping and fencing (to channelize pedestrians) and enhanced or moved bus shelters. Other improvements that can be made within 3 years would be: re-signalization and median modifications. Intersection improvements would take longer to implement.
- Orange County needs to work with FDOT to make sure projects are included in the work program.
- The new INSYNC software will need to be interfaced with the SCOOT system used by UCF.
- Note that LYNX can only move a bus shelters once every five years.

Questions
- Will right turn lanes remain at the intersections with Alafaya Trail? If not, will sight distances be compromised? [Yes, so sight distances will not be compromised.]
- How will large vehicles handle the turns with the reduced radii? [There are multiple lanes at those intersections. Also, UCF has indicated that large delivery trucks do not use Alafaya Trail to enter campus.]
- What are short term improvements that can be done, in addition to education? [The following could be done in the short term:
  - Bus stop enhancements;
  - Fencing;]
• Landscaping;
• Limited intersection improvements and within right-of-way and outside travel lanes;
• Expand UCF shuttle;
• Pedestrian safety education;
• Lighting;
• Enhanced crosswalks; and
• Wayfinding/signage/branding.

- Have right-of-way needs and costs been identified? If so, what is the range? [Not known at this time; likely the County will work with UCF first and then non-UCF properties.]
- If improvements are outside the curb, there will likely be costs associated with utility relocations; do we know these costs? [They will be identified during design.]
- For lighting, what exists and what will be added? [Lighting will be increased at all intersections and mid-block crossings.]
- UCF will provide Orange County with estimates of monthly lighting bills to use as a benchmark in developing the project’s costs.
- Consider LED lighting to reduce poser costs.
- Look at the project costs (in the handouts) as conceptual; these will be better defined during design.
- UCF supports the plan. Additional coordination will be needed with other responsible parties in order for the plan to take hold.
- FDOT will be involved with the engineering and design phase to ensure that medians and other design elements don’t conflict with traffic operations and movements.

Education
Mighk Wilson (MetroPlan Orlando) showed a video about cycling safety, which is used as part of an overall education series. It was suggested that these videos could be incorporated into the UCF education and awareness campaign.

Next Steps
- Orange County will meet with DOT and UCF regarding the Memorandum of Understanding
- Orange County will meet with LYNX regarding bus shelter locations and potential changes

Attachment: presentation slides

cc: Attendees; Core Group Me
SUMMARY
Stakeholder Interviews
Held November 17 through 21, 2014
UCF/Alafaya Trail Pedestrian Safety Study

As part of the data collection efforts, six stakeholder interviews were held during the week of November 17, 2014. Here are the highlights of those interviews. Interviews were held with the following stakeholders, using the questions provided in Attachment A.

November 17th  Central Florida Research Park – Carol Ann Dykes
November 17th  Knights Circle – Rob Myers
November 18th  Northview – Ellen Hughey, Seth Reder, and LaToya Moss
November 18th  University Apartments – Adele Kelsey
November 19th  Plaza on University – Amber Kenney
November 21st  The Edge Orlando – Craig Galbo

Central Florida Research Park
Central Florida Research Park (CFRP) was created in 1978 in partnership with the University of Central Florida (UCF). With its location just south of UCF, the CFRP has become the 2nd largest research park in the United States with over 10,000 employees. Most of the businesses located within the CFRP are high tech oriented covering: simulation and training, hardware/building simulators, labs, sensors, electronics, robotics, and laser optics. There are few large parcels remaining for future development; therefore, any future development (and redevelopment) will be vertical. The roads located within the CFRP are private. About 48 to 60 students work with CFRP client groups.

Mobility Issues and Solutions
- Internal roads are private (would need to work with CFRP on any changes)
- Adequate sidewalks in place; consider making them wider, more inviting to encourage use
- More people out walking as well as cycling and jogging; professors seen riding their bicycles; no walkers on Challenger Parkway, mostly on Research Parkway
- Alafaya Trail and University Boulevard intersection is very dangerous and needs help; hotel/conference center being proposed in the southeast quadrant; new Plaza on University (retail and housing) in northwest quadrant
- In the summer, pedestrians looking for the quickest way to get out of the heat and rain; shelters or designated places to gather would help
- Not a lot of “in person” interaction between UCF and CFRP; if needed, the UCF shuttle is used (two buses loop through CFRP – routes 5 and 9)
- Growing “cut through” traffic through CFRP, especially since Woodbury Road opened; alternative to Alafaya Trail; concerns about having additional non-CFRP traffic using the private roads
• Peak times in the morning are staggered; however, afternoon peak travel time seems to be concentrated (adding to the congestion)
• Missing bike lanes in the area
• Bike racks will be added soon within CRFP
• No LYNX stop within CFRP; closest stops are along Alafaya Trail

Other Shared Observations
• Consider use of landscaping to funnel pedestrians to the desired crossings (similar to the changes at Fairbanks Avenue in front of Rollins College)
• Not many crosswalks along Alafaya Trail; lots of interaction between the students and UCF campus, also between the hotels and restaurants
• Consider mid-block crossings and have signals at official crosswalks
• Students are using the parking spaces at the Plaza at University as a “park and ride” lot to UCF
• No businesses with 24-hour shifts (no manufacturing in CFRP)
• Due to the need for experienced work force, few of the CFRP employees are millennials
• Increasing concerns/interest in having connectivity between the UCF/CFRP area and the Lake Nona area
Knights Circle
Knights Circle is located in the southeast quadrant of Alafaya Trail and McCulloch Road. It is the largest single, off-site college residential complex in the United States with 2,500 beds. The community is open 24 hours; however, office hours are limited to 9am to 7pm daily. About 90% of the residents are UCF students and employees; 7% are Valencia College students; others are Seminole State College and Full Sail students. Currently, Knights Circle is 99% occupied, with only 25 open beds; will have a wait list in the summer before the semester begins. There are two-, three-, and four-bedroom configurations. Knights Circle provides basic furniture (not TV); each resident has own bedroom and bathroom with shared common spaces.

**Mobility Issues and Solutions**
- Bike racks are located throughout the community
- Phase III is closest to the UCF campus and these residents tend to walk to campus; most take the shuttle
- No specific hazards for pedestrians or cyclists observed
- The University Boulevard/Alafaya Trail intersection is dangerous; a pedestrian overpass may draw pedestrians (rather than jaywalk)
- Existing sidewalks are in good condition; however, there are no sidewalks from the back entrance to Data Court; seems to have plenty of space to add sidewalks
- Overall lighting seems to be good
- Lots of students running recreationally; most along Corporate Drive
- Many Siemens employees (at the Quadrangle) walk to restaurants at lunch time, such as Crazy Moon and Tijuana Flats
- Distracted pedestrians and drivers are a BIG concern; sees that drivers make use of their “down” time (while waiting in traffic) to check phone information
- Inebriated students walk between Knights Circle and Mad Hatter
- Would like the shuttle service expanded (additional hours on the weekends as well as to other destinations like Waterford Lakes)
- Night time shuttle service recently expanded
- Suggested bus service to other destinations in the area, like Downtown Orlando and Cocoa Beach

**Other Shared Observations**
- No major renovations or investments anticipated in the near future; completed a $42 million facelift three or four years ago; minor updates to happen include: new fitness center, gym, and clubhouse game room
- Overall, residents are well behaved; zero tolerance for crazy activities; one RA in each building
Northview
Northview is located in Seminole County, in the northeast quadrant of McCulloch Road and Lockwood Boulevard. Opened in Fall 2013, it is one of the newer residential communities, home to 600 residents. On the first floor are two faith based community centers: Hillel (Jewish) and campus ministries (Catholic), which serve residents and non-residents. Other sister properties are Knights Circle and the Rosen campus. No expansions are planned for the Northview community.

Mobility Issues and Solutions
- Majority of residents are UCF students and use the shuttle; Northview parking permit is required (eliminates the need for a campus parking permit)
- UCF shuttle stop is just outside the parking garage (behind the Chevron station); students tend to congregate inside the garage if it’s hot or rainy (poses a safety problem); would like to have the shuttle stop at a different spot with shelter (a better place to congregate/gather)
- UCF shuttle is frequent; comes about every 10 or 15 minutes; or until full
- Bicycle parking provided on the first floor of the parking garage (used for employees and temporary visitors; students park on upper levels); bicycles must have Northview registration (not allowed to store in apartments)
- Crossing near the fire station is dangerous; just south of the fire station the sidewalk ends; need to fill the gaps in the sidewalk network; look at accessibility (especially in meeting ADA needs) to and from UCF campus along Orion Boulevard
- Additional crosswalks are needed in front of McDonald’s
- Frequent accidents at the University Boulevard/Alafaya Trail intersection; pedestrian bridge would help
- Lighting is needed; add reflective surfaces

Other Observations Shared
- Northview is a hub of activity on game days; easy walk to the stadium
- Hillel is opening a full service Kosher restaurant in Spring 2015, which will draw non-residents to the property
- Likes the UCF banners (along University Boulevard and Alafaya Trail) as a means to announce that you’re in a special place; difficult to have one grand entry to UCF campus since there are multiple access points
- Need to announce that you’re in a different setting as you approach UCF; more awareness of surroundings is needed
- Need to be aware that there is a significant evening student population on the UCF campus (while there may be 10,000 employees leaving in the evenings, there are many night students arriving)
- Safety programs are conducted (active and passive) by the Seminole County Sheriff’s Office and the University Police
- Northview (as well as the UCF campus) has protocols for every type of emergency (from lock downs to hurricane evacuations)

University Apartments
University Apartments is located just south of the University Boulevard and Alafaya Trail intersection along the west side of Alafaya Trail. This residential complex has had the same owner for the last 28 years and is not affiliated with UCF. There are 180 residents, with about half being students. The complex consists mostly of two-bedroom units.

**Mobility Issues and Solutions**
- With the absence of barriers, pedestrians cross Alafaya Trail where it’s convenient; happens at several locations along Alafaya Trail
- LYNX bus stop is in front of the complex as well as across the street
- Students walk to campus rather than drive; many of the students come without a car
- There are a lot of bicycles (many have them even if they have a car); able to park in stairwells and in apartments
- On game days, it appears that there are private buses that drop off and pick up students at Habaneros (just north of University Apartments)
- Overpass at University Boulevard and Alafaya Trail may be helpful
- UCF shuttle does not stop at University Apartments; some residents have been walking to The Sterling (residential community just to the south) for the closest shuttle stop

**Other Shared Observations**
- A lot of students are hit coming out of the area bars; most recently on November 4th; lots of accidents at Knights Pub and The Next Door (not far from University Apartments)
- There is a lot of under aged drinking; worse on Fridays, game nights, and weekends
- Anticipates the corridor to have more intense development; every piece of available land will be used to build residential communities (or supporting services)
Plaza on University
Plaza on University is a mixed use community located in the northwest quadrant of University Boulevard and Alafaya Trail and just opened in Fall 2014. The community is 100% leased with 1,309 residents, primarily UCF students. Space is leased by the room (private space) with shared common areas. Each apartment is fully furnished. Rent is all inclusive (cable, internet, pest control) with a cap for utilities. There is a parking garage and residents pay to park here. The ground level will be retail with the following tenants: Bar Louie, Burger Fi, Floyd’s Barbershop, GNC, Blades Pizza, Spoleto; some of which are now open and some will be open early next year.

Mobility Issues and Solutions
- There are two shuttle stops on the property; runs frequently every 10 – 15 minutes; shuttles are well used; asset
- Signals are needed at pedestrian crossings
- LYNX bus stop on University Boulevard and Turbine Drive
- There seems to be adequate parking; the first two levels are for retail customers (no charge); 200 residents are without vehicles
- There are bike racks on property, outside the parking garage
- Pedestrian bridge at University Boulevard and Alafaya Trail may be helpful; concerned about blocking signage identifying Plaza on University

Other Shared Observations
- Lighting does not seem to be a problem
- There’s security on property; also oversees garage parking; additional security on game days
- Retail at Plaza on University is different from the surrounding retail, so not competing
- Measures taken to create a safe environment: well lit areas, locks on residential bedrooms, front door locks, and garage gates; cameras throughout the property
- 20 employees with 11 living on property
- Students need to be more cautious and aware
The Edge Orlando
The Edge Orlando is located on the west side of Alafaya Trail at Research Parkway. This community was built in 1999 and was purchased by the current owner in 2005. There are 930 residents and most are UCF and Valencia College students and currently at 100% occupied. Currently, there is no waiting list.

Mobility Issues and Solutions
• Majority of UCF students in the complex use the shuttle (easier; safe to use); runs from 7 am to 10 pm (Monday through Friday); operates randomly on Saturdays; also runs on game days; runs every 10 to 15 minutes
• Bicycle racks located throughout the property; every two buildings or so
• Alafaya Trail is dangerous
• LYNX bus stops on Alafaya Trail; within 50 feet of the entrances
• Residents walk frequently to the nearby Walgreen's; also walk to local bars; not well lit (especially for the walks to the local bars)
• Need a weekend circulator (suggested name: “Knight Rider”)
• Wider sidewalks would help
• Would be helpful to have regular shuttles to Publix and Waterford Lakes
• 70% to 80% of residents have cars
• Parking pass at UCF is $89 per semester ($120 per semester for specific garages)
• Pedestrian bridge may help; however, recognizes that it will cost a lot of money to build
• Consider use of reflective wristbands as students exit bars

Other Shared Observations
• Minor upgrades ongoing; different improvements scheduled for each year
• Issues involve drunken pedestrians and distracted pedestrians
• Have a blueprint that will guide future redevelopment of area, especially in providing additional connectivity options

Summary
• Alafaya Trail is dangerous for all modes, especially pedestrians; need for additional crosswalks with signals
• Distracted pedestrians and drivers contribute to the dangerous traveling environment along Alafaya Trail
• UCF shuttle is asset and is well used; would like expansion of service
• Need to fill in sidewalk gaps
• Need to establish visual cues to convey that one is in a different setting (more pedestrians, less high speed vehicles)
• Mix of pedestrians trip purposes; recreational as well as travel to/from UCF
• Need more lighting/reflective surfaces for safer night time environment
• Need broader education/awareness of setting as move through it (not a high speed raceway)
Attachment A
List of Questions Used During Stakeholder Interviews

• What is the nature of the business or residential community and how are you tied to the UCF community? What are your business hours?

• What percentage of your business (or residential community) is made of UCF students/employees? How are they likely to travel to you?

• How do your employees/tenants get to work/school? Do they use transit, bikes, or walk?

• What are your concerns about the walking environment in the UCF area?

• Do you have any suggestions about to make walking in the UCF area safer and more inviting?

• Does your business/residential community have a UCF shuttle or LYNX bus stop nearby? Is it well used?

• Do you have bike racks on your property?

• Are there any locations that you can identify that seem particularly hazardous for pedestrians and cyclists?

• What do you like most about the corridor that you would like to see preserved?

• What do you dislike about the corridor that you would like to see changed?

• What is your vision for future development?

• Discuss any potential roadblocks you see in terms of future development.

• What criteria are most important in terms of development in the area for you? (such as: cost, locale, distance, traffic, security, safety, capability for future growth, parking)?
Appendix B – Speed Data Summaries
UCF Area Pedestrian Safety Study

Posted Vs. Actual Speeds

For Survey Period Observed (Fri, Sat, Mon):

• Representative Vehicles Speeds 4 MPH to 9 MPH Higher than Posted Speed

• High Vehicle Speeds & Pedestrians/Bicycles Results in Dangerous Environment

<table>
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<tr>
<th></th>
<th>Observed Speeds</th>
<th>Fri/Sat Night</th>
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<tbody>
<tr>
<td>Alafaya Tl</td>
<td>53.0</td>
<td>44.9 / 42.8</td>
</tr>
<tr>
<td>University Bv</td>
<td>49.3</td>
<td>38.0 / 35.3</td>
</tr>
<tr>
<td>McCulloch Rd</td>
<td>53.1</td>
<td>49.1 / 46.1</td>
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Appendix C – Recommended Alafaya Trail Cross Sections – FDOT Study
Figure 8: Section 3 – SR 58/Colonial Drive to Science Drive (Recommended Alternative D)

Figure 9: Section 2 – Science Drive to McColloch Road (Recommended Alternative D)
Appendix D – Intersection Signalization Improvements Recommendations
Alafaya Trail & University Blvd

**EBR, NBR, SBR:**
- Protected Overlap Right Turns OR
- Prot/Perm OV (FYA Right Turn)
- Prohibit U-Turns (NBL, EBL, WBL)

Alafaya Trail & Gemini Blvd

**NBR, SBR:**
- Protected Overlap Right Turns OR
- Prot/Perm OV (FYA Right Turn)
- Prohibit U-Turns (EBL, WBL)
Alafaya Trail & Central FL Blvd

NBR, WBR:
• Protected Overlap Right Turns OR
• Prot/Perm OV (FYA Right Turn)
• Prohibit U-Turns (WBL, SBL)

Alafaya Trail & Research Pkwy
University Blvd & Quadrangle Blvd

All 4 Approaches:
• All 4 Approaches are Shared Thru Right Turn Movements
• Recommend FYA With Circular Green (FYA W/ CG) and Yield to Peds Sign

Circular Green for Thru with FYA for RT & Yield to Ped Sign