ROBINSON ST.

Many Users. One Street.

Robinson Street Corridor Planning Study

MAY 2017

FDOT

Acknowledgments

Thank you to the many professionals and stakeholders who participated in and contributed to this study. From the communities along the corridor, to the members of the Project Visioning Team and Community Liaison Group, everyone played a crucial role in forming the results and conclusions contained in this study.

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5. What are the Purpose and Needs of the Study?

6. What are the Potential Solutions?

7. How can Alternatives Address the Needs?

8. What Alternatives Best Address the Needs? How do we Advance these Alternatives?

Appendix

1. Why Robinson Street?

Introduction

In the last decade, Downtown Orlando has experienced significant population growth, job growth, and development activity; rapidly evolving into a 24-hour downtown that is more than just the job center of the region. Downtown now has more than 149,300 jobs and 43,400 residents. Between 2000 and 2010, Downtown experienced 13% population growth. It has seen about 2,000 new residential units constructed since 2013 with another 3,300 units already planned in the next five to ten years.[1] New community venues such as the Amway Center and Dr. Phillips Performing Arts Center, significant transit investment such as SunRail and LYMMO expansions, and planned or ongoing developments such as Creative Village/University of Central Florida (UCF) Downtown campus and the Orlando City Soccer Stadium shows that Downtown Orlando is continuing to mature into a world-class destination. As with other urban areas throughout the Country, Downtown Orlando is also faced with challenges that come with this significant growth, including the need to address changing demographics (aging population, rise of Millennial generation), an increased demand for mobility options, and the desire to create a place where citizens can live, work, and recreate.

Amidst this evolving context, State Road (SR) 526 (Robinson Street) helps to connect and form the northeast Downtown area. Robinson Street links the western side of the City's core, west of Interstate 4 (I-4), runs east to the Orlando Executive Airport, and borders many of Downtown's historic residential neighborhoods, such as Thornton Park, Lake Eola Heights, Colonialtown South, and East Central Park. Careful planning is required to determine the best future for one of Downtown's most important corridors.

View of Robinson Street from Rosalind Avenue towards the east.

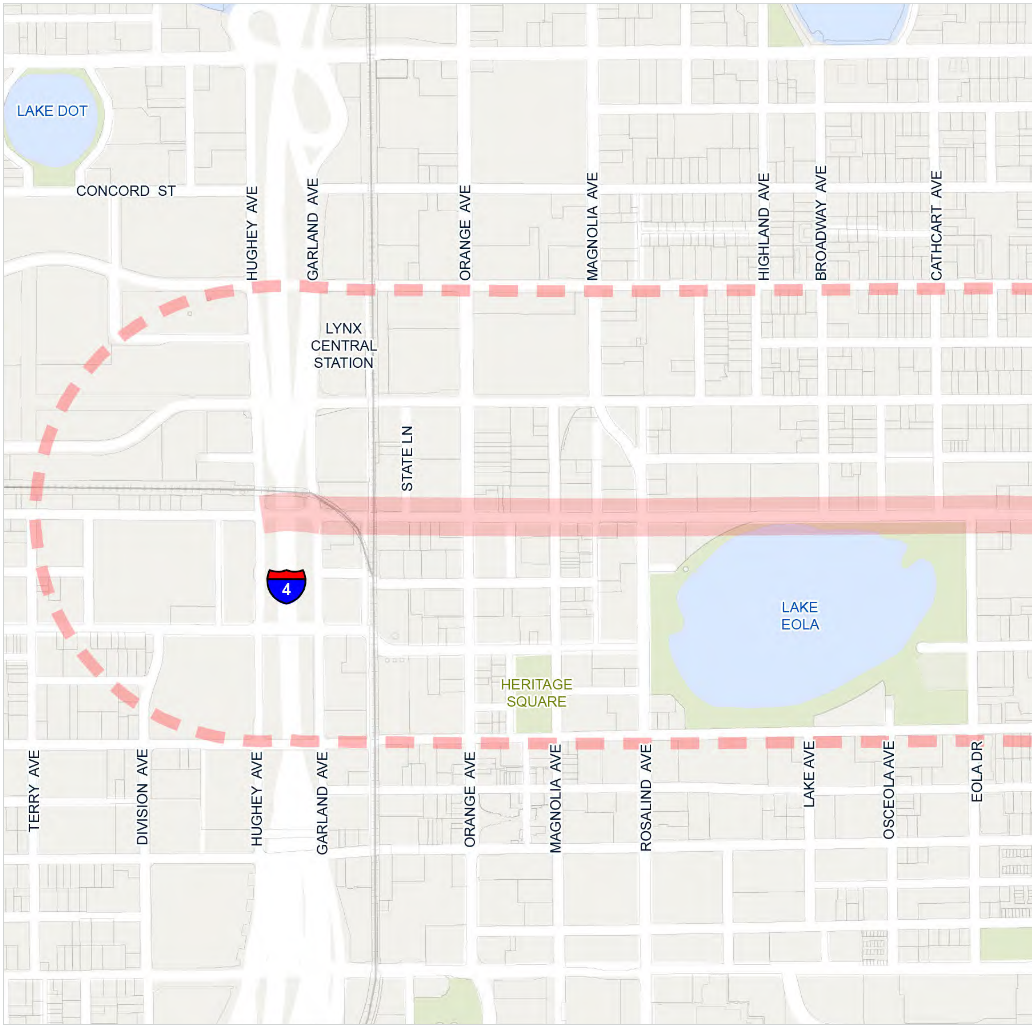
As such, the Florida Department of Transportation (FDOT) – District 5, in partnership with the City of Orlando, conducted a corridor planning study on SR 526 (Robinson Street) to objectively evaluate possible improvements to the Robinson Street corridor that will improve multimodal safety, operations and connectivity, and will address the increased demand for travel options.

1 US Census Bureau, 2013 American Community Survey; Orlando Downtown Development Board

Study Corridor

The study area, shown in **Figure 1**, includes a half-mile wide east-west corridor following Robinson Street from north Hughey Avenue to Crystal Lake Avenue/ Maguire Boulevard (2.3 miles). Robinson Street is one of the few roadways that connect the western side of Downtown (west of I-4), east to the Orlando Executive Airport. SR 50 (Colonial Drive) and South Street/Anderson Street are the other east-west routes providing through connections with limited impedances. While the study is primarily focused on Robinson Street, network-level evaluations were undertaken to understand travel patterns within the larger context – which includes the area between SR 50 (Colonial Drive) to the north and Anderson Street/South Street to the south, and between Crystal Lake Drive/Maguire Boulevard to the east and Hughey Avenue to the west. The Robinson Street corridor includes a diverse set of land uses and is a critical east-west link in the Downtown network.

Figure 1 | Study Corridor



Study Corridor
Study area
COLONIAL DR
SUMMERLIN AVE
HYER AVE
MILLS AVE
HINE AVE
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
YMCA DOWNTOWN
HARWOOD ST
LIVINGSTON ST
RIDGEWOOD ST
ROBINSON ST
ORLANDO FESTIVAL PARK
HAMPTON PARK
JEFFERSON ST
DICKSON AZALEA PARK
HILLSIDE AVE
WASHINGTON ST
CENTRAL BLVD
MAYOR CARL T. LANGFORD PARK
THORNTON AVE
BROWN AVE
LAKE LAWSONA
GLENWOOD AVE
GRAHAM AVE
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
COLONEL JOE KITTINGER PARK
SOUTH ST
15
ANDERSON ST
0
1,000
2,000
Feet
N

Report Organization

This final report discusses the key multimodal issues and opportunities facing the Robinson Street corridor, the planning process used to arrive at the improvement alternatives, and a detailed discussion of the recommended alternatives and next steps.

This report is organized in the following sections:

Section 1
Why are we studying the Robinson Street corridor?

Section 2
What is the planning context?

Section 3
How were the stakeholders and community engaged?

Section 4
What is the corridor like today?

Section 5
What are the purpose and needs of the study?

Section 6
What are the potential solutions?

Section 7
How can the alternatives address the needs?

Section 8
Which alternatives best address the needs? How do we advance these alternatives?

Pedestrians enjoying a walk around Lake Eola Park, fronting Robinson Street.

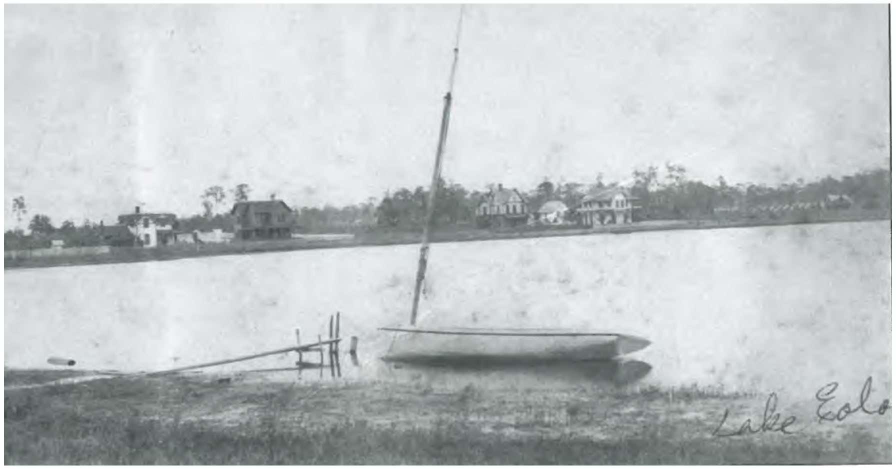
Pedestrian view of walk along Robinson Street near Lake Eola (facing east).

2. What is the Planning Context?

Planning Context

Several transportation studies have been conducted for Robinson Street in the past, but none have taken a holistic planning-level view of the corridor's multimodal needs and opportunities. Thus, this study aims to take a comprehensive look at the role of Robinson Street in the surrounding network, and identify potential improvements to not only meet the immediate transportation needs of the corridor but also to support the larger corridor community's vision of enhancing multimodal travel in Downtown. It is important to note that the role of other parallel facilities through Downtown has been defined to a certain degree through past infrastructure investments to Livingston Street and Central Avenue, as well as the more recent SR 50/UCF Connector Alternatives Analysis Study. The corridor's historical context and related studies and plans are summarized on the following pages.

East Robinson Avenue in the early 1900's. [Source: Homan, L.M., & Reilly, T. (2001). Postcard History Series: Orlando in Vintage Postcards, Arcadia Publishing]



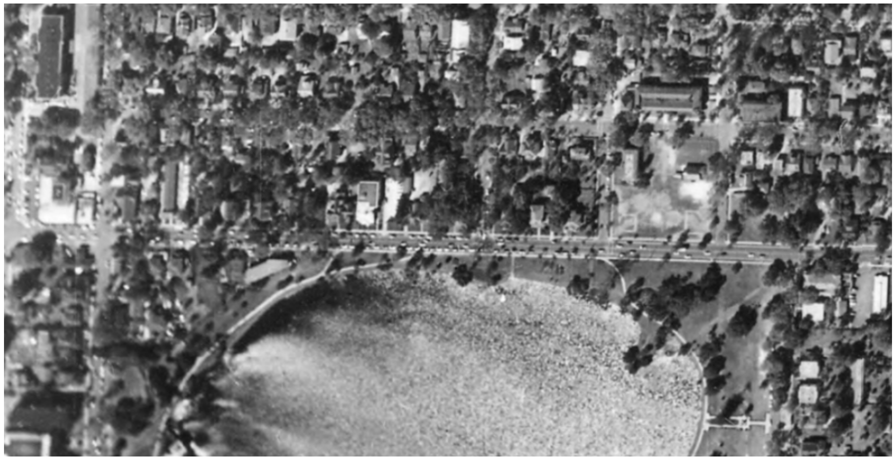
A look across Lake Eola at Robinson Street near Broadway Avenue in the 1880's. [Source: Lost Orlando, Arcadia Publishing]

Robinson's Historical Context

Robinson Street has long been recognized as a key roadway in Orlando, included on historic maps dating to the 1890's. Robinson Street was named for Samuel Robinson[2], a surveyor and civil engineer who surveyed most of Orange County and laid out the network of streets in Orlando. Robinson Street began as a simple two-lane road connecting Downtown Orlando to the citrus groves that eventually became the Orlando Executive Airport. Over time, the land uses around Robinson grew as primarily residential, turning into mixed-use (residential on top of commercial on two-story 'homes'), and eventually into primarily offices closer to Lake Eola and the Downtown core.

Figure 2, a black and white aerial dating from 1954, shows Robinson Street as a two-lane street with on-street parking on both sides. Later, after the construction of I-4 in the late 1960's, Robinson Street was reconfigured to four-lanes, converting the former on-street parking lanes to travel lanes (**Figure 3**). The additional lanes was likely intended to provide better regional mobility between the Interstate to the residential neighborhoods east of Lake Eola, the T.G. Lee factory, and the Orlando Executive Airport. However, the completion of the East-West Expressway (SR 408) in 1973, and subsequent expansion in the 1980's and 2000's, paralleled Robinson's route through Downtown. Today's SR 408, together with South Street and Anderson Street, effectively serves as the alternative for regional and long-distance trips.

Figure 2 | 1954 Aerial of Robinson Corridor



1954 aerial of Robinson corridor with Downtown Orlando on the left and Lake Eola in the center. [Source: from the State of Florida Archives (The Florida Memory Project)]

Figure 3 | Robinson Street (Circa 1960's) from the State of Florida

Robinson Street (Circa 1960's) [Source: from the State of Florida Archives (The Florida Memory Project)]

2 Rajtar, Steve. (2006). *A Guide to Historic Orlando.* The History Press, Charleston, SC. Page 79.

Area and Corridor Planning Efforts

Creative Village

Currently under construction on the former 68-acre Amway Arena site, Creative Village will be a mixed use, transit-oriented urban infill development with offices, creative studios, residences, retail/commercial, and educational uses. The new development will be anchored by a new Downtown UCF and Valencia campus that is projected to have 8,000 students in the next 10 years.

Project DTO - Advancing Downtown Orlando

Completed in 2014, Project DTO is a comprehensive visioning process to craft the next chapter of Downtown Orlando's evolution. The strategic plan for Downtown Orlando outlines actions to improve multimodal travel within the Downtown Orlando Community Redevelopment Agency (CRA) area. Among its recommendations are creating shade and pedestrian focused streets (including Robinson Street), improving pedestrian accessibility, promoting balanced use of all transportation modes, and creating better amenities and infrastructure that support a comfortable and safe walking and bicycling environment.

City of Orlando's Bike-sharing Program

The City of Orlando recently launched its Juice Downtown bikeshare program. Implemented in May 2015, Juice bicycles are available for rent from 24 locations throughout Downtown. The effort is aimed at enhancing connectivity throughout Downtown and to SunRail stations.

Rendering of proposed Creative Village.

Rendering of Magnolia Avenue, a part of the Project DTO Vision Plan.

Targeted Infrastructure Plans & Studies

SR 50 Alternatives Analysis

Completed in 2015, LYNX conducted a study to explore solutions to improved transit service along the SR50 corridor. The resulting locally preferred alternative (LPA), adopted by both the LYNX and the MetroPlan board is Bus Rapid Transit (BRT) service along SR 50 from Oakland, in west Orange County, to SR 434/Alafaya Trail, then up Alafaya Trail to UCF. The project is planned to be implemented in phases with Phase 1 initially providing service between Powers Drive and Goldenrod Road, along SR50. This BRT will operate at 10-minute frequencies during peak times, 15-minute frequencies during off-peak times, and provide an additional east-west premium transit option parallel to the Robinson Street corridor.

SR 50 Alternative Analysis Locally Preferred Alternative.

I-4 Ultimate Improvement Project

Beginning construction in 2015, FDOT is working on a 21-mile interstate improvement to add tolled express lanes along I-4, from west of Kirkman Road, in Orange County to east of State Road 434, in Seminole County. As part of this project, Robinson Street between Garland Avenue and Hughey Avenue, will be widened to a six-lane cross section consisting of a through-right turn lane, through lane, and exclusive left-turn lane in both directions.

SunRail

In May 2014, FDOT began running SunRail, Central Florida's first commuter rail and an important north-south premium transit connection that will provide an alternative to I-4 through the Region. The SunRail station at LYNX Central Station (LCS) is the closest station to the Robinson Street corridor. Future Phases II and III are proposed to extend to Kissimmee, DeLand, and the Orlando International Airport.

SunRail - Central Florida's fixed-rail transit.

LYMMO Grapefruit Line.

Map of LYMMO expansion.

LYMMO Grapefruit and Lime Line

Aside from investing in pedestrian and bicycling improvements, LYNX and the City of Orlando have recently expanded LYMMO, the free bus circulator in Downtown. In April 2014, LYNX opened the Grapefruit Line connecting the east and west sides of Downtown along Central Avenue. In the same month, LYNX extended the Orange Line into the North Quarter district. The Lime Line is currently under construction and will connect the future Creative Village and the area around the Amway Center.

Gertrude's Walk

Gertrude's Walk is an existing biking and walking path through Downtown Orlando, generally running parallel to the SunRail railroad tracks. Currently, the short segment of Gertrude's walk goes from Church Street to Washington Street, and from Livingston Street to Amelia Street. In addition to providing a recreational amenity, the trail serves as an alternative route for those who work in Downtown. The City of Orlando and its partners are working to fill the existing gap (Washington Street to Livingston Street); and the path will extend north along the railroad corridor to the Orlando Urban Trail at Magnolia Avenue. Once complete, the path will serve as a north-south bicycle and pedestrian connection from Robinson Street to the Church Street SunRail station, LYNX Central Station, Ivanhoe Village, and Loch Haven Park.

Robinson Street at Hampton Avenue Safety and Operational Analysis
This FDOT study conducted in March 2012 concluded that the existing on-street parking does not meet the FDOT standard requiring a distance of 100 feet upstream of an intersection. A portion of on-street parking was converted to a 50' bus bay.

Robinson Street at Garland Avenue Operational Analysis
This August 2009 FDOT study led to signal timing coordination/optimization on Robinson Street between Hughey Avenue and Garland Avenue. The study recommended implementing a split phase operation between the eastbound and westbound approaches if eastbound left-turn crash patterns develop.

Robinson Street at Mills Avenue Operational Analysis
This January 2013 FDOT study provided protected/permissive signal control for the eastbound left-turn movement.

Robinson Street at Summerlin Avenue Operational Analysis
This 2012 FDOT study recommended a protected-permissive left turn green phase for westbound Robinson Street at Summerlin Avenue.

Robinson Street Pedestrian Study from West of Broadway Avenue to East of Eola Drive
This October 2008 FDOT study found that there is heavy pedestrian activity observed within the study segment, which is attributed to the surrounding land uses. Pedestrian crossings were efficient with no conflicts observed with vehicular traffic. Based on these observations, the collision summary and the lack of concentrated crossings within the study segment, a mid-block crosswalk was not recommended.

Robinson Street at Howard Middle School Operational Analysis
Motorists were observed utilizing the transition area as on-street parking, which results in partial blockage of the outside eastbound through lane. In August 2006 FDOT added gore pavement markings within this transition area to better indicate the no-parking area.

Robinson Street from Hughey Avenue to Garland Avenue
Completed in March 2011, this FDOT study found that there were no I-4 trailblazing signs on Robinson Street in the vicinity of I-4 except for an "I-4 East" sign assembly on westbound Robinson Street approaching Garland Avenue. As a result, nine I-4 wayfinding sign assemblies were installed along the Robinson Street corridor.

SR 526 and Broadway Avenue Signal Warrant and Operational Analysis
This City of Orlando signal warrant study took pedestrian counts at five locations between Rosalind Avenue and Summerlin Avenue on Robinson Street. The eight-hour and four-hour warrant were satisfied as well as the coordinated signals warrant. In October 2005, this study recommended the installation of a mast arm traffic signal, reconstruction of the sidewalk ramps to ADA and FDOT standards, re-evaluation of the existing bus stop locations, relocation of utilities to underground configuration, and an investigation of the potential widening of Robinson Street to four ten-foot lanes near the signal.

A family waits to cross at the Robinson Street / Rosalind Avenue intersection

Looking west down Robinson Street towards the Central Business District

3. How were Stakeholders and Community Engaged?

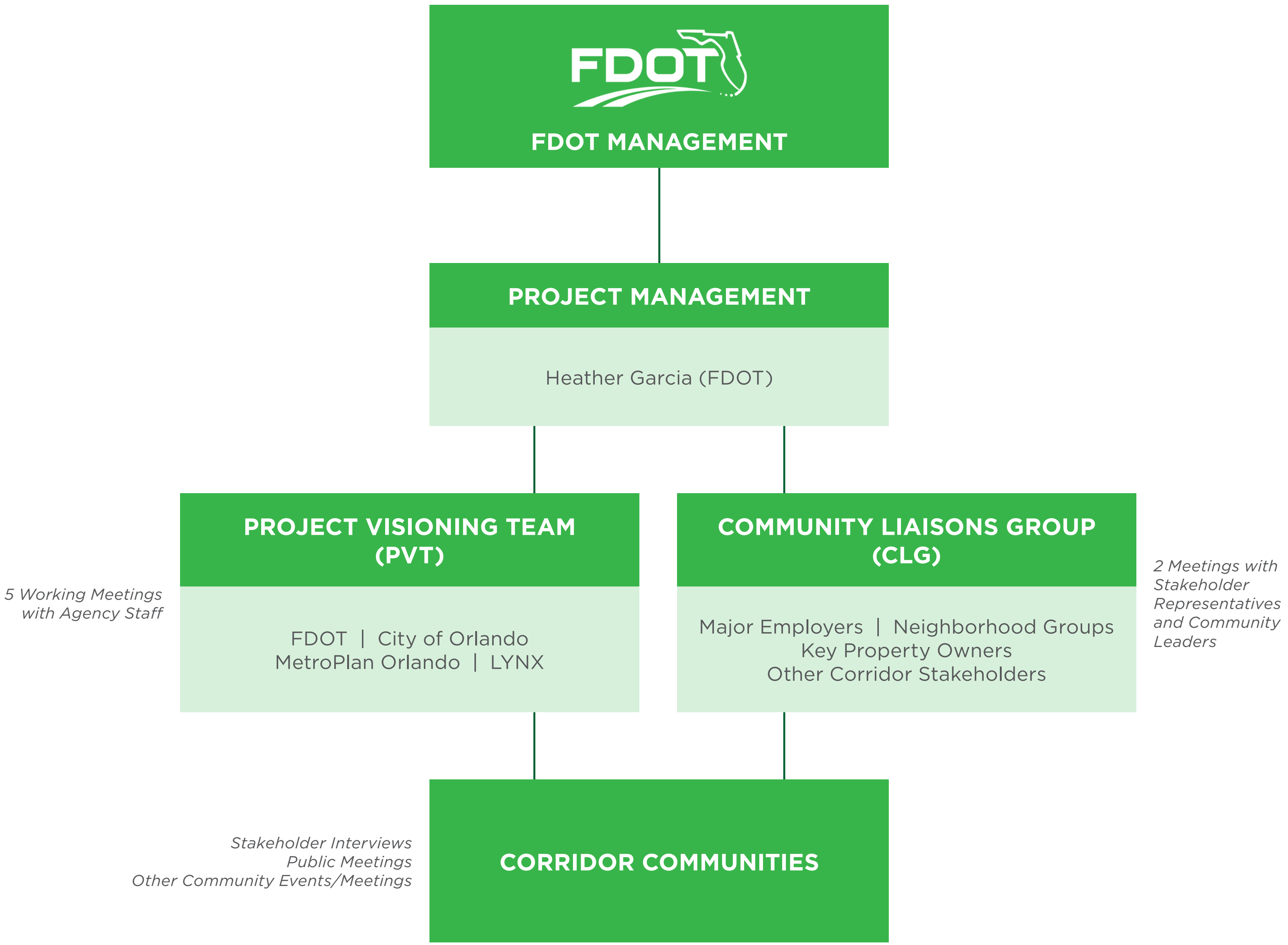
The Robinson Street corridor is home to a variety of residential neighborhoods, businesses, schools, churches, and other land uses. The study utilizes a variety of methods to engage these groups to better understand the needs and opportunities of the corridor and to receive feedback on eventual solutions.

This process began with engaging local agencies, community leaders and other stakeholders. The collaboration between FDOT and key stakeholders includes establishing a Project Visioning Team (PVT) comprised of agency staff from the various units of FDOT, the City of Orlando, LYNX, and MetroPlan Orlando. A separate Community Liaisons Group (CLG) was also established and comprised of representatives from the local community, including residents, large employers, institutions, and property owners. The study engaged these groups to seek input into the planning process and to promote a heightened awareness of the issues and challenges of the corridor. The decision-making framework used for the study is shown in **Figure 4**, on the next page.

A clear understanding of the corridor's existing function and future vision, developed through input from community stakeholders and data analysis, pointed to a clear definition of the problem, purpose, and needs to be addressed by the study. The purpose and needs eventually led to the definition, screening, and selection of improvement strategies/recommendations. Recommendations were developed collaboratively with the PVT, and incorporated input from the CLG and the public. With the help of the PVT, results from the study were crafted into an implementation plan that includes long-term strategies that support future development within the corridor, as well as specific improvements that can potentially be advanced in the near term though local agency participation and/or by FDOT as Resurfacing, Restoration, Rehabilitation (3-R) projects, safety enhancements, or traffic operations "push-button" projects.

Members of the public share input on the corridor during the first public workshop

Figure 4 | Decision-Making Framework



Stakeholder Interviews

In the initial data gathering phase of the study, over 30 representatives from various stakeholder entities were interviewed in order to obtain information and input about concerns and opportunities, future needs, and community desires for the corridor. The interviews complement and enrich the ongoing data collection and technical analyses. In the interviews, the study team asked stakeholders to identify any issues related to multimodal travel and access along the corridor, ongoing or future approved development along the corridor, and information about community initiatives and channels for further communication with the public about the project. The interviews were free flowing and informal and allowed stakeholders to share ideas and information about all aspects of the corridor.

The following organizations/groups have been interviewed:

- Florida Department of Transportation (FDOT) – District 5
- City of Orlando
  - Planning Division
  - Transportation Planning
  - Traffic Engineering
  - Downtown Development Board/ Community Redevelopment Agency (CRA)
  - Parks Division
  - Housing Division
  - Police Department
- MetroPlan Orlando Metropolitan Planning Organization (MPO)
- Central Florida Regional Transportation Authority (LYNX)
- GOAA - Orlando Executive Airport
- Orange County Public Schools
- Howard Middle School
- Lake Eola Charter School
- Orlando Housing Authority
- Charles Towne Homeowners Association
- Colonial Plaza
- Colonialtown South
- Downtown Orlando Condominium Alliance
- East Central Park
- First Unitarian Church of Orlando
- Highwoods Properties
- Lake Eola Heights
- Lawsona/Fern Creek Neighborhood Association
- Milk District
- South Eola
- St. James Cathedral School
- T.G. Lee
- The Vue
- Thornton Park Main Street Company
- Thornton Park Neighborhood Association
- Trial Pro Lawyers

Project Visioning Team

The PVT acted as a technical sounding board and decision-making group as the study team shared findings and developed alternative strategies for the Robinson Street corridor. This group included representation from the following agencies:

- FDOT
  - Corridor Planning
  - Modal Development
  - MPO Liaison
  - Traffic Operations
- City of Orlando
  - Transportation Planning Division
  - Public Works Department
  - Economic Development Department
- LYNX
- MetroPlan Orlando MPO

The PVT met five times throughout the study process at different project milestones. The presentations and meeting notes from each PVT meeting are included in **Appendix A**:

1. Project Kick-Off and Tour of corridor
   April 23, 2015
2. Existing Conditions and Purpose and Needs Review
   September 2, 2015
3. Review Long List of Alternatives
   February 4, 2016
4. Review Short List of Alternatives
   August 24, 2016
5. Review Public Input and Develop Set of Alternatives to Advance
   December 5, 2016

Project Visioning Team performing a field review.

Community Liaisons Group

Aside from the PVT, the study team also received regular input from the Community Liaisons Group (CLG). The CLG was comprised of the business community, institutions, neighborhood groups, and community leaders who provided additional perspective and input relative to multimodal transportation investments needed in the corridor. The CLG membership was extended to a variety of organizations, including the following:

- GOAA – Orlando Executive Airport
- Orange County Public Schools
- Howard Middle School
- Lake Eola Charter School
- St. James Cathedral School and Church
- Milk District
- Colonial Plaza
- Thornton Park Main Street Co.
- Downtown Orlando Condominium Alliance
- Hampton Park Neighborhood Association
- Charles Towne Homeowners Association, Inc.
- East Central Park Neighborhood Association
- Lake Eola Heights Historic Neighborhood Association
- Highwood Properties
- Callahan Neighborhood Association
- Downtown Orlando Development Board

The CLG met twice throughout the study process to review and discuss the corridor existing conditions and potential alternatives. The presentations and meeting notes from each CLG meeting are included in **Appendix B**:

1. Existing Conditions and Purpose and Needs Review
   September 30, 2015
2. Review Long List of Alternatives
   September 21, 2015

Public Workshops

The communities along the Robinson Street corridor were directly engaged through two series of public workshops and online engagement. The first public workshop was held on November 4, 2015 on the Robinson Street corridor (at the First Unitarian Church of Orlando) to present and hear input on the corridor existing conditions and needs, goals, and objectives. Approximately 107 members of the public attended this workshop. 77% of attendees lives in the corridor and 23% lives outside the corridor.

The second series of public workshops was held during the week of October 17, 2016 to obtain input on the short-list of alternatives. At these workshops, attendees were asked to provide input on improvement alternatives in each of the character districts along the corridor. This series of workshops included two individual events – one evening workshop on October 17, 2016 at the First Unitarian Church of Orlando and one daytime workshop on October 20, 2016 at Lake Eola Park. Approximately 120 members of the public attended these workshops.

October 20, 2016 public workshop at Lake Eola Park

Online Engagement

Survey

An online survey was conducted for about one month, in conjunction with the second series of public workshops, in order to collect public input on the short-list alternatives. 76 responses were gathered from this survey to supplement the input gathered during the in-person workshops. Screen shots from this online survey are included in **Appendix C**.

Online Commenting Map

Throughout the study, public input was received online through the use of an online commenting website. This online public involvement platform collected public comments on vehicular, transit, bicycle, pedestrian, freight, land use, and other issues along the Robinson Street corridor and was accessed at http://maps.kittelson.com/RobinsonStreet (screen shots shown in **Figure 5**). Approximately 240 comments were collected through this online platform throughout the study.

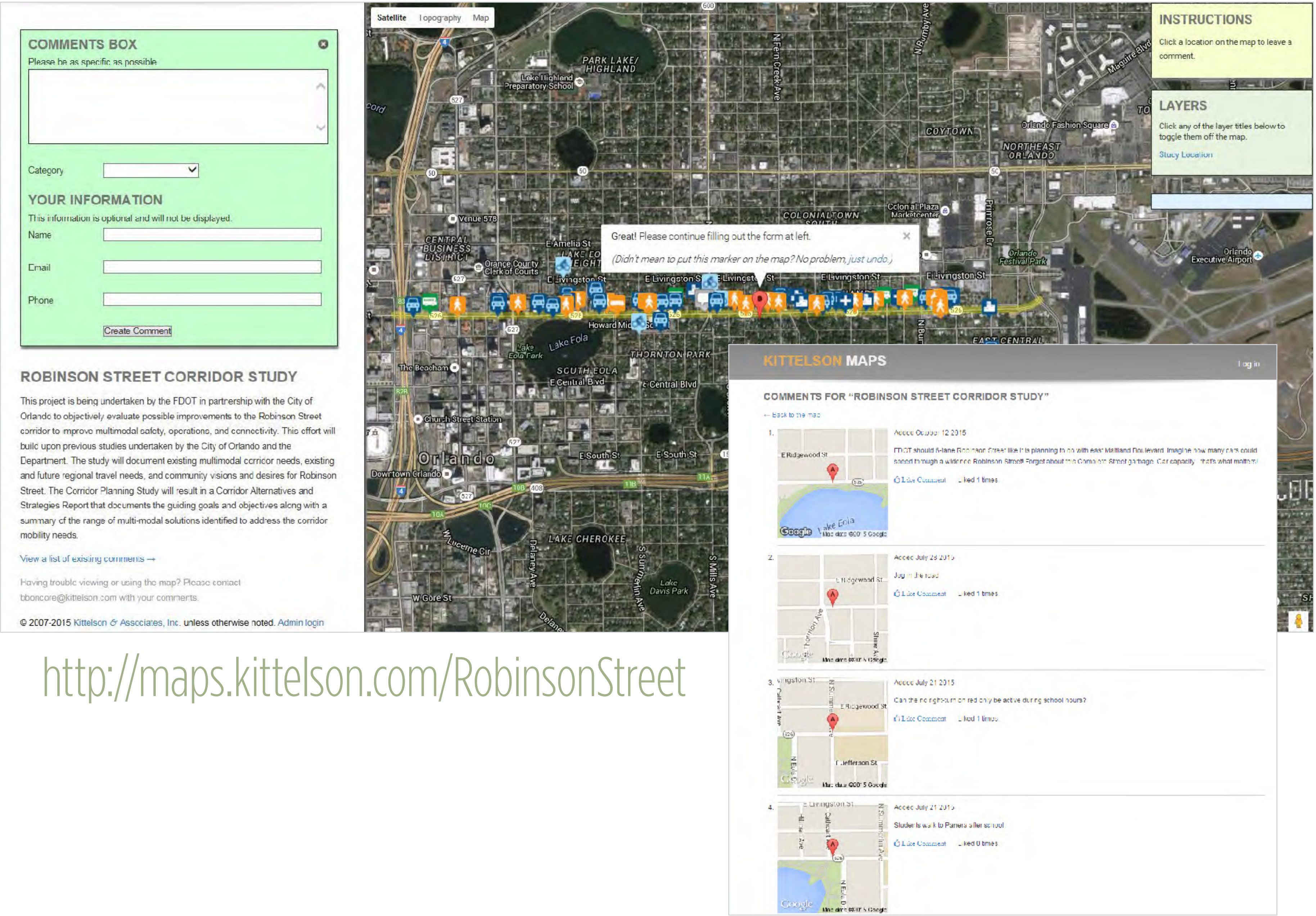
Commissioner Briefings

The City of Orlando was a close partner throughout the entire study, providing valuable input and direction as part of the PVT. In addition, the City of Orlando Commissioners of the districts/neighborhoods Robinson Street connects and travels through also acted as a sounding board at key points throughout the study.

Two rounds of commissioner meetings were conducted to allow commissioners to provide input:

1. Existing Conditions, Needs, Goals, and Objectives with Commissioner Sheehan
   September 24, 2015
2. Review and Input on Short-List Alternatives with Commissioner Sheehan, Commissioner Hill, and Commissioner Ortiz
   August 2nd, 3rd, and 10th, 2016

Figure 5 | Screen Shot of Maps Available Online



http://maps.kittelson.com/RobinsonStreet

4. What is the Corridor like Today?

The study team compiled a variety of data to better answer the following key questions:

- Who are the current and future users?
- What are the current and future land uses? What are the major destinations along the corridor?
- What are the current and future travel patterns along the corridor/in the study area?
- How will future development influence travel patterns and demand along Robinson?
- How has the corridor changed in the past? How will it change in the future?
- What are the current bicycling conditions in the corridor? What role does Robinson play in the bike network?
- What are the current parking conditions of the corridor?
- What are the current pedestrian conditions in the corridor? Where are the key desire lines/crossing locations for pedestrians, and what is order of magnitude?
- Are there opportunities for managing access better?
- What other issues were considered in the past? What solutions were evaluated?
- Are there issues related to speeding? Where are the speeding hotspots?
- How do we define "level of service" and "congestion"?
- Where, when, for how long, and how often does congestion occur?
- How is Robinson impacted by special events and crashes/incidents on major routes?
- What are the current travel patterns along the corridor/in the study area?
- What is the crash history along corridor? Where are we experiencing over-represented number of crashes (intersection and segments)?
- What are the current conditions, including reliability, frequency, ridership for transit service along the corridor?
- Where are the issues related to flooding?

Robinson Street must serve a diverse set of needs based on the existing and future land use contexts and the community's vision for the corridor. Transportation and land use data were collected, analyzed, and supplemented by input from community engagement. Key findings are presented in terms of considerations related to land use and multimodal mobility and safety.

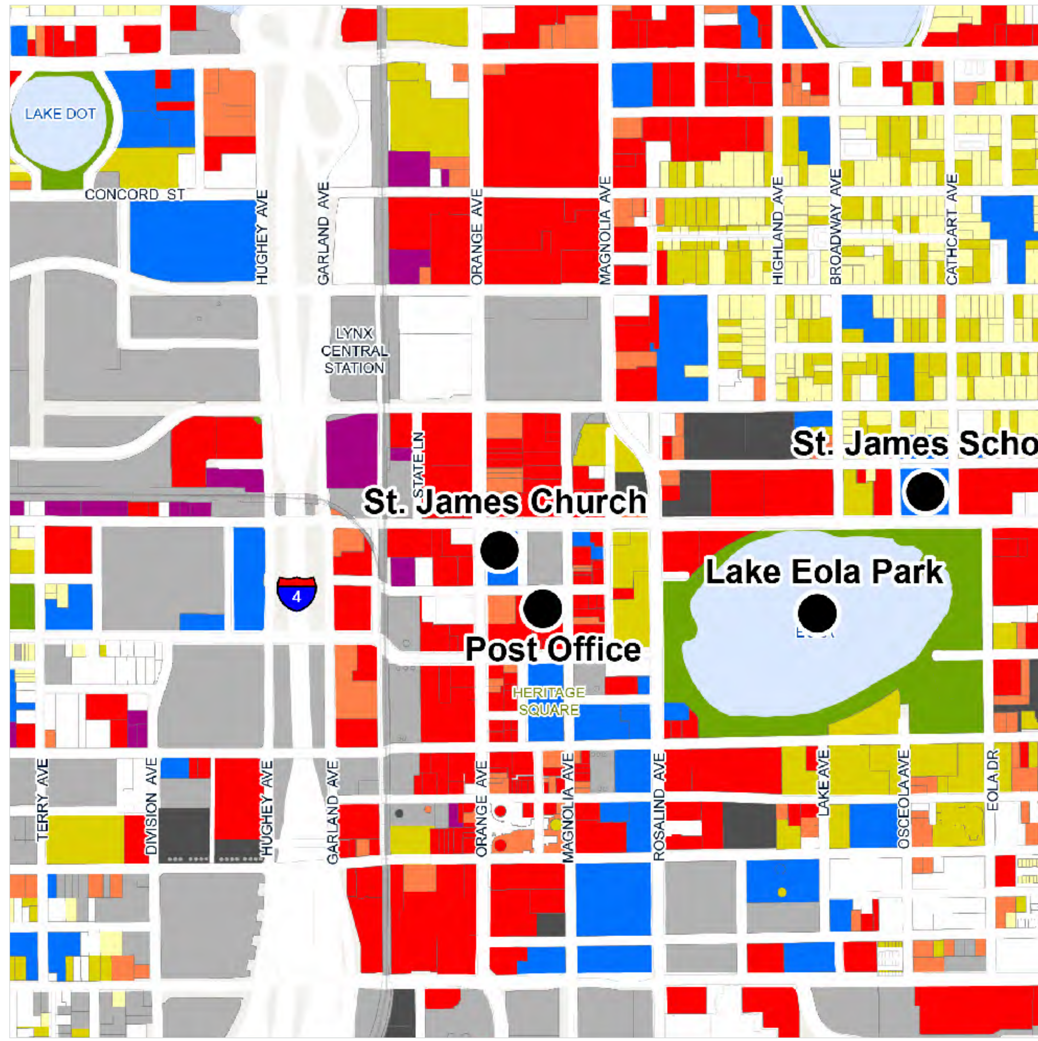
Land Use

Both Downtown workers and residents are looking for multimodal options to travel.

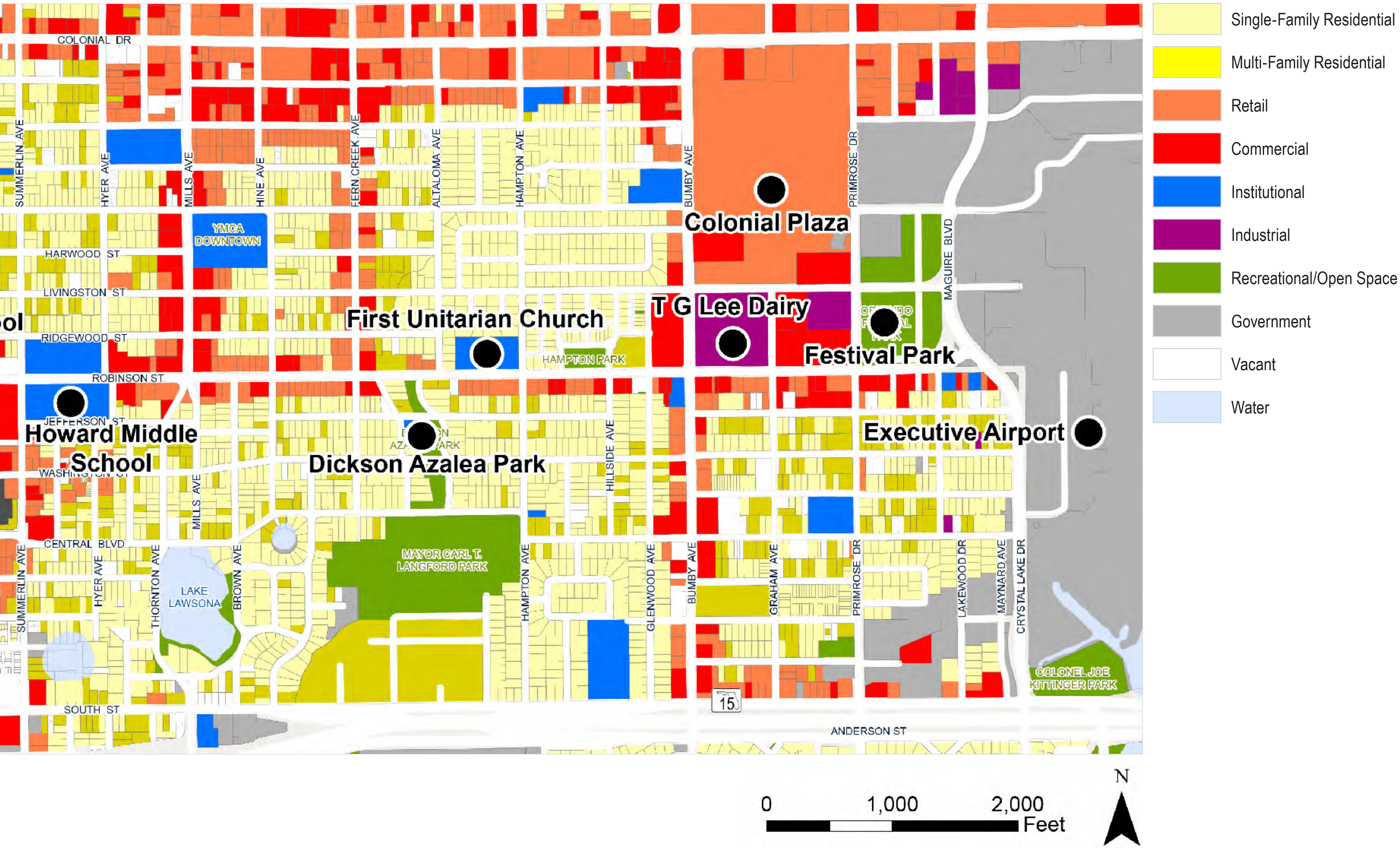
The Robinson Street corridor serves a variety of commercial, institutional, residential, recreational, and office land uses as seen in **Figure 6**. Toward the western end of the corridor, closer to the Central Business District (CBD), the corridor travels through predominantly office and commercial land uses with some retail, institutional, and residential uses dispersed throughout. This area also includes key community gathering places like St. James Church, the United States Post Office, and Lake Eola Park. Towards the middle of the corridor and immediately adjacent to the roadway are commercial land uses with some institutional and recreational uses including Howard Middle School, St. James Cathedral School, Dickson Azalea Park, First Unitarian Church. Single and multi-family residential neighborhoods immediately abut the commercial parcels. Many of these residential areas are designated historic neighborhoods.

Towards the eastern end of the corridor are T.G. Lee, Festival Park, and the Orlando Executive Airport. Colonial Plaza, although not located on Robinson, has a regional draw and influences the Robinson Street corridor. The section east of Bumby Avenue is known as the Milk District (named for its proximity to the T.G. Lee factory) where a concentration of restaurants, bars, and retail shops are located. Behind the Milk District is the East Central Park neighborhood.

Figure 6 | Existing Land Use and Community Destinations



Source: Orange County Property Tax Data



Single-Family Residential
Multi-Family Residential
Retail
Commercial
Institutional
Industrial
Recreational/Open Space
Government
Vacant
Water
Colonial Plaza
T G Lee Dairy
Festival Park
First Unitarian Church
Howard Middle School
Dickson Azalea Park
Executive Airport
YMCA DOWNTOWN
HAMPTON PARK
MAYOR CARL T. LANGFORD PARK
LAKE LAWSONA
COLONEL JOE KITTINGER PARK
COLONIAL DR
HARWOOD ST
LIVINGSTON ST
RIDGEWOOD ST
ROBINSON ST
CENTRAL BLVD
SOUTH ST
ANDERSON ST
SUMMERLIN AVE
HYER AVE
MILLS AVE
HINE AVE
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
HILLSIDE AVE
THORNTON AVE
BROWN AVE
GLENWOOD AVE
GRAHAM AVE
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
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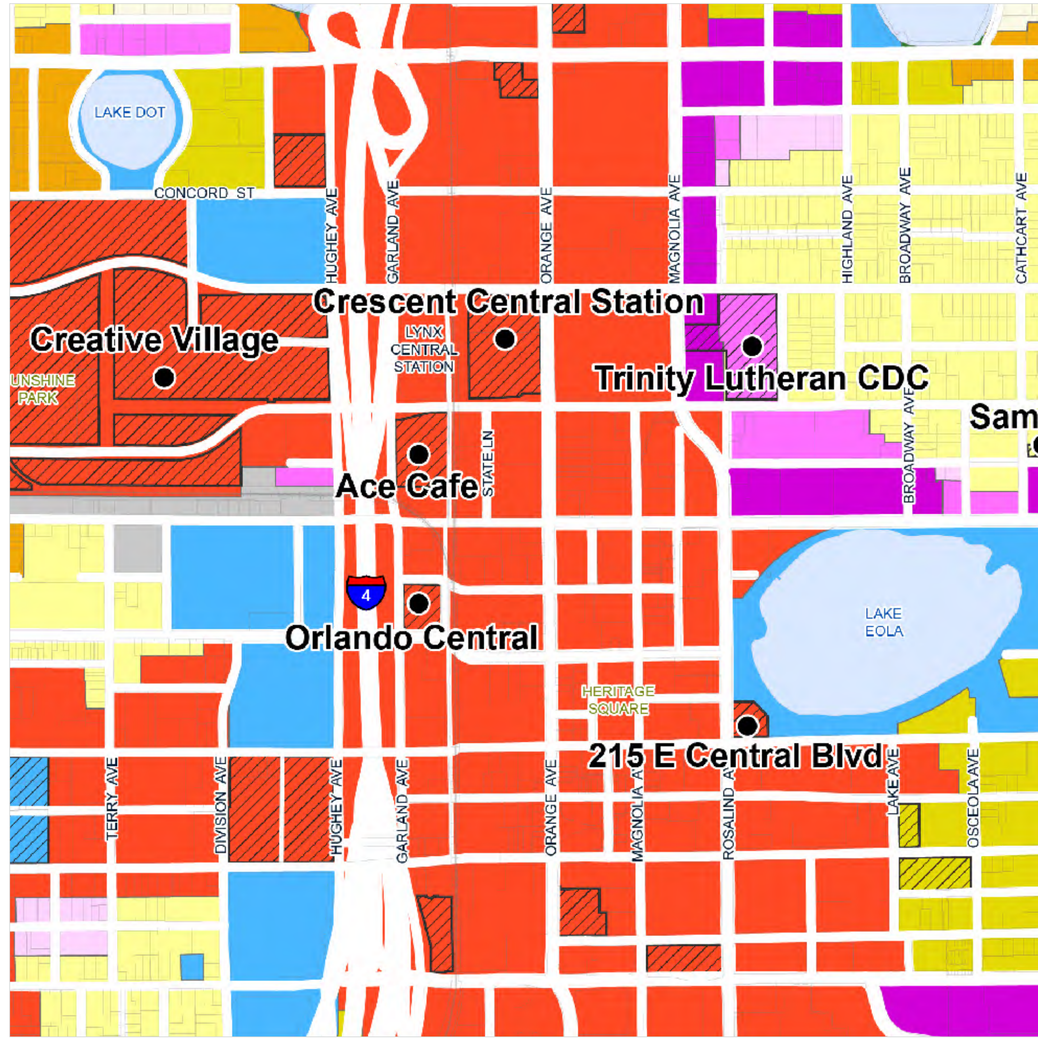
Robinson Street is host to many different community destinations.

Aside from the many regional attractions located in the Downtown core, many community destinations are also located directly on Robinson Street. These include the Downtown US Post Office, St. James Cathedral, Lake Eola Park, St. James Cathedral School, Howard Middle School, Dickson Azalea Park, First Unitarian Church, Colonial Plaza, Festival Park, and the Orlando Executive Airport. These uses not only serve the local Downtown residents and workers, but also attract users from outside Downtown and outside the City. In fact, Robinson Street is closed to vehicular traffic approximately 25 times every year for various Downtown events that attract thousands of local and regional visitors.

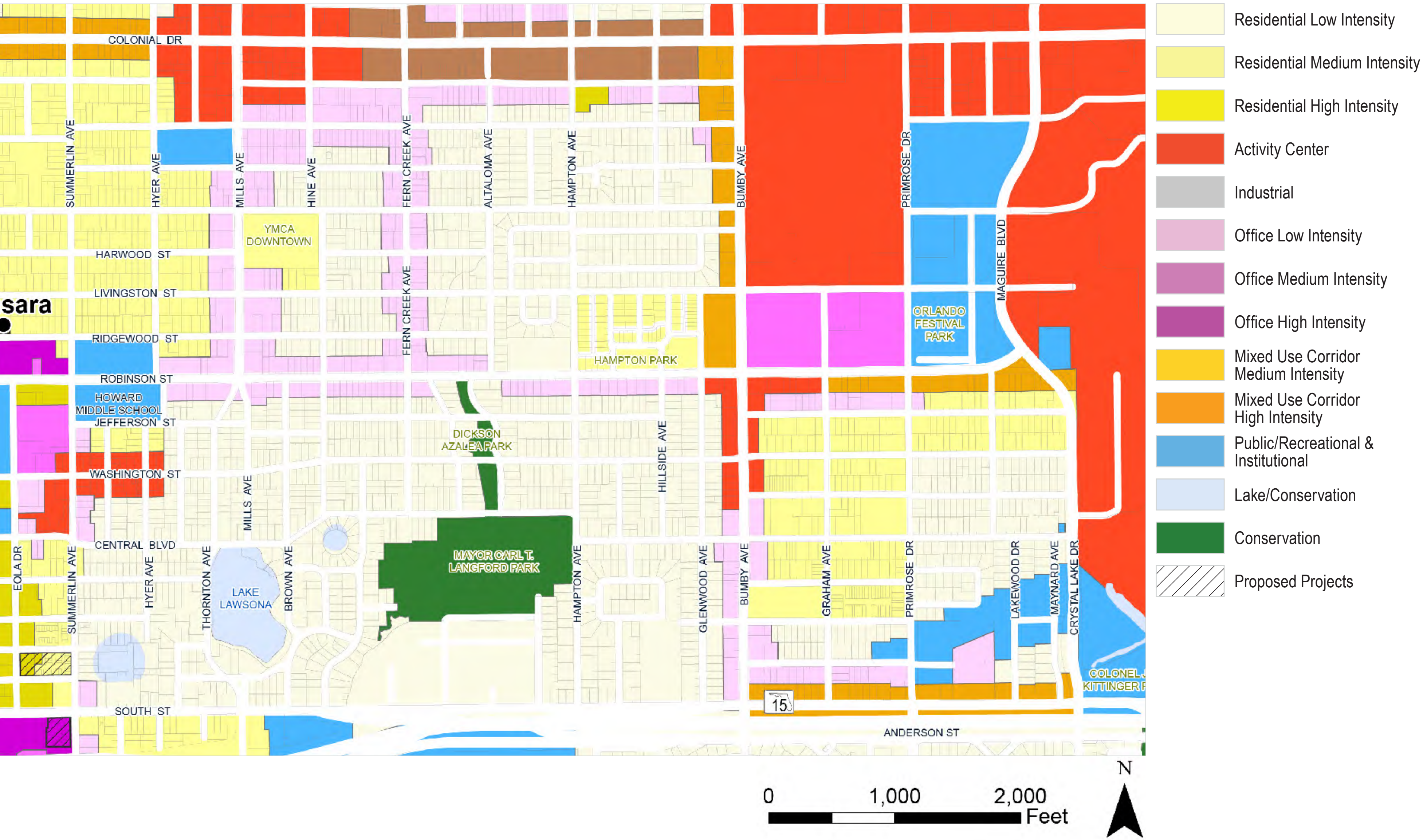
Corridor land uses are not expected to change significantly over the long-term.

Figures 7 and **9** show the generalized future land use and zoning along the corridor. The City's future land use and zoning designate either ends of the corridor as activity centers. The rest of the corridor, generally, has low, medium, and high-intensity office use designations. Only one block, between Fern Creek Avenue and Altaloma Avenue, has single-family residential use designation right along Robinson Street.

Figure 7 | Future Land Use



Source: City of Orlando GIS Department, 2015


Residential Low Intensity
Residential Medium Intensity
Residential High Intensity
Activity Center
Industrial
Office Low Intensity
Office Medium Intensity
Office High Intensity
Mixed Use Corridor Medium Intensity
Mixed Use Corridor High Intensity
Public/Recreational & Institutional
Lake/Conservation
Conservation
Proposed Projects
COLONIAL DR
SUMMERLIN AVE
HYER AVE
MILLS AVE
HINE AVE
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
YMCA DOWNTOWN
HARWOOD ST
LIVINGSTON ST
RIDGEWOOD ST
ROBINSON ST
HOWARD MIDDLE SCHOOL
JEFFERSON ST
WASHINGTON ST
CENTRAL BLVD
HAMPTON PARK
ORLANDO FESTIVAL PARK
DICKSON AZALEA PARK
HILLSIDE AVE
MAYOR CARL T. LANGFORD PARK
EOLA DR
THORNTON AVE
LAKE LAWSONA
BROWN AVE
GLENWOOD AVE
GRAHAM AVE
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
SOUTH ST
ANDERSON ST
15
0
1,000
2,000
Feet
N

There is opportunity for redevelopment in some portions of the study corridor.

There are pockets of redevelopment opportunity, especially in the Milk District and Colonial Plaza area. However, the redevelopment densities and intensities are significantly limited by the height and use restrictions brought about by the Orlando Executive Airport's noise buffer and airport potential zones (shown in **Figure 8**).

There are two major future development projects within the corridor. Crescent Central Station, located on Orange Avenue next to LYNX Central Station, is a transit-oriented development that will include multi-family residential, retail, hotel, and office uses. 215 East Central Blvd is a mixed-use high rise tower that will include multi-family apartment units and commercial retail space.


St. James Catholic Church is located in the west portion of the corridor.


Landmark Center buildings located across the street from Lake Eola holds many of the jobs along the corridor.

Festival Park is on the east end of the corridor.

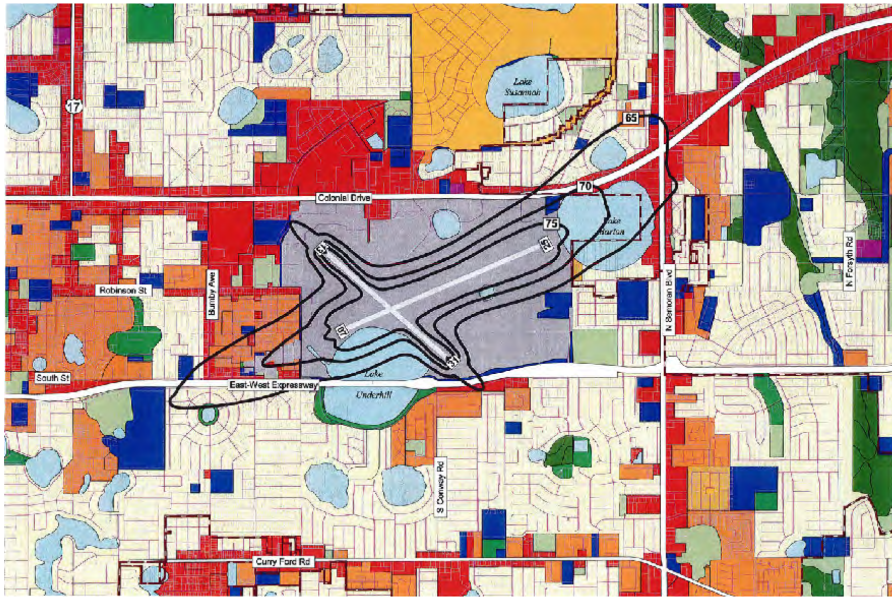
Various converted offices are located in the central section of the corridor.

The Milk District includes restaurants, bars, and retail shops lining Robinson Street.

Howard Middle School is located in the center section of the corridor.

Crescent Central Station proposed development along Orange Avenue, a couple of blocks from Robinson Street.

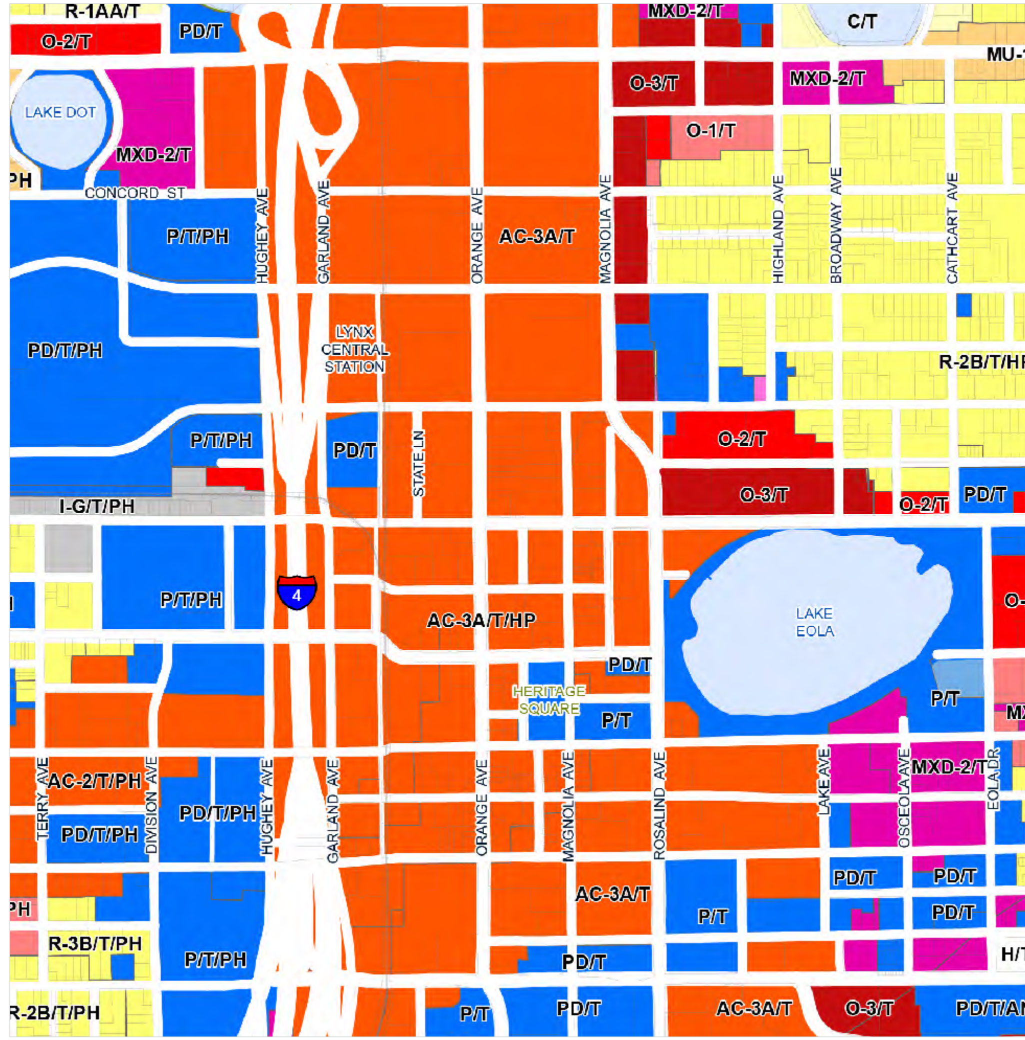
Figure 8 | GOAA 2006 Noise Exposure Map



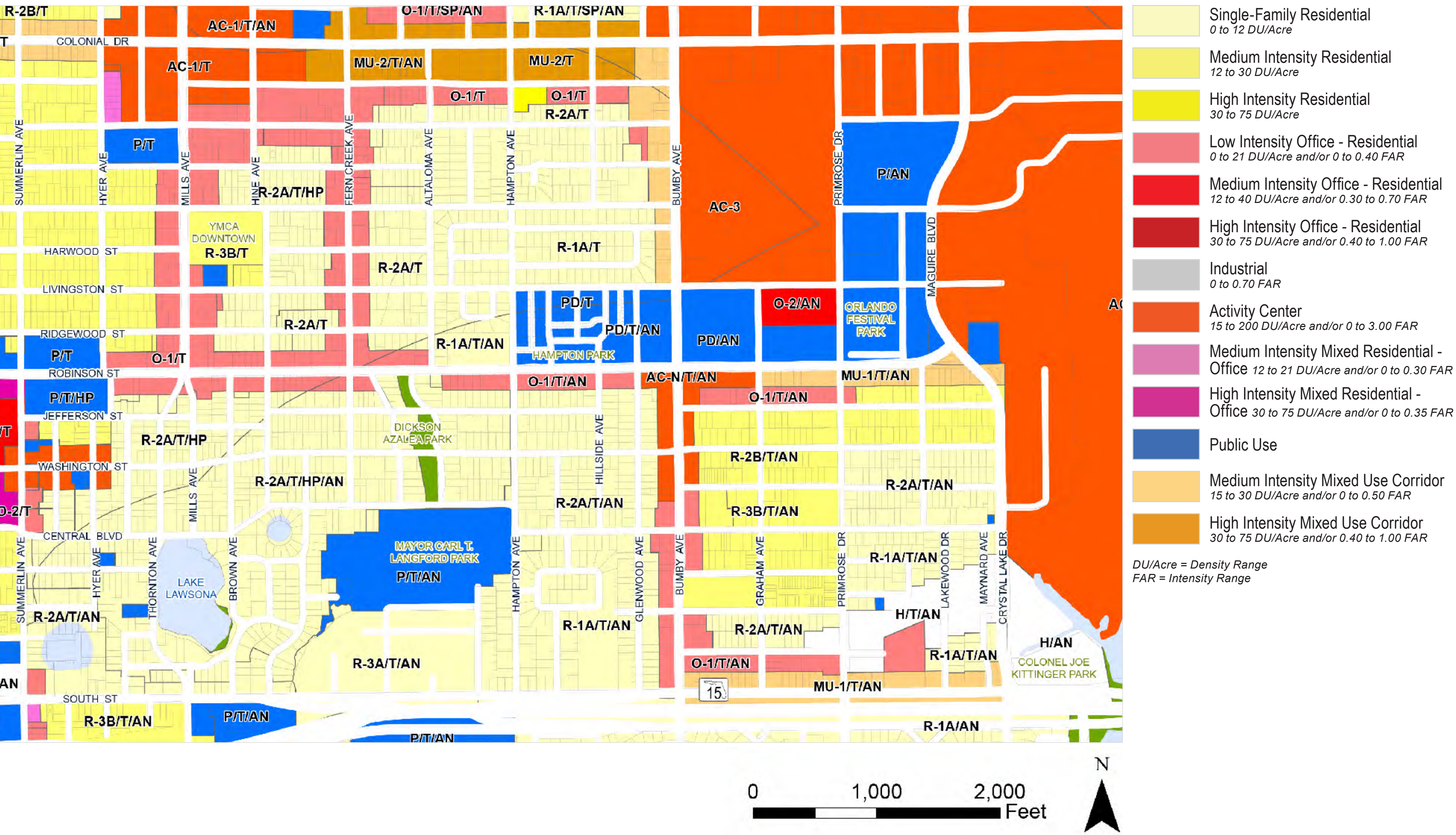
[Source: Greater Orlando Aviation Authority]

- Airport Property
- Commercial
- Conservation
- Industrial
- Institutional/Recreational
- Low Density Residential
- Low-Medium Density Residential
- Medium Density Residential
- High Density Residential
- No Designation
- Parks and Recreation
- Rural/Agriculture
- Water Body

Figure 9 | Zoning



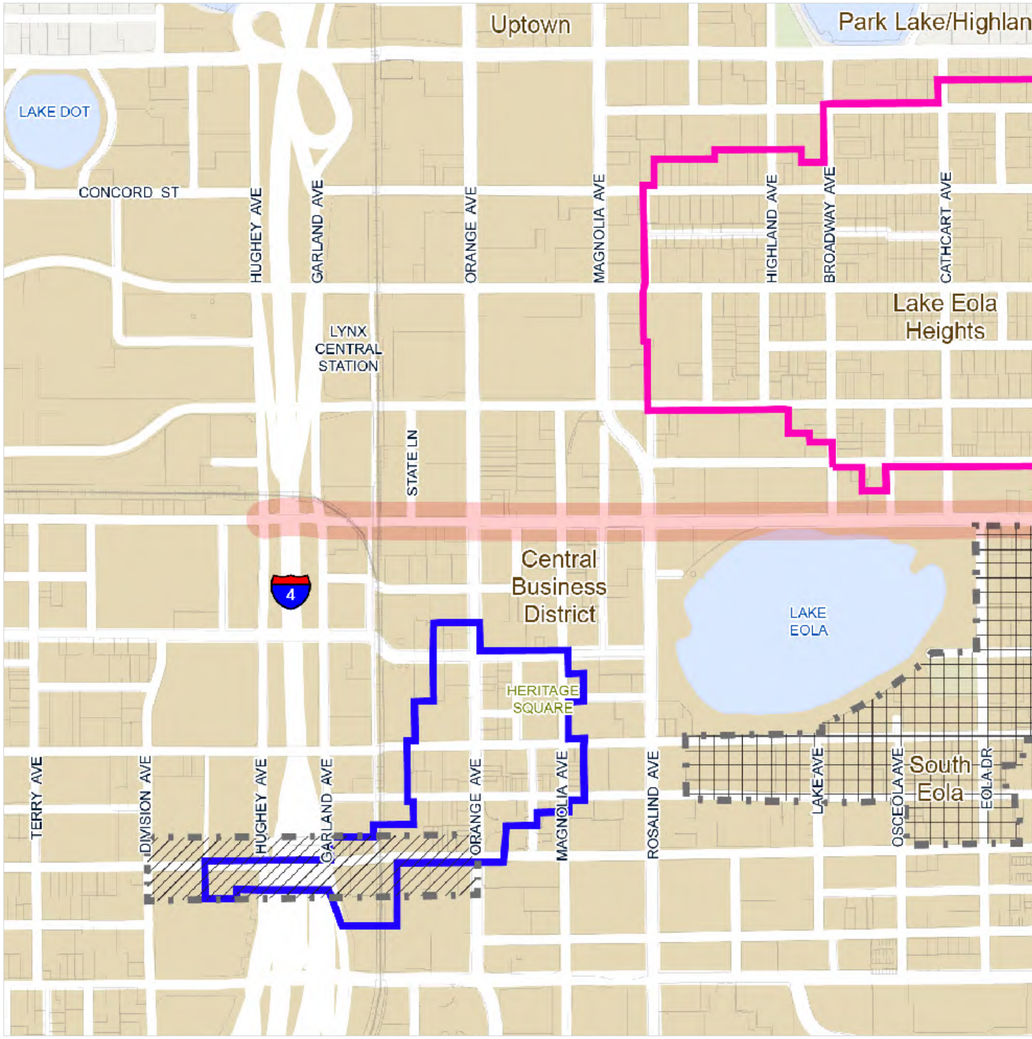
Source: City of Orlando GIS Department, 2015


R-2B/T
AC-1/T/AN
O-1/T/SP/AN
R-1A/T/SP/AN
COLONIAL DR
AC-1/T
MU-2/T/AN
MU-2/T
O-1/T
O-1/T
R-2A/T
P/T
SUMMERLIN AVE
HYER AVE
MILLS AVE
HINE AVE
R-2A/T/HP
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
AC-3
PRIMROSE DR
P/AN
YMCA DOWNTOWN
R-3B/T
HARWOOD ST
R-2A/T
R-1A/T
MAGUIRE BLVD
LIVINGSTON ST
PD/T
O-2/AN
ORLANDO FESTIVAL PARK
R-2A/T
PD/T/AN
RIDGEWOOD ST
P/T
O-1/T
R-1A/T/AN
HAMPTON PARK
PD/AN
ROBINSON ST
P/T/HP
O-1/T/AN
AC-N/T/AN
MU-1/T/AN
O-1/T/AN
JEFFERSON ST
DICKSON AZALEA PARK
R-2A/T/HP
HILLSIDE AVE
R-2B/T/AN
WASHINGTON ST
R-2A/T/HP/AN
R-2A/T/AN
MILLS AVE
R-2A/T/AN
R-3B/T/AN
CENTRAL BLVD
MAYOR CARL T. LANGFORD PARK
P/T/AN
R-1A/T/AN
SUMMERLIN AVE
HYER AVE
THORNTON AVE
LAKE LAWSONA
BROWN AVE
HAMPTON AVE
GLENWOOD AVE
BUMBY AVE
GRAHAM AVE
PRIMROSE DR
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
R-2A/T/AN
H/T/AN
R-1A/T/AN
R-2A/T/AN
H/AN
R-3A/T/AN
O-1/T/AN
R-1A/T/AN
COLONEL JOE KITTINGER PARK
15
MU-1/T/AN
SOUTH ST
R-3B/T/AN
P/T/AN
P/T/AN
R-1A/AN
Single-Family Residential
0 to 12 DU/Acre
Medium Intensity Residential
12 to 30 DU/Acre
High Intensity Residential
30 to 75 DU/Acre
Low Intensity Office - Residential
0 to 21 DU/Acre and/or 0 to 0.40 FAR
Medium Intensity Office - Residential
12 to 40 DU/Acre and/or 0.30 to 0.70 FAR
High Intensity Office - Residential
30 to 75 DU/Acre and/or 0.40 to 1.00 FAR
Industrial
0 to 0.70 FAR
Activity Center
15 to 200 DU/Acre and/or 0 to 3.00 FAR
Medium Intensity Mixed Residential - Office 12 to 21 DU/Acre and/or 0 to 0.30 FAR
High Intensity Mixed Residential - Office 30 to 75 DU/Acre and/or 0 to 0.35 FAR
Public Use
Medium Intensity Mixed Use Corridor
15 to 30 DU/Acre and/or 0 to 0.50 FAR
High Intensity Mixed Use Corridor
30 to 75 DU/Acre and/or 0.40 to 1.00 FAR
DU/Acre = Density Range
FAR = Intensity Range
0
1,000
2,000
Feet
N

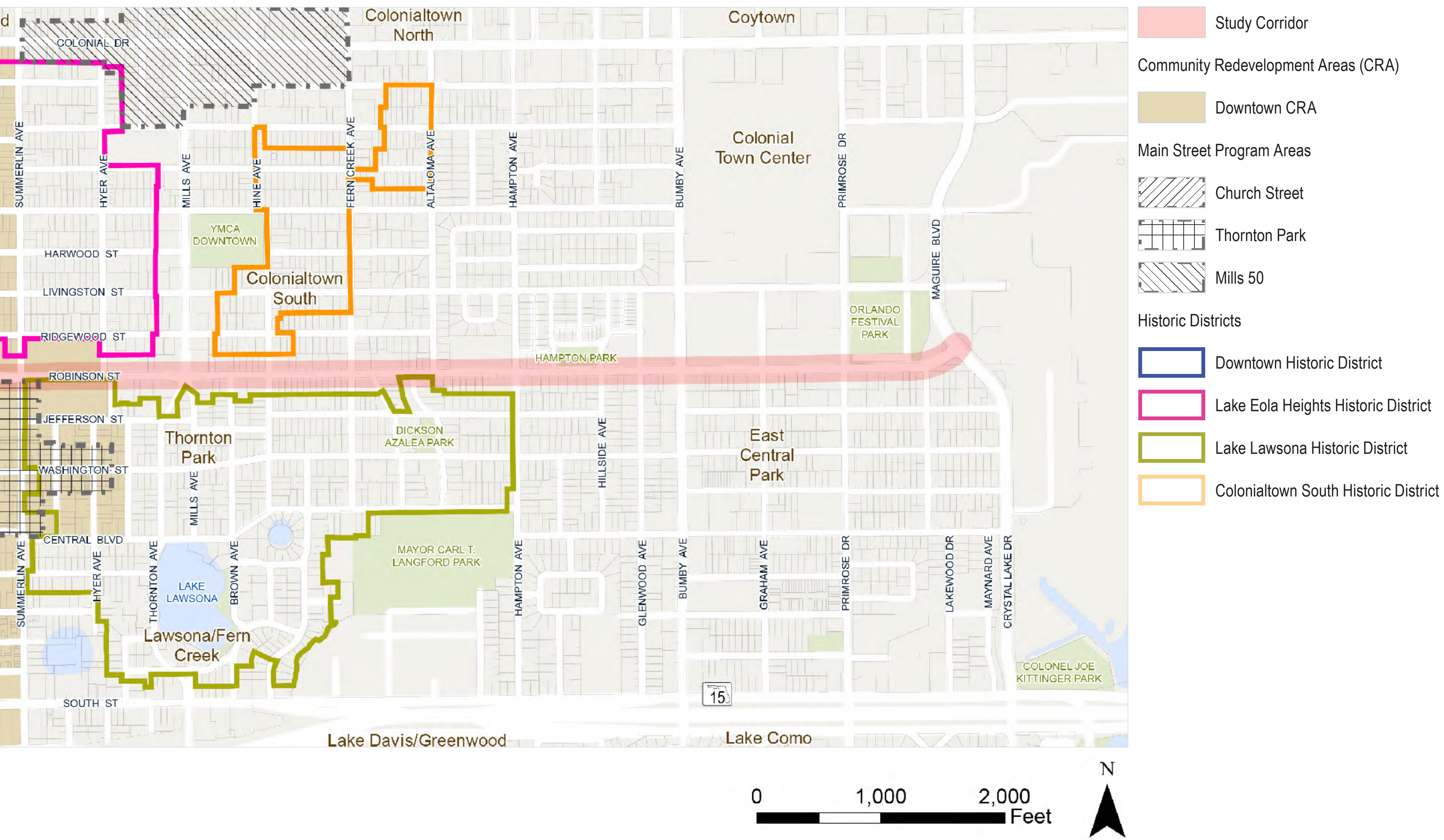
Robinson Street borders and connects neighborhoods.

The Robinson Street corridor is adjacent to a number of special districts, including the Downtown CRA, Historic Neighborhood Districts, and Main Streets, as shown in **Figure 10**. These areas include the Central Business District, South Eola, Thornton Park and Lawsona/Fern Creek, Lake Eola Heights, and Colonialtown South. Robinson Street does not go through these historic neighborhoods and districts but, rather borders and connects these different areas. The historic neighborhoods surrounding the corridor are stable and expected to remain in their current form and development with some parcel-based infill redevelopment occurring.

Figure 10 | CRA, Historic Districts, and Main Streets



Source: City of Orlando GIS Department, 2015

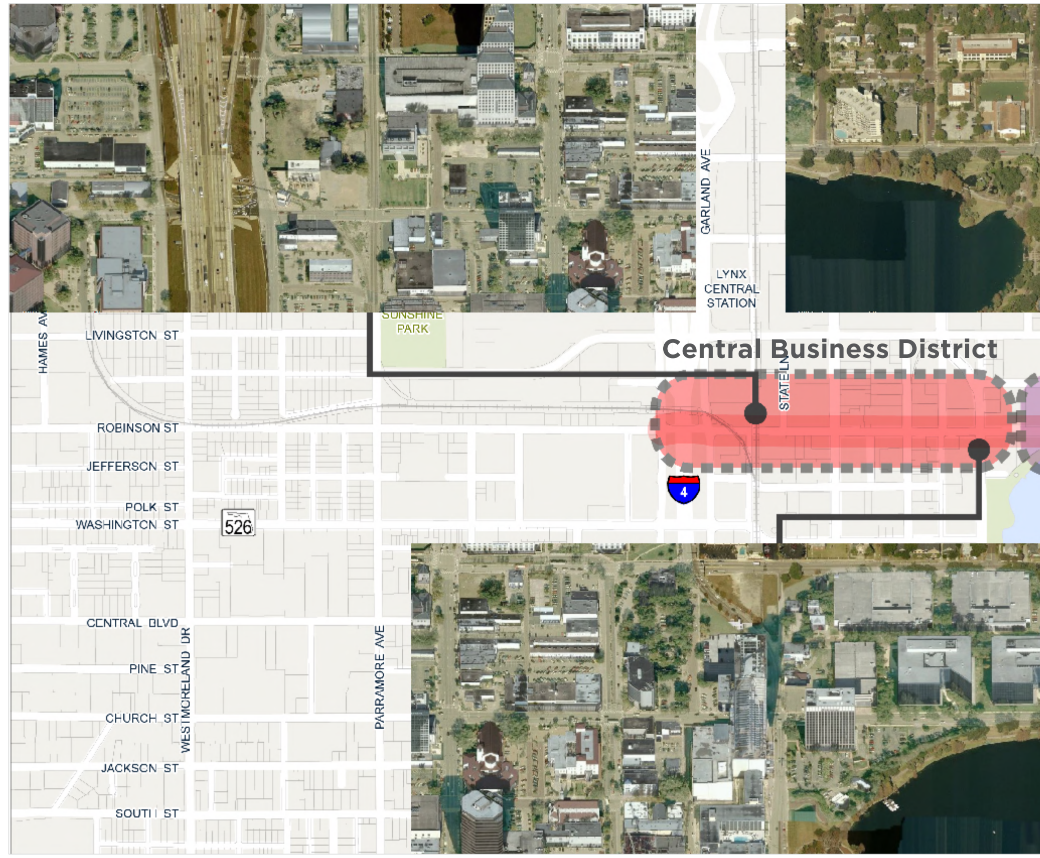


Colonialtown North
Coytown
COLONIAL DR
Colonial Town Center
SUMMERLIN AVE
HYER AVE
MILLS AVE
HINE AVE
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
YMCA DOWNTOWN
HARWOOD ST
LIVINGSTON ST
RIDGEWOOD ST
ROBINSON ST
Colonialtown South
ORLANDO FESTIVAL PARK
HAMPTON PARK
JEFFERSON ST
WASHINGTON ST
CENTRAL BLVD
Thornton Park
DICKSON AZALEA PARK
HILLSIDE AVE
East Central Park
MAYOR CARL T. LANGFORD PARK
THORNTON AVE
BROWN AVE
LAKE LAWSONA
Lawsona/Fern Creek
GLENWOOD AVE
GRAHAM AVE
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
COLONEL JOE KITTINGER PARK
SOUTH ST
15
Lake Davis/Greenwood
Lake Como
Study Corridor
Community Redevelopment Areas (CRA)
Downtown CRA
Main Street Program Areas
Church Street
Thornton Park
Mills 50
Historic Districts
Downtown Historic District
Lake Eola Heights Historic District
Lake Lawsona Historic District
Colonialtown South Historic District
0
1,000
2,000
Feet
N

Robinson Street's diverse corridor character creates different mobility patterns and requires that solutions not be one-size-fits-all.

The Robinson Street corridor has unique character zones. The diverse land use characters and contexts along the corridor require different approaches to accommodating various users with different multimodal travel patterns. After synthesizing the information gathered in the land use analysis and stakeholder interviews, four character districts were identified, as seen in **Figure 11**. These character districts serve as a basis for development of potential corridor improvements.

Figure 11 | Robinson Street Character Districts



The **Central Business District** on the west end of the corridor, between Hughey Avenue and Orange Avenue, includes office and commercial uses as well as a few vacant properties. This section goes under I-4 and crosses the railroad.

The **Lake Eola District**, spans just west of Rosalind Avenue to Hyer Avenue, just west of Mills Avenue. This district is fully developed with office buildings and some multi-family housing. It includes Lake Eola Park, St. James Cathedral, The Vue residential tower, the Landmark office buildings, the Day building, Eola Park Center, the Reeves residential building and St. James School. This section also includes Howard Middle School, a magnet school that attracts students across the City and Orange County.

The **Neighborhood District** is mostly made up of smaller office and parcels of residential uses from Hyer Avenue to Bumby Avenue. The office uses in this section are commonly residential conversions surrounded by single-family neighborhoods.

The **Milk District** is characterized by adjacent commercial uses surrounded by residential neighborhoods from Bumby Avenue to Maguire Avenue. It also encompasses the T.G. Lee milk factory, Festival Park, and Orlando Executive Airport frontage and has experienced significant redevelopment in recent years. In October 2016, the City of Orlando approved the addition of the Milk District to the Orlando Main Street program. This Milk District will receive financial and technical support to help grow the small businesses in the District.

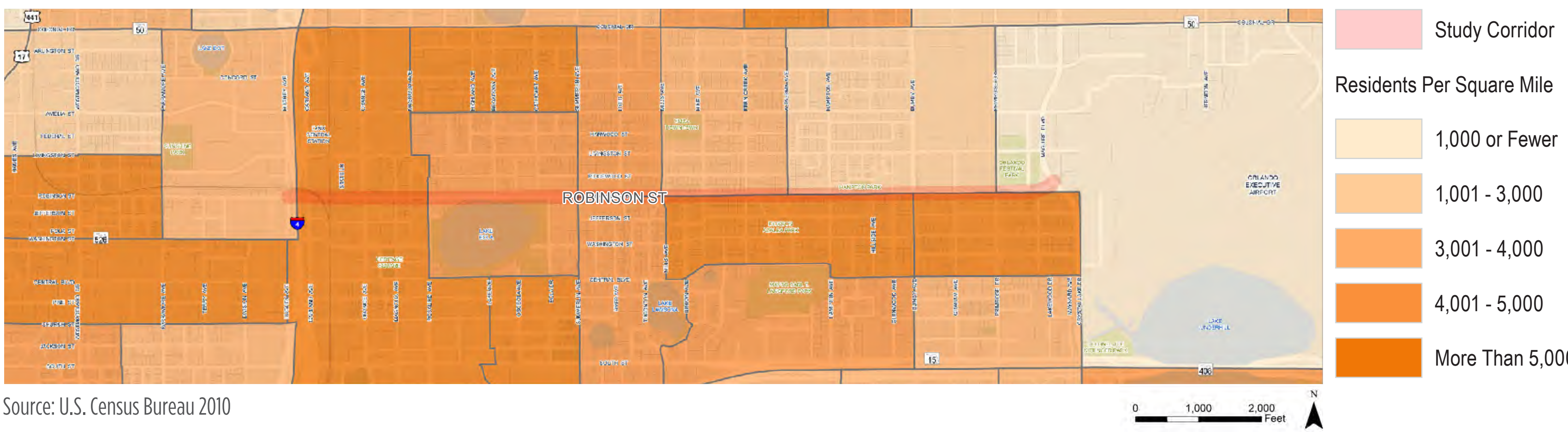
Socio-economic Context

The corridor contains higher than average population densities.

Between 2000 and 2010, the population in the Downtown area increased by 13% and the population in the corridor increased by 6%. Population densities along the corridor are generally higher than the rest of the City with some areas having higher population densities than other areas as shown in **Figure 12**. The Lake Lawsona/Thornton Park neighborhoods and Central Business District exhibit population densities of more than 5,000 residents per square mile.

Other areas in the corridor generally has between 1,000 and 5,000 residents per square mile. These average population densities are relatively high and support the potential demand for enhanced bicycling and pedestrian transportation infrastructure and higher frequency transit service.[3]

Figure 12 | Population Density



Source: U.S. Census Bureau 2010

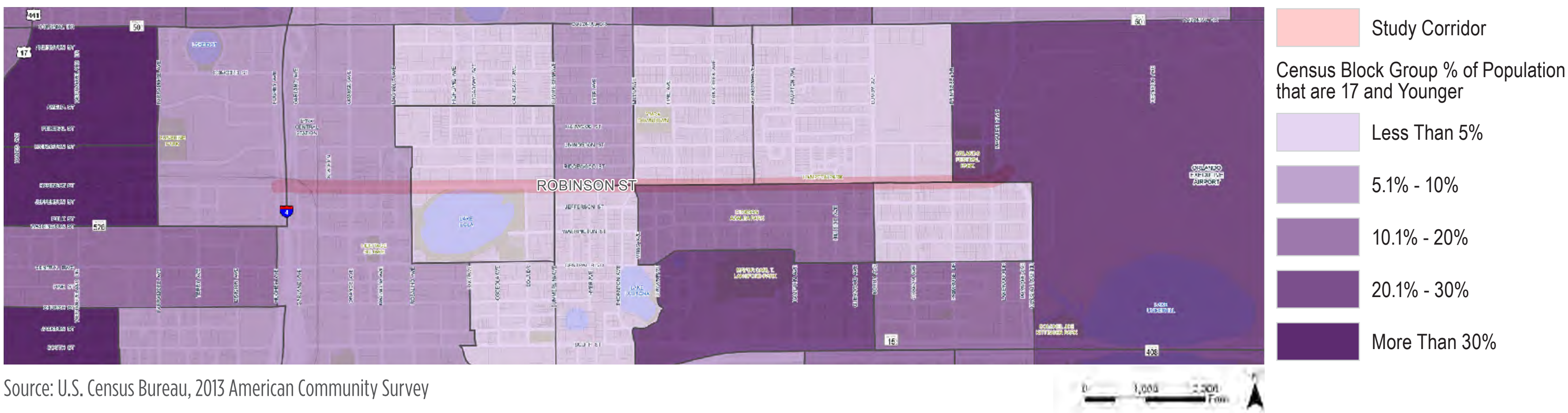
3 FTA Guidelines has a threshold of 2,500 persons per square mile as a minimum requirement to qualify for premium transit.

The corridor has a significant Millennial population.

Youth (age 17 and younger) and elderly populations (age 65 and older) tend to rely on public transportation and other active transportation modes (walking and bicycling). **Figure 13** shows that some higher than average concentrations of youth populations are located south of the corridor near Langford Park, east of the corridor near the Orlando Executive Airport, and west of the corridor in the Parramore neighborhood. Most of the corridor, however, shows youth concentrations that are well below the metro area-wide average of 23%.

Another population group that is growing in the corridor is the Millennial population - defined as those born between 1981 and 1997. Compared to the countrywide average of 32% of the corridor has 43% of Millennial population. It has been found that Millennials have more propensity to use transit and bicycle, compared to other population groups.

Figure 13 | Youth Population within each Census Block Group



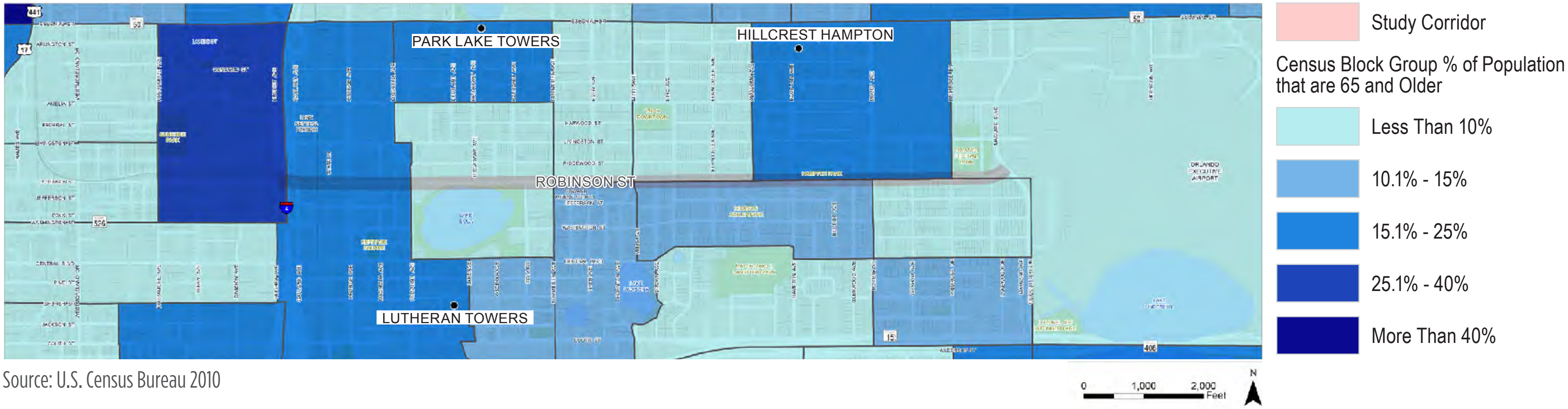
Source: U.S. Census Bureau, 2013 American Community Survey

The corridor has a higher than average percentage of elderly population.

On the other hand, there are many small pockets of higher than average concentrations of elderly persons compared to Orange County's average of 10% located in the Central Business District, near the Colonial Plaza, and in the Lake Eola Heights Neighborhood, shown in **Figure 14**. Concentrated elderly housing developments such as Park Lake Tower in Lake Eola Heights and Hillcrest Hampton House in Colonialtown South contribute to the elderly populations that make up more than 15% of some census tracts. Transportation strategies and improvements along Robinson Street should respond to the needs of these two populations groups.

The Hillcrest Hampton House is one of the Senior Living Residences located within the study corridor.

Figure 14 | Elderly Population within each Census Block Group

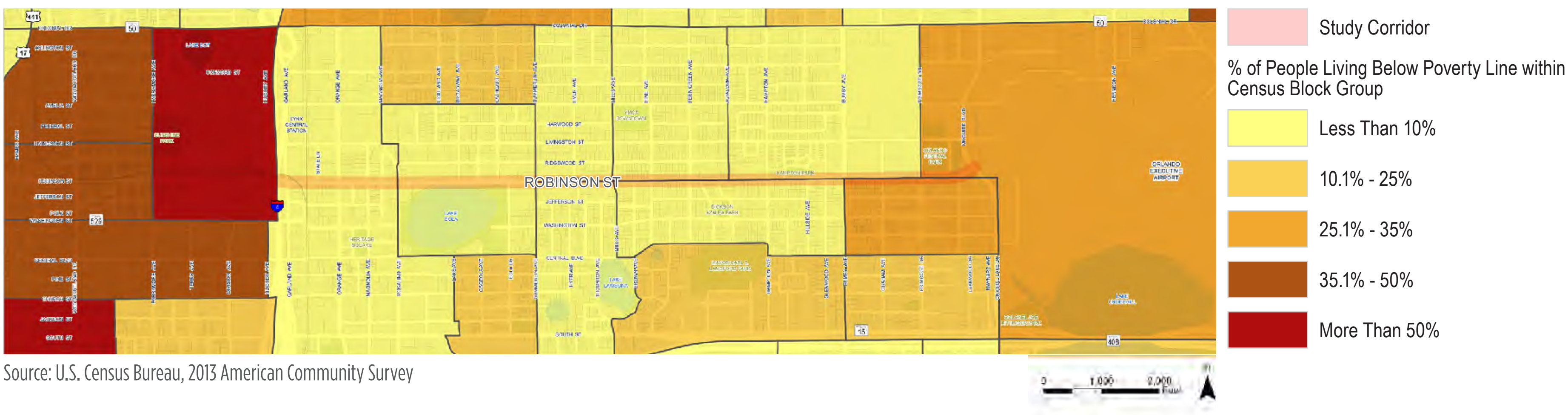


Source: U.S. Census Bureau 2010

The corridor has significant transit-dependent population.

In order to determine the need for multimodal transportation, it is beneficial to look for areas with the highest levels of people who are currently using transit and who may be transit-dependent. Transit dependent populations often include people who live below the poverty line and those who do not have access to a vehicle. As shown in **Figure 15**, there are many census tracts near but not on the corridor that are above the Orange County average (17%) for people living below the poverty line. The highest concentrations in the area are located west of the corridor, in the Parramore and Callahan neighborhoods. The east side of the corridor near the Orlando Executive Airport also has relatively higher concentrations of lower income populations.

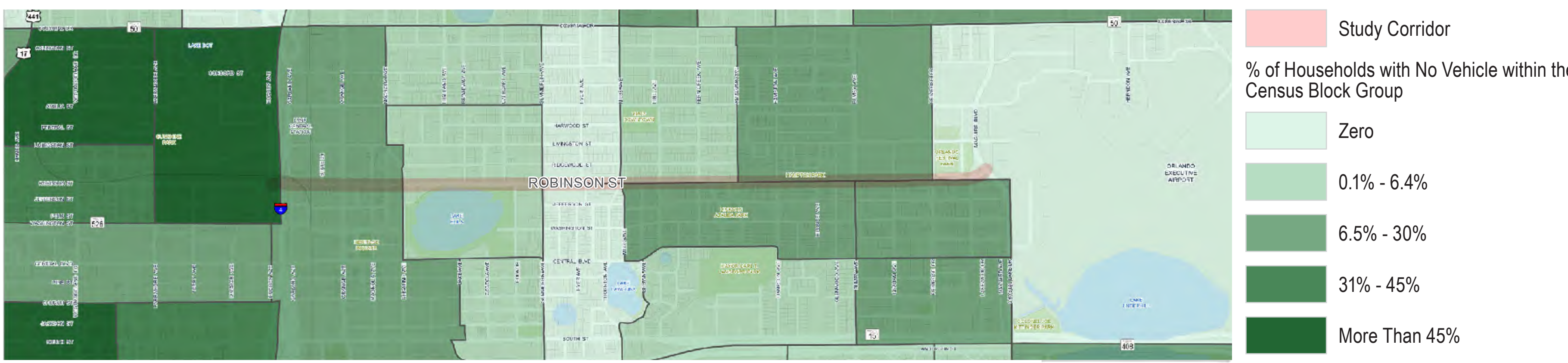
Figure 15 | People Living Below the Poverty Line



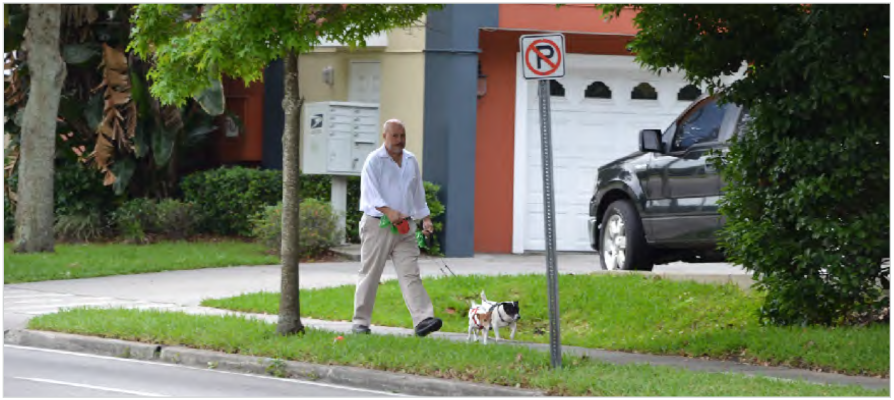
Source: U.S. Census Bureau, 2013 American Community Survey

Figure 16 shows there are also many areas along the corridor that have higher than the Orange County average (6%) for households with no car. These areas are located all throughout the corridor with the strongest concentrations in the Hampton Park neighborhood, the Central Business District, and the Parramore and Callahan neighborhoods.

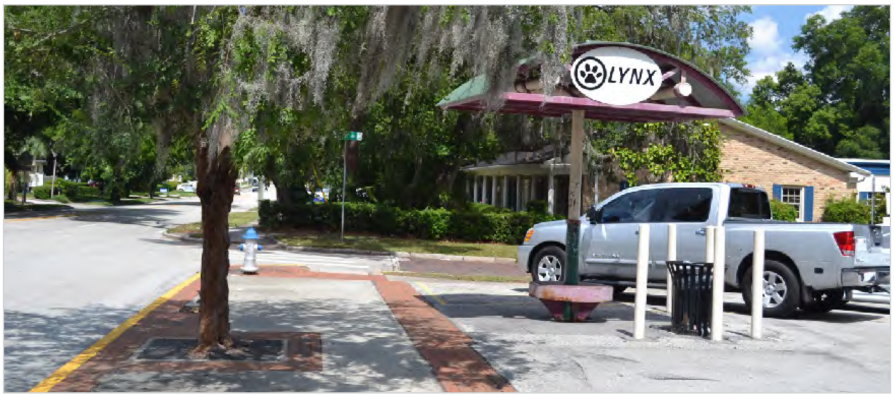
Figure 16 | Households with No Vehicle



Source: U.S. Census Bureau 2010



A man walks his dog in the Hampton Park area



Bus shelter near Howard Middle School

Pedestrian crossing in the Central Business District

Users of all ages were seen on Robinson Street during FDOT's Cyclovia event

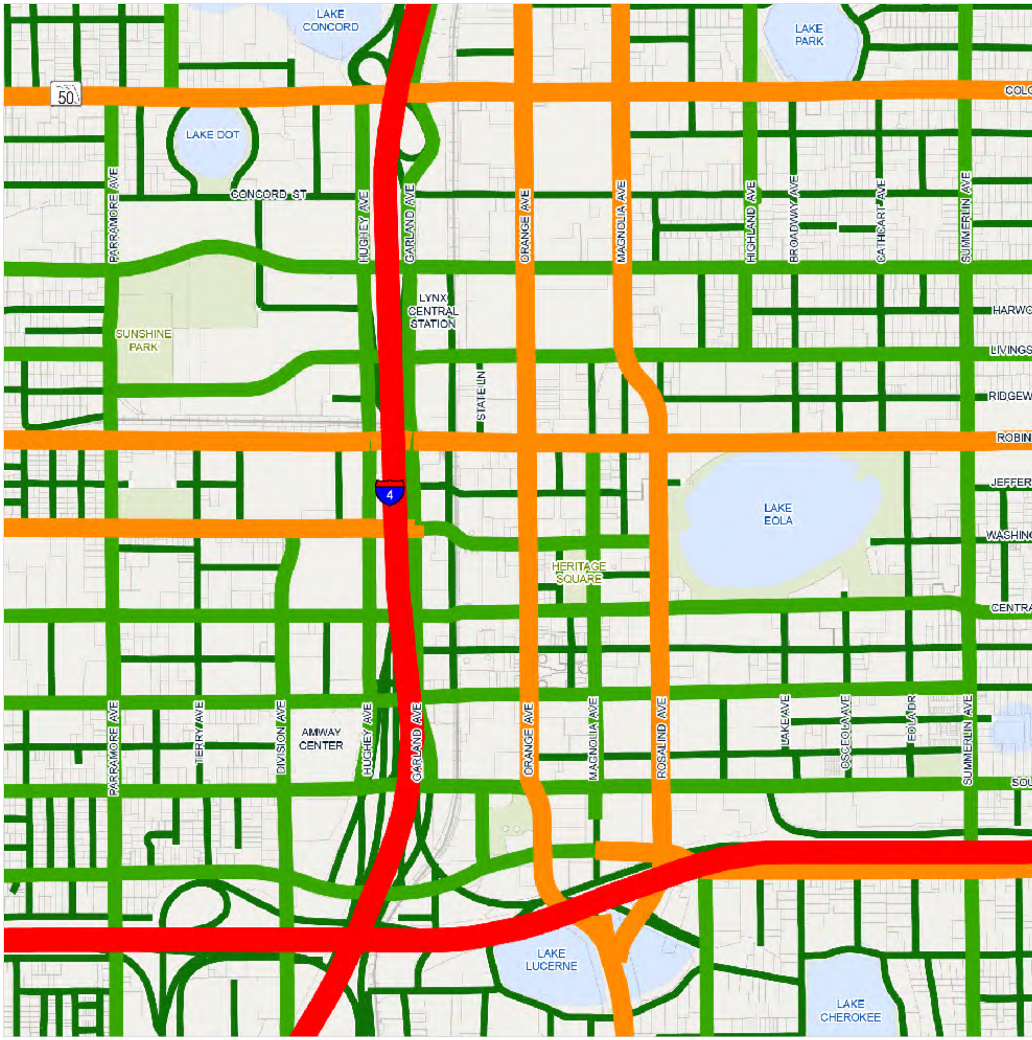
Overall Travel Patterns

Robinson Street plays many roles for the different users of the corridor.

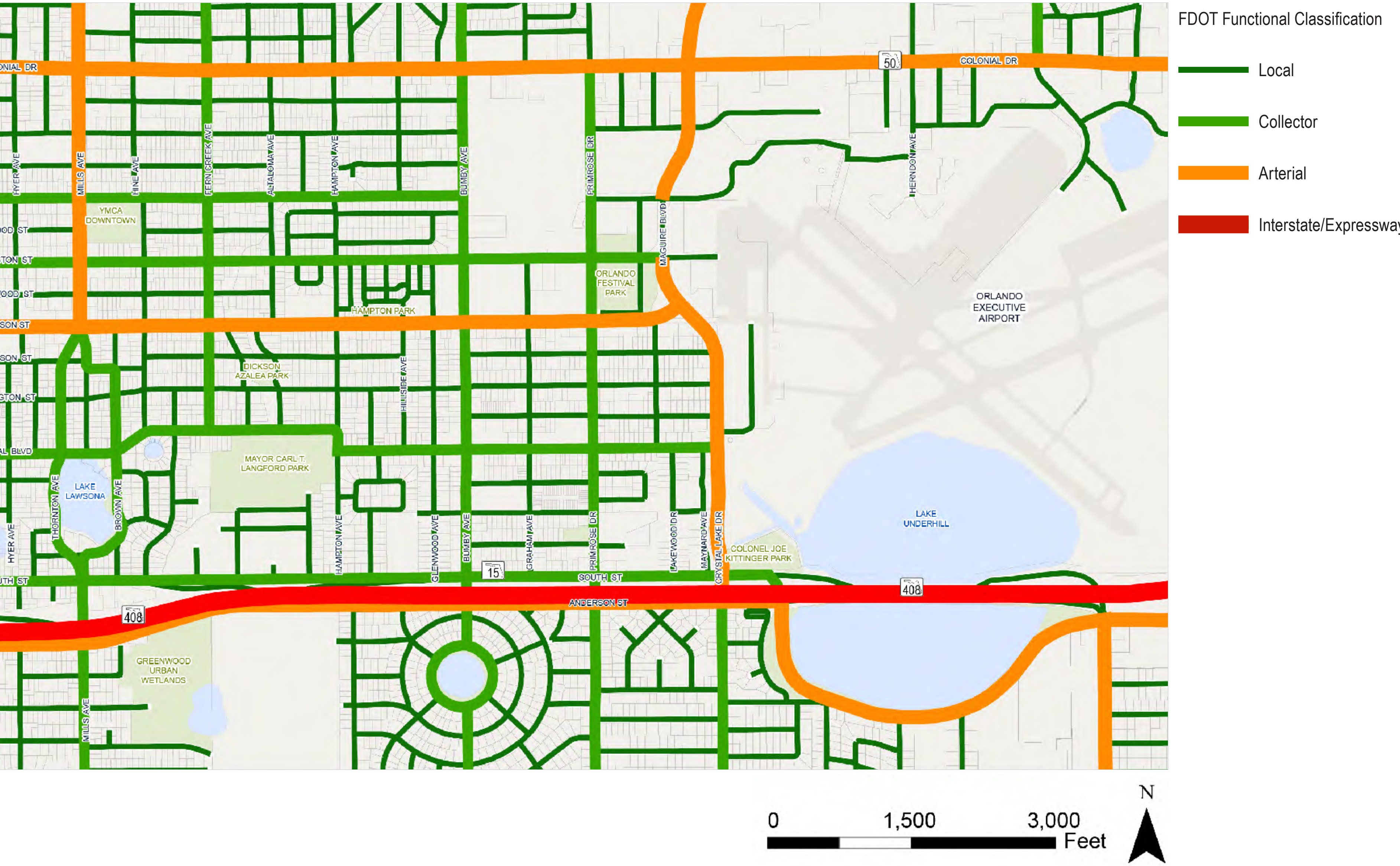
Robinson Street is one of six continuous east-west roadways that run between west of I-4 to Maguire Boulevard/Crystal Lake Drive in the core of Downtown. SR 408, SR 50, and the South Street and Anderson Street one-way pair, are generally considered as major regional routes that accommodate long-distance through trips, some into and out of Downtown. Central Boulevard and Livingston Street are generally regarded as roadways primarily providing for local access needs. Through the years, the City of Orlando has worked hard to design and implement infrastructure changes to encourage downtown-bound local traffic to travel at speeds suitable for a comfortable walking and biking environment and be accommodated on Livingston Street and Central Boulevard. The City implemented traffic calming measures on Livingston Street, restoring its brick surface. Streetscape improvements, along with the addition of on-street parking and lane reduction were implemented along Central Boulevard.

From a vehicular perspective, the State functional classification system designates Robinson Street as a *minor arterial*, as shown in **Figure 17**. However, Robinson Street's actual function and role in the Downtown street system may be evolving with the changing needs in Downtown. Also, the last reconstruction of I-4 has removed Robinson Street's interchange with I-4 and this configuration will remain in the I-4 Ultimate Plan.

Figure 17 | Functional Classification



Source: Florida Department of Transportation RCI Database, 2015


FDOT Functional Classification
Local
Collector
Arterial
Interstate/Expressway
COLONIAL DR
50
MILLS AVE
HYER AVE
HINE AVE
FERN CREEK AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
HERNDON AVE
YMCA DOWNTOWN
ORLANDO FESTIVAL PARK
HAMPTON PARK
ORLANDO EXECUTIVE AIRPORT
DICKSON AZALEA PARK
HILLSIDE AVE
MAYOR CARL T. LANGFORD PARK
LAKE LAWSONA
THORNTON AVE
BROWN AVE
LAKE UNDERHILL
GLENWOOD AVE
GRAHAM AVE
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
COLONEL JOE KITTINGER PARK
15
SOUTH ST
ANDERSON ST
408
GREENWOOD URBAN WETLANDS
0
1,500
3,000
Feet
N

Based on the FDOT Functional Classification Handbook, "the arterial system serves the highest degree of through traffic movement and largest proportion of total travel." According to the Handbook, some of the defined characteristics of an minor arterials are that they:

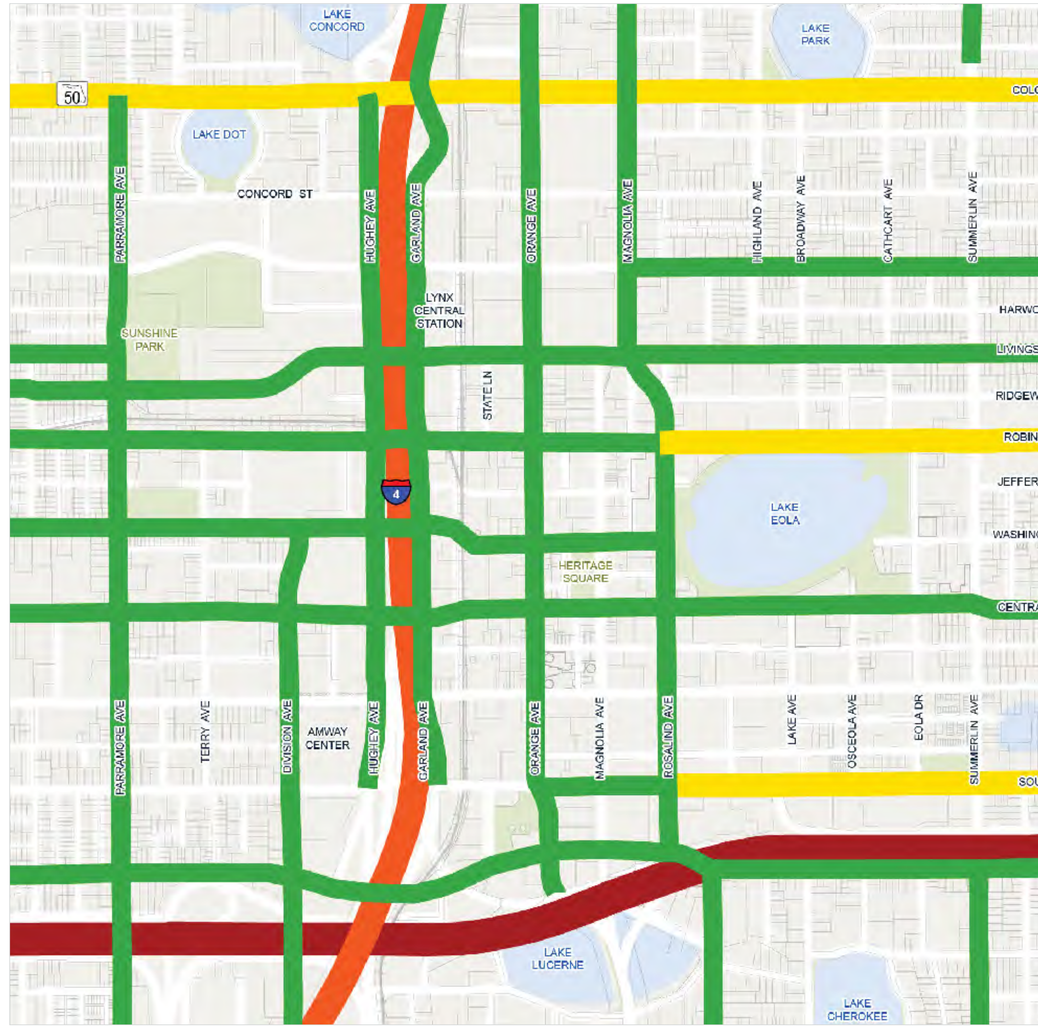
- Interconnect with and augment the higher level arterials
- Serve trips of moderate length at a somewhat lower level of through traffic movement than principal arterials
- Distribute traffic to smaller geographic areas than those served by higher-level arterials
- Provide more direct property access than principal arterials without penetrating identifiable neighborhoods

Robinson Street, however, also aligns with some of the characteristics of an urban major collector roadway. Per the FDOT handbook, "collectors typically are designed for travel at lower speeds and for shorter distances." Major collectors provide direct property access and traffic circulation in higher density residential neighborhoods and commercial and industrial areas. Major collectors have the following characteristics:

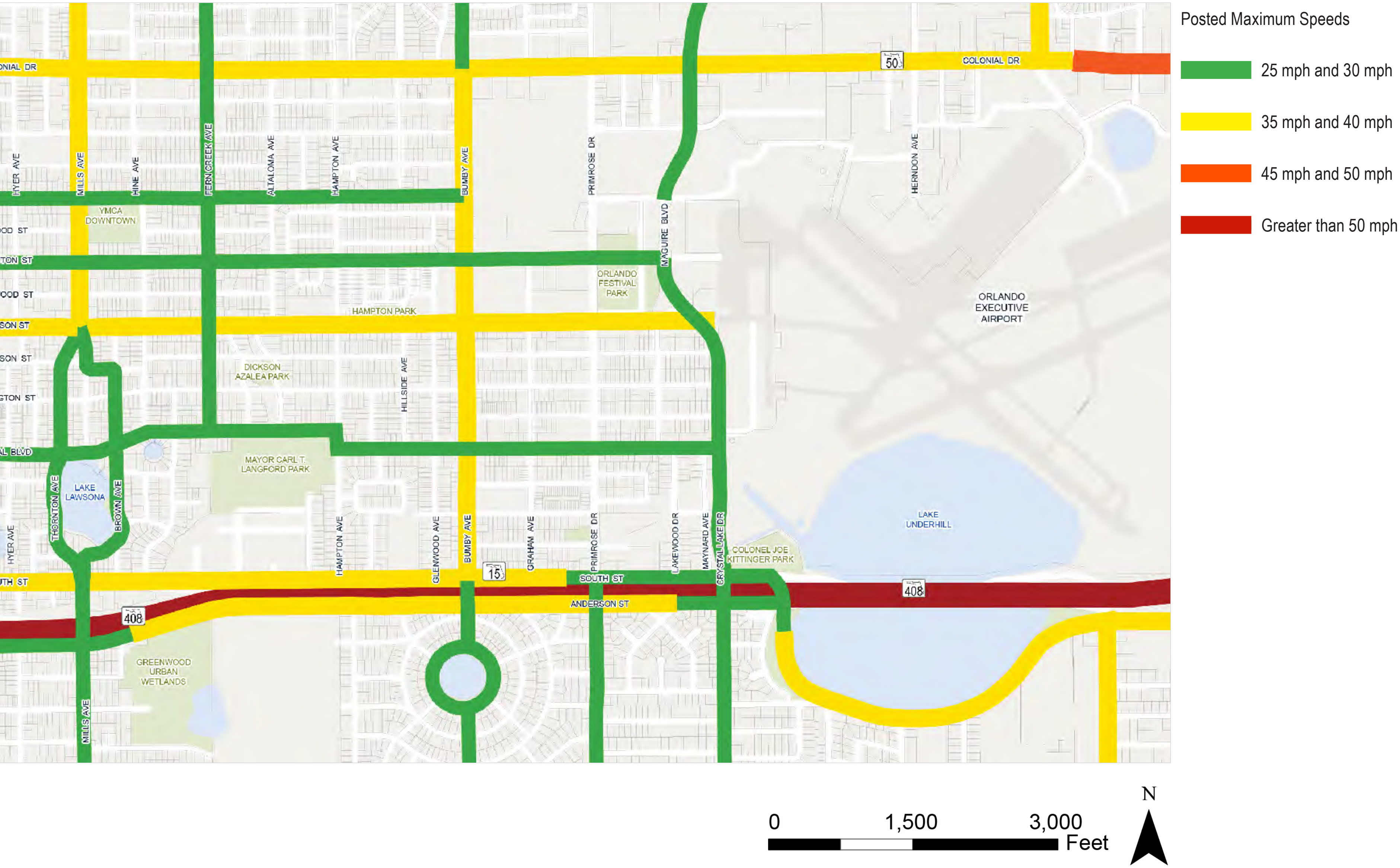
- Serve both property access and traffic circulation in higher density residential, and commercial/industrial areas
- Penetrate residential neighborhoods, often for significant distances
- Distribute and channel trips between local streets and arterials, usually over a distance of greater than three-quarters of a mile

Another way to define the role of a roadway is by considering the desired speed of a trip along the roadway. Longer distance regional corridors are more likely to accommodate travel at faster speeds, whereas local access roadways would ideally have slower speeds. The current posted speeds along Robinson Street and other area streets generally reflect the functional class, as seen in **Figure 18**. Robinson Street currently has a posted speed of 35 mph. Throughout this corridor study, the role, function, and posted speed of Robinson Street was further discussed and refined with corridor stakeholders. Future transportation strategies should support the desired role of Robinson Street based on community needs and goals.

Figure 18 | Posted Maximum Speeds



Source: Florida Department of Transportation RCI Database, 2015

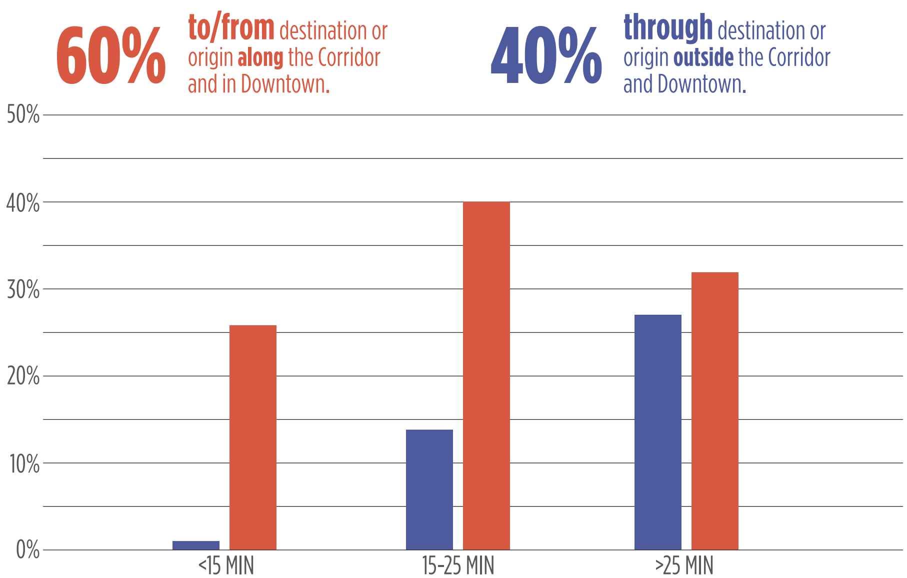

Posted Maximum Speeds
25 mph and 30 mph
35 mph and 40 mph
45 mph and 50 mph
Greater than 50 mph
COLONIAL DR
50
MILLS AVE
FERNCREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
HERNDON AVE
YMCA DOWNTOWN
ORLANDO FESTIVAL PARK
HAMPTON PARK
ORLANDO EXECUTIVE AIRPORT
DICKSON AZALEA PARK
HILLSIDE AVE
MAYOR CARL T. LANGFORD PARK
LAKE LAWSONA
THORNTON AVE
BROWN AVE
GLENWOOD AVE
GRAHAM AVE
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
COLONEL JOE KITTINGER PARK
LAKE UNDERHILL
15
SOUTH ST
ANDERSON ST
408
GREENWOOD URBAN WETLANDS
0
1,500
3,000
Feet
N

The majority of the trips along the corridor are "to trips" and not "through trips".

To help better understand the corridor's role and function, the study team surveyed the origin and destination of a sample of daily trips traveling along Robinson Street. Trip patterns help in understanding the rationale for traveling on Robinson versus another corridor, and also in understanding the trip lengths and the propensity of corridor users to travel by bike, pedestrian, and transit modes. Based on representative origin-destination data collected in April 2015 (StreetLight Data's Streetlight Insight Travel Metrics), 60% of trips that travel along Robinson Street begin or end in the corridor or in Downtown, and 40% of the trips travel through the corridor (as shown in **Figure 19**), not originating or ending in the Robinson Street corridor or in Downtown. Majority of trips (74%) that are along the corridor take 25 minutes or less.

Another data set that the study team looked into to understand where trips are coming from is the U.S. Census Bureau and Department of Labor's Longitudinal Employer-Household Dynamics data (**Figure 20**). An estimated 17% of residents who live along the corridor also work within the corridor or in Downtown Orlando. This gives a good understanding of the population which may be more amenable to using enhanced transit, bike, and pedestrian connections to travel to work along or just outside the corridor. **Figures 21** and **22** show the work locations of corridor residents and home locations of workers, respectively.

Figure 19 | To and Through Trips Along the Corridor

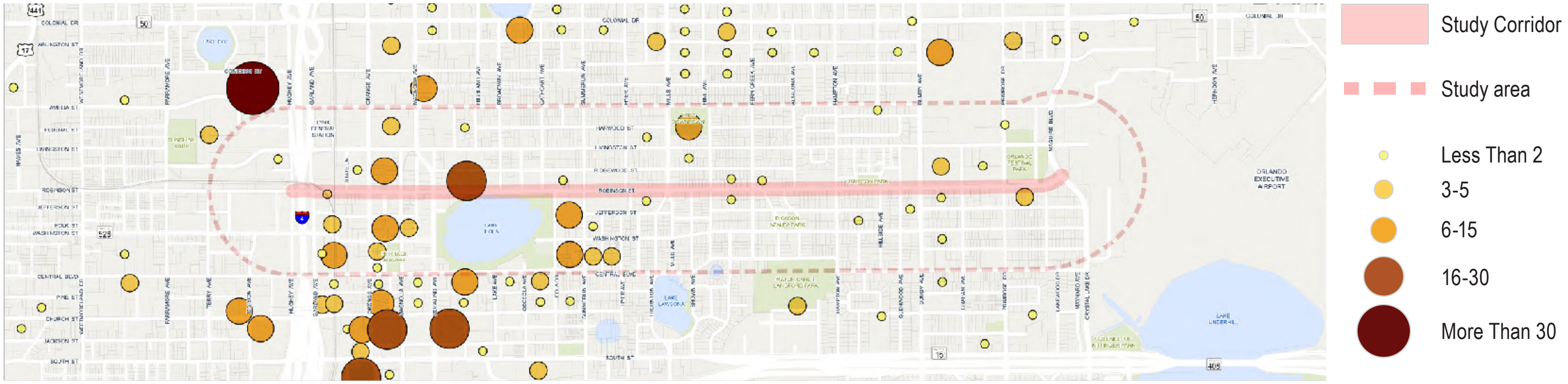


Source: Streetlight Origin-Destination Data, April 2015

Figure 20 | Inflow and Outflow of Workers

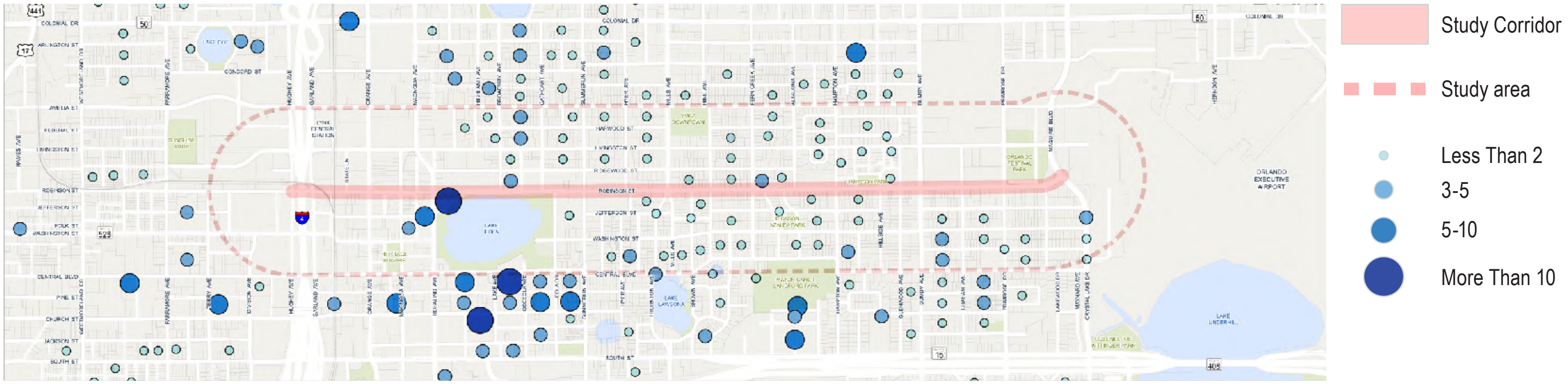
Source: U.S. Census Longitudinal Employment and Household Dynamics (LEHD) data, 2011

Figure 21 | Work Locations of Residents in the Study area



Source: U.S. Census Longitudinal Employment and Household Dynamics (LEHD) data, 2011

Figure 22 | Home Locations of Workers in the Study area



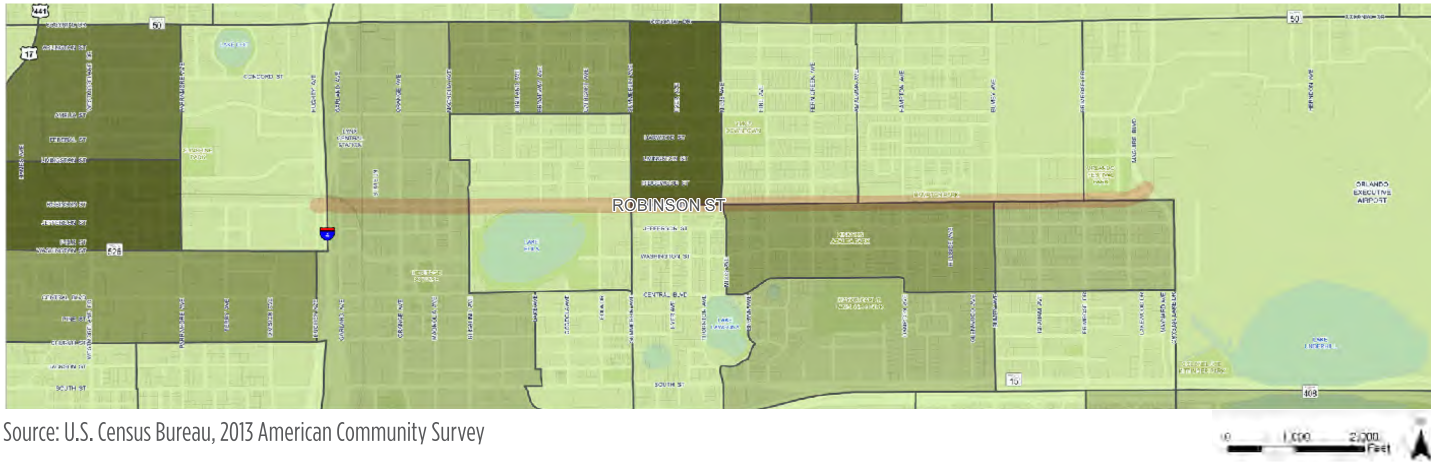
Source: U.S. Census Longitudinal Employment and Household Dynamics (LEHD) data, 2011

A higher than average percentage of corridor residents are walking and bicycling to work.

Figure 23 shows that, compared to the Orange County average of 0.5%, there are a few census blocks in the corridor where bicycling to work is a relatively popular mode of travel. Bicycling mode share is particularly high in the Mills50 District (along Mills Avenue between SR 50 and Robinson), north Lake Eola Heights, and surrounding Dickson Azalea Park; where more than a 5% share of population bicycling to work. As seen in **Figure 24**, walk to work is also particularly high in some areas of the corridor. These areas include the Central Business District, area surrounding Lake Eola, and in the Hampton Park area west of Colonial Town Center; where more than 5% of the total population walk to work.

Bicyclist frequently take a whole lane when traveling along the corridor.

Figure 23 | Bike to Work



Source: U.S. Census Bureau, 2013 American Community Survey

Study Corridor

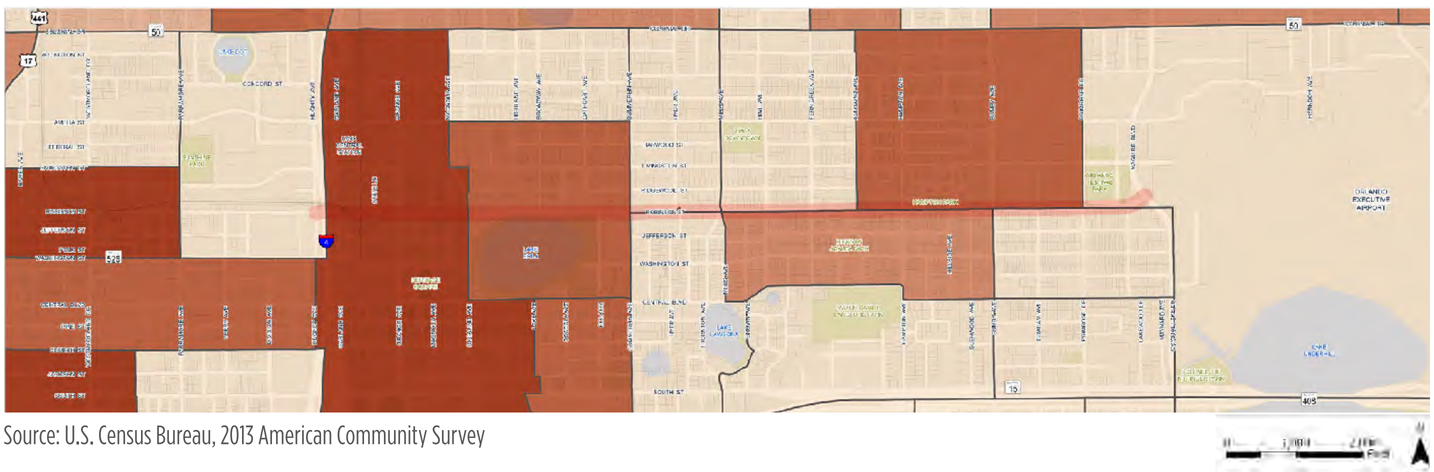
% of Population Census Block Group Who Bicycle to Work

- Zero
- 0.5% - 2%
- 2.1% - 5%
- 5.1% - 10%
- More Than 10%

Orange County Average for Residents Bicycling to Work: 0.5%

No Census Block Group with in the Study area have Residents Bicycling to Work between 0.1% - 0.5%

Figure 24 | Walk to Work



Source: U.S. Census Bureau, 2013 American Community Survey

Study Corridor

% of Population Census Block Group Who Walk to Work

- Zero
- 0.1% - 1.3%
- 1.4% - 5%
- 5.1% - 10%
- More Than 10%

Orange County Average for Residents Walking to Work: 1.3%

Pedestrians

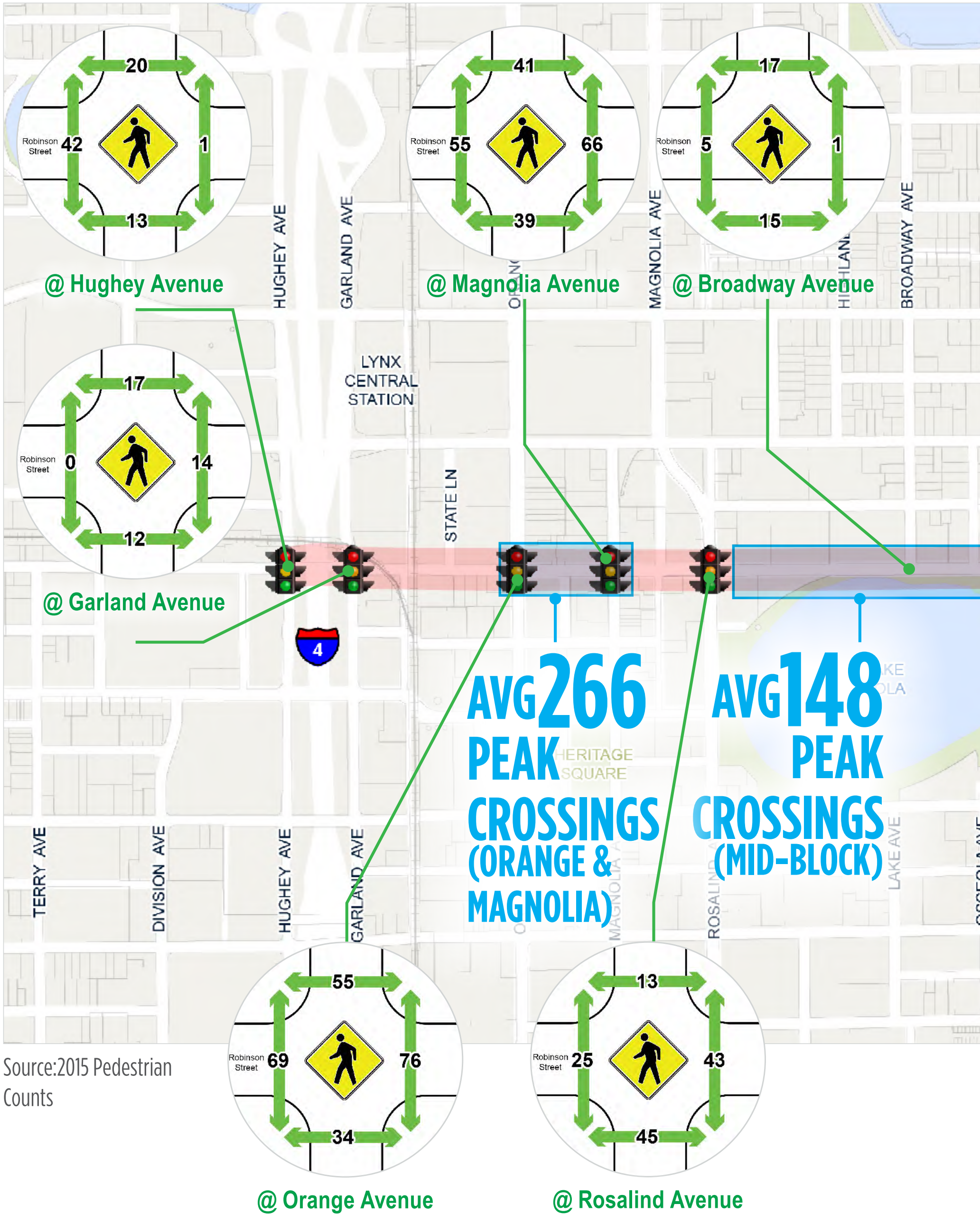
There is a clear desire and need to improve pedestrian safety, accessibility, and comfort along the corridor.

The signal spacing within Downtown provides several protected crossing opportunities at approximately 0.10-mile spacing; however, there is a half-mile segment along Robinson Street in front of Lake Eola without a marked crossing. Along this stretch of the corridor are pedestrian crossing warning signs that indicate pedestrians are present in the next half mile. There are also regulatory signs that indicate pedestrians must use crosswalks just east of Rosalind Avenue on Robinson Street.

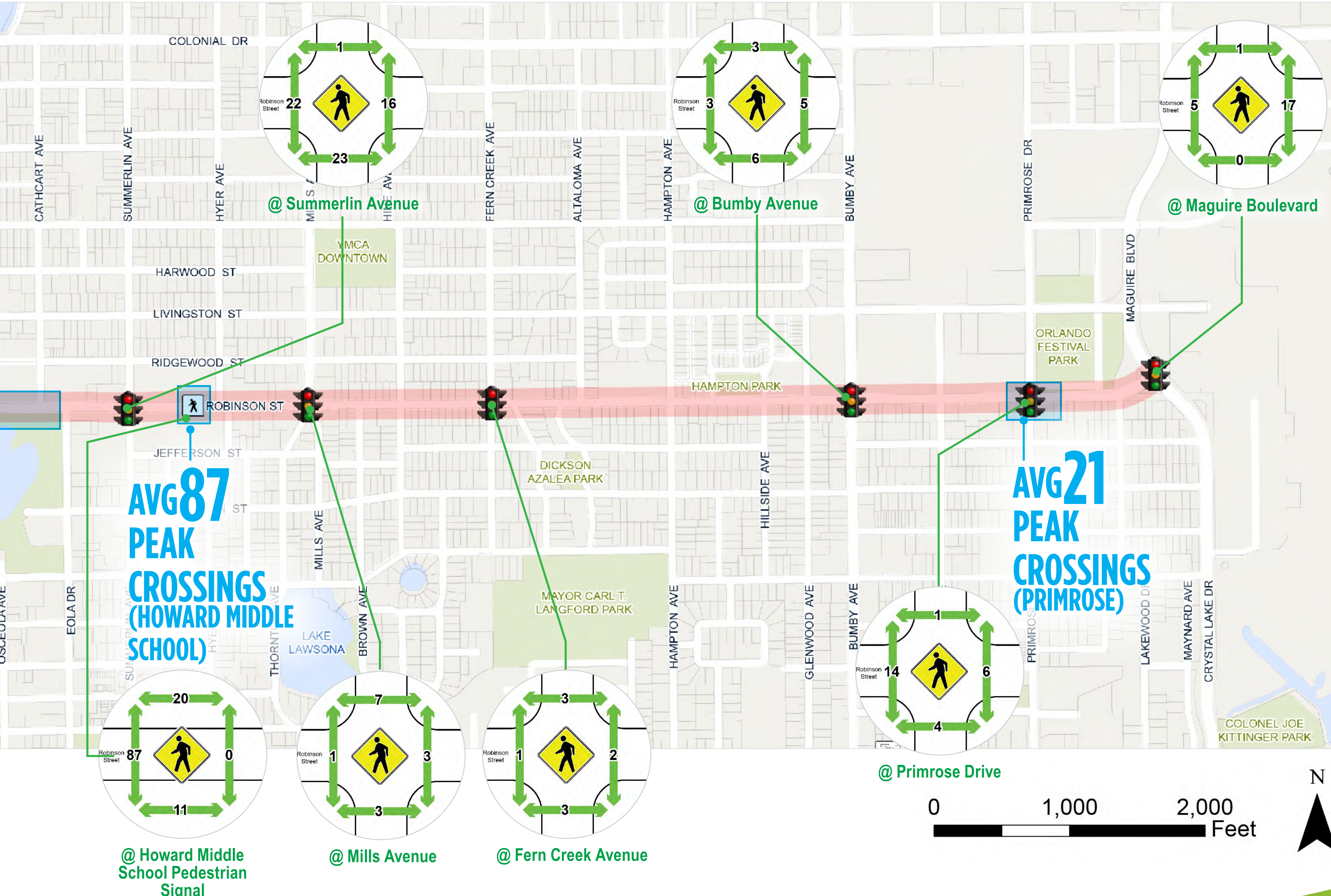
Robinson Street is one of the front doors to Lake Eola Park and many pedestrians currently access the Park along most of the Park's frontage on Robinson, without much channeling or gateway treatments into the Park. Based on data collected on March 11, 2017, nearly 700 pedestrians were observed crossing Robinson Street in front of Lake Eola in a 12-hour period, between Rosalind Avenue and Eola Drive. Of these, with about 150 of these crossings occurring in the morning and afternoon peak periods (see **Figure 25**). Many of these pedestrians accept small gaps to dash across the 4-lanes of traffic. Also, in the center portion of the corridor, there were 87 pedestrian crossings observed at the pedestrian signal at Howard Middle School.

Pedestrian activity increases again on the east end of the corridor, near the Milk District, where there were three reported pedestrian crashes. Of the intersections in the Milk District, the Primrose Drive intersection experiences the highest concentration of Robinson Street pedestrian crossings in the peak periods with 21 pedestrians crossing. Intersection count data can be found in **Appendix D**.

Figure 25 | Peak Period (AM and PM) Pedestrian Counts



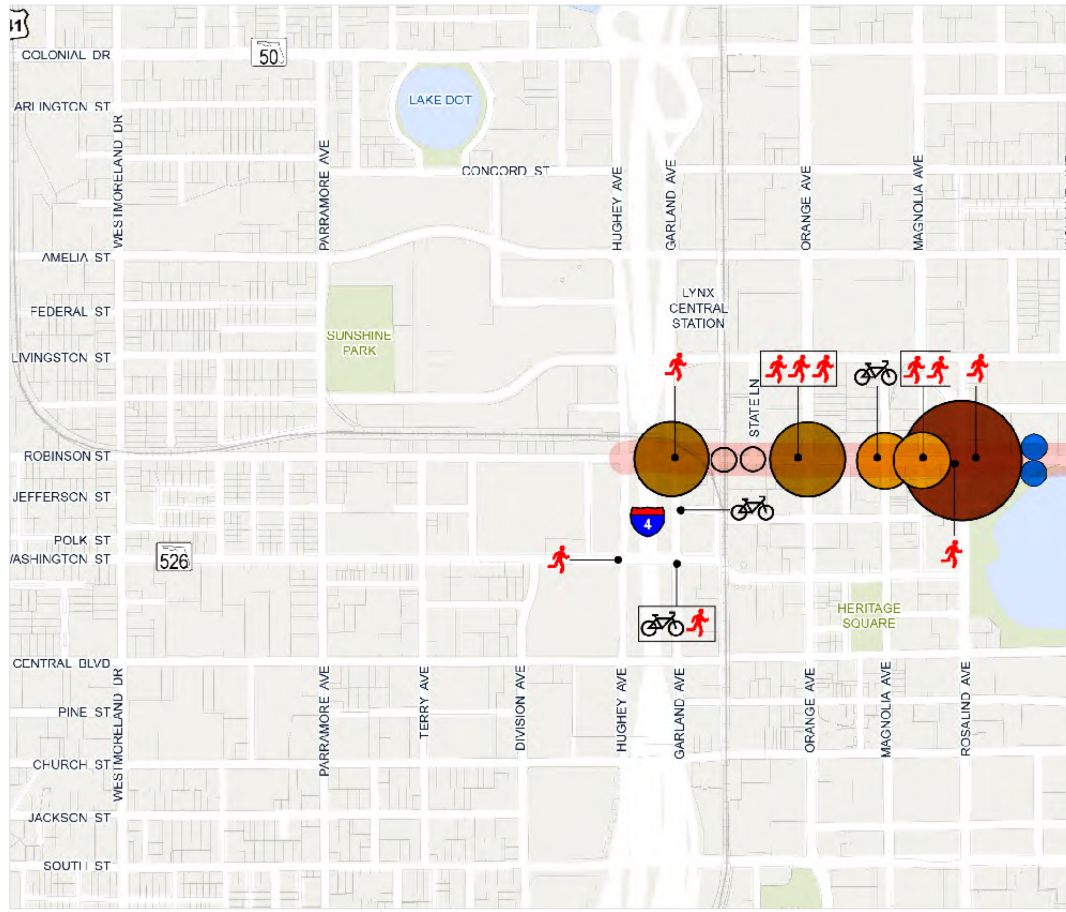
Source:2015 Pedestrian Counts



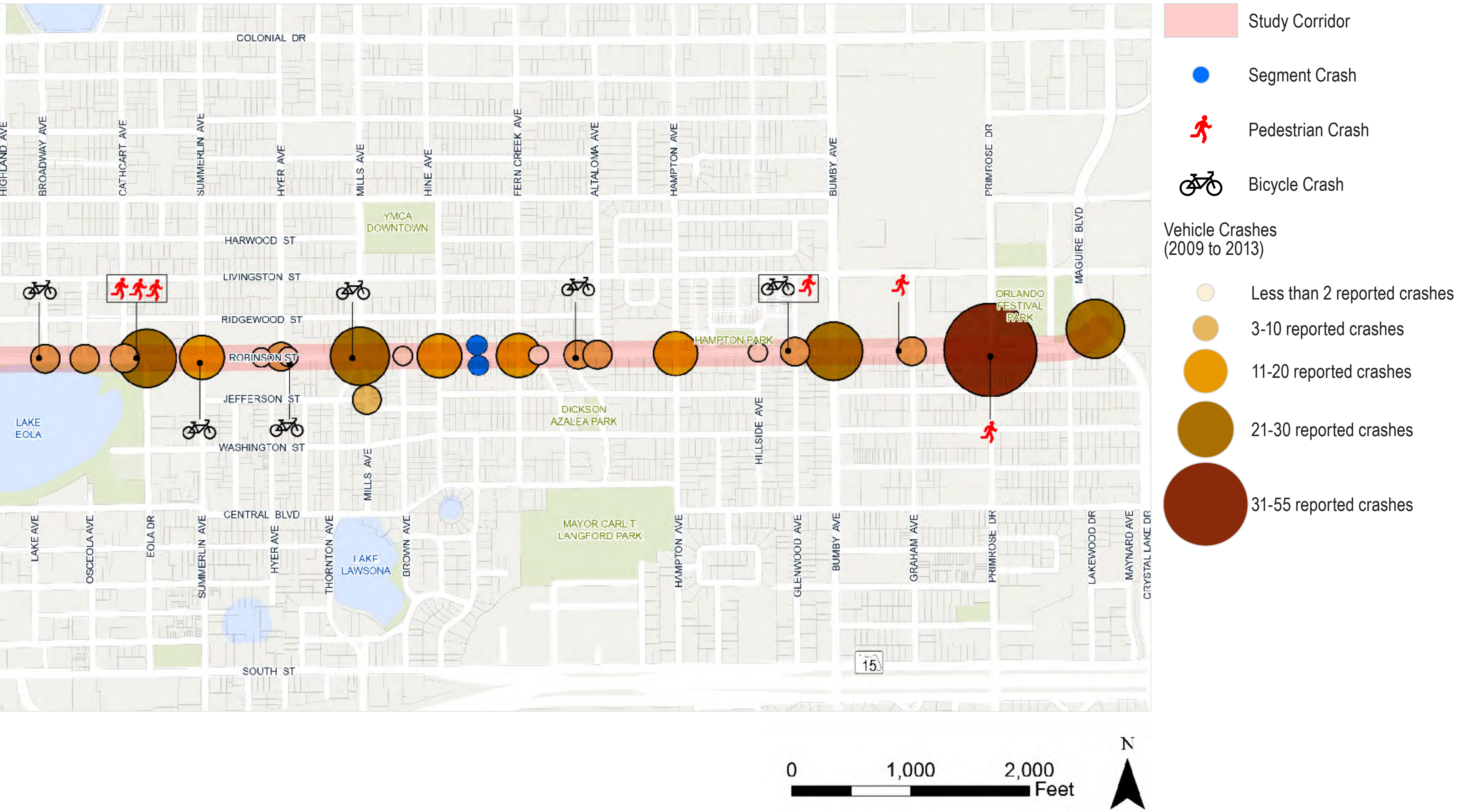
@ Summerlin Avenue
1
22
16
23
Robinson Street
@ Bumby Avenue
3
3
5
6
@ Maguire Boulevard
1
5
17
0
AVG 87 PEAK CROSSINGS (HOWARD MIDDLE SCHOOL)
AVG 21 PEAK CROSSINGS (PRIMROSE)
@ Howard Middle School Pedestrian Signal
20
87
0
11
@ Mills Avenue
7
1
3
3
@ Fern Creek Avenue
3
1
2
3
@ Primrose Drive
1
14
6
4
COLONIAL DR
HARWOOD ST
LIVINGSTON ST
RIDGEWOOD ST
ROBINSON ST
JEFFERSON ST
CATHCART AVE
SUMMERLIN AVE
HYER AVE
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
HILLSIDE AVE
MILLS AVE
BROWN AVE
EOLA DR
GLENWOOD AVE
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
YMCA DOWNTOWN
HAMPTON PARK
ORLANDO FESTIVAL PARK
DICKSON AZALEA PARK
MAYOR CARL T. LANGFORD PARK
LAKE LAWSONA
COLONEL JOE KITTINGER PARK
0
1,000
2,000
Feet
N

As observed through field reviews, input from corridor stakeholders, and pedestrian count data collected, pedestrian safety, accessibility, and comfort are important concerns along Robinson Street. There is high pedestrian traffic on the western section of the corridor, in the Central Business District, and surrounding Lake Eola Park. Between 2009 and 2013, of the 15 pedestrian crashes that occurred along the corridor, 11 were reported in the western section (see **Figure 26**). Detailed crash data is provided in **Appendix E**.

Figure 26 | Crashes along the Corridor



Source: Signal Four Analytics and Crash Analysis Reporting System (CARS) data, 2009 to 2014


Study Corridor
Segment Crash
Pedestrian Crash
Bicycle Crash
Vehicle Crashes
(2009 to 2013)
Less than 2 reported crashes
3-10 reported crashes
11-20 reported crashes
21-30 reported crashes
31-55 reported crashes
COLONIAL DR
HARWOOD ST
LIVINGSTON ST
RIDGEWOOD ST
ROBINSON ST
JEFFERSON ST
WASHINGTON ST
CENTRAL BLVD
SOUTH ST
HIGHLAND AVE
BROADWAY AVE
CATHCART AVE
SUMMERLIN AVE
HYER AVE
MILLS AVE
HINE AVE
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
HILLSIDE AVE
LAKE AVE
OSCEOLA AVE
EOLA DR
THORNTON AVE
BROWN AVE
GLENWOOD AVE
GRAHAM AVE
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
YMCA DOWNTOWN
DICKSON AZALEA PARK
HAMPTON PARK
ORLANDO FESTIVAL PARK
MAYOR CARL T LANGFORD PARK
LAKE EOLA
LAKE LAWSONA
15
0
1,000
2,000
Feet
N

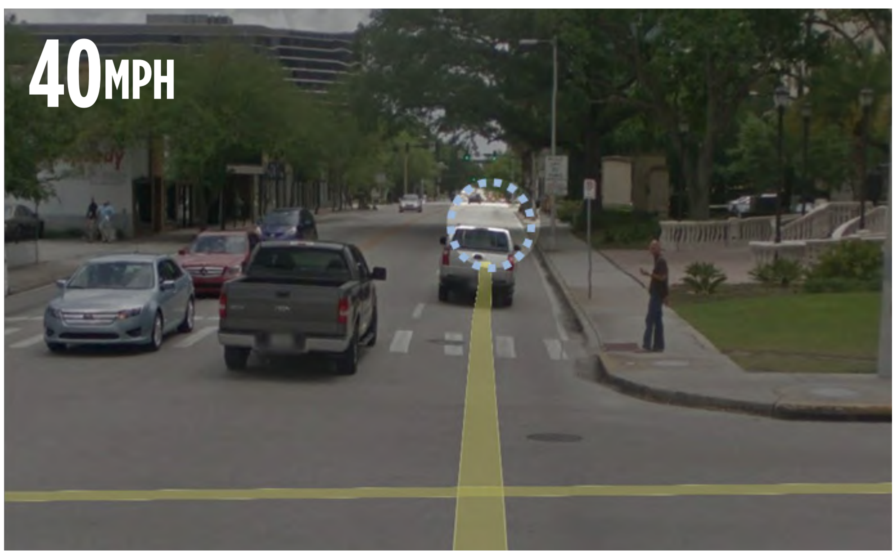
The speed along Robinson Street directly contributes to pedestrian comfort and safety.

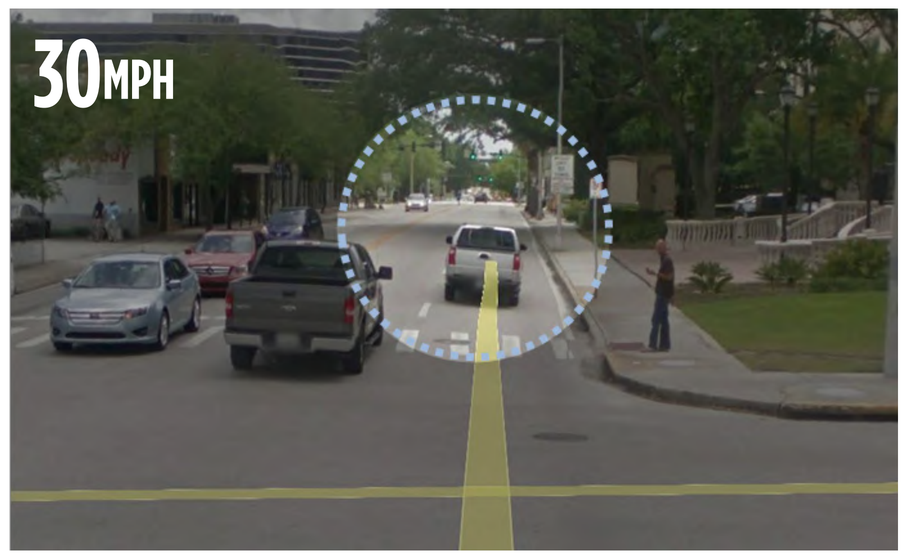
Vehicle travel speed is a key factor contributing to pedestrian safety. Research suggests that 55% of pedestrians will survive an accident with a vehicle traveling at 30 mph, while 95% of pedestrians will survive an accident at 20 mph.[4] This is directly related to a driver's cone of vision at varying speeds. As shown below, a driver's fixation point at 40 mph and 30 mph is farther down the road (greater than 200') relative to slower speeds, decreasing chances that the driver will notice a crossing or waiting pedestrian.[5] As speeds decrease, the driver's nearer fixation point and increased cone of vision allows for better awareness of pedestrians and other vulnerable road users in the public right-of-way. As Robinson Street is being asked to support more significant multimodal travel Downtown, the posted and operating speeds along the corridor were a focus of discussion for the corridor study.

As seen in **Figure 27**, the 85th percentile speed, measured at three locations throughout the corridor, was within 5 mph of the 35 mph posted speed, with speeds as high as 50 mph near Lake Eola between Rosalind Avenue and Mills Avenue. Although the 85th percentile speed along the corridor is between 33mph and 37mph, 20% to 25% of vehicles were observed to be traveling above the posted speed limit of 35 mph. More vehicles were observed to be operating at higher than posted speeds during the off-peak periods (25% of total vehicles) than during the peak periods (20%). A full set of the speed data collected can be found in **Appendix F**. In addition, the lack of buffer between the sidewalk and the travel lane increases the perception of high speeds and contributes to pedestrian discomfort.

4 United Kingdom Department of Transportation

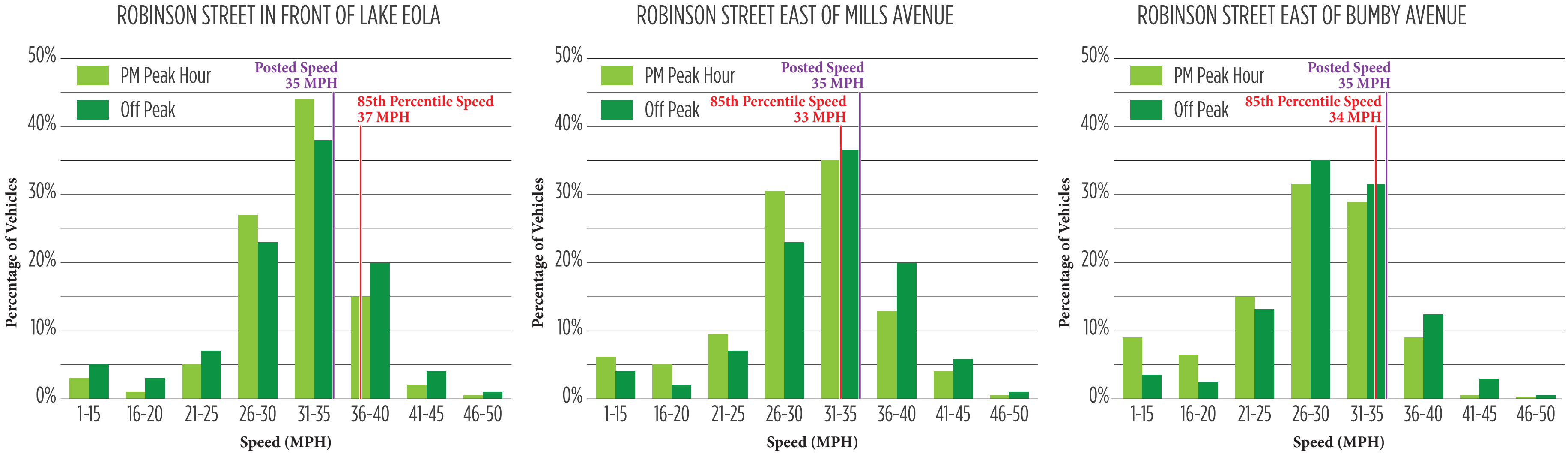
5 Hamilton, J.R. & Thurstone, L.R., 1937. Safe Driving: Human Limitations in Automobile Driving. Doubleday, Foran, and Company, Inc.



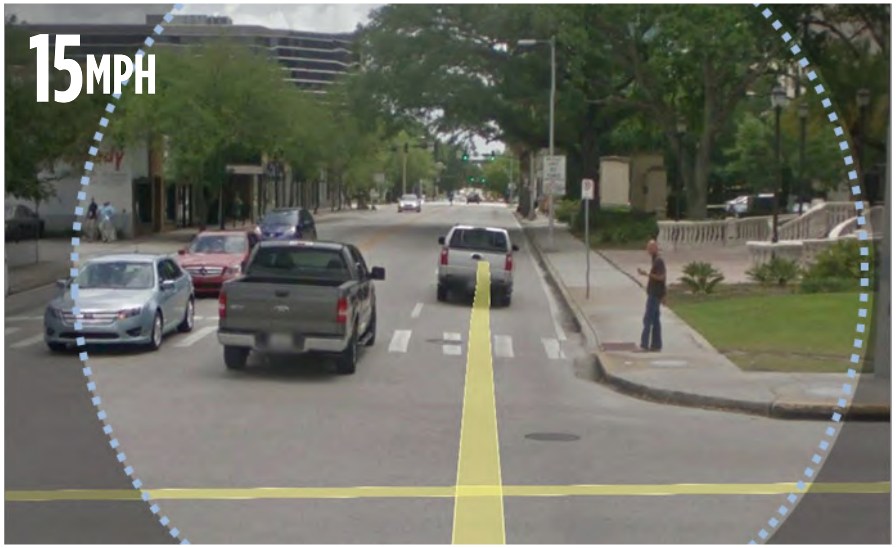


Example of driver's cone of vision based on speed.

Figure 27 | Vehicle Speeds along Robinson Street



Source: Tube Counts, March 2015

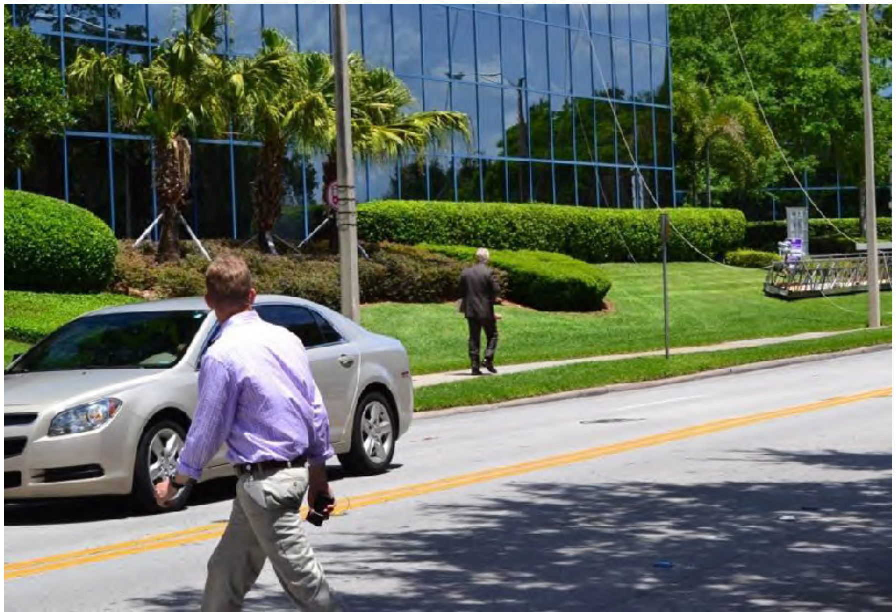


Portions of sidewalks along Robinson Street are not in good condition.

In some sections, particularly east of Mills Avenue, the sidewalks are interrupted by landscaping and utility poles, reducing the effective sidewalk width. Between Rosalind Avenue and Mills Avenue, tree roots from existing street trees are growing into the sidewalk creating uneven surfaces along the sidewalk. Some of the street trees also have canopies and branches protruding onto the sidewalk and roadway, creating a hazard for pedestrians and motorists.

Frequent mid-block crossings along Lake Eola Park.

Many pedestrians use the most natural path to/from their destination when crossing Robinson Street



Many pedestrians accept small gaps in traffic to dash across four-lanes.

Utility poles and other obstacles in the middle of the sidewalk create barriers to pedestrian access along the corridor.

Landscaping encroaches on the sidewalk in some places along the corridor.

Sidewalk are located next to narrow travel lanes.

Lack of pedestrian shade was a concern shared by community members.

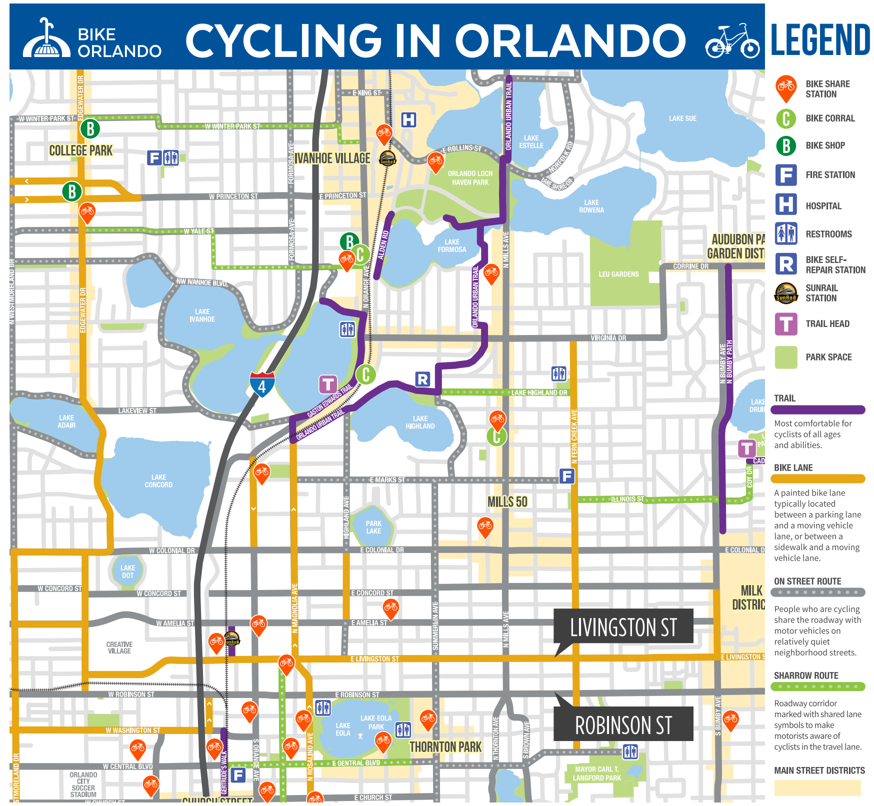
Bicyclists

Robinson Street is not part of the planned regional bike network. However, there are destinations that attract bicycling trips and there are bicyclists on the corridor.

Robinson Street is not part of the future bicycle network, based on the City's Primary Bicycle Routes Map (**Figure 28**). However, bicyclists were still observed to be traveling to and from the corridor. With the overall increased popularity of bicycling in Downtown and the introduction of bike share, bicycling to reach community destinations along the corridor will likely continue. There are 13 Juice bike share stations within a half-mile of Robinson Street including stations at the Orange County Courthouse, intersection of Rosalind Avenue and Washington Street, in Thornton Park, and at Lake Eola Park (station map shown in **Figure 28**). Juice is able to use GPS units on the bikes to map popular bicycling routes throughout the City. Along Robinson Street, the highest bike share activity is in the Central Business District and along Lake Eola Park (**Figure 29**).

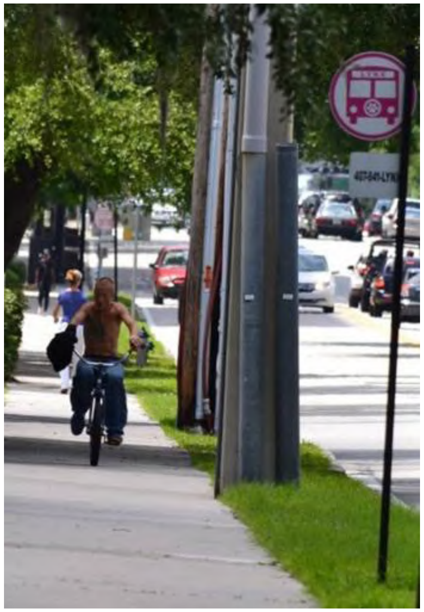
On average, there were two bicyclists observed at each intersection in the AM peak hour and one bicyclist observed per intersection in the PM peak hour. These counts only account for bicyclists traveling along the roadway. The Magnolia Avenue intersection has the highest observed on-street bicycle traffic with five and six bicyclists observed during the AM and PM peak hours, respectively. Most of the bicyclists tend to use the sidewalk for bicycle travel, many times bicycling against vehicular traffic resulting in a high potential for collisions at driveways.

Figure 28 | City of Orlando's Primary Bicycle Routes and Juice Bike Stations



The City of Orlando does not allow bicycling along the path around Lake Eola. The City has also designated Livingston Street as the primary east-west bicycling route through Downtown. There are bike lines on both sides of Livingston Street along the entire corridor. Livingston Street, posted at 25 mph through most of the study corridor, also has relatively lower speeds with its brick surface.

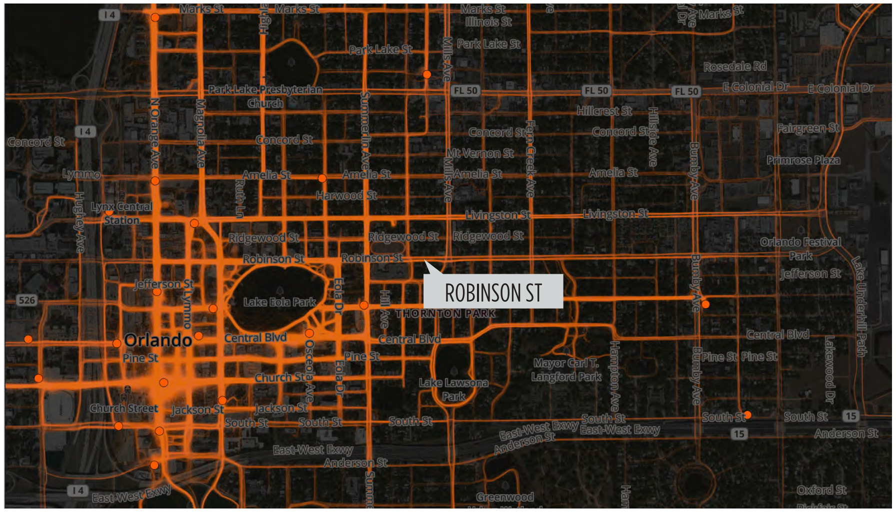
Many bicyclists ride on sidewalk creating undesired bike-vehicle conflict.



Many bicyclists prefer to ride on the sidewalk to avoid narrow lanes and high speeds in the roadway.

Bike lanes on Livingston Street.

Figure 29 | Juice Bike Share Usage Heat Map



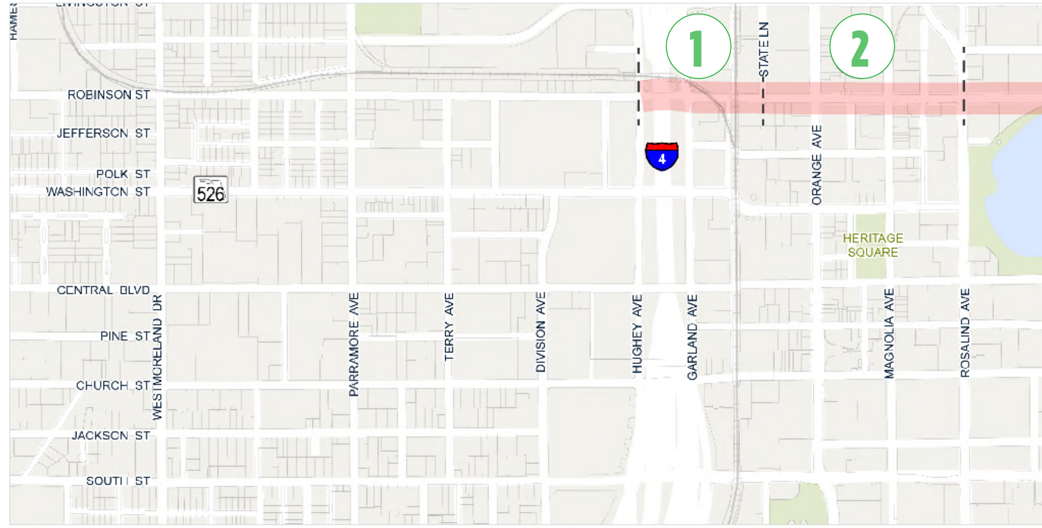
The brighter areas on the map indicate higher bike share usage. [Source: City of Orlando | Juice Bikes]

Motorists

Robinson Street generally accommodates vehicular traffic with very reliable travel times and good levels of service.

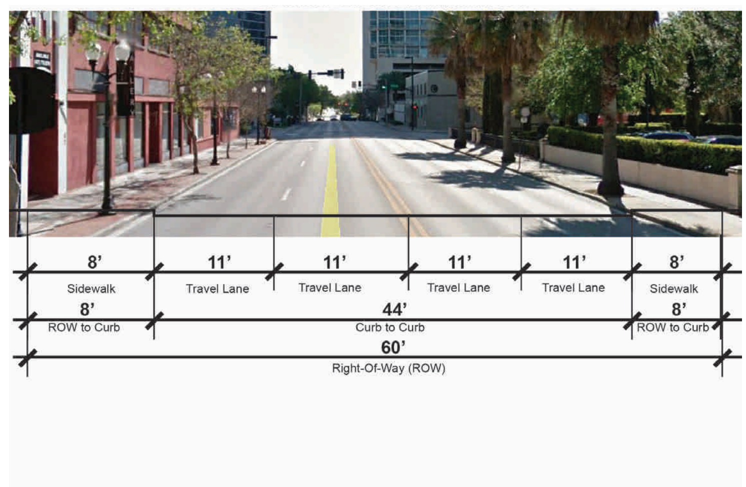
Robinson Street is characterized by 4-travel lanes along most of the corridor, with exclusive right- and left-turn lanes at some of its signalized intersections. Its typical cross section varies along the study area, having 11’ travel lanes between State Lane and Rosalind Avenue and 9.5’ and 10’ travel lanes along the rest of the corridor (shown in **Figure 30**). Robinson Street is classified as a minor arterial with a posted speed of 35 mph through most of the corridor and 30 mph between Garland Avenue and Rosalind Avenue.

Figure 30 | Typical Cross Sections

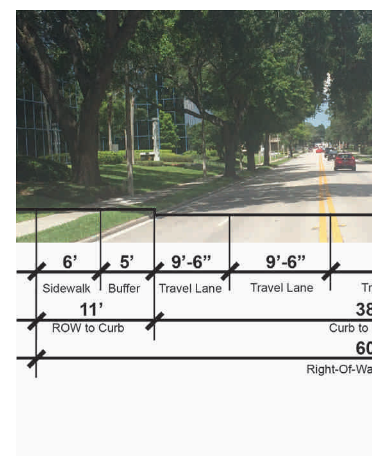


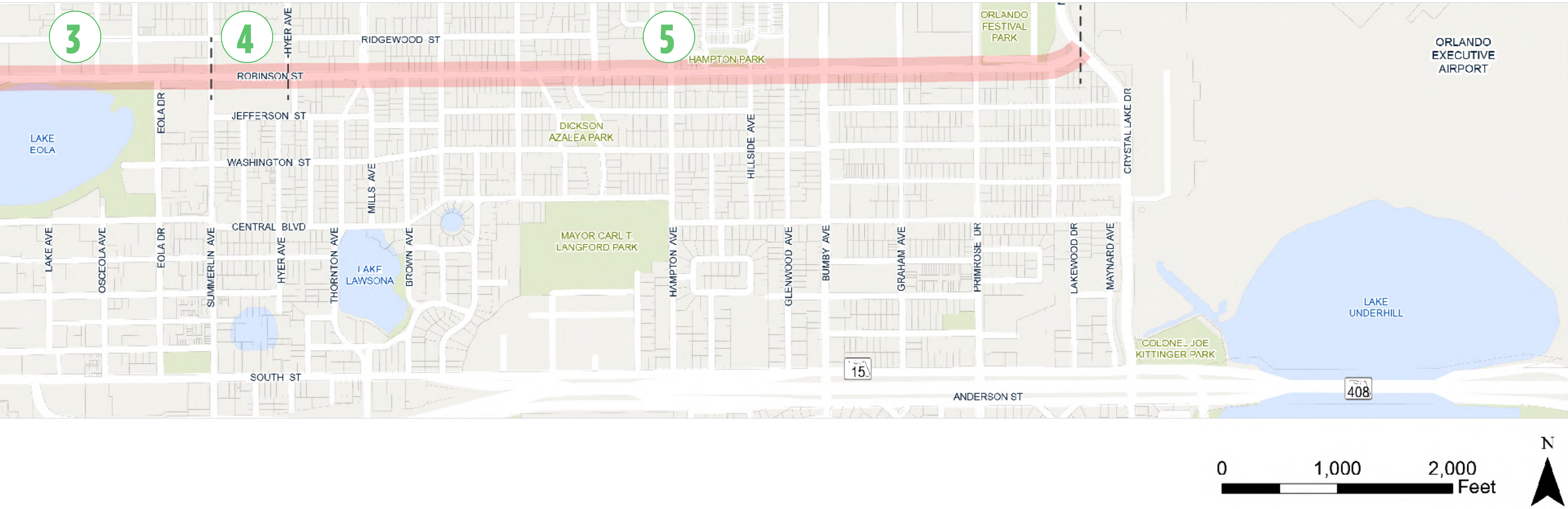
1 Hughey Avenue to State Lane

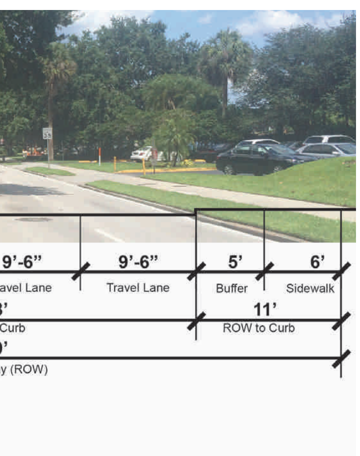
2 State Lane to Rosalind Avenue



3 Rosalind Avenue to Summerlin Avenue

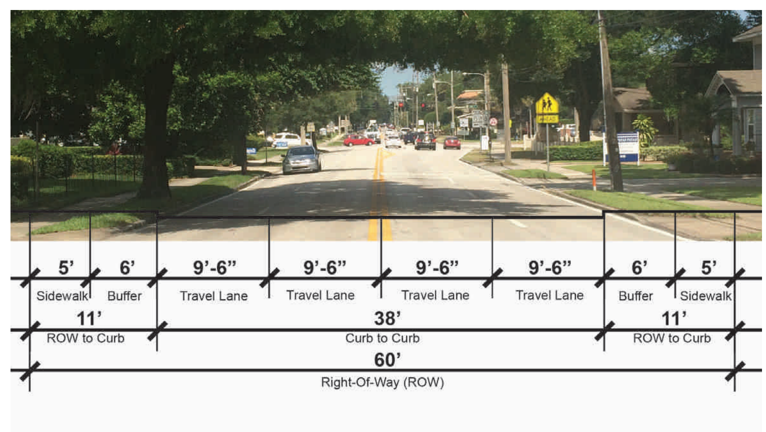






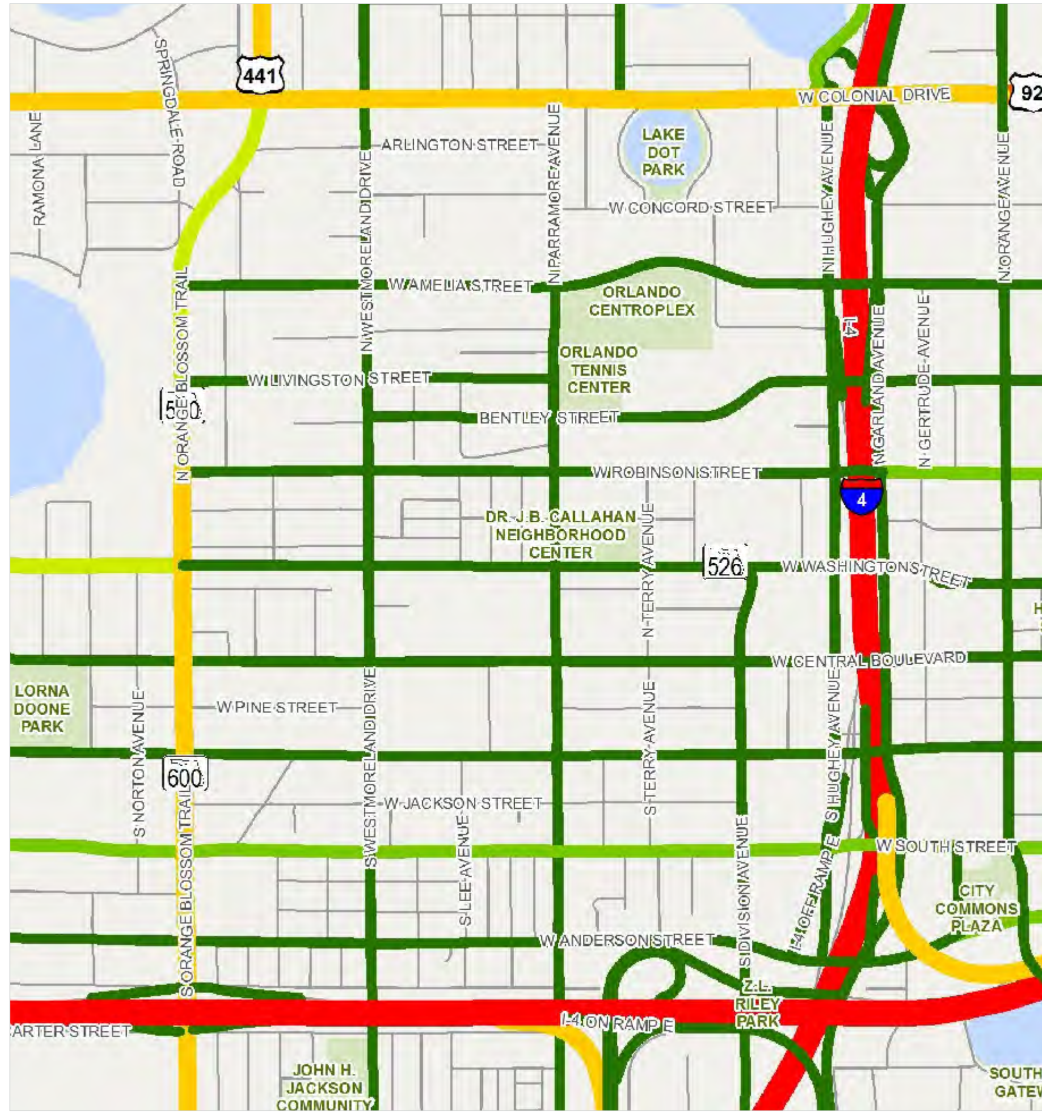
4 Summerlin Avenue to Hyer Avenue

5 Hyer Avenue to Maquire Avenue

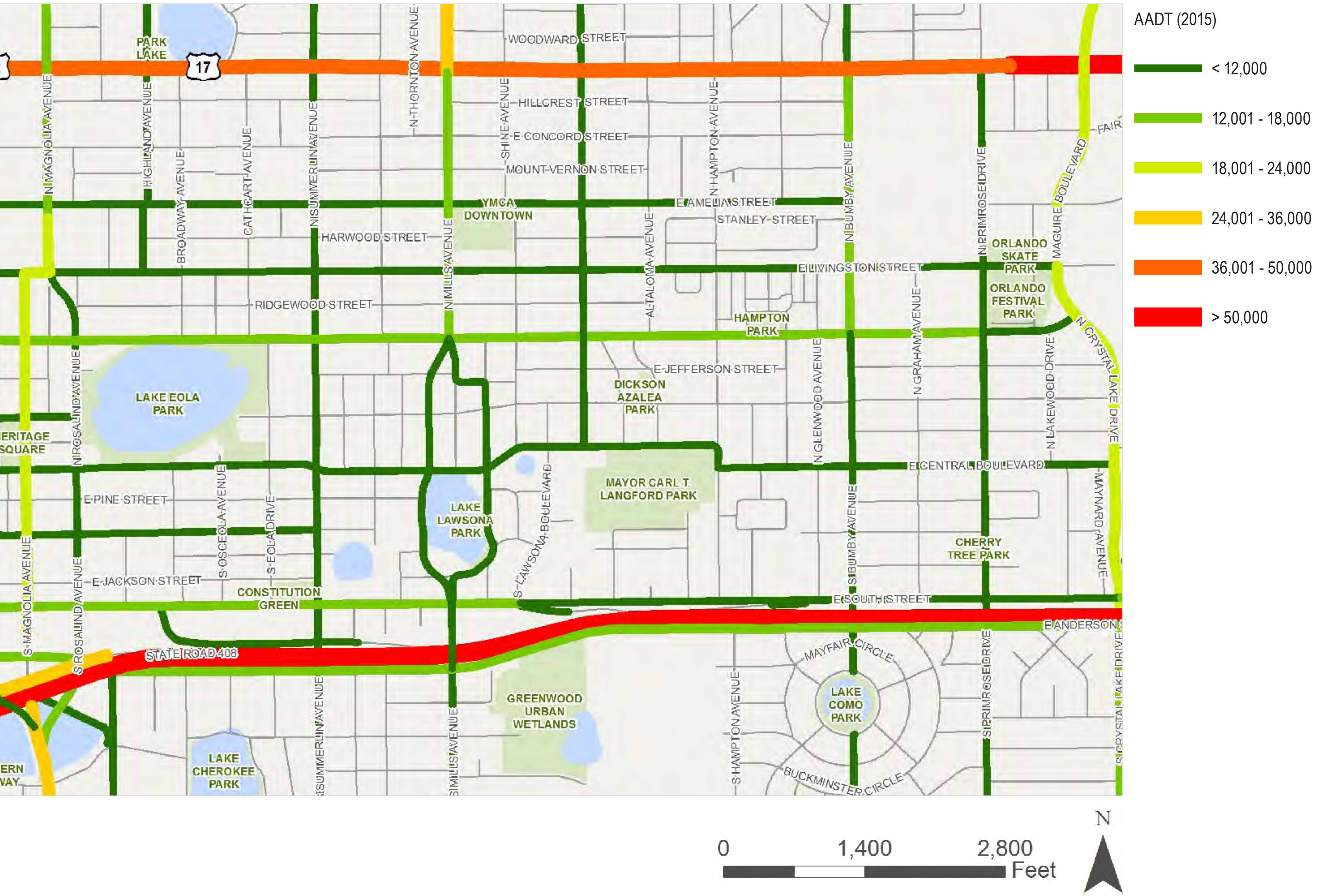


Robinson Street carries between 9,100 and 17,000 vehicles per day along the corridor, as shown in **Figure 31**. Traffic volumes along a roadway also indicate a roadway's function in the system. Robinson Street has less daily traffic than SR 50 (Colonial Drive), but more traffic than most local roadways.

Figure 31 | Average Annual Daily Traffic (AADT) Map



Source: Florida Department of Transportation RCI Database, 2015

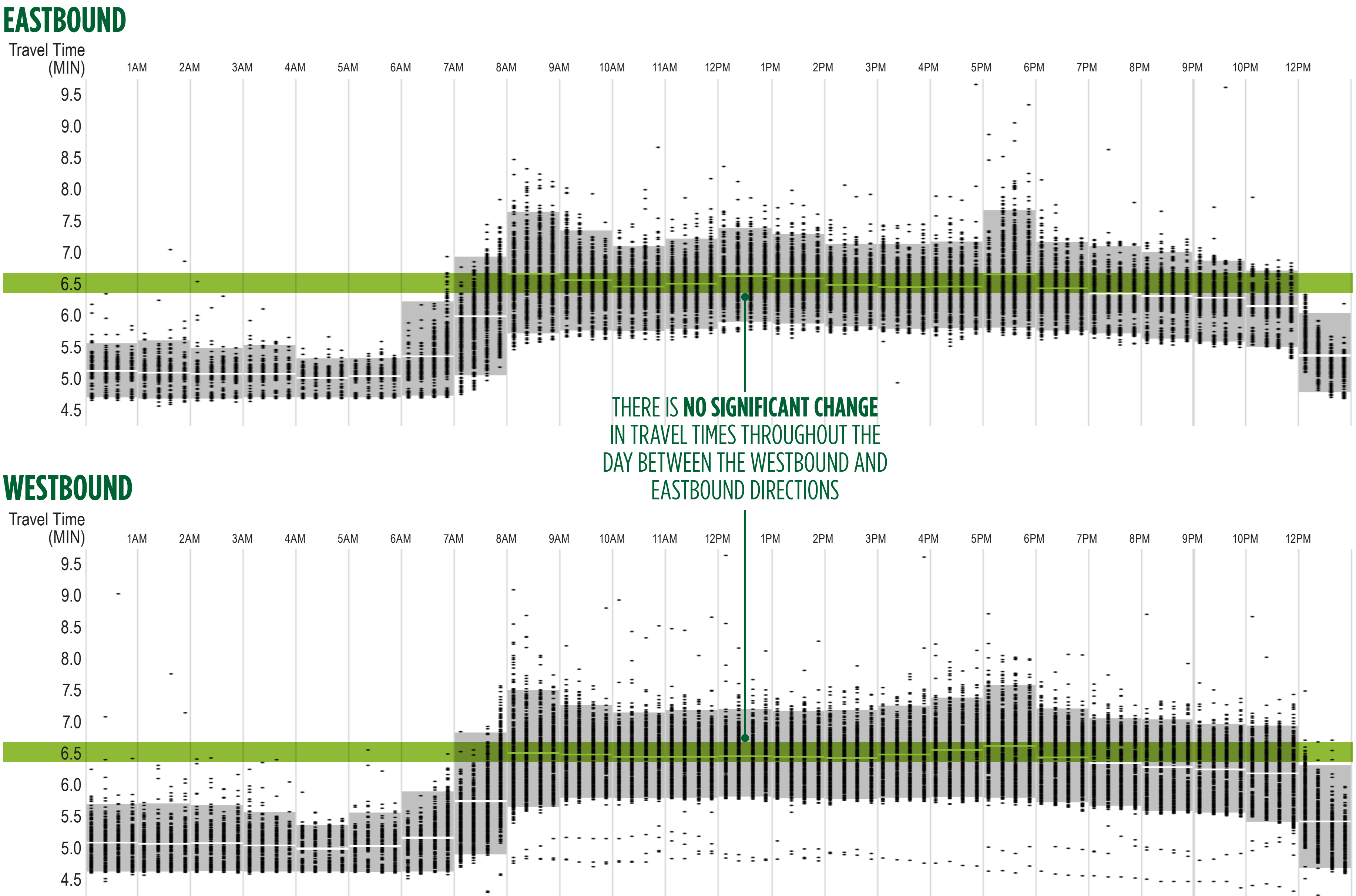

AADT (2015)
< 12,000
12,001 - 18,000
18,001 - 24,000
24,001 - 36,000
36,001 - 50,000
> 50,000
0
1,400
2,800
Feet
N
PARK LAKE
LAKE EOLA PARK
YMCA DOWNTOWN
ORLANDO SKATE PARK
ORLANDO FESTIVAL PARK
HAMPTON PARK
DICKSON AZALEA PARK
MAYOR CARL T. LANGFORD PARK
LAKE LAWSONA PARK
CHERRY TREE PARK
CONSTITUTION GREEN
GREENWOOD URBAN WETLANDS
LAKE COMO PARK
LAKE CHEROKEE PARK
STATE ROAD 408
WOODWARD STREET
HILLCREST STREET
E CONCORD STREET
MOUNT VERNON STREET
E AMELIA STREET
STANLEY STREET
HARWOOD STREET
E LIVINGSTON STREET
RIDGEWOOD STREET
E JEFFERSON STREET
E CENTRAL BOULEVARD
E PINE STREET
E JACKSON STREET
E SOUTH STREET
E ANDERSON S
MAYFAIR CIRCLE
BUCKMINSTER CIRCLE

Vehicular travel times along Robinson Street are very reliable, with average travel times over the course of a year ranging between 5 to 6.5 minutes for travel from one end of the corridor to the other (see **Figure 32).** The data compiled from HERE (formerly known as NAVTEQ) GPS data over an entire year (2014) shows that peak and off-peak travel times have minimal variability.

AM EASTBOUND 6.6 MINUTES
WESTBOUND 6.5 MINUTES

PM EASTBOUND 6.7 MINUTES
WESTBOUND 6.6 MINUTES

Figure 32 | Travel Time Charts

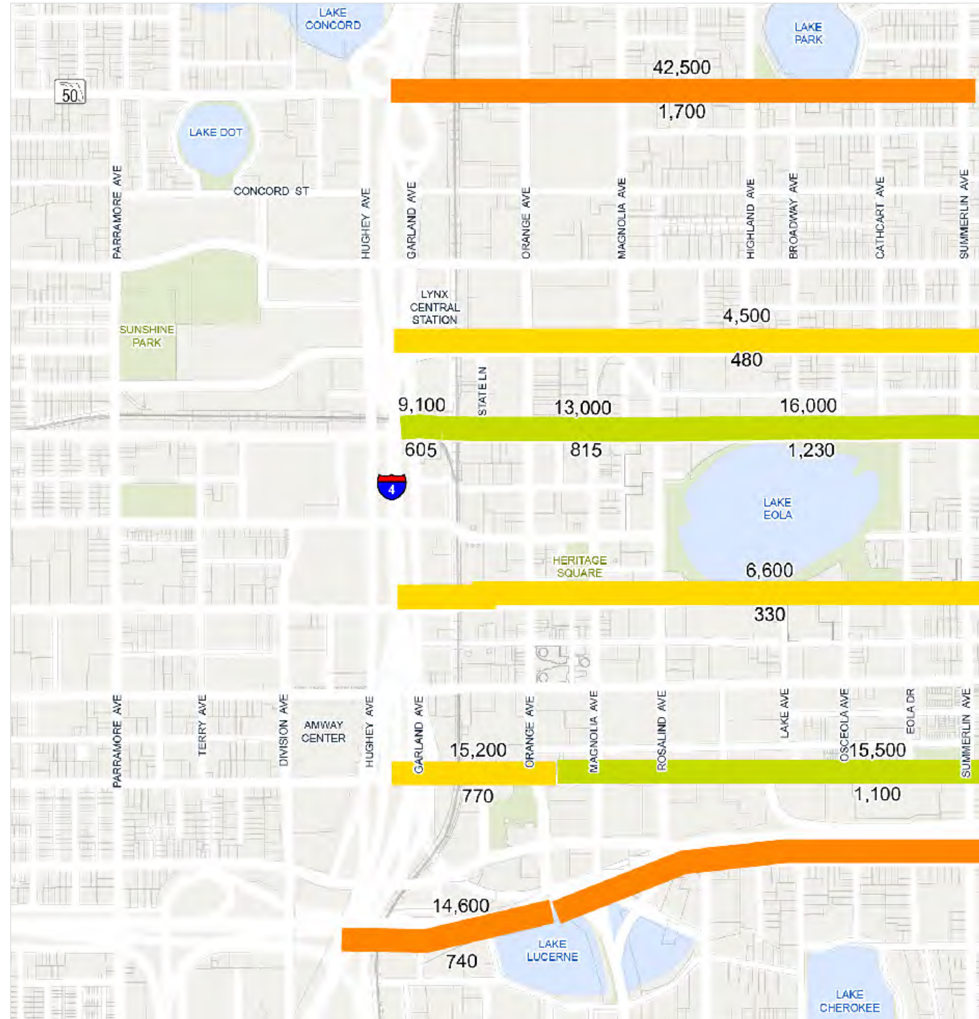


Source: HERE GPS data, 2015

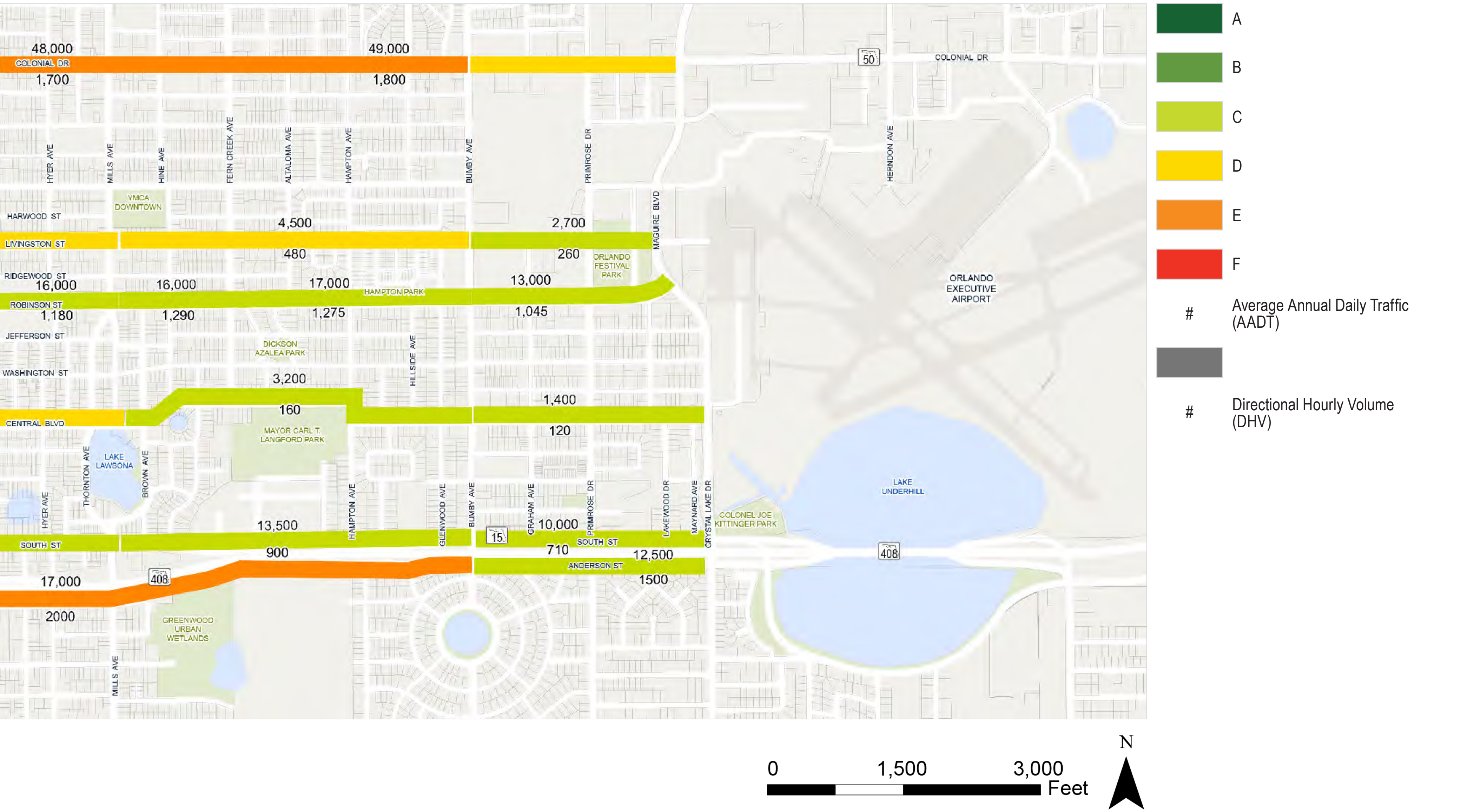
In order to determine the extent to which congestion affects mobility along the corridor, segment and intersection traffic volumes were collected. Segment traffic volumes were collected for a week at two locations (March 6 to March 12, 2015), 4-hour turning movement counts were collected at major intersections (March 11, 2015), and 72-hour vehicular class counts were collected on several locations along Robinson Street (March 7, 8, and 10, 2015). Additional 72-hour counts were also collected along parallel and intersecting roadways (Livingston Street, Central Boulevard, South Street, Anderson Street, Rosalind Avenue, and Maguire Avenue) for 72 hours during this time, to better understand the potential influence of event and peak period traffic on these area streets. These new count data, combined with existing counts from FDOT count stations informed the corridor and intersection vehicular traffic analysis. Detailed count information can be found in the **Appendix**.

Traffic volumes east of Rosalind Avenue operate at a generalized segment Level of Service (LOS) C volume for 90 minutes during the AM peak and two hours during the PM peak (**Figure 33**). Traffic volumes west of Bumby Avenue operate at a generalized segment LOS B volume for 90 minutes during the AM peak and three hours during the PM peak. These volumes are far from the City of Orlando's acceptable LOS threshold of LOS E. **Figure 33** compares Robinson Street's corridor capacity and LOS to parallel roadways serving an east-west function in Downtown Orlando. Robinson Street generally performs well compared to its parallel counterparts, operating at a corridor LOS C. Detailed existing volumes and LOS analysis can be found in **Appendix G**.

Figure 33 | Corridor Capacity and Level of Service



Source: Florida Department of Transportation RCI Database, 2015 and ARTPLAN Analysis


48,000
COLONIAL DR
1,700
49,000
1,800
50
COLONIAL DR
HYER AVE
MILLS AVE
HINE AVE
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
HERNDON AVE
MAGUIRE BLVD
YMCA DOWNTOWN
HARWOOD ST
4,500
2,700
LIVINGSTON ST
480
260
ORLANDO FESTIVAL PARK
RIDGEWOOD ST
16,000
16,000
17,000
HAMPTON PARK
13,000
ROBINSON ST
1,180
1,290
1,275
1,045
ORLANDO EXECUTIVE AIRPORT
JEFFERSON ST
DICKSON AZALEA PARK
HILLSIDE AVE
WASHINGTON ST
3,200
1,400
160
CENTRAL BLVD
MAYOR CARL T. LANGFORD PARK
120
LAKE LAWSONA
THORNTON AVE
BROWN AVE
LAKE UNDERHILL
HYER AVE
HAMPTON AVE
GLENWOOD AVE
BUMBY AVE
GRAHAM AVE
PRIMROSE DR
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
COLONEL JOE KITTINGER PARK
13,500
10,000
15
SOUTH ST
SOUTH ST
900
710
12,500
408
ANDERSON ST
408
17,000
1500
2000
GREENWOOD URBAN WETLANDS
MILLS AVE
A
B
C
D
E
F
#
Average Annual Daily Traffic (AADT)
#
Directional Hourly Volume (DHV)
0
1,500
3,000
Feet
N

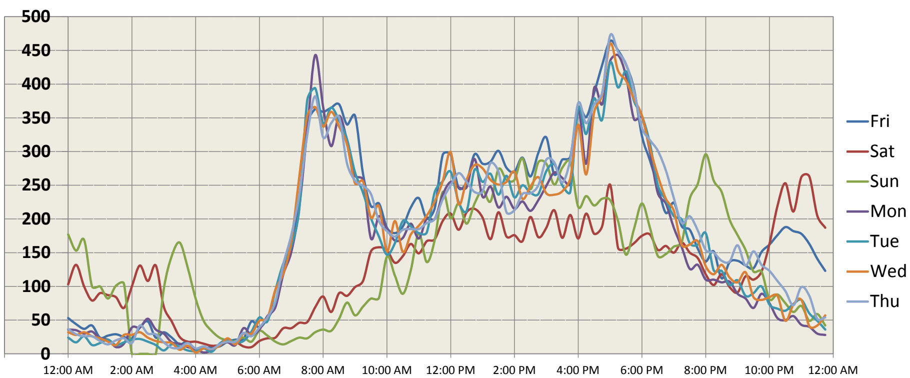
Robinson Street experiences very pronounced peaking of traffic volumes during the morning and evening peak times with weekdays showing very similar volumes during the AM and PM peak periods (**Figure 34**). Downtown event traffic was also observed during the traffic volume count period to determine its impact on Robinson Street. Four major events were held on Saturday, March 6, 2015 (a major concert at Amway Center, a ballet at the Dr, Phillips Performing Arts Center (DPAC), Chili Cook-off at Festival Park, and Orlando Bike Week) and four major events were held on Sunday, March 7, 2015 (Orlando Magic game at Amway Center, a ballet at DPAC, the inaugural Orlando City Soccer game at the Citrus Bowl, and Orlando Bike Week). The highest volume peak during the weekend occurred on Sunday at 8:00 PM when the soccer game let out. The volume at this time matches the weekday mid-day peak.

Traffic counts were also collected at intersections to understand intersection operations. The data shows that although corridor level of service is considered to be at acceptable levels, congestion occurring in the corridor is primarily due to the delay at the signalized intersections. The data shows that some signalized intersections on Robinson Street without exclusive right- or left-turn lanes, or having very short exclusive turn lane storage bays have relatively higher congestion levels. The current intersection LOS for the Robinson Street signalized intersections are between B and E, and segment LOS is between A to C for the majority of the corridor (see **Figure 36**). Shorter segments on either end of the corridor have closer signal spacing relating to a lower segment LOS. Detailed intersection operations analysis results can be found in **Appendix H**.

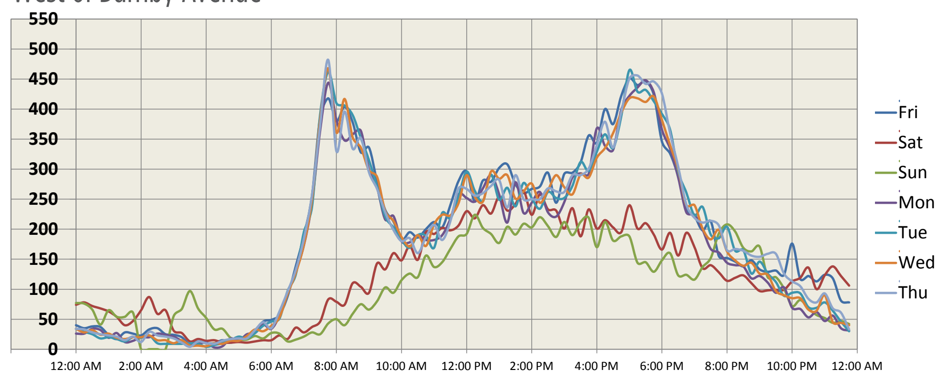
Further, delays at intersection are observed to be caused by the lack of exclusive turn lanes, causing left turn traffic to block the through lane. To better understand this issue, the study team collected additional traffic data showing lane utilization at the Mills Avenue intersection on May 5, 2015. As seen in **Figure 35**, there is an imbalance in the inner and outer lane utilization approaching the intersection (approximately 75/25 split in the PM peak hour). This shows that the intersection approach may be operating as having a de facto through lane and an exclusive right-turn lane. In addition, more than 75% of the left-turn crashes reported along the corridor occurred at intersections that do not have exclusive left-turn lanes.

Figure 34 | Pronounced Peaking of Traffic Volumes

East of Rosalind Avenue

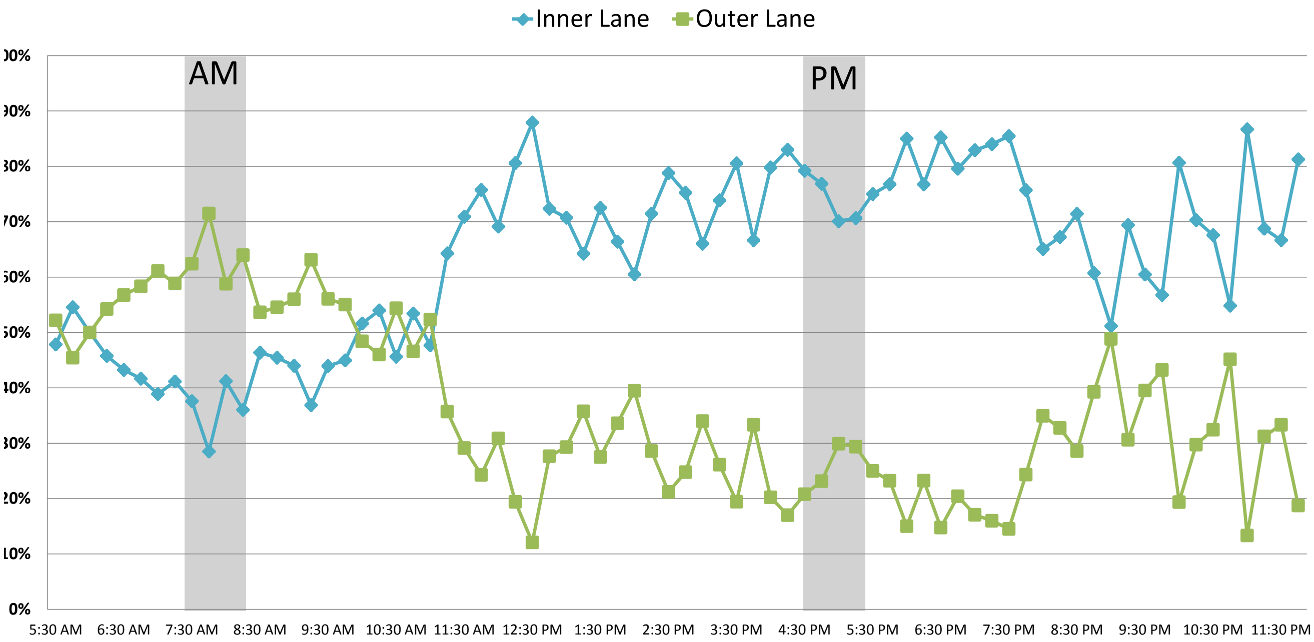


West of Bumby Avenue



Source: Tube Counts, March 6 to March 12, 2015

Figure 35 | East of Mills - Westbound Lane Utilization

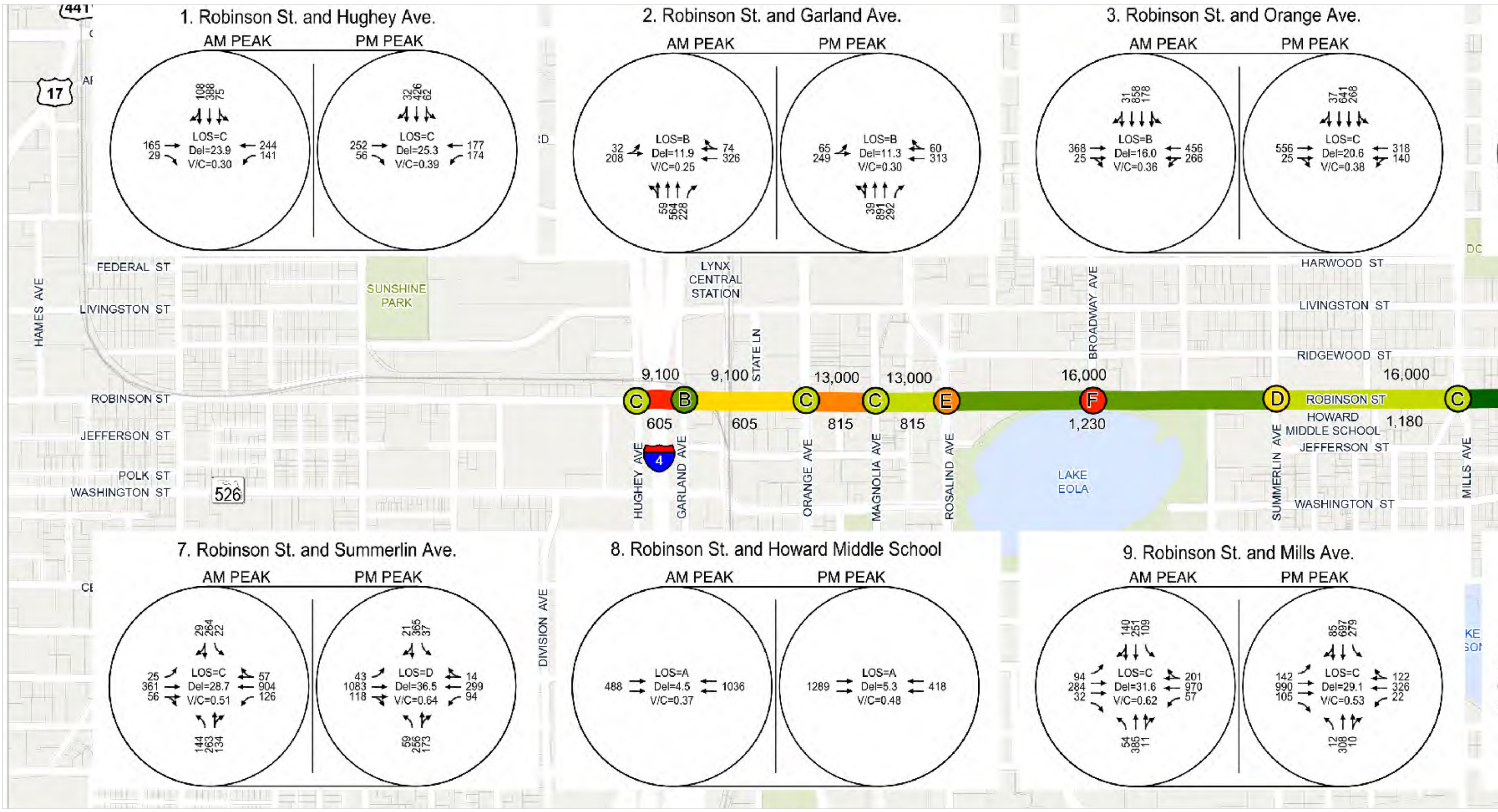


Source: Tube Counts, May 5, 2015

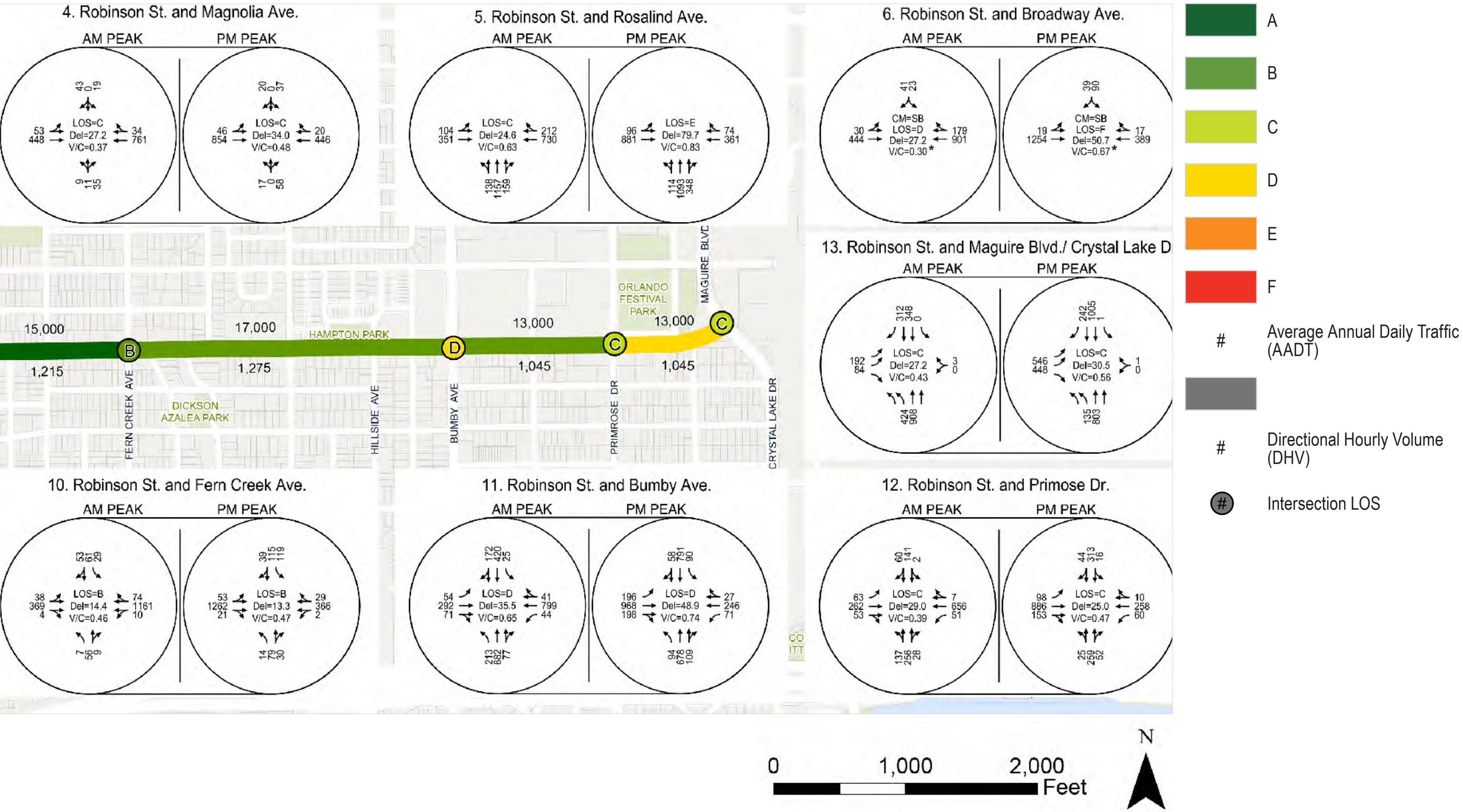
Lane utilization east of Mills Avenue.

Intersection queuing along Robinson Street caused by left-turning vehicles at Broadway Avenue.

Figure 36 | Intersection Delay and Segment PM Peak LOS Map



Source: Florida Department of Transportation RCI Database, 2015; ARTPLAN analysis, Synchro Analysis

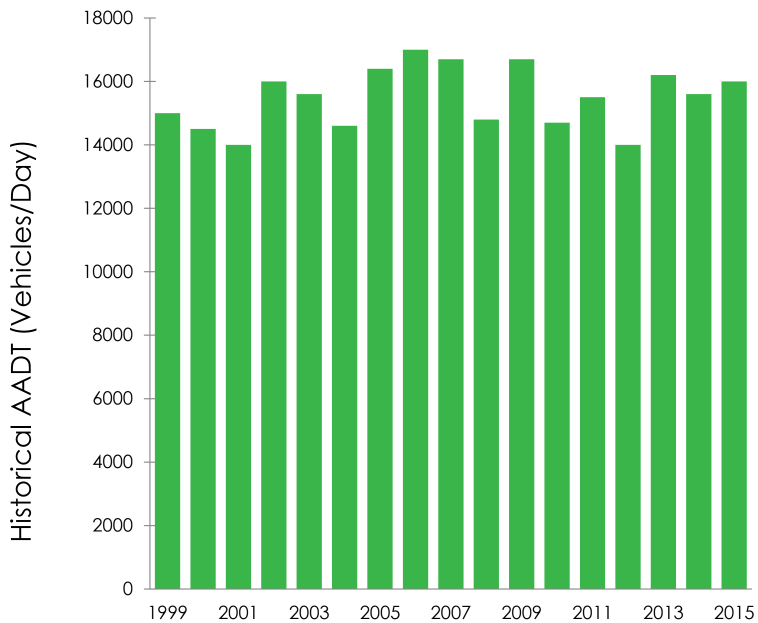

4. Robinson St. and Magnolia Ave.
5. Robinson St. and Rosalind Ave.
6. Robinson St. and Broadway Ave.
13. Robinson St. and Maguire Blvd./ Crystal Lake D
10. Robinson St. and Fern Creek Ave.
11. Robinson St. and Bumby Ave.
12. Robinson St. and Primose Dr.
AM PEAK
PM PEAK
15,000
17,000
13,000
13,000
1,215
1,275
1,045
1,045
HAMPTON PARK
ORLANDO FESTIVAL PARK
DICKSON AZALEA PARK
FERN CREEK AVE
HILLSIDE AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
CRYSTAL LAKE DR
A
B
C
D
E
F
Average Annual Daily Traffic (AADT)
Directional Hourly Volume (DHV)
Intersection LOS
0
1,000
2,000
Feet
N

Volumes along Robinson Street have not changed much in the past.

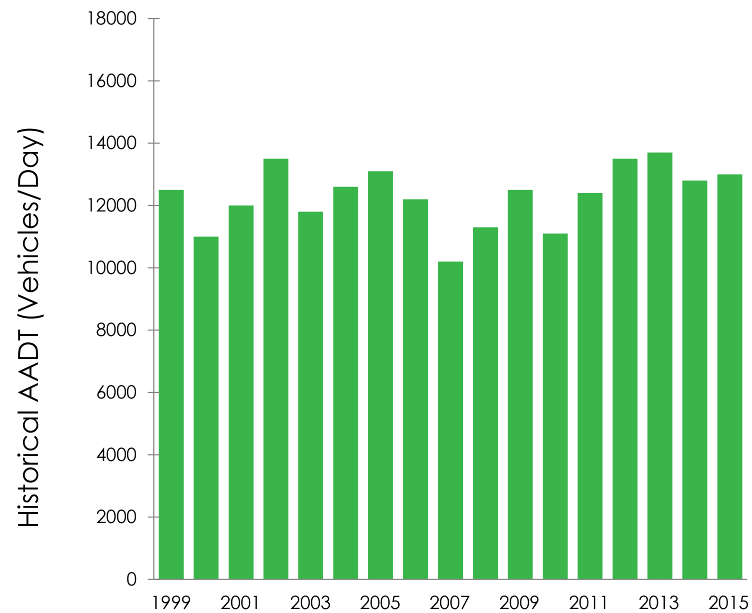
As seen in the historical AADT shown in **Figure 37** (detailed tables located in **Appendix I**), traffic volumes along Robinson Street in the past 15 years have been sporadic and decreasing over time in some areas. This has happened during a time when Downtown Orlando's population grew by 13%. This demonstrates that, although Downtown Orlando's population is projected for continued growth, the traffic along the corridor may not respond in a similar manner.

Similar data was also analyzed for the parallel corridors of SR 50 and South Street (shown in **Figure 38**). For SR 50, a clear trend of decreasing traffic volumes can be observed in the last 10 years. Between 2000 and 2013, traffic dropped by almost 10,000 vehicles per day. Again, this occurred when Downtown experienced a population growth of more than 10%, further demonstrating that population increase may not lend to a proportional increase in traffic on Downtown streets. Traffic volumes along South Street in the same time period showed a decreasing and sporadic trend.

Figure 37 | Historical AADT along Robinson Street



EAST OF ROSALIND AVENUE



EAST OF BUMBY AVENUE

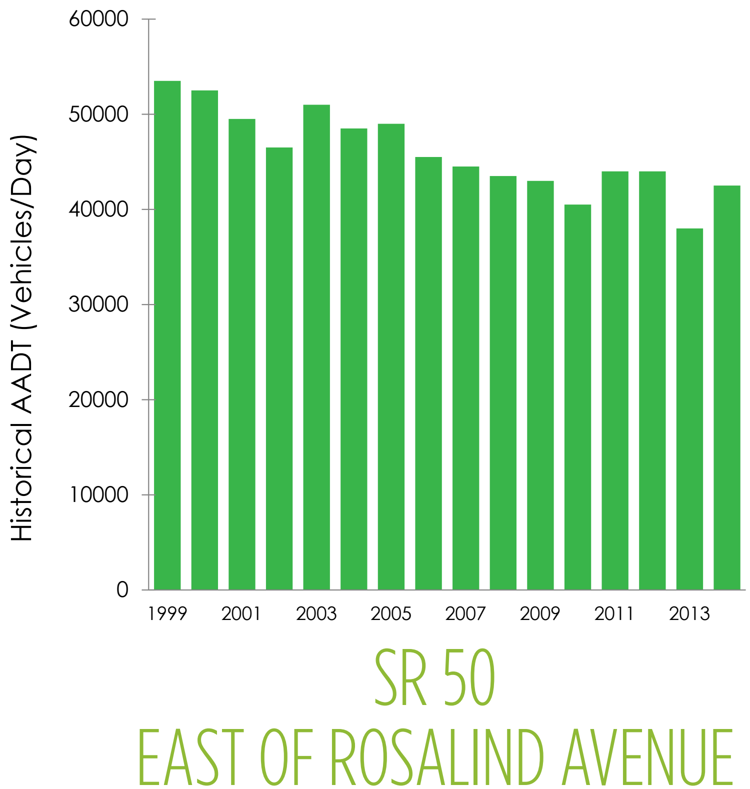
Source: FDOT Florida Traffic Information, 2014; Tube Counts, 2015

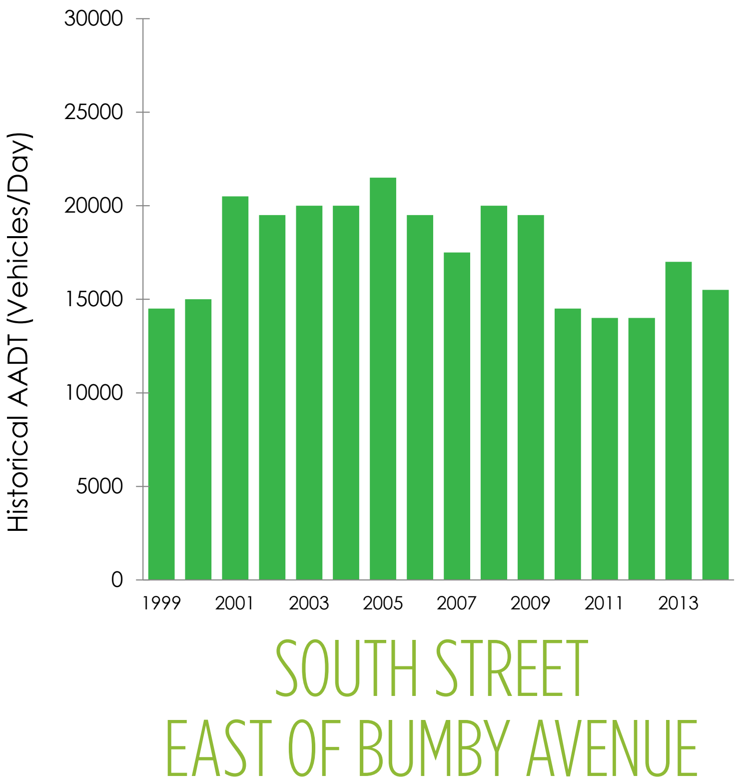
Many potential factors may have contributed to this stable traffic volume trend, including changes in Downtown Orlando's land use mix (more residential uses) resulting in a change in travel pattern and travel modes, improvements along SR 408 and I-4 encouraging regional traffic to use limited access roadways, and increase in multimodal transportation infrastructure.

There remains a strong desire among stakeholders to maintain an acceptable level of vehicular mobility.

Robinson Street is the eastern gateway to Downtown Orlando. The corridor currently serves and will continue to serve multimodal trips for many local residents and workers. Stakeholders expressed that any potential improvements to Robinson Street should consider the safe and efficient movement of vehicular traffic in and out of Downtown.

Figure 38 | Historical AADT along Streets Parallel to Robinson Street





Areas with maintenance and drainage issues present challenges to east-west mobility.

Stakeholder and FDOT input along with field review suggests that there are a couple areas along the corridor with maintenance and drainage issues. Asphalt rehabilitation, curb reconstruction, and landscape maintenance along the corridor are needed to facilitate proper drainage flow, fix deteriorating concrete, and accommodate safe east-west travel. Specifically, the intersection of Robinson Street and Palmetto Avenue and section of roadway between Rosearden Drive and Hampton Avenue (eastbound side) were called out as retaining standing water in the vehicle through lanes after a short rainfall. Drainage analysis at these locations is recommended.

Outside edge of travel lane deteriorating near Lake Eola.

Tree roots cause curb line to shift and sidewalks to buckle at some locations.

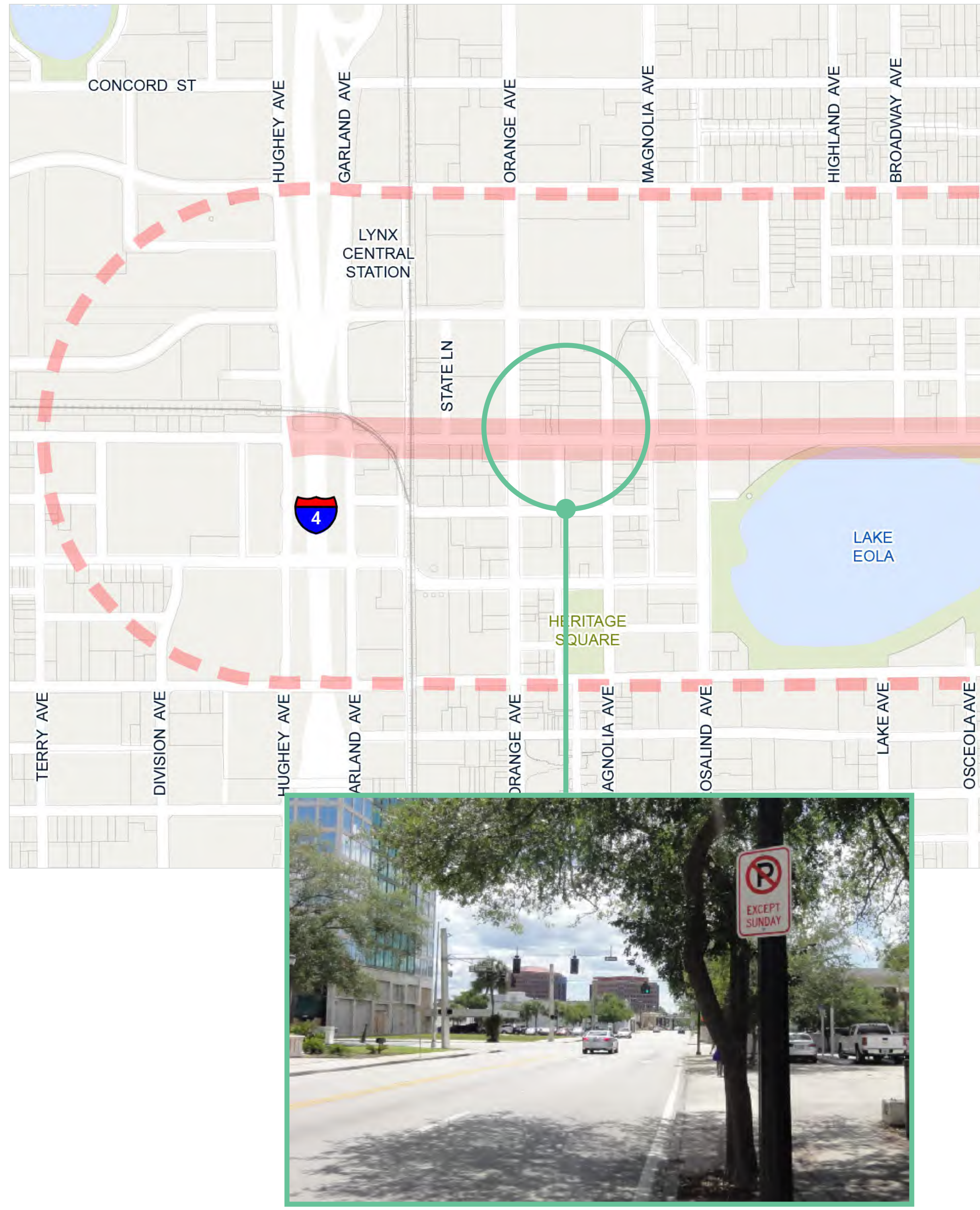
Driveway pavement deteriorating near Lake Eola.

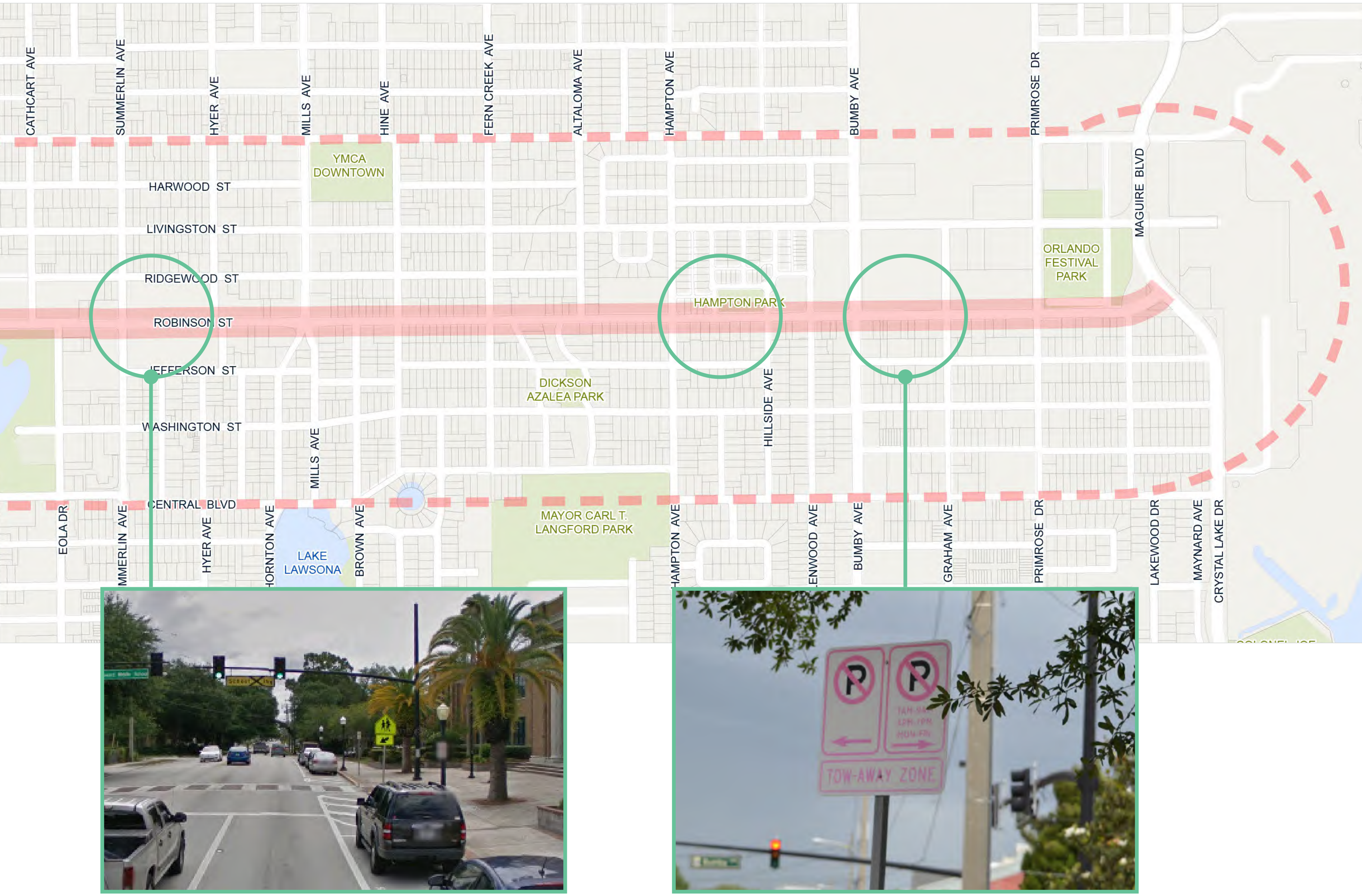
High asphalt restricts flow at some drainage inlets along the corridor.

On-street parking needs vary by location along the corridor.

As shown in **Figure 39**, there are four segments along Robinson Street where some type of on-street parking exists. There is time-restricted on-street parking in front of St. James Catholic Cathedral between Orange Avenue and Magnolia Avenue, near First Unitarian Church of Orlando, and in the Milk District between Bumby Avenue and Graham Avenue. Segments of exclusive lane parking exist in front of Howard Middle School and in the Hampton Park area. Although parking needs are accommodated on-site for most of the corridor, stakeholders would like to see additional on-street parking and improved retail loading/unloading areas in the Milk District. Stakeholders also shared that the small office business community between Hyer Avenue and Fern Creek Avenue have customer parking needs that can be addressed by additional on-street parking.

Figure 39 | On-Street Parking Locations and Photos




CATHCART AVE
SUMMERLIN AVE
HYER AVE
MILLS AVE
HINE AVE
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
YMCA DOWNTOWN
HARWOOD ST
LIVINGSTON ST
RIDGEWOOD ST
ROBINSON ST
JEFFERSON ST
WASHINGTON ST
ORLANDO FESTIVAL PARK
HAMPTON PARK
DICKSON AZALEA PARK
HILLSIDE AVE
MILLS AVE
CENTRAL BLVD
EOLA DR
MMERLIN AVE
HYER AVE
HORNTON AVE
LAKE LAWSONA
BROWN AVE
MAYOR CARL T. LANGFORD PARK
HAMPTON AVE
LENWOOD AVE
BUMBY AVE
GRAHAM AVE
PRIMROSE DR
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
TOW-AWAY ZONE

Freight traffic is not significant along the Corridor, except for those bound for T.G. Lee.

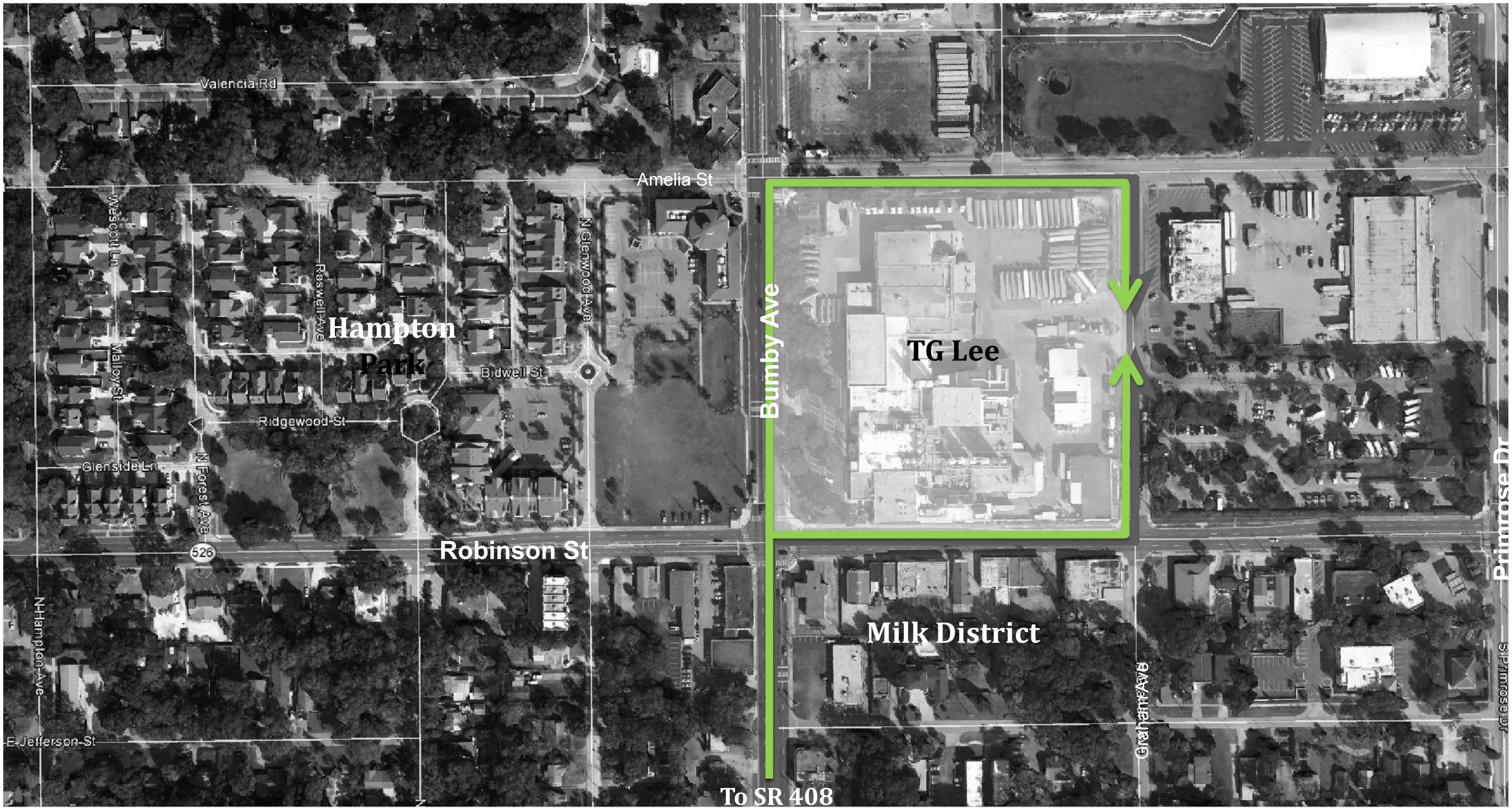
Overall, freight traffic does not comprise a large portion of the vehicular volumes along Robinson. Collected data shows that "heavy vehicle traffic" makes up around 2.5-4% of the total traffic on a given day. Based on observations, these are mostly local freight deliveries to businesses, restaurants, and shops.

Freight traffic also serves the T.G. Lee milk factory on the east end of the corridor. Based on observation and coordination with T.G. Lee representatives, about 50 to 60 trucks enter and exit their facility daily with majority of these leaving the factory between 1:00-4:00 AM and returning at various times throughout the day. According to T.G. Lee representatives, their truck routes do not travel along Robinson Street for more than one block. Most T.G. Lee trucks cross Robinson Street at Bumby Avenue and enter the T.G. Lee property via Amelia Street and Graham Avenue (shown in **Figure 40**). A few stakeholders also expressed concerns regarding deliveries blocking the outside travel lane near the Milk District and near Eola Drive (loading at Panera Bread).

Truck unloading on Robinson Street between Bumby Avenue and Graham Avenue.

T.G. Lee truck turning right onto Robinson Street.

Figure 40 | T.G. Lee Truck Route and Freight Truck Unloading



Transit

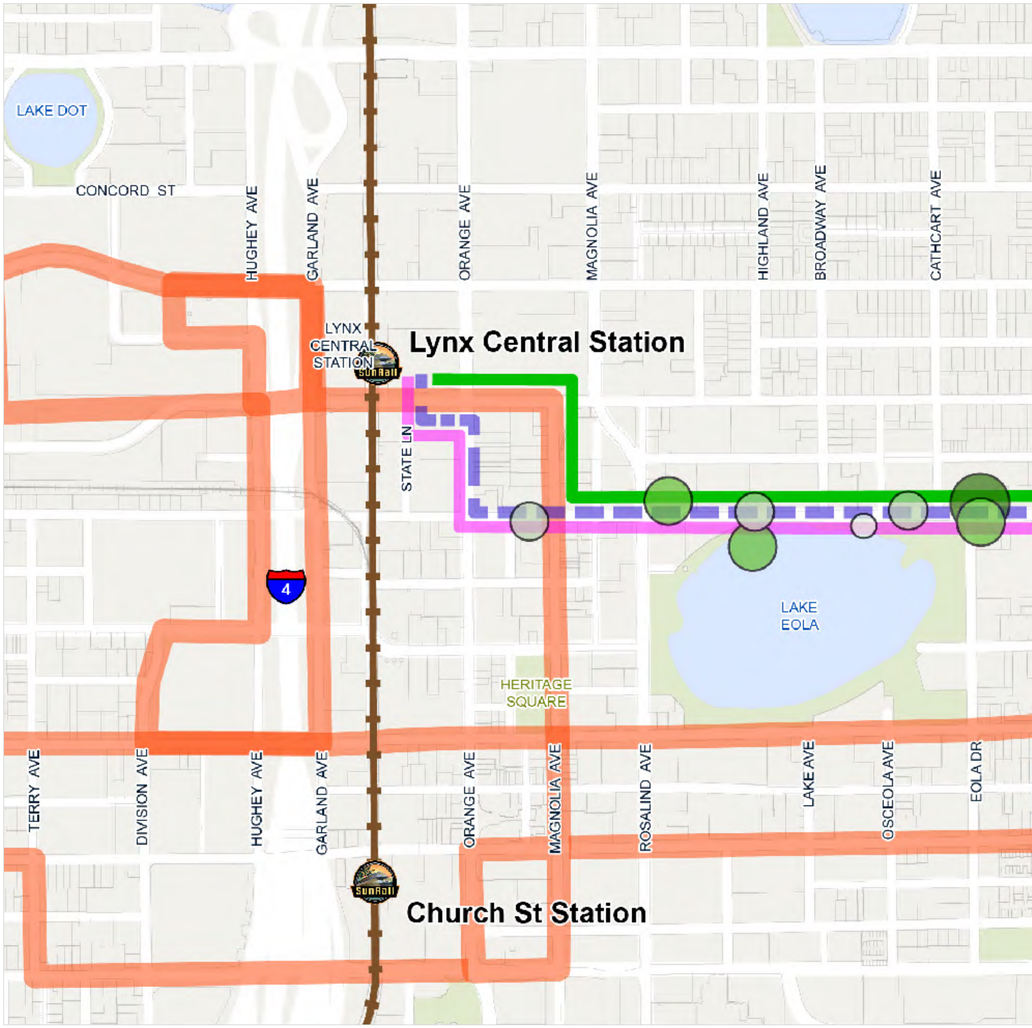
Robinson Street is part of the transit network.

LYNX Link 51 connects LYNX Central Station (LCS) to the Orlando International Airport and has local stops along Robinson Street between Orange Avenue and Primrose Drive. Link 125 connects LCS to the West Oaks Mall and has local stops along Robinson Street between Magnolia Avenue and Mills Avenue. Link 104 connects LCS to UCF and travels almost the entire length of the corridor; however, it is an express service and does not stop within the study area.

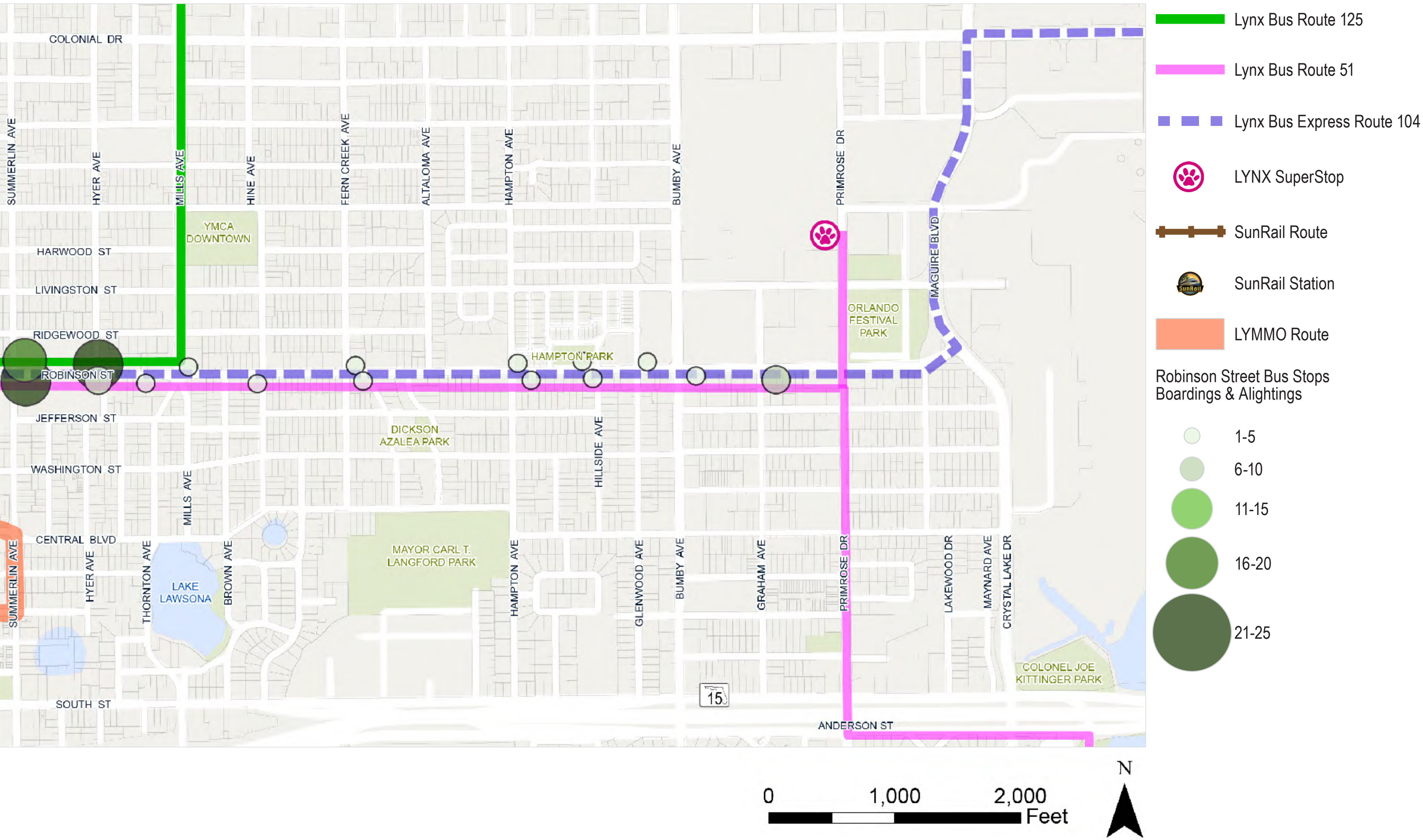
Link 125 and Link 51 combined make up about 4% of the system's ridership and are considered average performing routes relative to the rest of the system, ranking 9th and 31st in ridership, respectively. The highest boarding and alighting of passengers are observed between Magnolia Avenue and Mills Avenue. **Figure 41** shows the transit network in the study area and daily boarding and alighting activity along the corridor's three routes.

Most transit stops along the corridor have bus stop poles with a concrete loading pad. There are two shelters with benches near the Howard Middle School and a LYNX SuperStop at the Colonial Plaza Shopping Center, just north of the corridor.

Figure 41 | Transit Network and Activity Map



Source: LYNX Automatic Passenger Count (APC) data, 2014

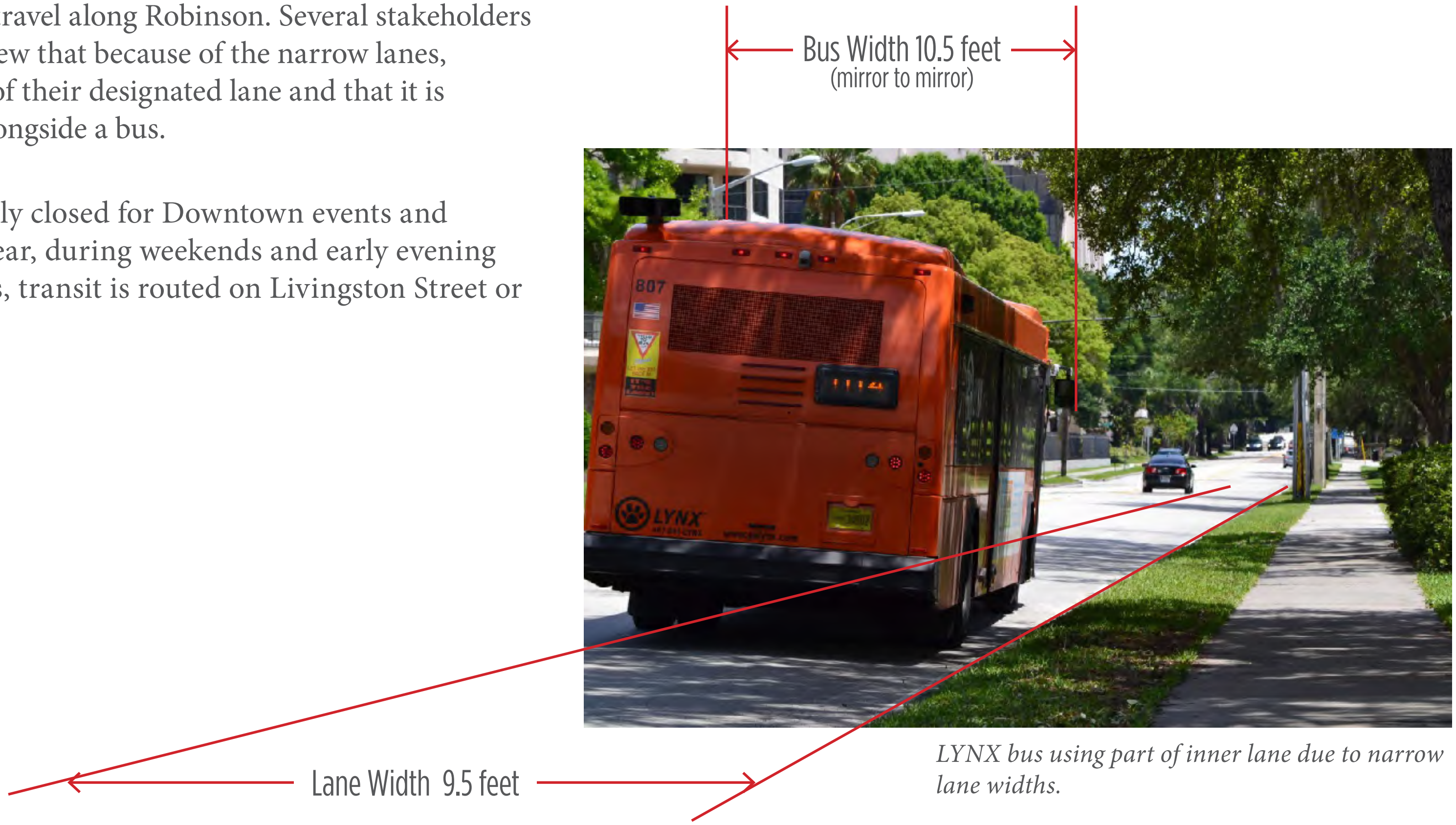


Lynx Bus Route 125
Lynx Bus Route 51
Lynx Bus Express Route 104
LYNX SuperStop
SunRail Route
SunRail Station
LYMMO Route
Robinson Street Bus Stops Boardings & Alightings
1-5
6-10
11-15
16-20
21-25
COLONIAL DR
SUMMERLIN AVE
HYER AVE
MILLS AVE
HINE AVE
FERN CREEK AVE
ALTALOMA AVE
HAMPTON AVE
BUMBY AVE
PRIMROSE DR
MAGUIRE BLVD
YMCA DOWNTOWN
HARWOOD ST
LIVINGSTON ST
RIDGEWOOD ST
ROBINSON ST
ORLANDO FESTIVAL PARK
HAMPTON PARK
JEFFERSON ST
DICKSON AZALEA PARK
HILLSIDE AVE
WASHINGTON ST
CENTRAL BLVD
THORNTON AVE
BROWN AVE
LAKE LAWSONA
MAYOR CARL T. LANGFORD PARK
GLENWOOD AVE
GRAHAM AVE
LAKEWOOD DR
MAYNARD AVE
CRYSTAL LAKE DR
COLONEL JOE KITTINGER PARK
SOUTH ST
ANDERSON ST
15
0
1,000
2,000
Feet
N

Substandard lane widths pose a challenge to transit operations.

As observed and understood through input from LYNX, a standard LYNX bus is 10.5-feet wide (mirror edge to mirror edge). However, there are several locations along the corridor with 9.5-foot lanes. Because of this, LYNX buses collide with trees and other vehicles, resulting in damaged side mirrors on LYNX buses. In the last three years (2012 to 2015), there were 33 cases of buses colliding with stationery objects, street trees, and other vehicles and losing their mirrors on the buses that travel along Robinson. Several stakeholders noted during the field review that because of the narrow lanes, buses often travel outside of their designated lane and that it is uncomfortable to travel alongside a bus.

Robinson Street is regularly closed for Downtown events and parades throughout the year, during weekends and early evening hours. During these times, transit is routed on Livingston Street or Colonial Drive.



LYNX bus using part of inner lane due to narrow lane widths.

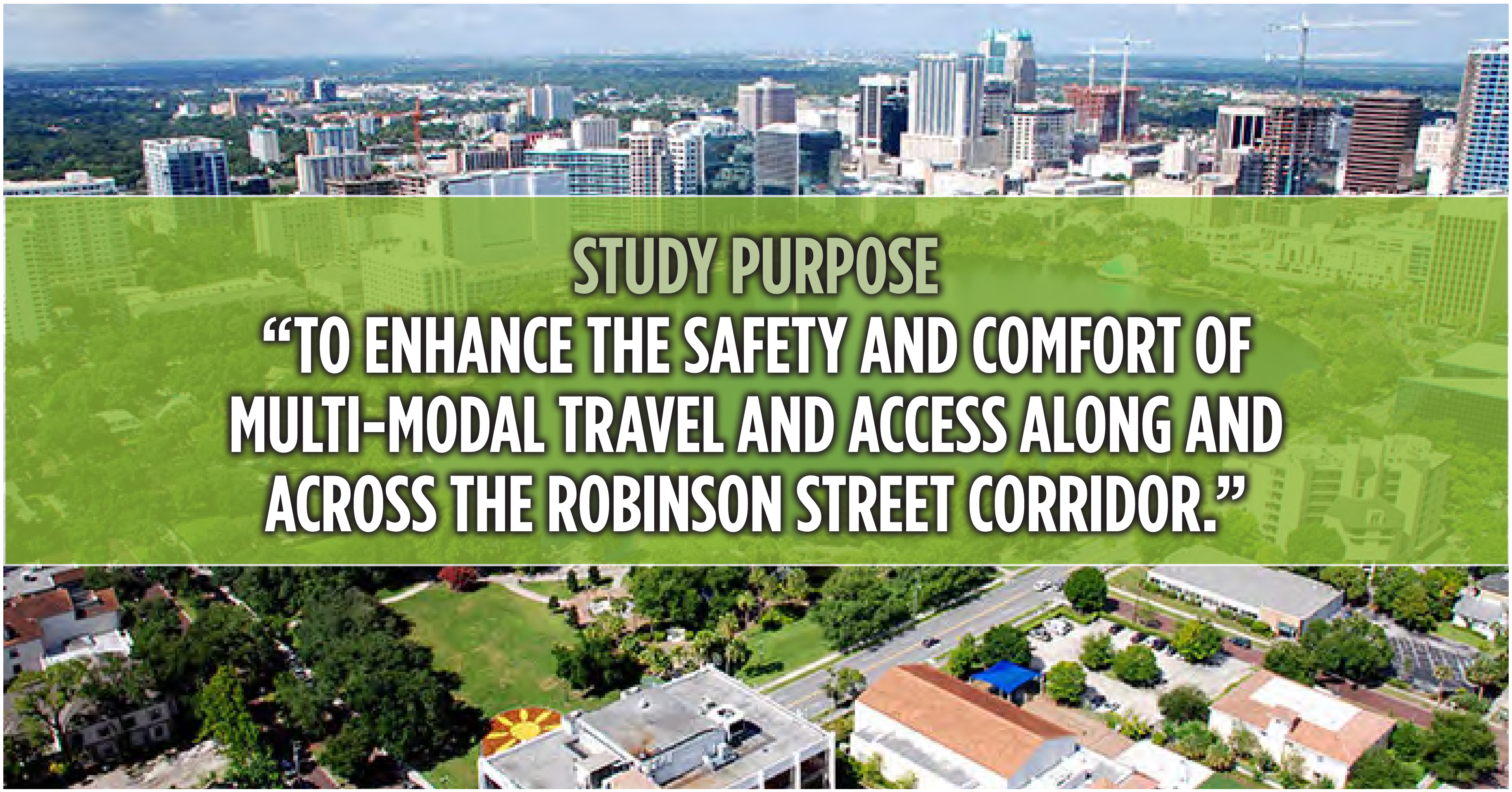
Trees are close to the roadway in some sections along Robinson Street causing buses to utilize a portion of the inner lane.

Festivals at Lake Eola park frequently close a portion of Robinson Street causing LYNX buses to be routed to Livingston Street

5. What are the Purpose and Needs of the Study?

Purpose & Needs

The existing conditions presented in this report were synthesized into a purpose statement with eight overall needs that the Robinson Street Corridor Study will be responding to. These needs were defined with the PVT who also helped identify objectives to support each need. These objectives led to performance measures by which proposed alternatives were evaluated. Of these eight needs, the Robinson Street corridor is observed to currently fully meeting only Need 4 (Maintain appropriate vehicular mobility and existing neighborhood character), while the other seven needs are not fully met. All the potential recommendations were evaluated on how well each recommendation addresses all of the corridor's needs. The evaluation was conducted at two levels with increasing degree of analysis detail, (1) to screen the long list of alternatives, and (2) to compare the short-list of alternatives.



Need 1: Improve multimodal access to support Downtown growth and development.

Downtown Orlando is evolving into a 24-hour downtown where more people are living, working, and recreating in Downtown, and where both workers and residents are looking for multimodal options to travel.

Objective	Long List Evaluation Measure
Identify cross section changes that are tailored to each character district/segment.	On-street parking provided to support District Needs
Consider cross section changes that improve access to and from the downtown roadway network.	Intersection delay for key turning movements
Provide for local delivery traffic and needs.	Cross section allows for delivery needs where critical

Need 2: Incorporate Complete Streets principles to improve pedestrian safety and comfort.

There is a clear desire and need to improve pedestrian safety, accessibility, and comfort along the entire corridor.

Objective	Long List Evaluation Measure
Develop comprehensive streetscape that addresses unique character districts (i.e. lighting, furniture, street trees).	Cross section accommodates/ has space for streetscape amenities within the appropriate character district
Provide sufficient sidewalk and buffer areas along the sidewalk.	Average distance from back of sidewalk to edge of travel lane
	Average sidewalk width
	Vertical buffer provided
Modify signal timing to minimize pedestrian delay	Number of new pedestrian crossings.
Evaluate posted speed if cross section changes	Cross section changes allow for lowering of design speed to 30mph or lower

Need 3: Accommodate bicycling needs for users accessing destinations along the corridor

Active transportation modes (bicycling and walking) have a higher than average mode share in the corridor. This need prioritizes cyclists who are using Robinson Street to access destinations along the corridor. While Livingston Street currently has a dedicated bike lane within the study area, cyclists accessing corridor destinations, such as the businesses in the Milk District, must cross or ride along Robinson Street at some point on their trip.

Objective	Long List Evaluation Measure
Provide appropriate non-vehicular infrastructure for all types of bicycle users.	Level of bicycle accommodation

Need 4: Maintain appropriate vehicular mobility for trips accessing corridor and maintain existing neighborhood character.

Robinson Street serves both through and local trips. While vehicle delays are concentrated at the intersections, there is a continued desire to maintain the good corridor vehicle levels of service and travel times for corridor and Downtown-bound trips. Also, as Downtown's growth continue to influence the historic neighborhoods along Robinson Street, changes to Robinson Street should maximize potential benefits and minimize potential impacts on local neighborhood streets.

Objective	Long List Evaluation Measure
Maintain consistent travel times.	Robinson LOS
Improve vehicular efficiency through operational improvements (signal timing coordination and addition of turn lanes where needed).	Intersection delay
Minimize impacts to neighborhood streets	Ability to accommodate existing volumes along corridor

Need 5: Support and improve transit operations along the corridor.

Some transit challenges exist along Robinson Street affecting driver, pedestrian, and bicyclist comfort and safety. A key performance measure for improving the transit operations on Robinson Street is lane width. Today, the 10.5' LYNX buses do not fit in the 9.5' travel lanes on Robinson Street. In addition, transit stops are placed throughout the corridor with varying levels of convenience and connectivity to surrounding land uses. New marked crossings and shorter crossing distances (as part of the Alternatives) could provide better accommodation for transit users.

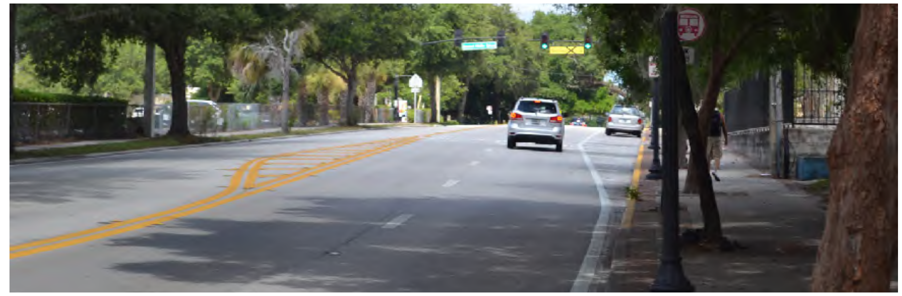
Objective	Long List Evaluation Measure
Accommodate safe and effective operation of transit.	Percentage of corridor with lane widths meeting standard
Evaluate bus stop locations for safety and convenience.	Opportunity for bus pull-outs

Need 6: Provide multimodal access consistent with corridor context and emerging character.

Robinson Street is a diverse corridor with diverse land uses, corridor context, and neighborhood character. Because of this, the study's recommendations must:

- Tailor solutions to each character district/segment.
- Improve pedestrian and bicycling access to key destinations along the corridor.

These objectives will be accomplished through the objectives under the other various needs.



Need 7: Reconnect neighborhoods by increasing corridor permeability.

Along some portions of the corridor, Robinson Street acts as a border and barrier to pedestrian and bicycling connectivity between adjacent neighborhoods.

Objective	Long List Evaluation Measure
Enhance connections between neighborhoods on either side of Robinson Street	Average mid-block crossing distance

Need 8: Implement fiscally responsible solutions and advance solutions that can be implemented in the short-term.

Recommended alternatives should consider the cost of implementation, be fiscally feasible, and include strategies that can be implemented in the short-term without extensive right-of-way acquisition.

Objective	Long List Evaluation Measure
Minimize fiscal impacts	Does it move curb and gutter
	ROW Impacts

6. What are the Potential Solutions?

Potential solutions were developed based on the defined Purpose and Needs of the Robinson Street corridor. The solutions can be organized into three groups:

1 Corridor-wide Strategies

2 Cross Section Alternatives

3 Spot Improvements

Corridor-wide Strategies

Corridor-wide strategies were developed to address the needs that were consistent along the corridor. These include strategies that can be implemented regardless of which cross section alternative is selected. Many of them can be incorporated into routine FDOT maintenance activities, but many require coordination with the City of Orlando and/or LYNX to implement. The following is a list of potential strategies that can be implemented on a corridor-wide basis:

- Coordinate with the City of Orlando to optimize signal timing coordination and implement leading pedestrian intervals and/or maximum pedestrian phasing at locations in the Central Business District and Lake Eola District.
- Improve/restripe existing pedestrian crosswalks through FDOT maintenance.
- Provide alternatives that include left or right-turn lanes, where needed.
- Coordinate with LYNX to improve ADA accessibility at all bus stops.
- Coordinate with LYNX to consolidate and/or relocate bus stops to improve pedestrian connectivity.
- Coordinate with the City of Orlando to incorporate appropriate lighting, landscaping, and street furniture, where possible.
- Coordinate with the City of Orlando to implement vehicular and pedestrian wayfinding
- Pursue partnerships with the City of Orlando and businesses along the corridor to add bicycle parking at strategic locations, especially at locations where on-street parking spots can be converted to bicycle corrals or in conjunction with bike share stations.

Cross Section Changes

FDOT worked closely with the City of Orlando and rest of the PVT to identify a wide range of roadway cross section alternatives. The first set of alternatives (or the Long List Alternatives) considered all permutations and configurations possible within the limited 60 feet of right-of-way (ROW) along Robinson Street. This long list of alternatives was then applied to each of the four character districts (Central Business District, Lake Eola District, Neighborhood District, and Milk District) and evaluated based on the corridor Needs, Objectives, and Performance Measures to arrive at a set of two corridor-wide alternatives.

Long List of Cross Section Alternatives

A full range of pedestrian, bicycle, travel lane/median, parking, and landscape configurations were explored to meet the corridor needs and to develop the long list of cross section alternatives. The different cross section elements explored include:

Wide Sidewalks

Wide sidewalks (6-7' in residential areas, 8-12' in high pedestrian areas) allow for more pedestrian maneuverability and comfort. Appropriate sidewalk width depends on the adjacent uses and intensity of uses.

Landscape Buffer

Horizontal and vertical separation from the roadway, by use of shade trees and street furniture, add to pedestrian comfort and sense of safety. Keeping the curb line and drainage features the same as existing can significantly cut down on construction costs.

Long-List Alternatives

- No Build
- 16 Alternatives

Apply to Districts

- Central Business District
- Lake Eola District
- Neighborhood District
- Milk District

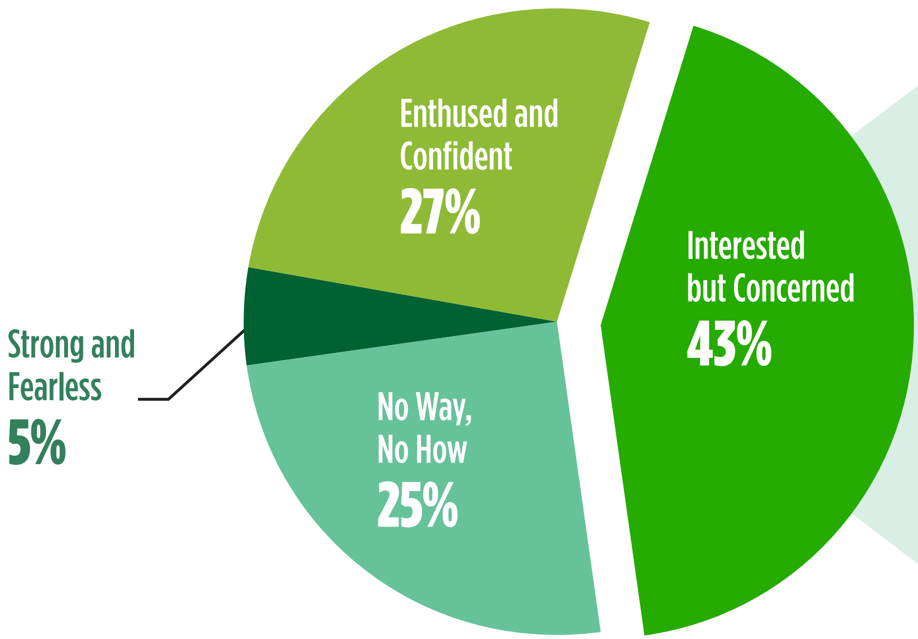
Short-List Alternatives

- No Build
- 2 Corridor-wide Alternatives

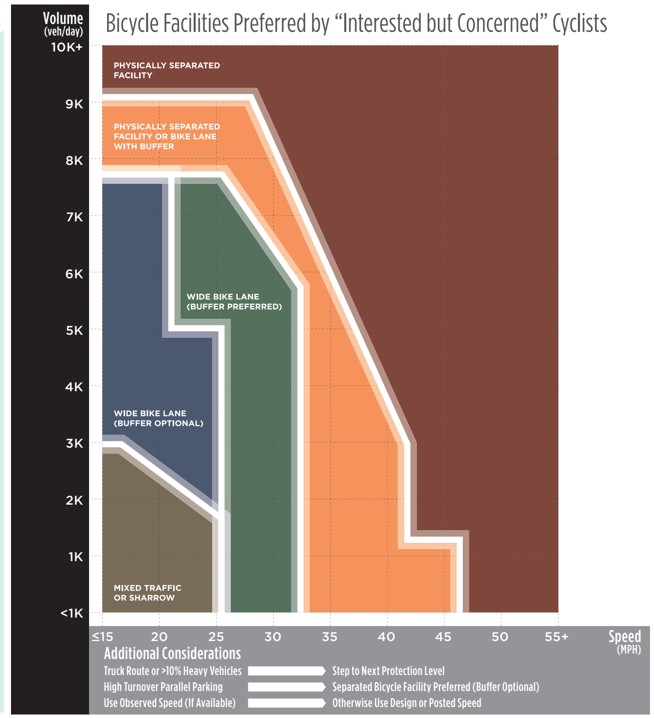
Bicycle Facility

Different levels of bicycle accommodation can be used for different target groups of bicycle users. The "interested but concerned"[6] group requires additional levels of separation at lower traffic volumes and speeds than have traditionally been provided. Shared lane markings ("sharrows") are recommended for use on roadways with low speeds (<30 mph) and low volumes (<3,000 veh/day).[7] Separated bicycle facilities including buffered bike lanes, shared use paths and cycle tracks, are generally recommended for speeds above 30 mph and 8,000 vehicles/day. The following page describes different types of bicycling facilities.

Types of Cyclists and Bicycle Facility Preferences



Source: National Institute for Transportation and Communities, Portland State University, Lessons from the Green Lanes: Evaluating Protected Bike Lanes in the U.S.



Source: Montgomery County Bicycle Planning Guidance, 2014

6 The "interested but concerned" group accounts for approximately 45% of cyclists according to "Lessons for the Green Lanes," a Portland State University research study that interviewed over 2,200 residents from five cities around the nation.

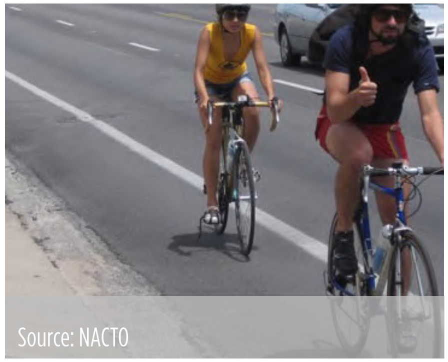
7 According to National Association of City Transportation Officials (NACTO) Bikeway Design Guide

Types of Bicycle Facilities


Source: www.bikeportland.org

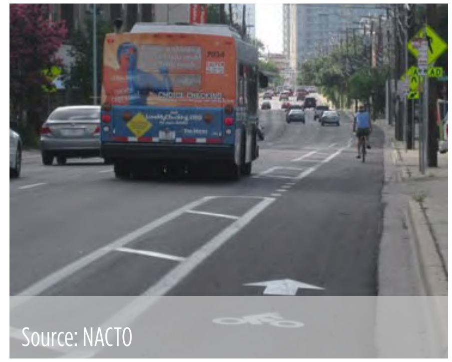
Sharrow/Shared Lane Marking

- No separation from vehicles
- Encourages bicyclists to take full lane
- Applicable to low speed streets (30 MPH or lower)


Source: NACTO

Conventional Bike Lane

- Lane marking
- Increases predictability of user positioning and interaction
- Not comfortable for bicyclist on roadways with high speeds or multiple vehicle lanes


Source: NACTO

Buffered Bike Lane

- Greater shy distance between vehicles and bicyclists
- Buffer provides more comfort and perceived safety
- Appeals to a wider cross section of bicycle users


Source: Cbus Cycle Chic; https://cbuscyclechic.wordpress.com/category/cycle-tracks/

Raised 2-Way Protected Cycle Track

- Comfort and safe improvement with cycling space closer to pedestrians than cars
- Encourages riding in cycle track rather than sidewalk
- Reduce the curb to curb width thereby calming traffic


Source: NACTO

1-Way Protected Cycle Track

- Protects bicycle space and improves perceived comfort and safety
- Prevents encroachments like double parking
- Significantly reduces risk and fear of vehicle collisions


Source: www.publicimages.org, Carl Sundstrom

Raised Cycle Track

- Comfort and safe improvement with cycling space closer to pedestrians than cars
- Encourages riding in cycle track rather than sidewalk
- Reduce the curb to curb width thereby calming traffic


Source: https://streets.mn/2013/05/29/all-the-bestus-cycle-tracks-are-street-level/

2-Way Protected Cycle Track

- Protects bicycle space and improves perceived comfort and safety
- Prevents encroachments like double parking
- Increase width allow safer overtaking for bicyclists


Source: Calm Streets Boston, http://calmstreetsboston.blogspot.com

Shared Use Path

- Used by both pedestrians and bicyclists
- Increased comfort and safety for bicyclists
- Narrow width can hinder pedestrians

On-Street Parking

On-street parking can serve as a buffer for pedestrians and bicycles and provide “friction” to slow down vehicular traffic along the roadway. On-street parking can also support local commercial uses along the roadway by providing space for delivery vehicles to load and unload, and potential locations for bus pull-offs.

Raised Medians

Raised medians provide a refuge for pedestrians crossing the roadway, allowing pedestrians to negotiate one direction of travel at a time. These may incorporate appropriately designed landscaping and wayfinding elements.

Roadway Width

The number of travel lanes and the width of the travel lanes both impact the roadway width. Wider streets can become barriers to pedestrian travel, making it difficult for safe and comfortable pedestrian crossing.

On street parking in Winter Park serves commercial uses and creates a barrier between the roadway and sidewalk

How cross section influences driving behavior

Lowering speed limits along a roadway can decrease crash frequency and severity and increase the comfort of our most vulnerable road users – bicyclists and pedestrians. [8] Speeds cannot be reduced simply by changing the posted speed limit. Geometric and cross section elements establish a driving environment in which drivers choose a speed that feels reasonable and comfortable. The design of the roadway should reinforce the desired operating speed of the roadway. Potential geometric features that help to slow speeds along a corridor include:

- Horizontal deflection (roundabouts, splitter islands);
- Vertical deflection (speed tables);
- On street parking to create friction;
- Street trees and other landscaping; and
- Setting signal timing to a moderate progression speed.

8 *“Killing Speed and Saving Lives - The Government’s Strategy for Tackling the Problems of Excess Speed on our Roads.” London: Department of Transport, 1987.*

The long list of alternatives includes 16 different combinations of these features as shown in **Figure 42**. These alternatives were organized based on number of lanes and bicycle accommodation and are outlined below. The evaluation of these cross section alternatives is outlined later in this report.

Figure 42 | Long List of Alternatives

			ACCOMMODATION				BICYCLE ACCOMMODATION			
			S1	S2	S3	S4	B1	B2	B3	B4A
FOUR LANE		No-Build	X				X			
		Alternative 1 - 11" Lanes	X				X			
		Alternative 2 - Bike Lanes		X				X		
THREE LANE	SHARROWS	Alternative 3 - Wide Lanes + Sharrow	X				X			
		Alternative 4 - Reversible Lanes + Sharrow	X				X			
		Alternative 5 - Sharrow + Parking	X		X		X			
	BIKE LANE	Alternative 6 - Bike Lane	X		X				X	
		Alternative 7 - One Buffered Bike Lane + One-Way Protected Cycle Track	X							X
		Alternative 8 - Buffered Bike Lanes			X					
	PROTECTED BIKE FACILITY	Alternative 9 - Two One-Way Protected Cycle Track		X						
		Alternative 10 - Two-Way Striped Cycle Track		X	X					
		Alternative 11 - Two-Way Protected Cycle Track		X	X					
		Alternative 12 - Shared Use Path		X		X				
TWO LANE		Alternative 13 - Buffered Bike Lanes	X		X					
		Alternative 14 - Sharrow + Parking	X		X		X			
		Alternative 15 - Two One-Way Protected Cycle Tracks			X					
		Alternative 16 - Protected Cycle Track + Parking		X						

S1	5' sidewalk	S4	Shared use Path	B3	5' bike lane	B5	One-way protected cycle track (both sides)
S2	6' sidewalk	B1	Shared lanes	B4a	Striped buffered bike lane (one side)	B6	Raised Cycle Track (one side)
S3	8' sidewalk	B2	4' bike lane	B4b	Striped buffered bike lane (both sides)	B7a	Two-way Cycle Track (striped)

							TRAVEL LANE/MEDIAN			PARKING		SIDEWALK LANDSCAPE		
	B4B	B5	B6	B7A	B7B	B8	T1	T2	T3	P1A	P2B	L1A	L1B	L2A
							X						X	X
							X						X	X
							X							
								X					X	X
								X					X	X
								X		X		X		X
								X				X		X
			X					X				X		
	X							X						X
		X						X						
				X				X					X	X
					X			X		X			X	X
						X		X		X			X	X
	X								X			X		X
								X			X	X		X
		X							X				X	X
		X							X	X				

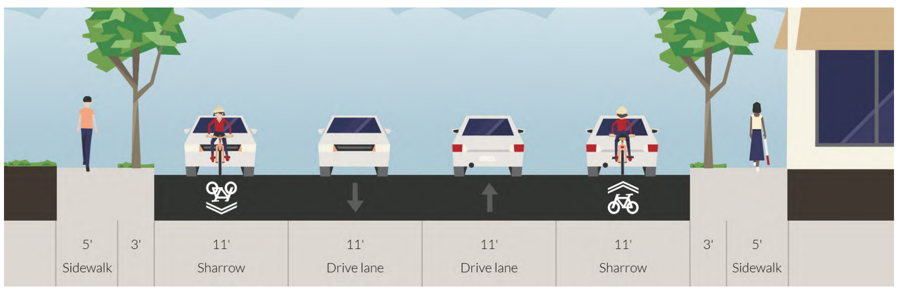
B7b Two-way Cycle Track (protected)
B8 Shared use Path
T1 4 lanes
T2 3 lanes
T3 2 lanes
P1a Parallel On-street (one side)
P2b Parallel On-street (both sides)
L1a Planting strip/ rain garden (one side)
L1b Planting strip/ rain garden (both sides)
L2a Trees in grates

Long List of Alternatives

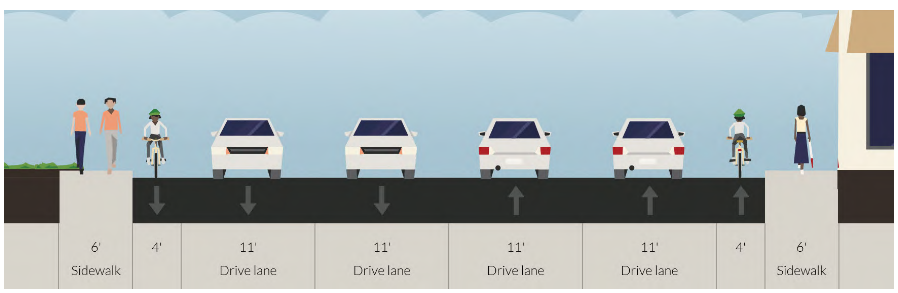
Four Lane Alternatives

No Build / Existing (60' ROW)

Alternative 1 - 11' Lanes And Sharrows (60' ROW)



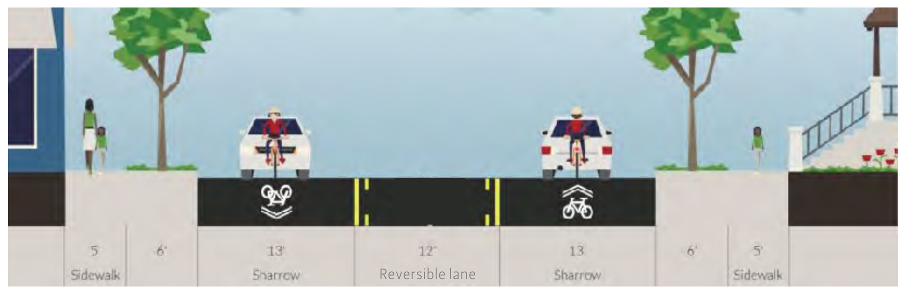
Alternative 2 - Bike Lanes (64' ROW)



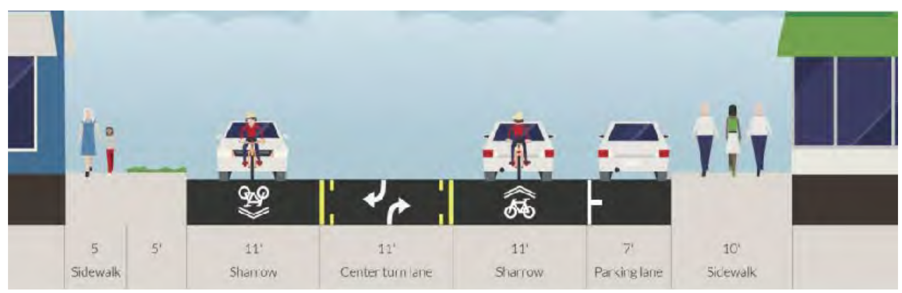
Three Lane with Sharrow Alternatives

Alternative 3 - Wide Lanes + Sharrow (60' ROW)

Alternative 4 - Reversible Lanes + Sharrow (60' ROW)

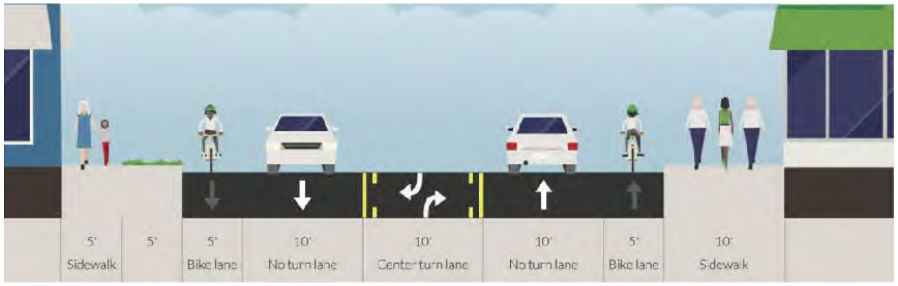


Alternative 5 - Sharrow + Parking (60' ROW)

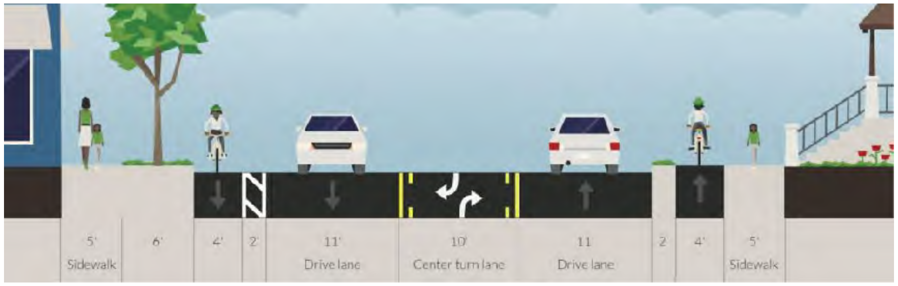


Three Lane with Bike Lane Alternatives

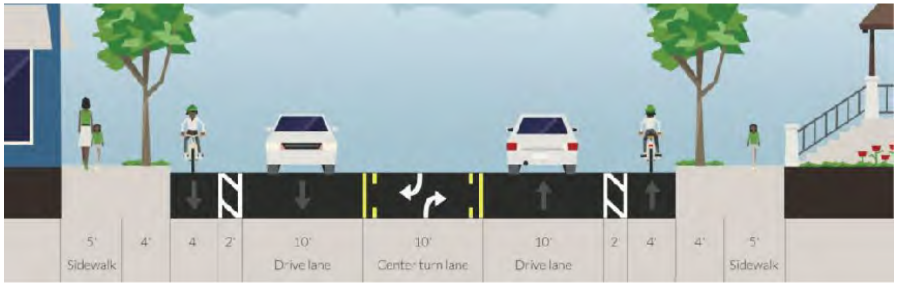
Alternative 6 - Bike Lane (60' ROW)



Alternative 7 - One Buffered Bike Lane + One-Way Protected Cycle Track (60' ROW)

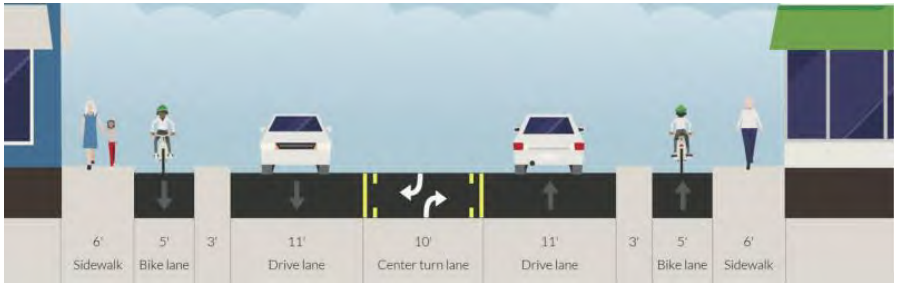


Alternative 8 - Buffered Bike Lanes (60' ROW)



Three Lane with Cycle Track/Shared Use Path Alternatives

Alternative 9 - Two One-Way Protected Cycle Track (60' ROW)



Alternative 11 - Two-Way Protected Cycle Track (66' ROW)

Alternative 10 - Two-Way Striped Cycle Track (64' ROW)

Alternative 12 - Shared Use Path (64' ROW)

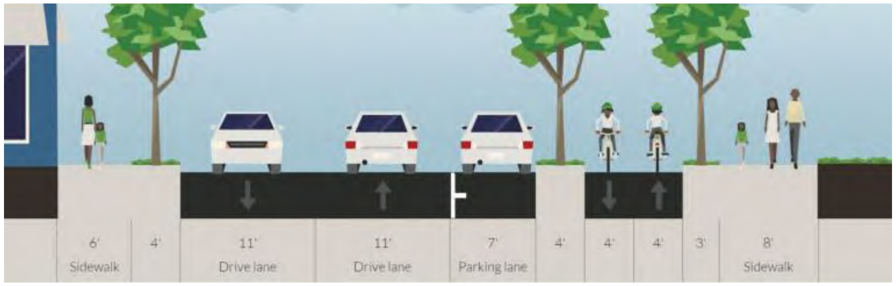
Two Lane Alternatives

Alternative 13 - Buffered Bike Lanes (60' ROW)

Alternative 15 -Two-One Way Protected Cycle Tracks (60' ROW)

Alternative 14 - On-Street Parking (60' ROW)

Alternative 16 – Protected Cycle Track + Parking (60' ROW)



Linking Priority Needs to Each Character District

The objectives and measures were used to evaluate how well each alternative meets the eight corridor needs. Since the corridor exhibits diverse character and land use, each of the character districts had a unique combination of primary needs. As such, although all eight needs are important throughout the corridor, this phase of the alternatives evaluation linked the needs that were most important to each character district. The priority needs for each district were presented to and vetted with the PVT.

The Central Business District reveals a major need to support the corridor businesses and support the downtown environment, and shows the highest volumes of pedestrian crossings and cyclists accessing the downtown core. In addition, the Central Business District demonstrates a high need to facilitate turning movements to and from the north-south cross streets accessing the downtown core. Having very limited opportunity to widen the right-of-way, any alternatives proposed for this District must stay within the existing 60 feet. Therefore, Need 1 (support Downtown), Need 2 (improve pedestrian safety and comfort), Need 3 (accommodate bicycling), Need 4 (vehicular mobility and maintain neighborhood character), and Need 8 (fiscal responsibility) were seen as particularly important in this District. As a result, the performance measures correlating to these needs were used to evaluate alternative cross sections for the Central Business District.

The Lake Eola District shows high volumes of pedestrian crossings outside of unsignalized crossings, higher volumes of bicycle traffic on sidewalk, and facilitates three bus routes through its limits. In addition, neighborhood residents north of Robinson Street desire to have convenient access to Lake Eola Park and the park itself can benefit from more access to convenient on-street parking. Therefore, Need 1 (support Downtown), Need 2 (improve pedestrian safety and comfort), Need 3 (accommodate bicycling), Need 5 (support and improve transit operations), and Need 7 (Reconnect neighborhoods) were seen as particularly important in this District.

The Neighborhood District has the highest vehicular traffic volumes along the corridor and demonstrates a high need to facilitate turning movements to and from the north-south cross streets accessing SR 408 and the Mills50 district. In addition, Robinson Street in the Neighborhood District separates Lake Eola Heights and Colonialtown South from Thornton Park and north-south pedestrian and bike access is limited. Having limited opportunity to acquire more right-of-way due to small parcels sizes, any alternatives in this district must prioritize staying within the existing right-of-way. Therefore, Need 1 (support Downtown), Need 4 (vehicular mobility and maintain neighborhood character), Need 7 (Reconnect neighborhoods), and Need 8 (fiscal responsibility) were seen as particularly important in this District.

The Milk District has particular access needs of its own. Primarily, the business owners in the newly-formed Milk District Main Street voiced a strong desire to include permanent on-street parking spaces in this district to support the businesses in the area. The businesses in this district also serve as a pedestrian and cyclist destination, especially with the formation of the Main Street District which is expected to increase the frequency of special events and festivals that will attract pedestrians and cyclists. In addition, the presence of the TG Lee Plant and LYNX Superstop at Colonial Plaza causes higher heavy vehicle traffic in this area. Therefore, Need 1 (support Downtown), Need 2 (improve pedestrian safety and comfort), Need 3 (accommodate bicycling), and Need 5 (support and improve transit operations), were seen as particularly important in this District.

The priority needs for each district are highlighted below in **Table 1**.

Table 1 | Priority Needs for Each District

CBD	**Need 1 Supports Downtown**	**Need 2 Pedestrian Needs**	**Need 3 Bicycle Needs**	**Need 4 Vehicular Mobility and Maintain Neighborhood Character**	Need 5 Transit Conditions	Need 6 Character Consistency	Need 7 Reconnect Neighborhoods	**Need 8 Fiscal Responsibility**
Lake Eola	**Need 1 Supports Downtown**	**Need 2 Pedestrian Needs**	**Need 3 Bicycle Needs**	Need 4 Vehicular Mobility	**Need 5 Transit Conditions**	Need 6 Character Consistency	**Need 7 Reconnect Neighborhoods**	Need 8 Fiscal Responsibility
Neighborhood	**Need 1 Supports Downtown**	Need 2 Pedestrian Needs	Need 3 Bicycle Needs	**Need 4 Vehicular Mobility**	Need 5 Transit Conditions	Need 6 Character Consistency	**Need 7 Reconnect Neighborhoods**	**Need 8 Fiscal Responsibility**
Milk District	**Need 1 Supports Downtown**	**Need 2 Pedestrian Needs**	**Need 3 Bicycle Needs**	Need 4 Vehicular Mobility	**Need 5 Transit Conditions**	Need 6 Character Consistency	Need 7 Reconnect Neighborhoods	Need 8 Fiscal Responsibility

Priority Needs

Short-list of Cross Section Alternatives

Once the long-list of alternatives was narrowed down for each character district, alternatives were put together using the most logical and feasible combinations with regard to lane configuration and bicycle facility consistency. This resulted in a short-list of two corridor-wide alternatives to compare to the No-Build alternative. The lane configurations for these short-list alternatives are shown in **Figure 43** and are as follows.

No Build

The No-Build Alternative would keep most of the Robinson Street corridor "as-is" and incorporate most of the corridor-wide and spot improvements identified in this report. This section includes four 9.5 ft to 11 ft lanes, no permanent on-street parking, no bicycle accommodations, and narrow landscape buffers in many locations.

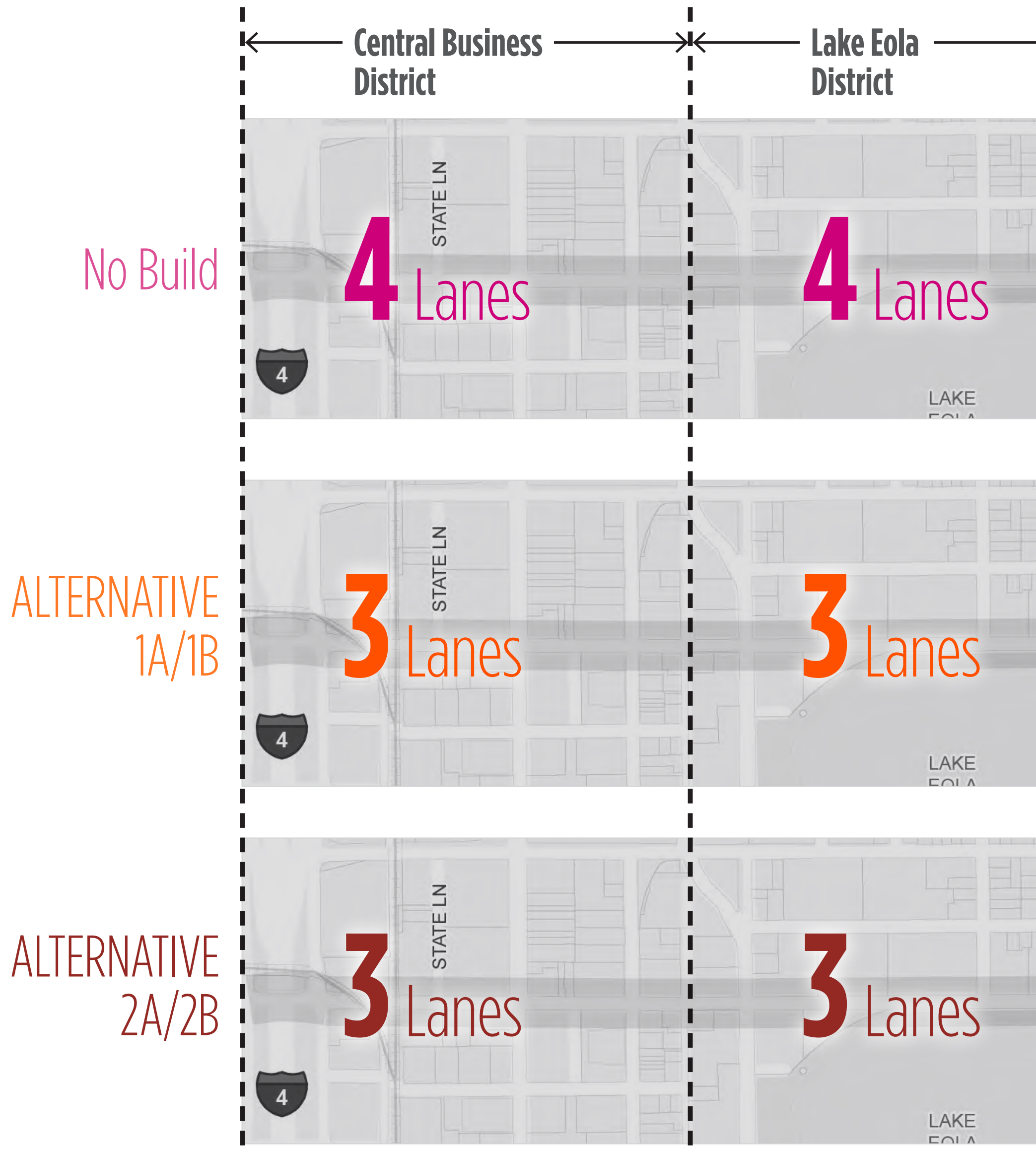
Alternative 1A/1B

Alternative 1A/1B reconfigures the cross section to three lanes (one lane in each direction and a two-way left turn lane or spot medians) throughout the corridor.

Alternative 2A/2B

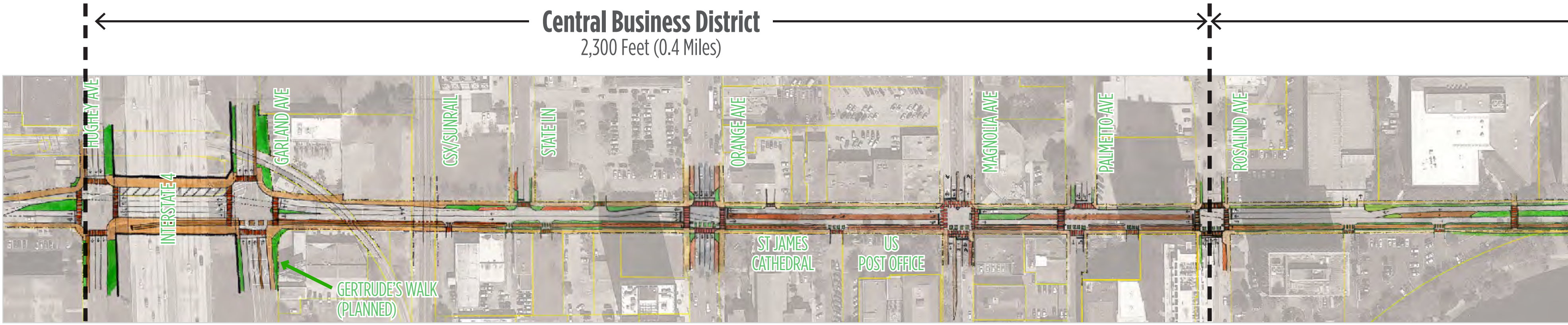
Alternative 2A/2B reconfigures the roadway to three lanes in the Central Business District and Lake Eola District, maintains the four lanes in the Neighborhood District, and have both an alternative for maintaining four lanes and an alternative for a three-lane cross section in the Milk District.

Figure 43 | Alternatives Lane Configuration

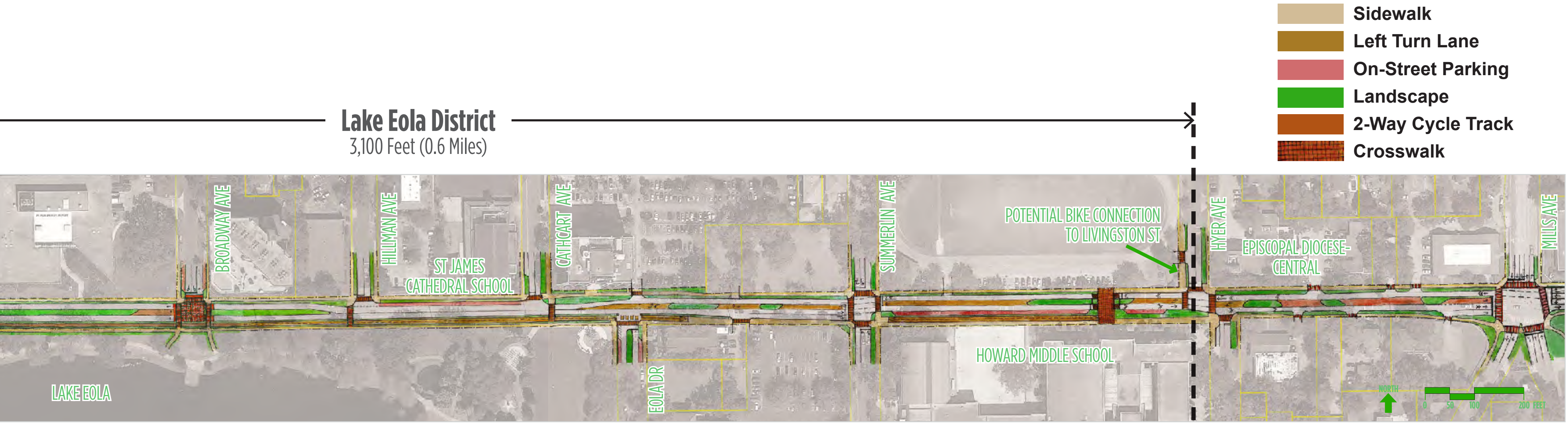


Neighborhood District
Milk District
LIVINGSTON ST
RIDGEWOOD ST
ROBINSON ST
JEFFERSON ST
HAMPTON PARK
DICKSON AZALEA PARK
ORLANDO FESTIVAL PARK
4 Lanes
4 Lanes
3 Lanes
3 Lanes
4 Lanes
3 or 4 Lanes
ALT 2B
ALT 2A

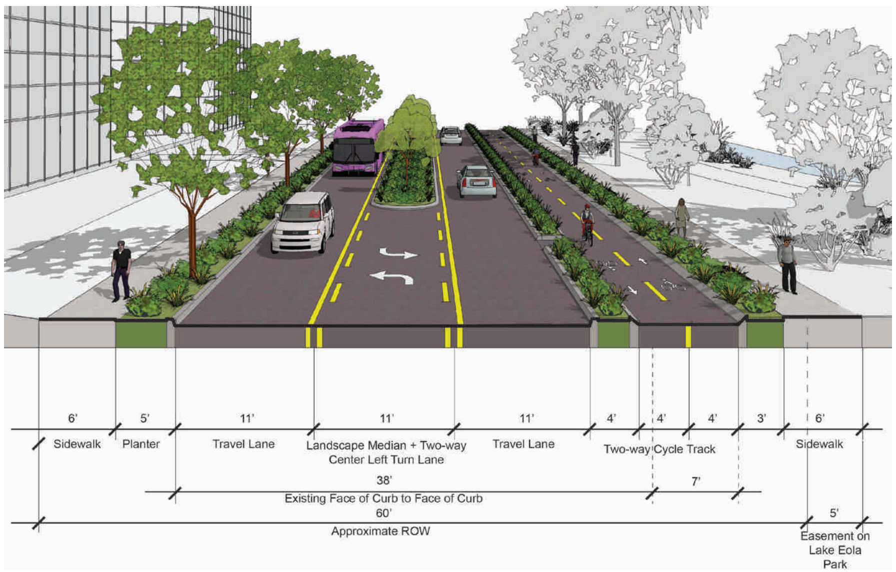
Figure 44 | Alternative 1A/1B Central Business District & Lake Eola District



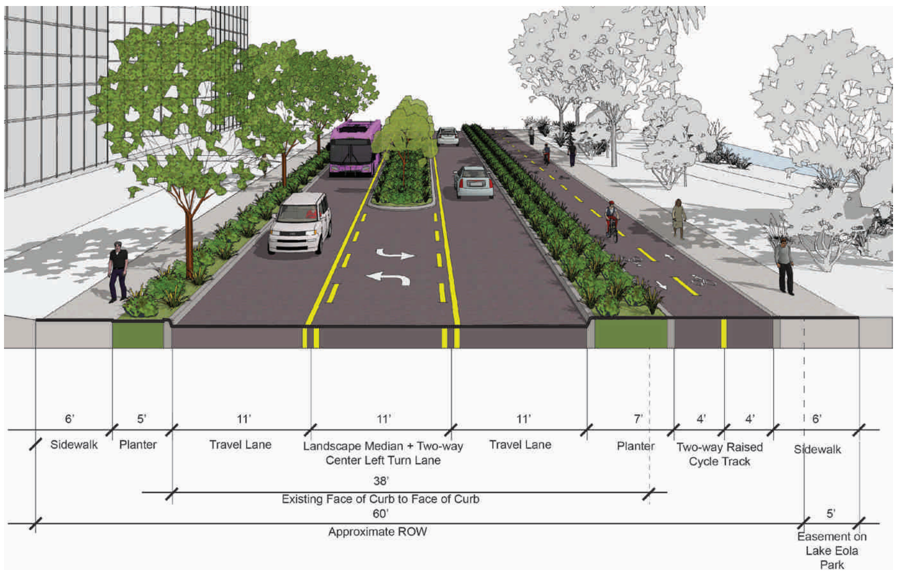
Central Business District: The Central Business District would include one travel lane in each direction with a center two-way left-turn lane along most of the section, with a parking lane where possible (west of Orange Avenue) to support the businesses along this section. This alternative includes a two-way cycle track on the south side of the road to support the higher levels of bicycle traffic and existing wide sidewalks.



Alternative 1A

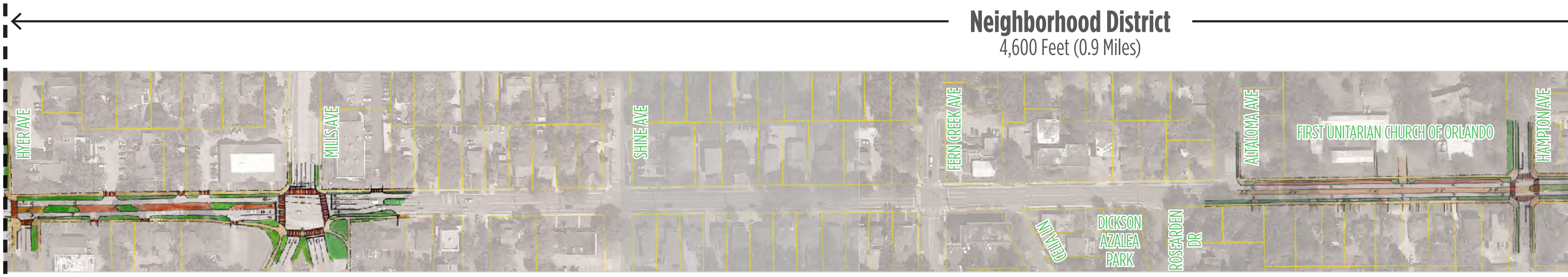


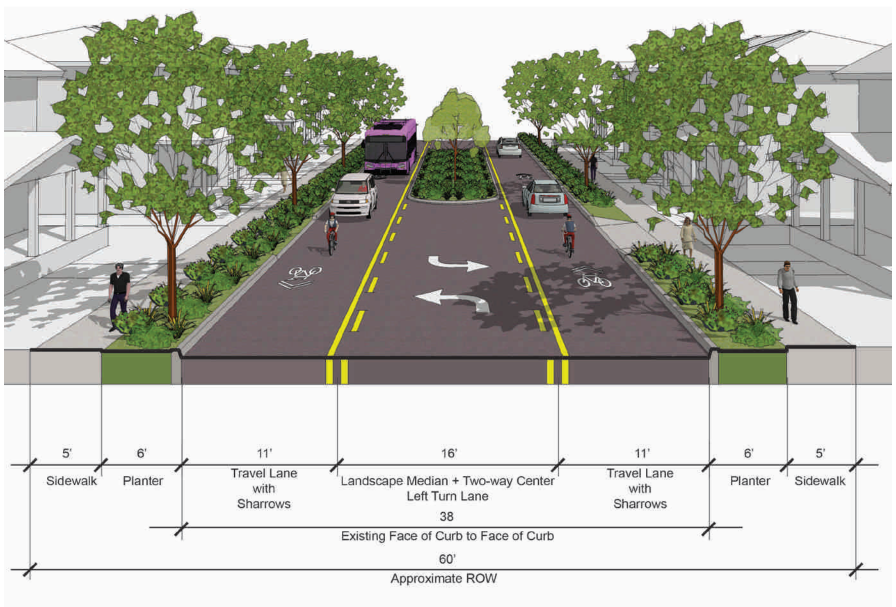
Alternative 1B



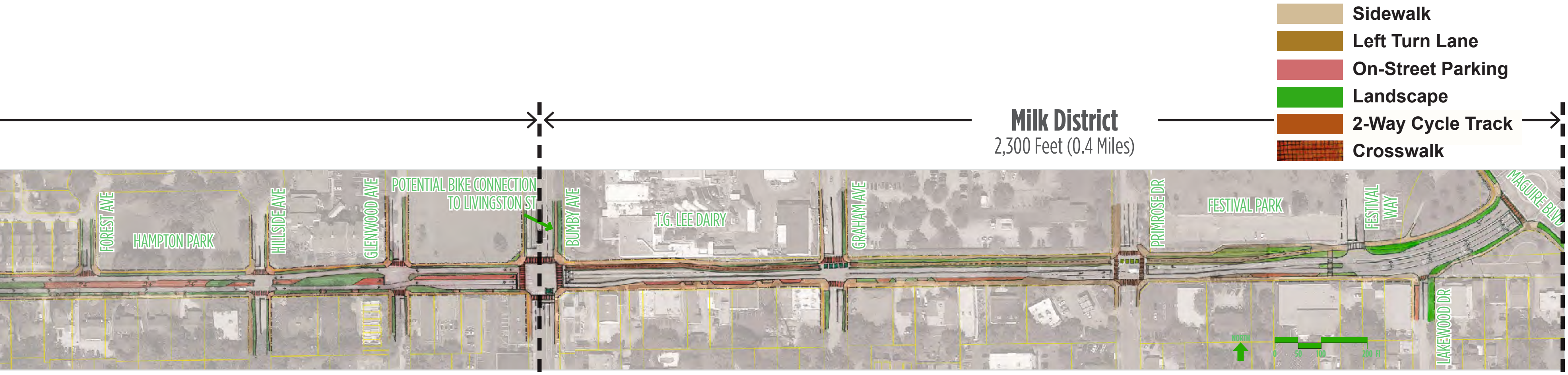
Lake Eola District: The Lake Eola District would include one travel lane in each direction with a center two-way left-turn lane and landscaped spot medians, at strategic locations. These spot medians would increase pedestrian crossing safety and comfort and create a parkway character as the street runs along Lake Eola Park. This alternative continues the two-way cycle track on the south of the road, with a 4-foot buffer between the travel lanes and cycle track and 3-foot buffer between cycle track and sidewalk. A slight variation of Alternative 1 (Alternative 1B) combines the two landscaped buffers to a wider, 7-foot buffer between a raised two-way cycle track and vehicle travel lanes to allow for more substantial landscaping. Alternative 1 in this district utilizes a 5-foot easement on Lake Eola Park. This easement was considered as a result of close coordination with the City's various departments, including the parks department. The City's parks department has initial plans on developing a shared use path along the park by providing an easement on the park property.

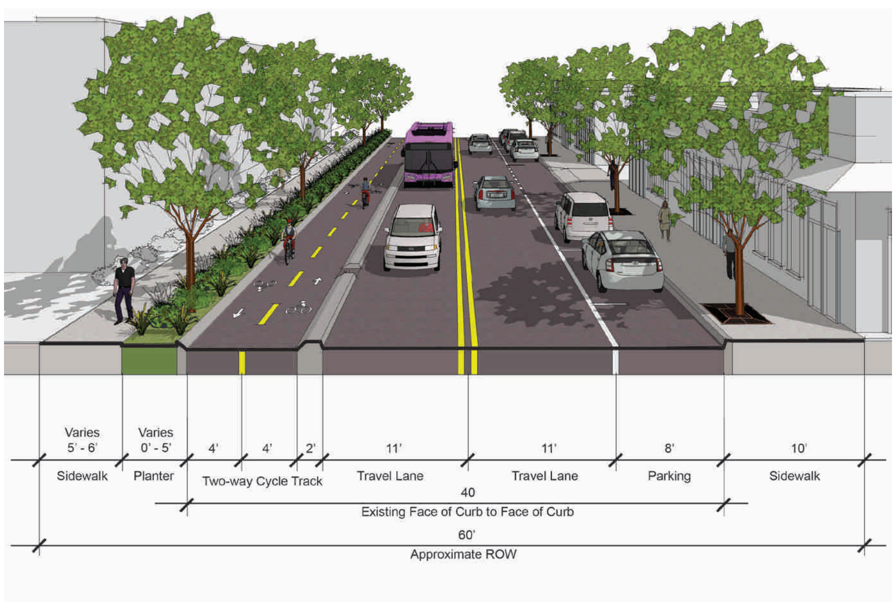
Figure 45 | Alternative 1A/1B Neighborhood District & Milk District





Neighborhood District: The Neighborhood District would include one travel lane in each direction with a wide center two-way left-turn lane and landscaped spot medians, at strategic locations. The spot medians can provide additional sense of enclosure on the street and help manage vehicular travel speeds. The Neighborhood District does not have many destinations and origins for bicycle travel and the relatively higher frequency of driveways limits the feasibility of implementing a separated cycle track through this District. Bicycle travel along Robinson Street would be accommodated with shared lane markings (sharrows) through this section, and the existing landscape buffer and sidewalks would remain.



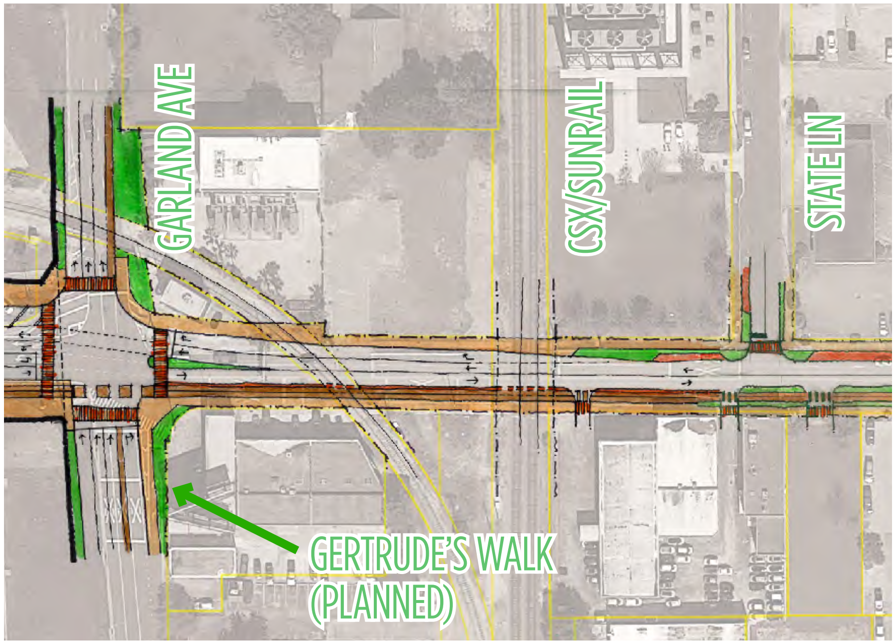


Milk District: The Milk District would include one travel lane in each direction and left-turn lanes at signalized intersections. This alternative re-introduces the two-way cycle track on the north side of the roadway along the TG Lee property and Festival Park and would connect to the shared use path along Maguire Avenue. This alternative includes an on-street parking lane on the south side to support the businesses along this section. This alternative includes wide sidewalks and landscape buffer, where existing.

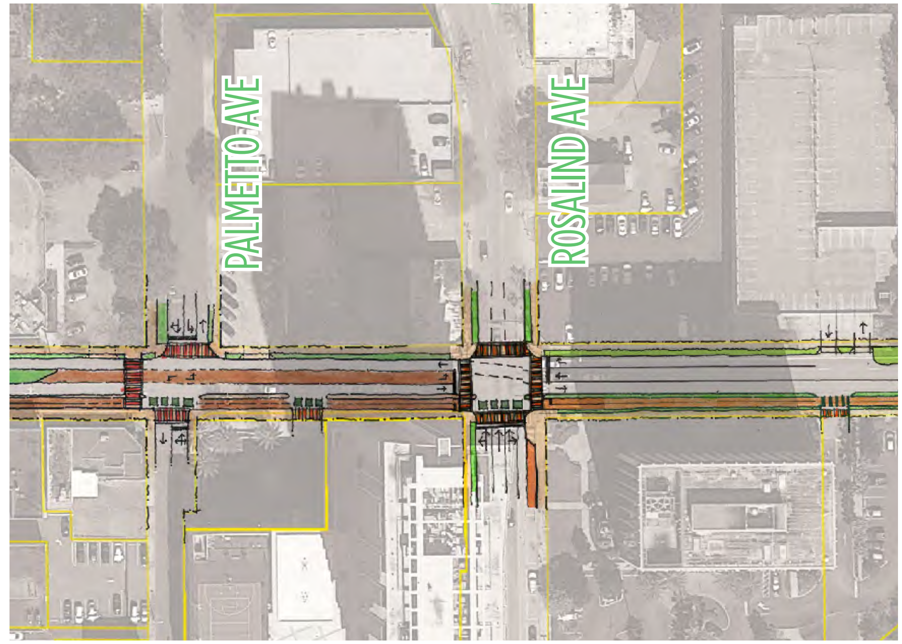
Alternative 1A/1B Roadway Elements

Alternative 1A/1B is three lanes with the highest level of bicycle accommodation throughout the corridor.

Central Business District

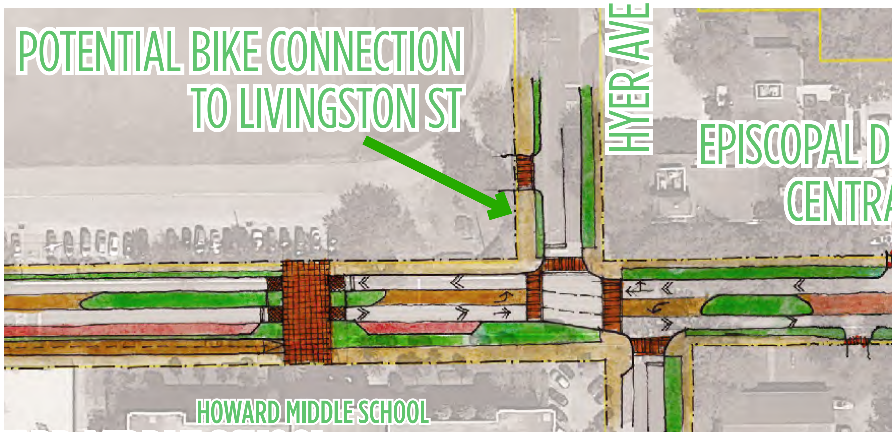


On the western end of the corridor, the two-way cycle track would connect to the planned bike/pedestrian path along Garland Avenue, Gertrude's Walk, connecting the Robinson Street cycle track to LYNX Central Station and the rest of Downtown Orlando. The cycle track will continue west under I-4 and end at Hughey Avenue. This alternative is feasible with the planned FDOT I-4 Ultimate improvements and can be constructed after the I-4 plans are implemented (scheduled for late 2019 for this section of I-4).



The three-lane cross section with two-way cycle track on the south side of the street would be carried through Rosalind Avenue to the Lake Eola District.

Lake Eola District



The bicycle accommodation along the corridor transitions from two-way cycle track to shared lane markings near Hyer Avenue, just west of Mills Ave. A cyclist who wants to continue on exclusive bike facility along the corridor would use the Howard Middle School pedestrian signal to connect from the cycle track to a potential shared use path on Hyer Avenue, connecting to the existing Livingston Avenue bike lanes to travel through the Neighborhood District.

The bicycle lanes on Livingston Street can be used as an alternative to bicycling on the sharrow sections of Robinson Street.

A Note On 2-Way Protected Cycle Tracks

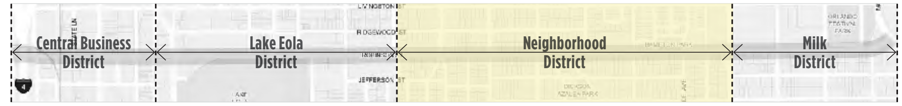
Many two-way cycle tracks have been implemented across the country in recent years as they provide exclusive space for bicycles and are separated from motor vehicle travel lanes, parking lanes, and sidewalks. The level of treatment and investment can vary– from delineating using paint and markers, to higher-level investments such as raised curbs, special pavers, and landscaping.

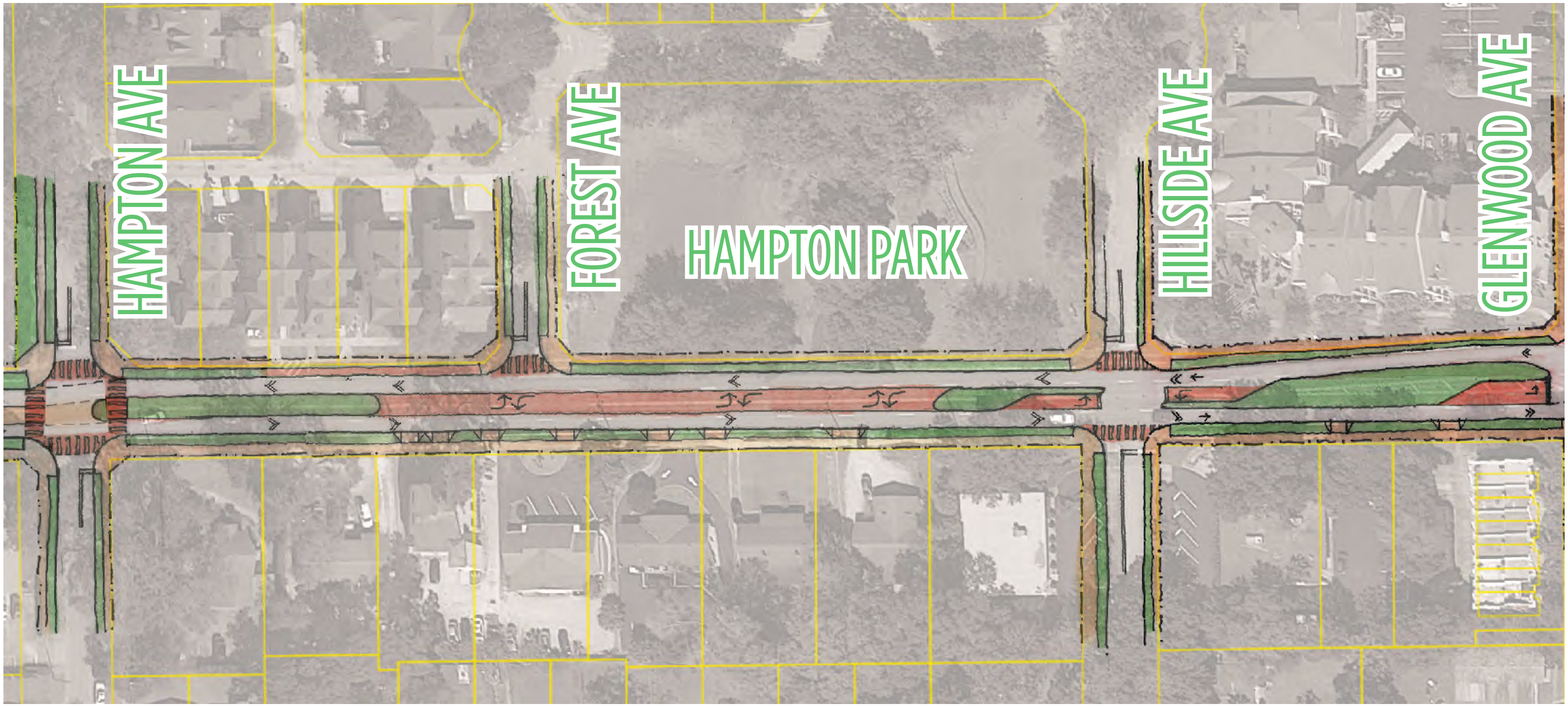
- Protects bicycle space and improves perceived comfort and safety
- Increase width allow safer overtaking for bicyclists
- May requires special signing at driveways and side streets to increase awareness of bi-directional bicycle travel.
- May require special bicycle and No Right-Turn-on-Red phasing to protect bicycle movements at signalized intersections

Davis, California
[Source: Sonoma County Bicycle Coalition: https://www.bikesonoma.org/were-heading-to-davis-ca/]

Dunsmuir Street, Vancouver, Canada
[Source: Photo by Paul Krueger under a Creative Commons license]

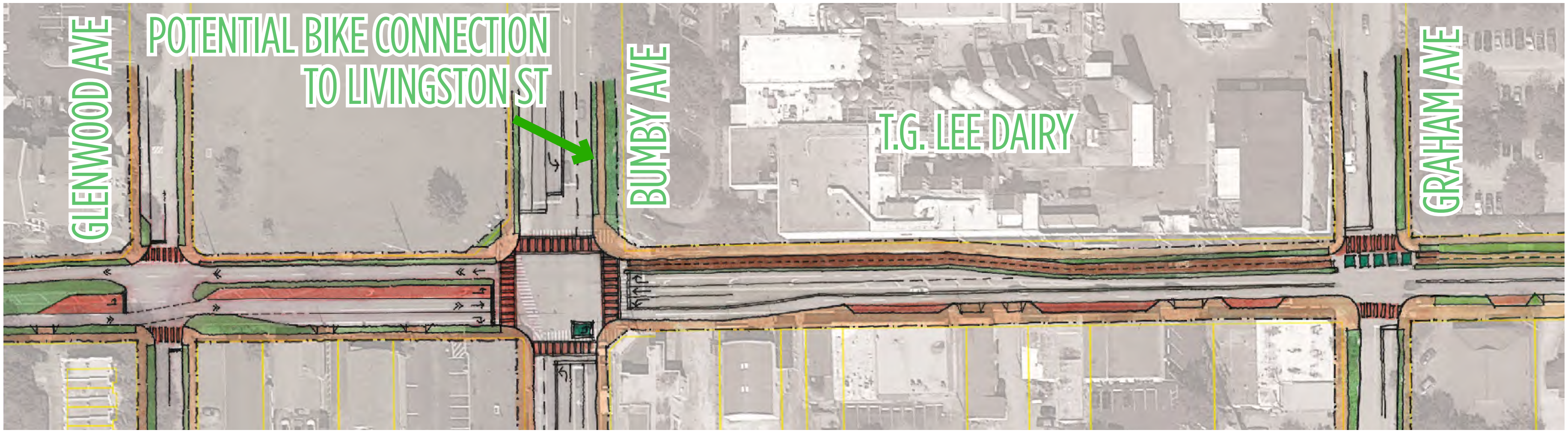
Neighborhood District





The two-way cycle track would be dropped and a wider landscaped median would be introduced at strategic locations along Robinson Street in the Neighborhood District.

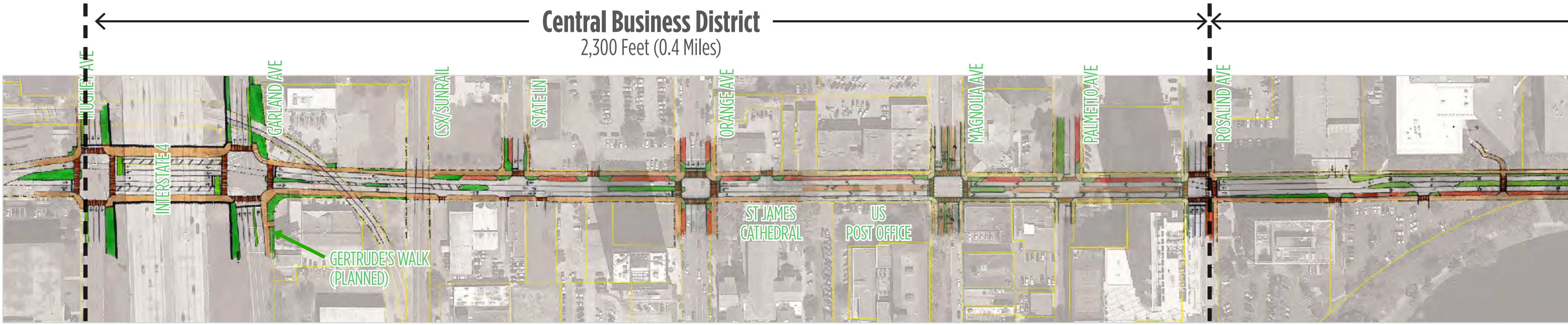
Milk District



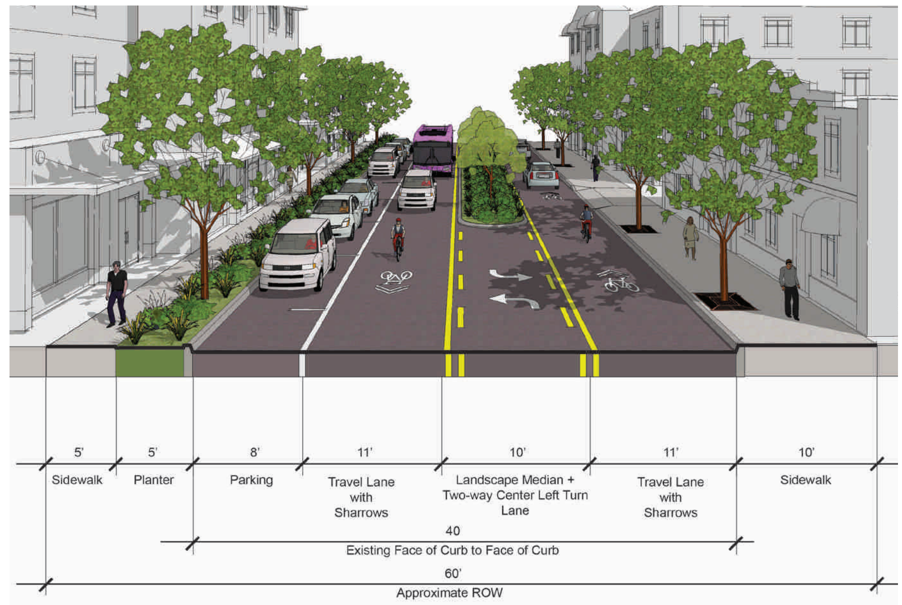
The two-way cycle track would be re-introduced on the north side of Robinson Street at Bumby Avenue, and permanent on-street parking spaces would be added on the south side, where possible, to support the businesses in this area.

On the eastern end of the corridor, the two-way cycle track would transition to a wide sidewalk just west of Maguire Boulevard, and eventually connect to the shared use path that runs along the east side of Maguire Boulevard.

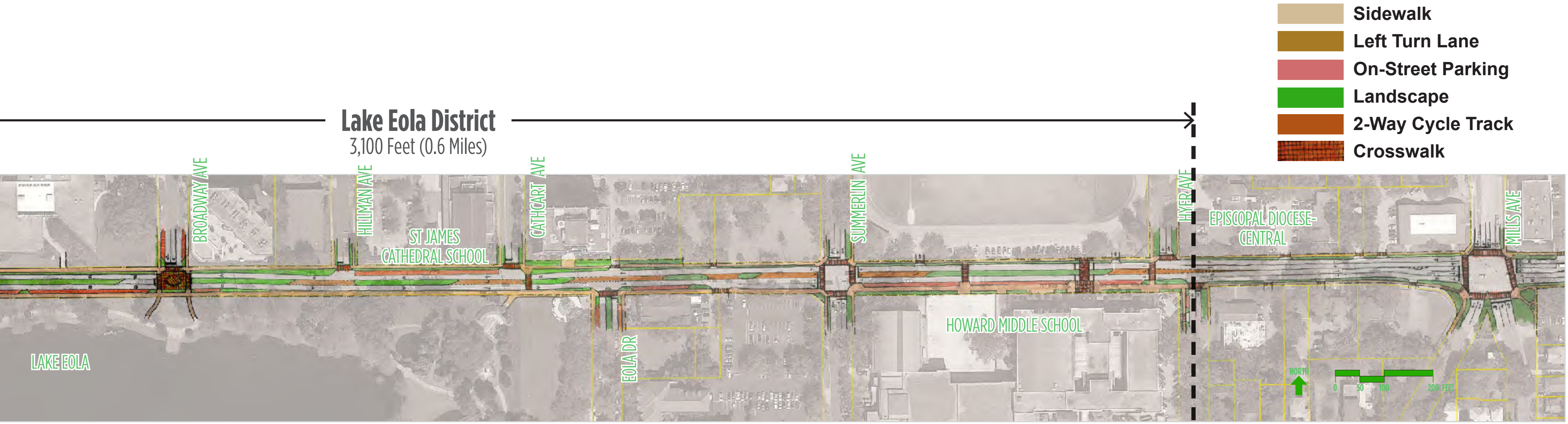
Figure 46 | Alternative 2A/2B Central Business District & Lake Eola District

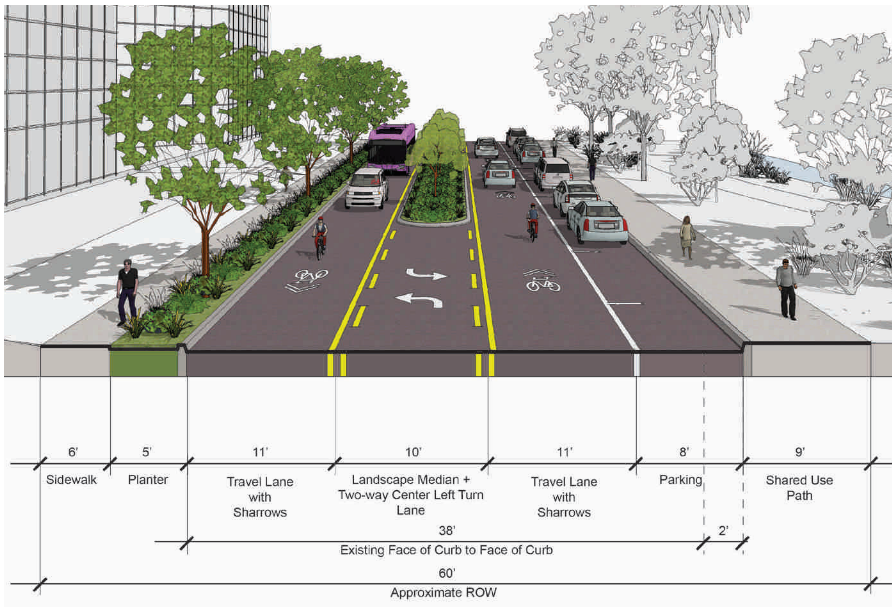


Alternative 2A/2B (shown in **Figure 46** and **Figure 47**) reconfigures the roadway to have three travel lanes between Hughey Avenue and Hyer Avenue, in the Central Business District and Lake Eola District, and will maintain the existing four lanes in the Neighborhood District and Milk District. The four lanes east of Hyer will allow for more vehicle capacity where traffic volumes are highest along the corridor, and allow a higher level of bicycle and pedestrian accommodation where there are more needs and destinations for walking and bicycling near Downtown and Lake Eola Park. Alternative 2B, a variation of Alternative 2A, includes three lanes in the Milk District to accommodate on-street parking for the Milk District shops and restaurants.



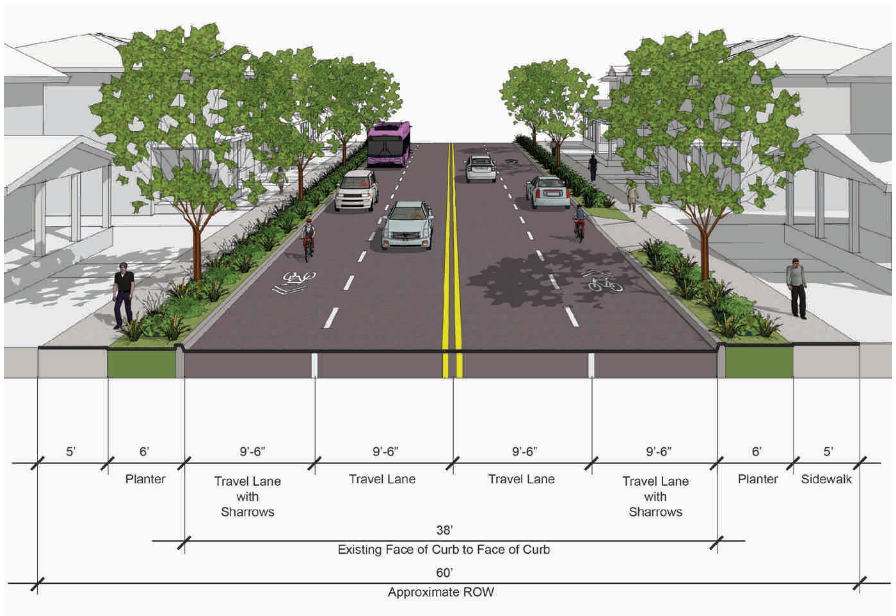
Central Business District: The Central Business District would include one travel lane with sharrows in each direction, a center two-way left-turn lane along most of the section, and a permanent parking lane along the north side of the roadway. This alternative includes the existing wide sidewalks. Washington Street (two blocks south of Robinson Street) was identified as a key pedestrian street and could also serve as a primary bicycle route, carrying cyclists on a future exclusive bicycle path through this District.



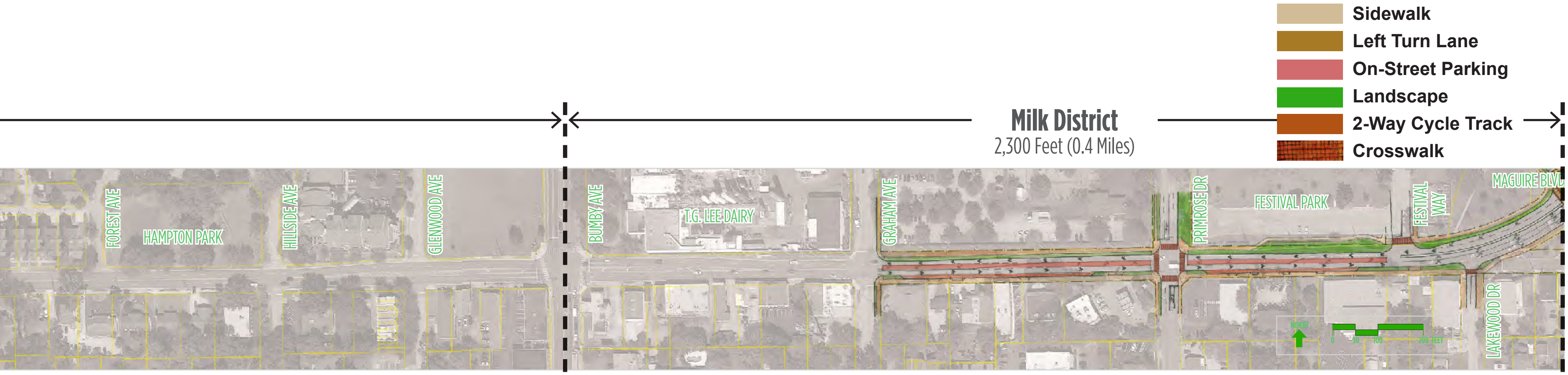


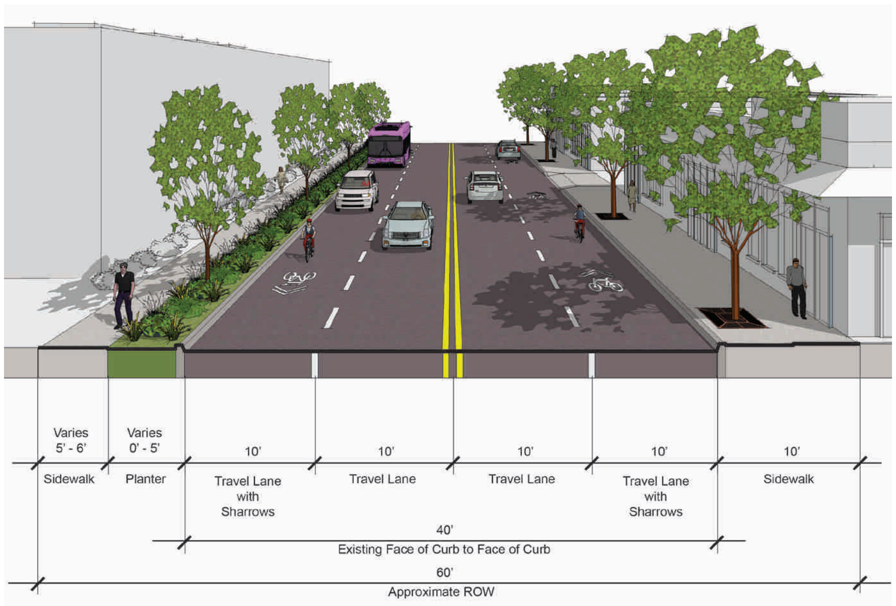
Lake Eola District: The Lake Eola District would include one travel lane with sharrows in each direction with a center two-way left-turn lane and landscaped spot medians, at strategic locations, to create a parkway character near Lake Eola Park. This alternative includes on-street parking on the south side of the road to support Lake Eola Park, and a shared-use path to support the safe and comfortable travel of pedestrians and cyclists accessing destinations along this stretch of roadway.

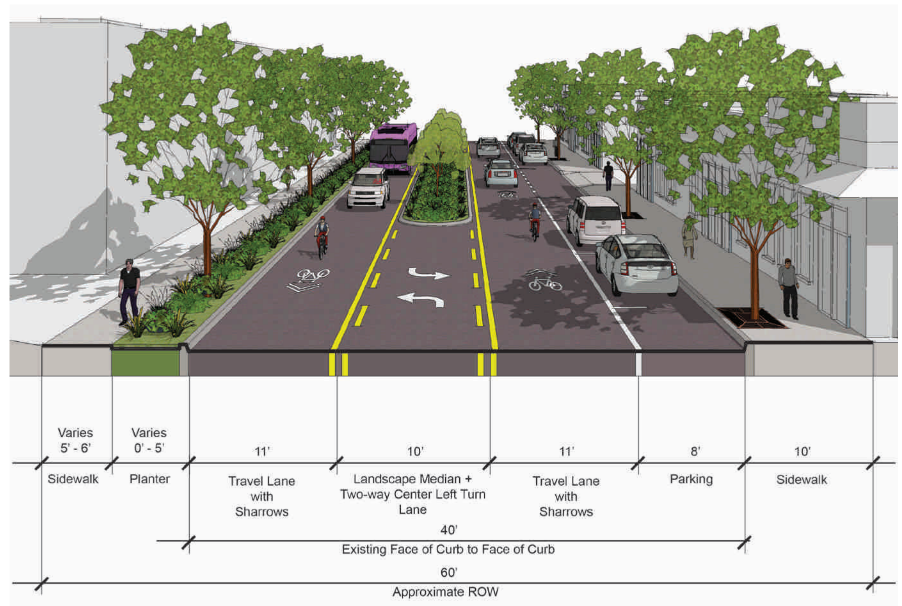
Figure 47 | Alternative 2A/2B Neighborhood District & Milk District



Neighborhood District: The Neighborhood District would be similar to existing conditions, and would include two travel lanes with sharrows on the outside lane in each direction, and existing sidewalks and landscape buffer remaining.

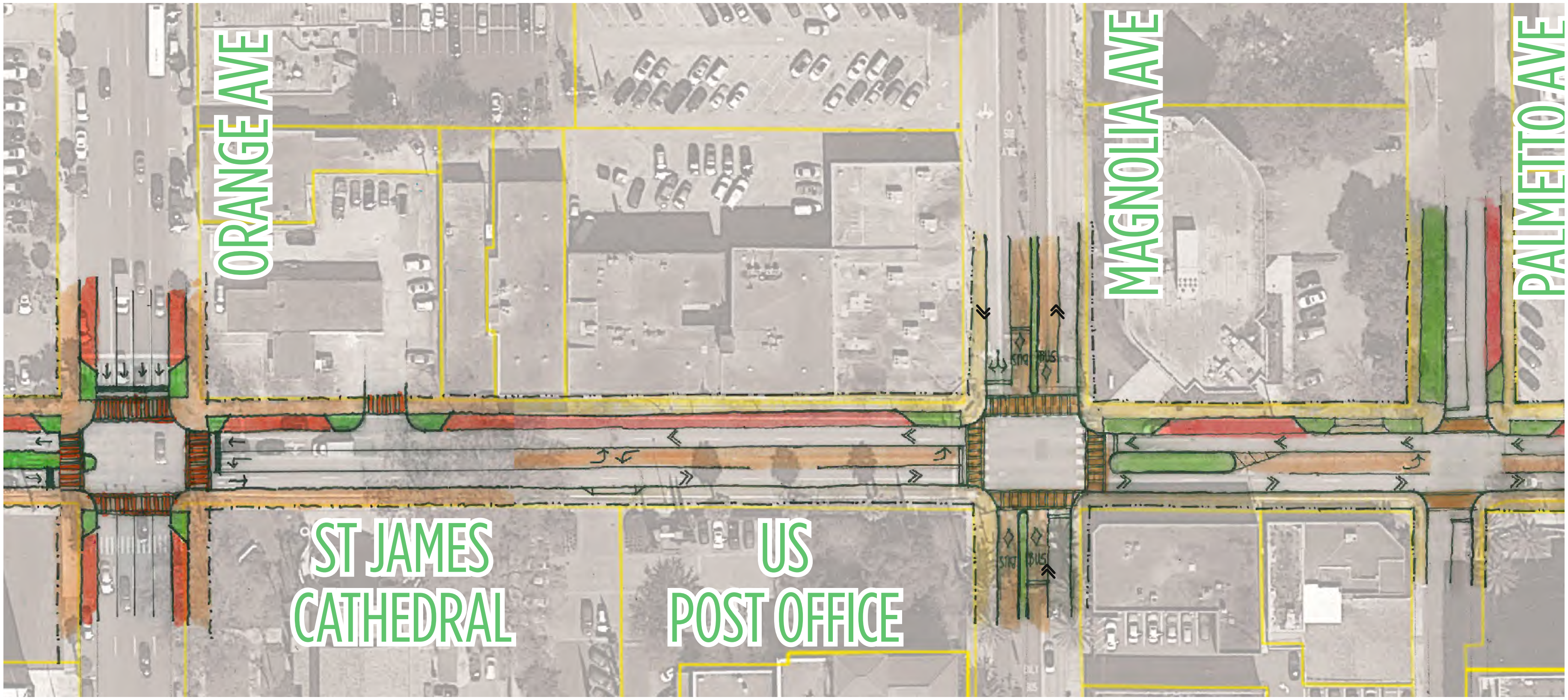






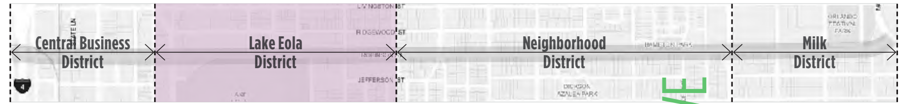
Milk District: In Alternative 2A, the Milk District would continue the four-lane cross section with sharrows in each direction and include existing sidewalks and landscape buffers. A variation of this alternative, Alternative 2B, would include one travel lane with sharrows in each direction and a center two-way left-turn lane and spot medians throughout. This alternative introduces on-street parking on the south side to support the Milk District businesses and includes wide sidewalks and landscape buffer, where existing.

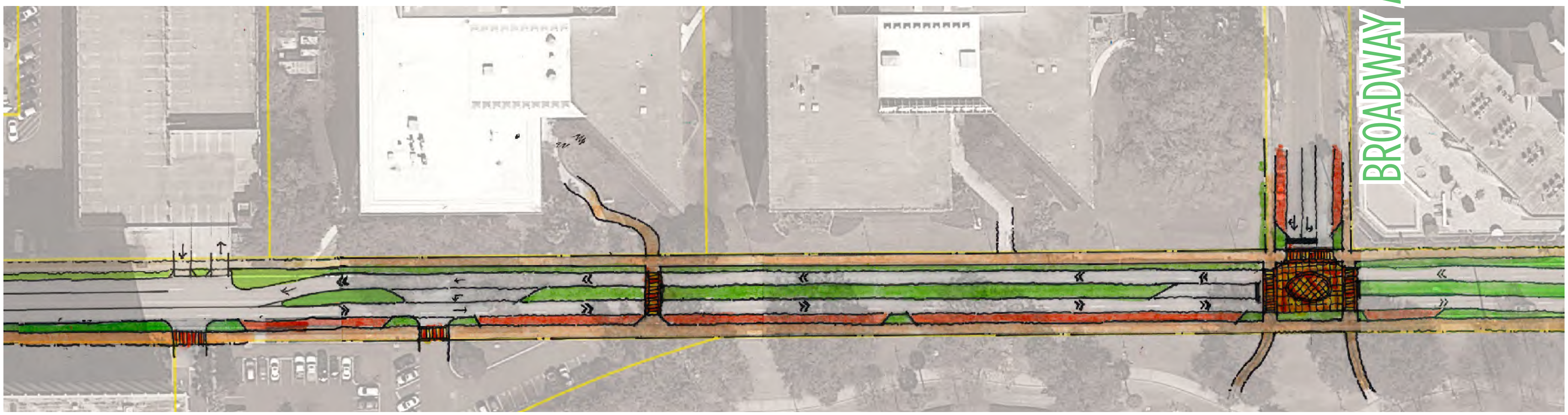
Central Business District



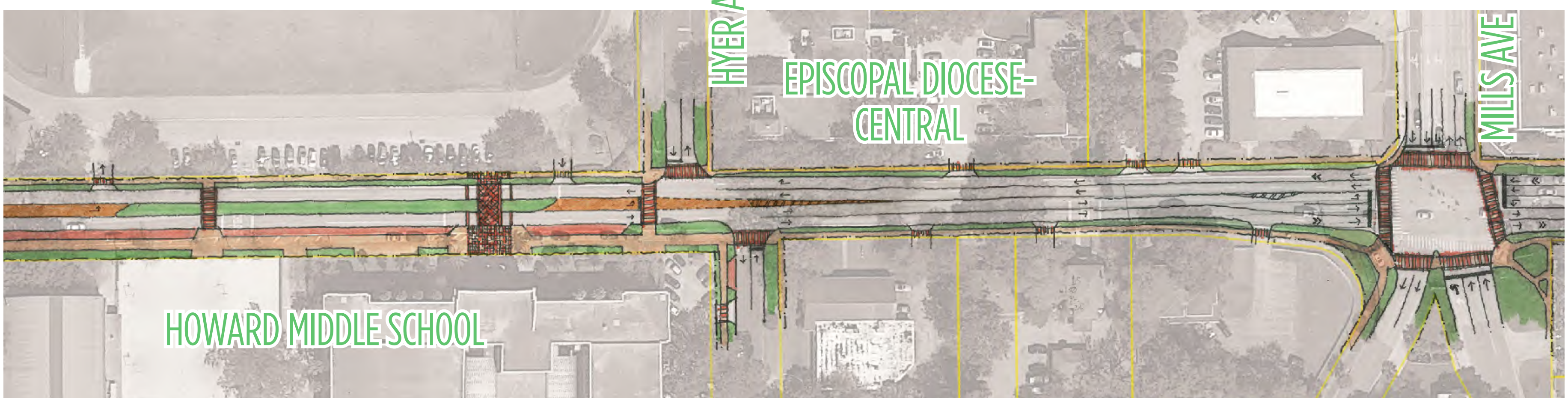
Alternative 2 would include permanent parking on the north side to support the businesses along this section of roadway.

Lake Eola District



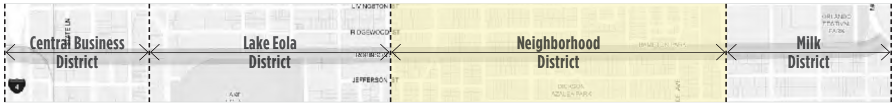


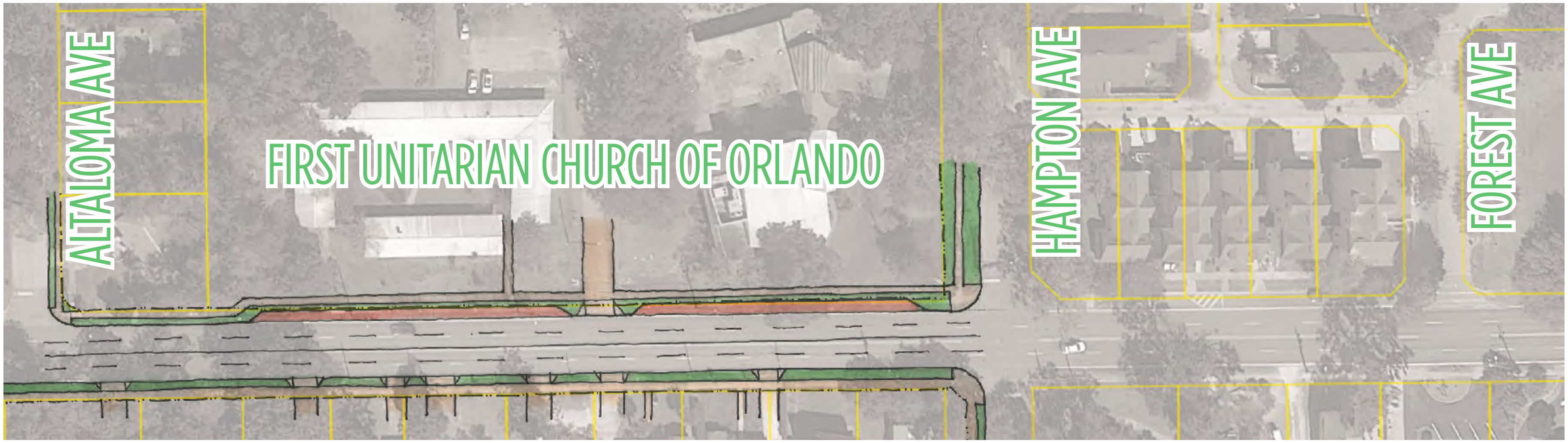
This section would include on-street parking on the south side to support Lake Eola Park and other businesses in the area. Similar to Alternative 1, it would include landscaped medians in front of Lake Eola Park to facilitate more comfortable and convenient pedestrian crossing and bring the "parkway" feel across the roadway.



This section would transition from three to four lanes just west of Mills Avenue in order to carry the existing four lanes of vehicular capacity and dedicated left-turn lanes through the busy Mills Avenue intersection.

Neighborhood District





This section would keep the existing four-lane cross section. Near the First Unitarian Church of Orlando, an easement on the north side of the road could be used to provide additional street parking for the church. The church expressed interest in additional on-street parking along Robinson Street. This scenario would have to be coordinated with the City of Orlando.

Milk District

Alternative 2A would continue the existing four-lane cross section through the Milk District. Alternatively, the stakeholders from the Milk District expressed their support for on-street parking in order to bolster the businesses in the area and help slow down traffic speeds. Thus a variation of Alternative 2A, Alternative 2B (shown above) was proposed to include only one travel lane with sharrows in each direction, a center left-turn lane at the intersections, and on-street parking on the south side.

The following are illustrative renderings of the alternatives near the intersections of Cathcart Avenue and Eola Avenue.

Short-List Alternative 1
(at Robinson Street and Cathcart Avenue)

Short-List Alternative 2
(at Robinson Street and Cathcart Avenue)

Spot Improvements

In addition to the cross section improvements, the study team identified spot improvements along the corridor that, if implemented, can also help to meet Robinson Street's needs. A few of these spot improvements cannot be implemented unless the corridor is reconfigured as a two-lane or three-lane roadway, but many can be implemented regardless of the cross section alternative selected.

Marked Crossings

At some locations along the corridor, there was a demonstrated need for a higher level of pedestrian accommodation to facilitate the safe crossing of Robinson Street. Locations were chosen based on spacing of existing marked pedestrian crossing locations, pedestrian count volumes, and industry standards for marked pedestrian crossings as outlined in the Manual on Uniform Traffic Control Devices (MUTCD) and FDOT Traffic Engineering Manual (TEM). It is recommended that an additional engineering study be conducted at each of the proposed locations for new marked crossings. Further, FDOT Traffic Operations recommends that the mid-block crossings only be implemented if Robinson Street is reconfigured as a two or three-lane cross section, and that pedestrian refuges be included, where possible. The following outlines the potential new marked pedestrian crossings and the basis for their recommendation.

1 Lake Eola District Mid-Block Crossing Treatments

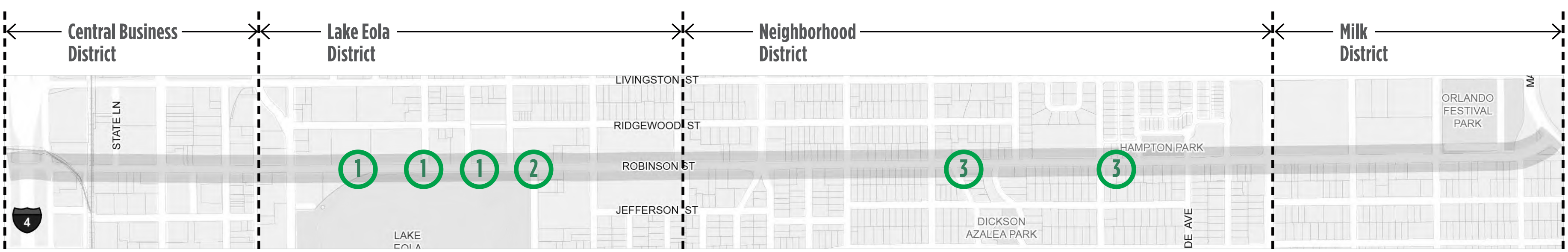
Recommendation: Consider providing pedestrian hybrid beacon at midblock location. An additional engineering study is needed to finalize the recommendation.

- ~1,000ft between existing intersections
- 85th Percentile Speed: 37 mph
- Vehicle volume: 16,000 ADT (1,642 two-way peak hour volume)
- Roadway width: 38 feet
- Pedestrian volume: 20+ for seven hours of the day

2 Broadway Avenue to Eola Drive Marked Crosswalk

Recommendation: Consider providing marked crossings and Rectangular Rapid Flashing Beacons (RRFB) at Hillman Avenue and Cathcart Ave (or Eola Drive). An additional engineering study is needed to finalize the recommendation.

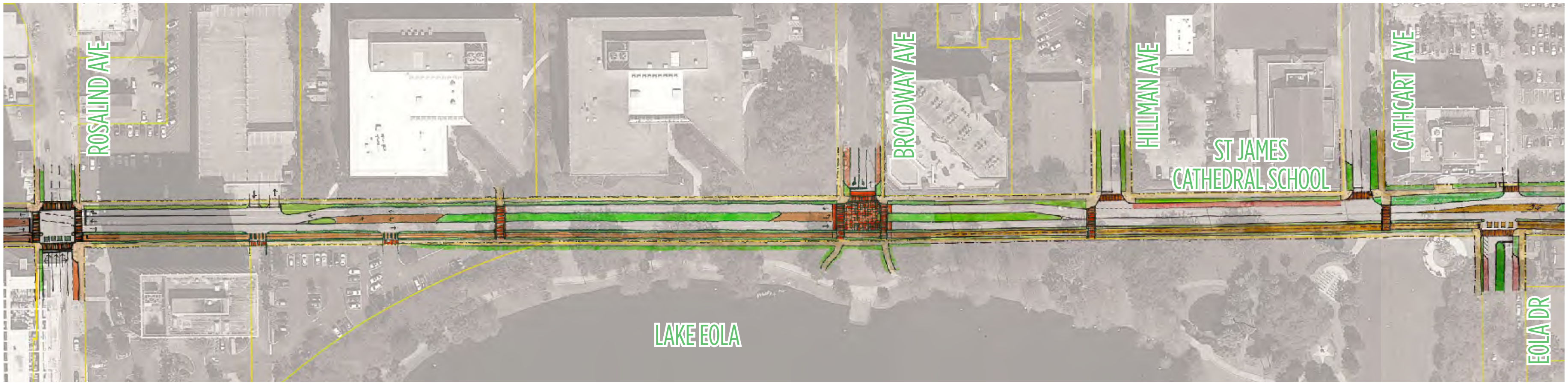
- ~350ft between existing intersections
- 85th Percentile Speed: 37 mph
- Vehicle volume: 16,000 ADT (1,642 two-way phv)
- Roadway width: 38 feet
- Pedestrian volume: 20+ for six hours of the day
- Three pedestrian crashes at Eola Drive



③ Fern Creek Avenue to Bumby Avenue Marked Crosswalk

Recommendation: Consider providing a marked crossing and RRFB at Hampton Road and a marked crossing at Rosearden Drive. An additional engineering study is needed to finalize the recommendation.

- <660ft between existing intersections
- 85th Percentile Speed: 34 mph
- Vehicle volume: 17,000 AADT (1,700 two-way phv)
- Roadway width: 38 feet
- Pedestrian volume: Not Available

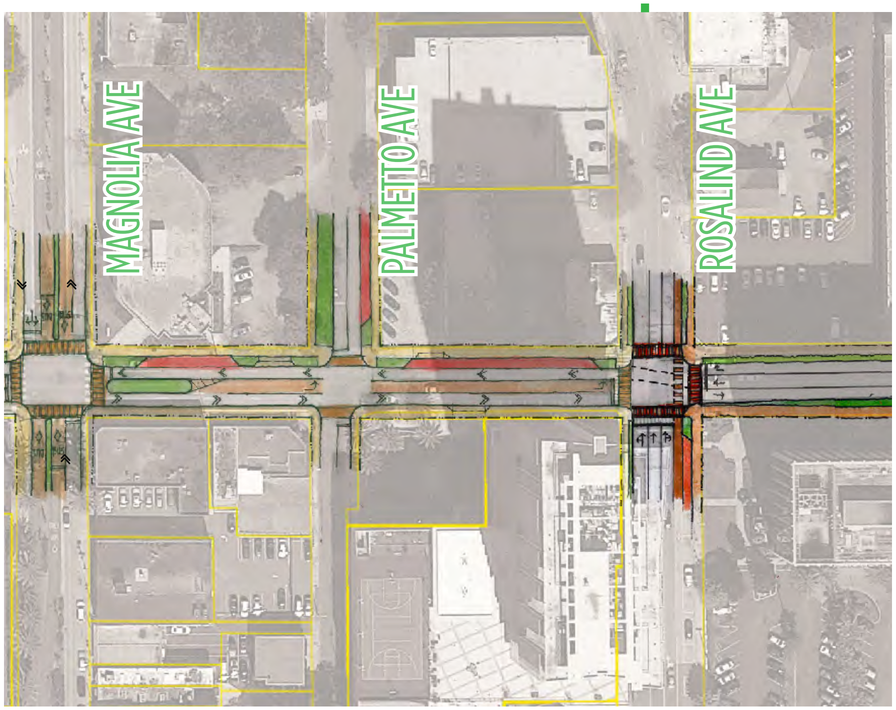


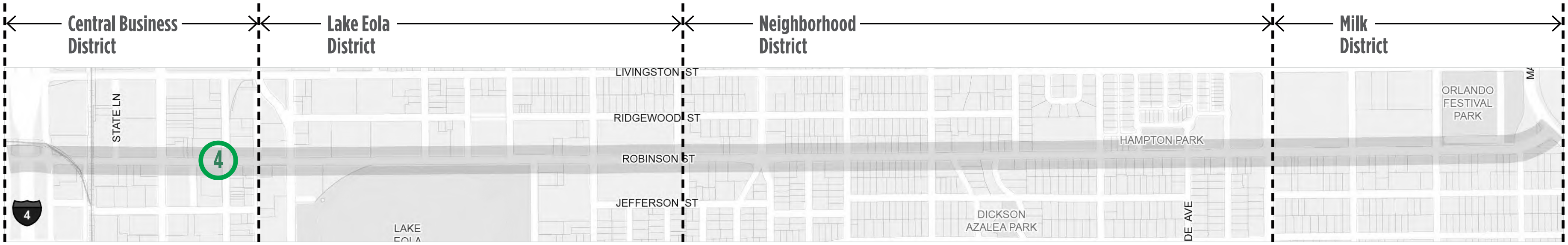
Potential Marked Crossings between Rosalind Avenue and Eola Drive.

④ Lake Eola Charter School

During the stakeholder interviews, Lake Eola Charter School expressed a concern with the pedestrian-vehicle conflicts at the Palmetto Avenue intersection. There is currently an unmarked pedestrian crossing at this intersection at which two pedestrian crashes have occurred. Consider conducting an engineering study to evaluate the benefit of a marked crosswalk and potential RRFB at this location (**Figure 48**).

Figure 48 | Conceptual sketch of potential marked crosswalk at Palmetto Avenue intersection to facilitate safer pedestrian crossings





Intersection Control

Broadway Avenue

The City of Orlando has a particular focus on exploring ways to increase safe pedestrian and vehicular movements at the Robinson Street and Broadway Avenue intersection. The study team explored potential traffic control options at Broadway Avenue and developed solutions for each of the possible corridor-wide alternatives, including a four-lane scenario.

For Four-lane Cross Section

A roundabout and signal were evaluated with a four-lane cross section. A multi-lane roundabout option resulted in significant right-of-way impacts and cost implications. If a signal is added while the existing four-lane section is maintained, the lack of a dedicated eastbound left-turn lane at this intersection may increase the potential for rear-end crashes . The study team recommends that a signal warrant study be conducted. If warranted, it is recommended that a signal be added in conjunction with an eastbound left-turn lane that can be added by utilizing the landscape buffer space on either side of the roadway, as shown in **Figure 49**.

For Three-Lane Cross Section

Three traffic control options at Broadway Avenue were evaluated for the three-lane Robinson Street scenario– a roundabout, traffic signal, and raised table. A roundabout was evaluated at this intersection for its feasibility and effectiveness at processing vehicular traffic and encouraging safe pedestrian crossings. While feasible, a roundabout would result in right-of-way impacts to the properties to the northwest and south of the intersection, affecting highly utilized open space at Lake Eola Park (see **Figure 50**). In addition, a roundabout would result in potential vehicular stacking challenges, where projected 95th percentile peak afternoon vehicular queues extend almost to Rosalind Avenue in the eastbound direction. If the roundabout option is not pursued, it is recommended that a raised table intersection pilot project be considered, shown in **Figure 51**.

A signal warrant study should be conducted to determine if the side street and pedestrian volumes warrant a traffic signal at this location with a three-lane Robinson Street configuration. If a roundabout or signal is not warranted, the study team recommends adding a marked crossing with a rectangular rapid flashing beacon (RRFB).

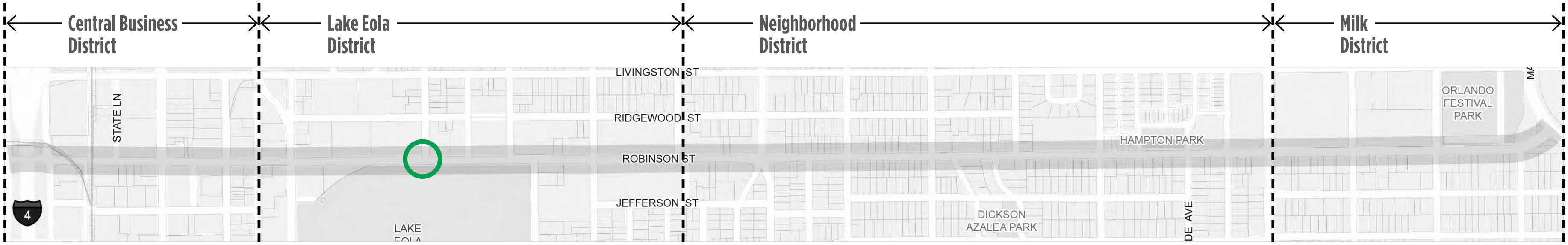


Figure 49 | Potential four-lane configuration at Broadway Avenue if traffic signal is pursued as a result of a signal warrant study.

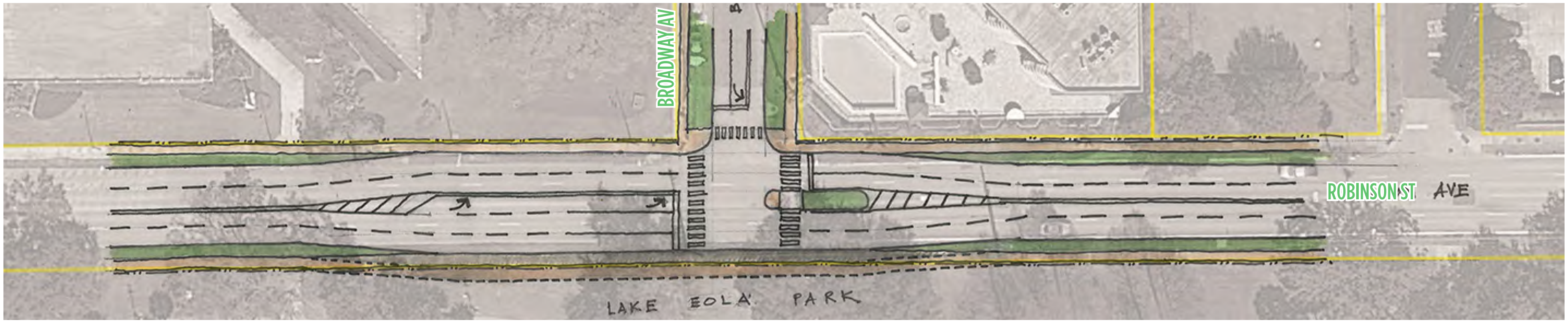
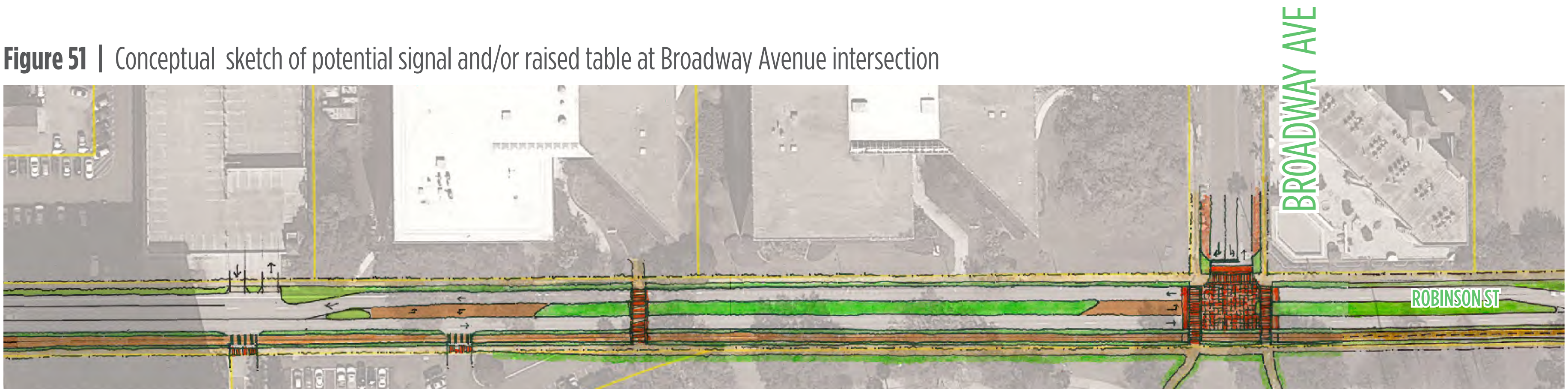


Figure 50 | Conceptual sketch testing the feasibility of a roundabout at Broadway Avenue intersection

Figure 51 | Conceptual sketch of potential signal and/or raised table at Broadway Avenue intersection



Other Intersections

The study team also conducted a sketch-planning roundabout evaluation at the Mills Avenue intersection. At Mills Avenue, a single-lane roundabout shows significant capacity issues, showing a volume-to-capacity ratio above 2.0 for the eastbound approach. A multi-lane roundabout exhibits less operational issues, but significant right-of-way takes would be necessary in order to be implemented. It is recommended that a more detailed analysis of geometric impacts of a roundabout be considered as part of the concept development phase.

In an effort to meet Need 7 (Reconnect Neighborhoods) in the Neighborhood District, it is recommended that a traffic control study be conducted at Hampton Avenue. As part of this study, roundabout, traffic signal, and controlled pedestrian crossing alternatives should be evaluated with a particular focus on multimodal access across Robinson Street.

Howard Middle School Circulation

Howard Middle School students regularly cross at the pedestrian signal in front of the school during the day for school activities, as well as before and after the day. During the busy drop-off and pick-up hours, the left-turn and right-turn queues at the entrance driveway to the track field/parking area back up through the existing pedestrian signal and block the travel lanes along Robinson Street. The traffic queues create dangerous conflicts between entering and exiting vehicles and students accessing the track field, as well as limit driver visibility of pedestrians at the traffic signal (see **Figure 52**).

A proposed solution to mitigate this issue is to relocate the existing eastern driveway from Robinson Street to Hyer Avenue. This change relocates some of the vehicular movement along Robinson in and out of the parking lot, and provides a new dedicated left-turn lane to store traffic accessing the parking lot at Hyer Avenue, as seen in **Figure 53**. This spot improvement may be implemented with any of the cross section alternatives.

The Orange County Public Schools (OCPS) plans to convert Howard Middle School to a full magnet school with the transition beginning in the 2017/2018 school year. This will result in some changes in the drop-off and pick-up traffic patterns of the school, as students who currently attend Howard Middle School from area neighborhoods may no longer attend the school, and students may come from various other geographic areas. The full magnet school implementation will be a few years out, and Howard Middle School may eventually not require school buses to service students. OCPS is beginning to study the needs related to the magnet school conversion. FDOT will closely coordinate with OCPS as Howard Middle School advances plans for converting to a full magnet middle school to incorporate this and other potential Robinson Street changes resulting from this study.

Figure 52 | Existing Howard Middle School Circulation Pattern

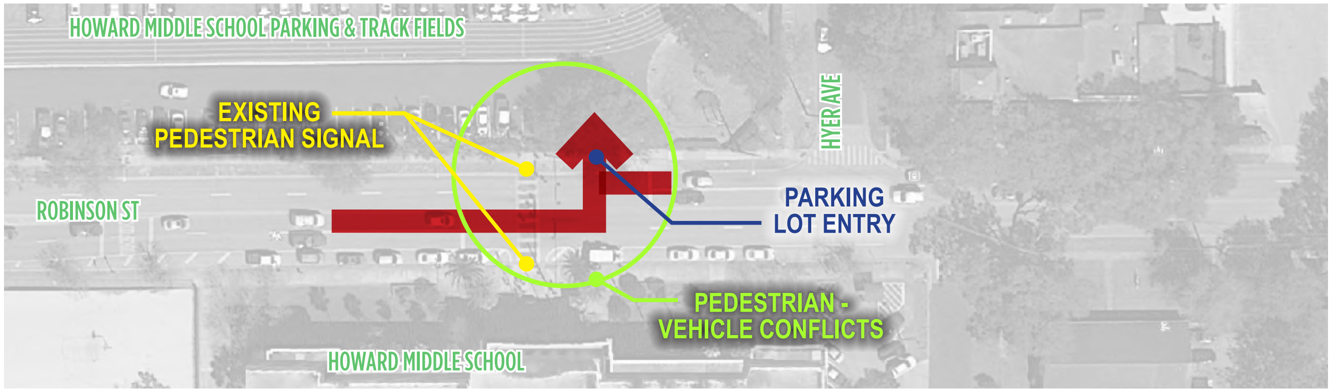
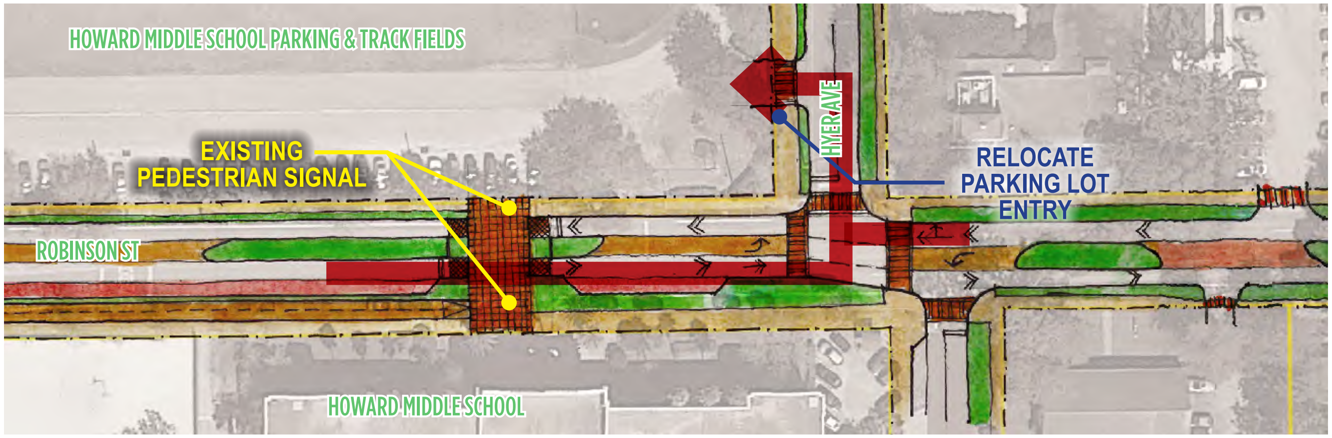
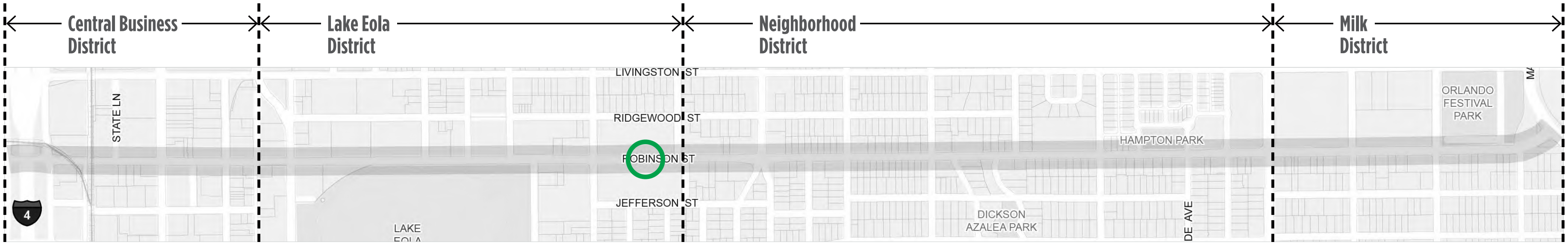


Figure 53 | Proposed Howard Middle School Circulation Plan

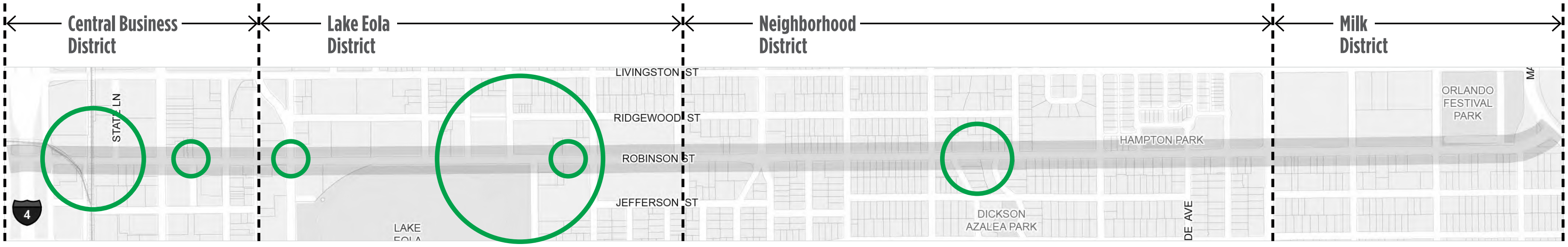




Maintenance Improvements

During the field review and stakeholder engagement, spot locations were identified as needing maintenance improvements. The following maintenance improvements should be incorporated into FDOT and the City of Orlando maintenance activities:

- Maintain landscaping to keep sidewalks clear
- Fix deteriorating pavement/curbs at various locations
- Improve drainage at locations where flooding has been observed:
  - Near Palmetto Avenue
  - West of Summerlin Avenue
  - East of Broadway Avenue
  - Between Rosearden Drive and Hampton Avenue
  - At constricted inlets
- Sidewalk accessibility and connectivity improvements
  - Sidewalk gap / barrier between Garland Avenue and railroad tracks. This gap will be addressed as part of the I-4 Ultimate plans.
  - Enhance Rosalind Avenue southeast corner pedestrian ramps.
  - Address sidewalk buckling east of Eola Drive.



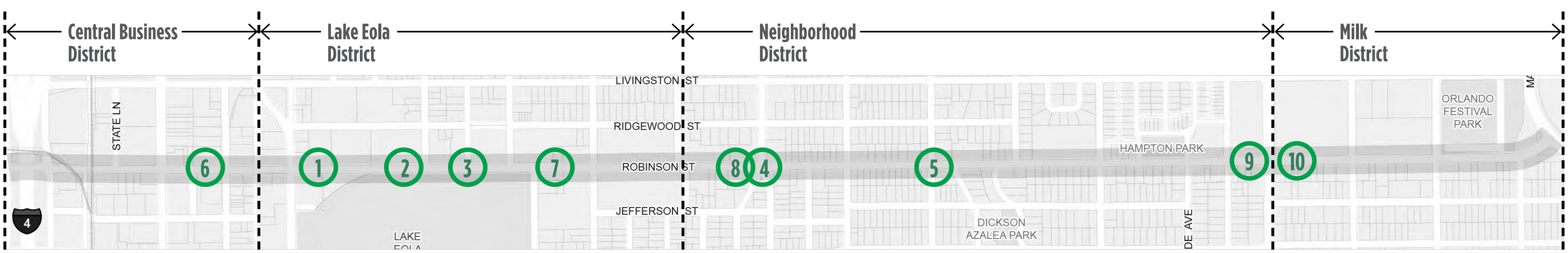
Bus Stop Relocation/ADA Enhancement

To encourage safe pedestrian crossings at designated locations, minimize conflicts with right-turning vehicles, and allow for increased right-turn capacity at intersections the study team identified existing bus stop locations which should be relocated. These includes the following and are illustrated through the key map at the bottom of the page.

1. East of Rosalind Avenue, westbound side: Locate to west of Rosalind Avenue
2. West of Broadway Avenue, eastbound and westbound sides: Locate near proposed mid-block crossing
3. East of Hillman Avenue, westbound side: Locate closer to Hillman Avenue intersection/proposed crossing
4. Mills Avenue surrounding bus stops: Locate to far-side of Mills Avenue and just north of Robinson Street
5. East of Fern Creek Avenue, westbound side: Locate to far-side of Fern Creek Avenue

The American with Disabilities Act (ADA) requires a 5' x 8' bus stop pad at all stops and connectivity from the bus stop to street, sidewalks, and/or pedestrian paths. The following bus stops are not currently compliant with ADA criteria. These are also indicated on the key map at the bottom of the page.

6. Eastbound, West of Magnolia Avenue: Sidewalk < 8ft wide
7. Eastbound, East of Eola Drive: Bus stop in grass next to sidewalk
8. Eastbound, West of Mills Avenue: Bus stop in grass between two driveways
9. Westbound, West of Bumby Street: Sidewalk < 8 ft wide
10. Eastbound, East of Bumby Street: Bus stop in grass next to sidewalk



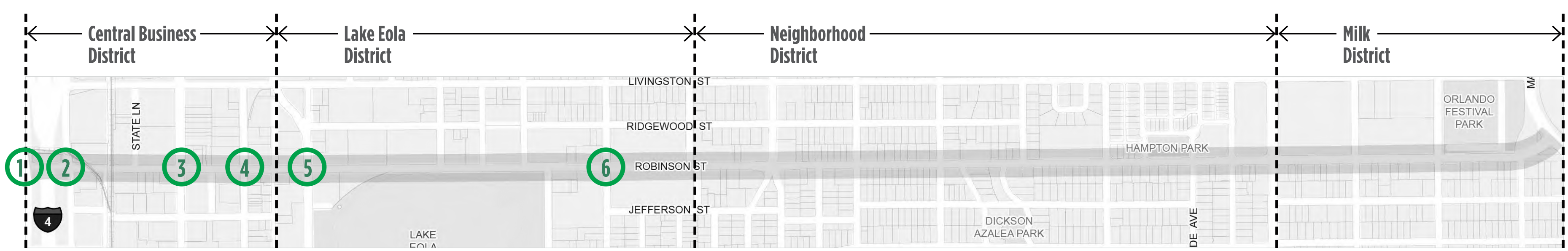
Signal Phasing Recommendations

Leading Pedestrian Intervals (LPIs) are a signal timing strategy that incorporates a pedestrian only phase prior to the vehicle through movement phase to give pedestrians a "head start" to clear one lane of traffic and reduce potential vehicle-pedestrian conflicts. Maximum pedestrian phasing is a signal timing strategy which extends the pedestrian phases so that the "flash don't walk" phase termination correlates with the green phase termination in order to give pedestrians the maximum opportunity to cross. LPIs and maximum pedestrian phasing are recommended for the following high pedestrian traffic locations in the Central Business District and Lake Eola District, and are illustrated in the key map at the bottom of the page.

1. Hughey Avenue
2. Garland Avenue
3. Orange Avenue
4. Magnolia Avenue
5. Rosalind Avenue
6. Summerlin Avenue

In addition, signal phasing recommendations were identified to optimize traffic operations along the corridor at specific locations. FDOT will work with City of Orlando to implement these recommendations:

- Consider reducing bus phase at Magnolia Avenue from twice per cycle to once per cycle
- Robinson Street at Summerlin Avenue:
  - Consider protected/permitted left-turn phase at northbound and southbound approach to relieve the southbound left-turn movement at Broadway Avenue
  - Remove "No Right Turn On Red" restriction during off-peak times (midday, late night, and weekend)



Safety Spot Improvements

While a detailed safety study was not conducted as part of this corridor study, Robinson Street corridor crash data for the years 2009-2013 were analyzed to identify locations showing a safety ratio near 1.0. Safety ratio is a planning-level metric used to identify intersections that, when compared to similar intersections in the County, FDOT District, and State, exhibit a higher than average crash rate. A more detailed safety study (including crash diagrams, updated crash data analysis, and crash type and severity analysis) should be conducted at the following locations exhibiting a safety ratio near 1.0:

1. Rosalind Avenue
2. Eola Drive

St. James Cathedral School Circulation

During the St. James Cathedral School morning drop-off hours (7:00 – 7:50 am) and afternoon pick-up hours (3:15 – 3:30 pm), the queues on Hillman Ave (see **Figure 54**) at the school extends onto Robinson Street, blocking the westbound traffic in the outer lane. If a three-lane cross section is implemented in the Lake Eola District, this queue can potential block the only through lane in the westbound direction. A potential solution was developed to add a hybrid drop-off/parking lane on the north side of Robinson Street between Hillman Avenue and Cathcart Avenue, as shown in **Figure 55**. This lane would serve as a queuing lane during the school drop-off and pick-up time periods, and serve as additional parking capacity for the surrounding destinations. This solution should be considered if a three-lane Robinson Street cross section is pursued.

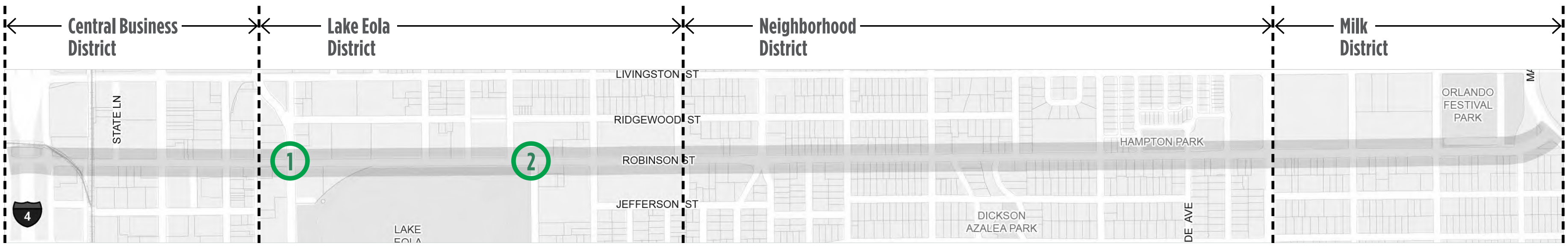
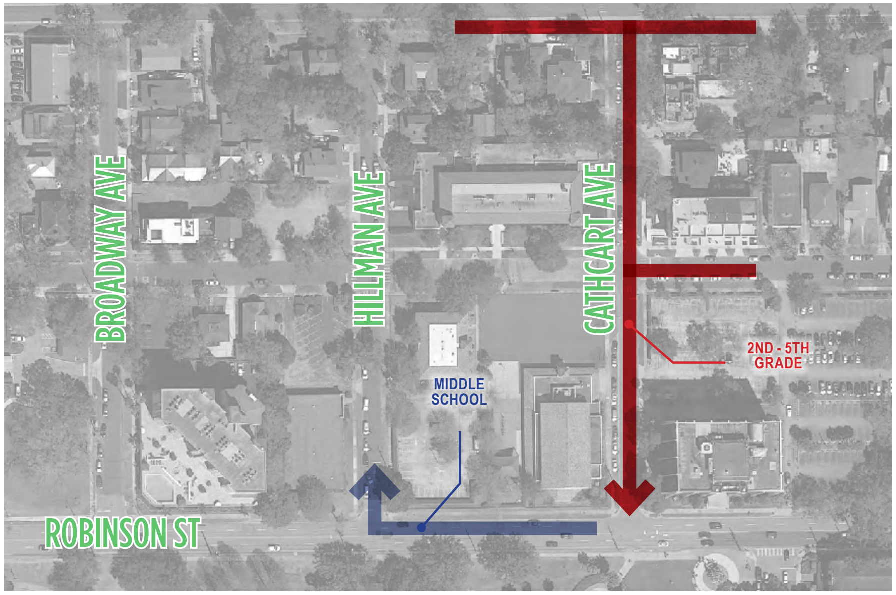


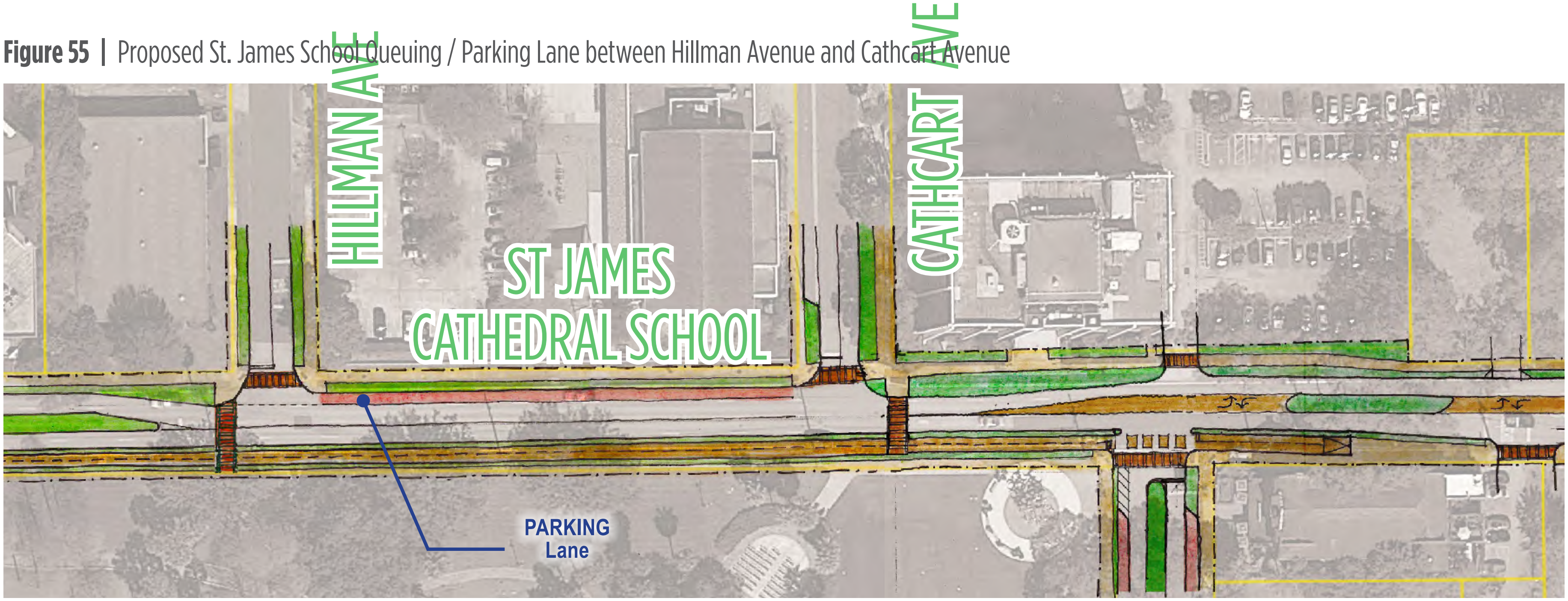
Figure 54 | St. James School Circulation Pattern



Drop off on Hillman Avenue from 7:00 am – 7:50 am
Queue spills onto Robinson Street in the morning

Pick up on Cathcart (going southbound) from 3:15 pm – 3:30 pm
Includes use of police officer to allow southbound left turn's

Figure 55 | Proposed St. James School Queuing / Parking Lane between Hillman Avenue and Cathcart Avenue



7. How can Alternatives Address the Needs?

Evaluation of Short-list Alternatives

In order to evaluate how well the short list alternatives meet the project needs, a second level of evaluation was conducted. This evaluation used the same objectives and measures utilized in the long list evaluation, but were applied with more detailed and quantitative analysis where feasible. This section shows the measures chosen for each need (Table 2), how they were evaluated for the alternatives, and a comparison of how well each short-list alternative meets the project needs.

Table 2 | Evaluation of Short-list Alternatives

Need	Objective	Short-List Measures
1. Improve multimodal access to support Downtown growth and consistent with corridor character	Improve access to existing downtown network.	Intersection delay for key turning movements
		Ratio of future corridor travel time to existing corridor travel time
	Provide for local delivery traffic and needs.	Cross section allows for delivery needs where critical
2. Incorporate complete streets principles to improve pedestrian safety and comfort	Increase safe crossing opportunities in key pedestrian areas.	Average spacing between marked and signalized crossings
	Provide sufficient pedestrian refuge for crossing.	Number of unsignalized crossings with pedestrian refuge
		Number of pedestrian crossings > X feet
	Enhance pedestrian comfort	Separation between pedestrians and automobiles
3. Accommodate bicycling needs for all users on trips accessing corridor destinations	Improve street design to accommodate safe bicycling to corridor destinations.	Percentage of corridor with design speed of 25 mph or less
		Percent of corridor with exclusive bike facilities
4. Maintain appropriate vehicular mobility for trips accessing corridor and Downtown destinations and maintain existing neighborhood character	Maintain consistent travel times.	Ratio of future corridor travel time to existing corridor travel time
		Corridor LOS for all Downtown E/W corridors
	Minimize turning movement blockages at intersections.	Number of turn lanes that can accommodate current year 95th percentile queue
	Improve vehicular efficiency by considering operational improvements (signal timing coordination, addition of turn lanes where needed, etc.)	Intersection delay
	Ensure lane widths are consistent with current standards.	Percentage of corridor with lane widths meeting standard
	Minimize impacts to neighborhood streets	Ability to accommodate existing volumes along corridor

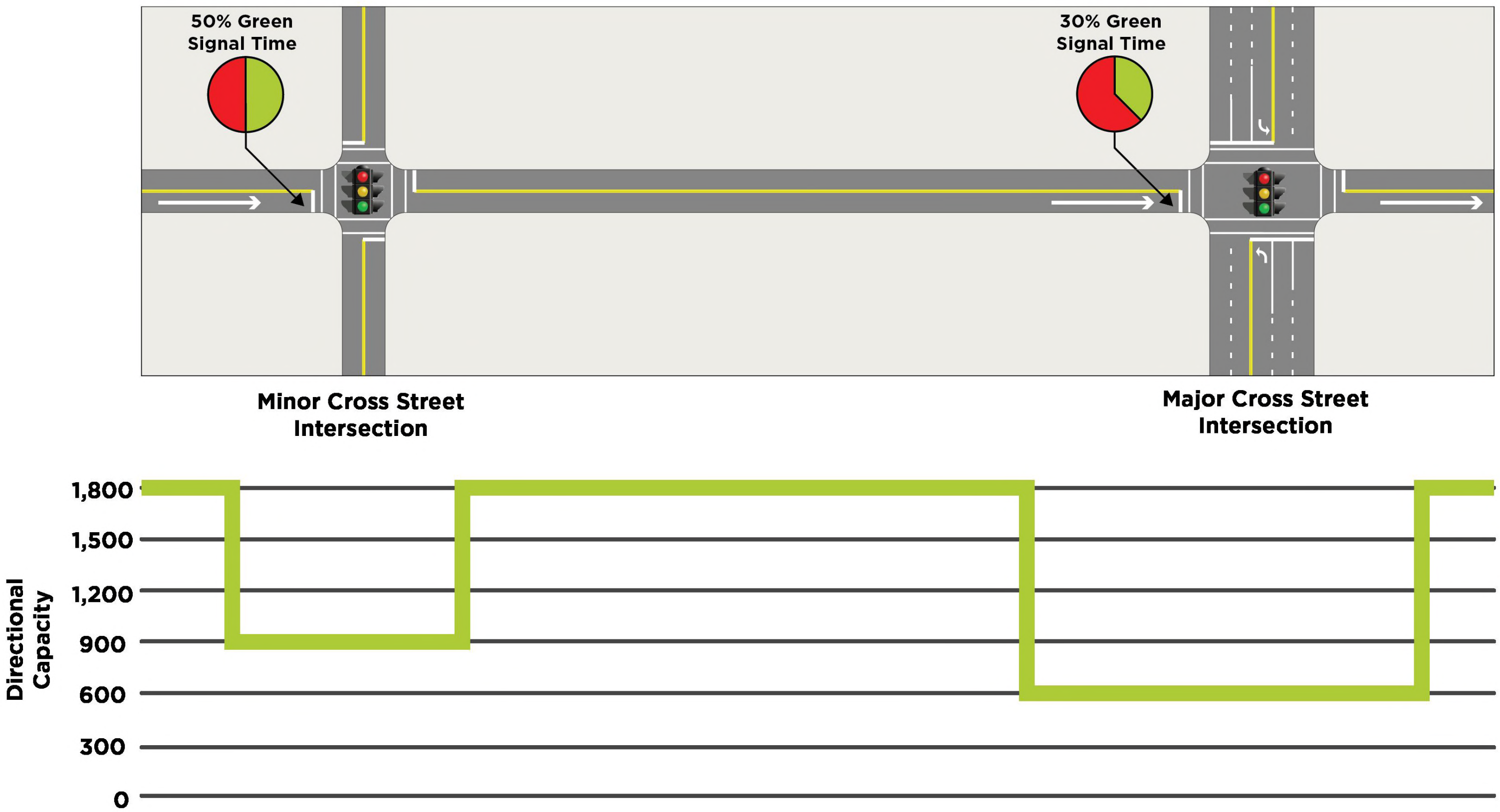
Need	Objective	Short-List Measures
5. Support and improve transit operations along the corridor	Improve safety and efficiency transit operation.	Percentage of corridor with lane widths meeting standard
	Improve transit users' safety, convenience, and comfort along the corridor.	Number of transit stops within 100 feet of marked crossings
	Improve bus stop facilities for user convenience and accessibility.	Number of new transit shelters
	Evaluate bus stop locations for safety and convenience.	Number/percentage of ADA improved bus stops
6. Provide multimodal access consistent with corridor context and emerging character	There were no specific performance measures identified for this need. Table 1 (page 109) highlights the key needs in each character district. A change in cross-section that addresses the priority needs in each district would satisfy Need 6.	
7. Reconnect neighborhoods by increasing corridor permeability	Maintain connections between neighborhoods on either side of Robinson Street	Number of new protected crossing opportunities to connect neighborhoods across Robinson Street
8. Implement fiscally responsible solutions and solutions in the short-term	Evaluate fiscal impacts of all solutions considered	Order of magnitude costs

Understanding Potential Vehicular Diversion

Understanding the potential for vehicular traffic diversion to other streets is a key measure in evaluating how well the alternatives address Need 4 (Vehicular Mobility). As part of this evaluation, the Study team explored what determines vehicular capacity at the corridor level, how operational capacity is influenced by the number of lanes, and future travel demand and potential traffic diversion based on various cross section alternatives.

Corridor capacity is determined at the intersections

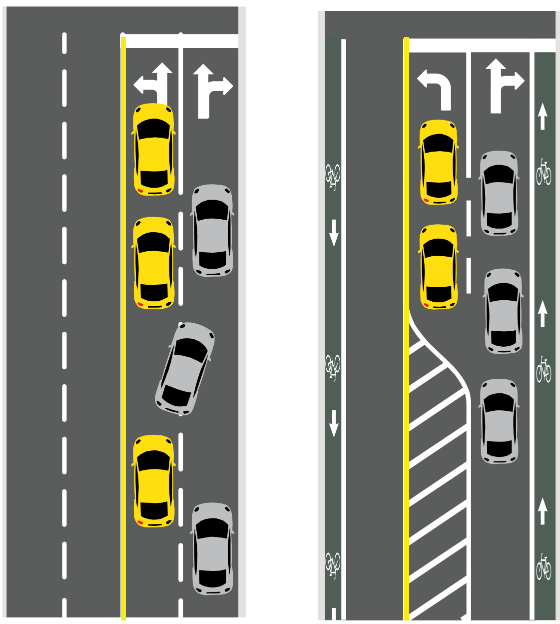
On a corridor with closely spaced signals, such as Robinson Street, the amount of vehicles the corridor can accommodate in an hour is constrained by the intersections. At a signalized intersection, green-time is shared between several conflicting movements. The mainline through movement may only receive 30-40% of the green time in an hour. The number of lanes at an intersection has a much bigger impact on corridor capacity than the number of lanes between two intersections. This is why same agencies have embraced the concept of "wide nodes, narrow roads."



How would Robinson Street operate with a three-lane cross section?

Left Turning Vehicle Operations

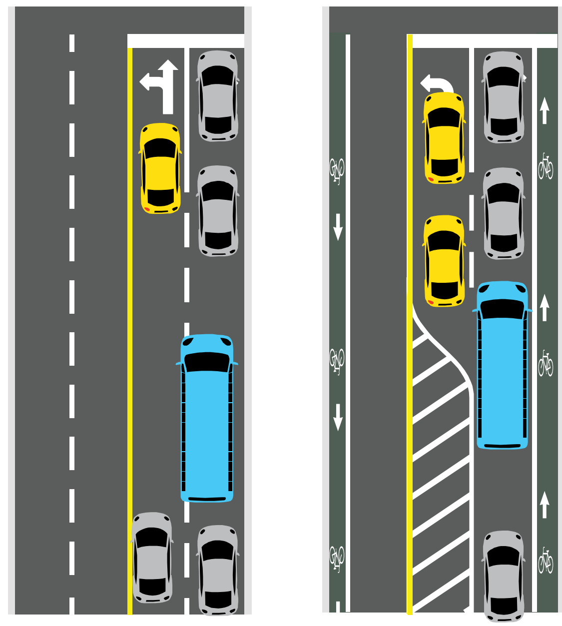
Existing Potential



- Today, many intersections on Robinson St. do not have left turn lanes.
- Cars wanting to make a left-turn stop through traffic behind them, often resulting in risky passing maneuvers.
- A three-lane cross section provides more opportunities for exclusive left-turn lanes.
- The safety benefits of exclusive left-turn lanes are also expected at unsignalized intersections.

Bus Operations

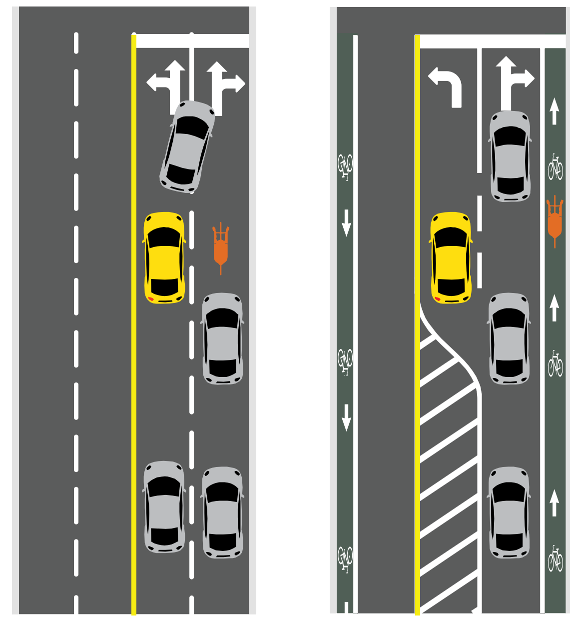
Existing Potential



- LYNX buses are wider than the existing 9.5' lanes on Robinson St.
- Buses have been observed taking up both travel lanes, limiting the capacity of the four-lane section.
- With a three-lane section, the lanes would be widened to fully accommodate wider vehicles and buses.

Bicycle Operations

Existing Potential

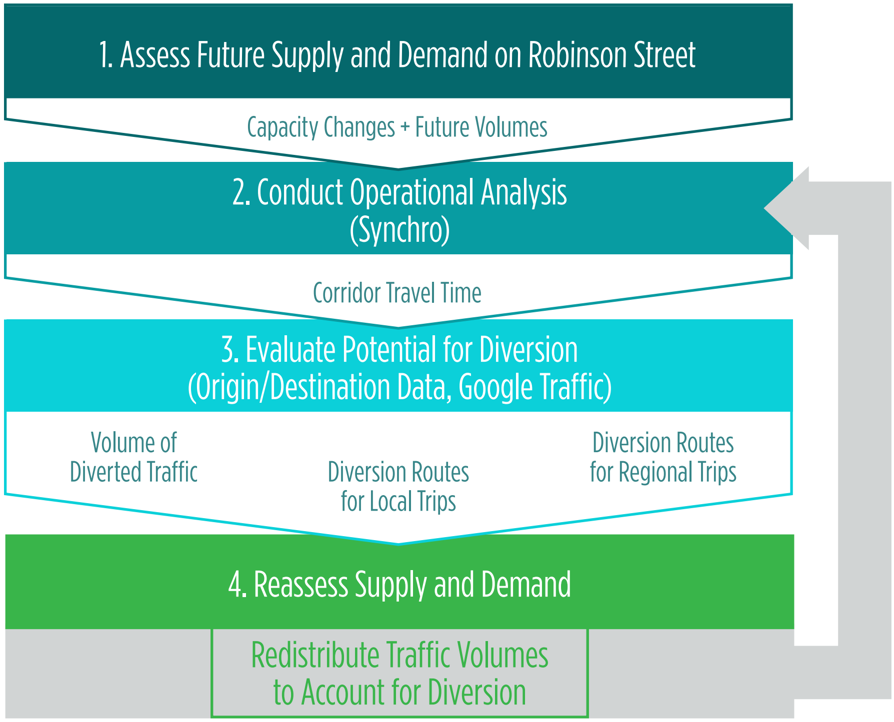


- Bicycles are legally required to 'take the lane' when riding on Robinson St., often slowing down the vehicles behind them.
- A three-lane cross-section would provide a dedicated space for cyclists to ride safely and comfortably.

Future Travel Time and Diversion Potential

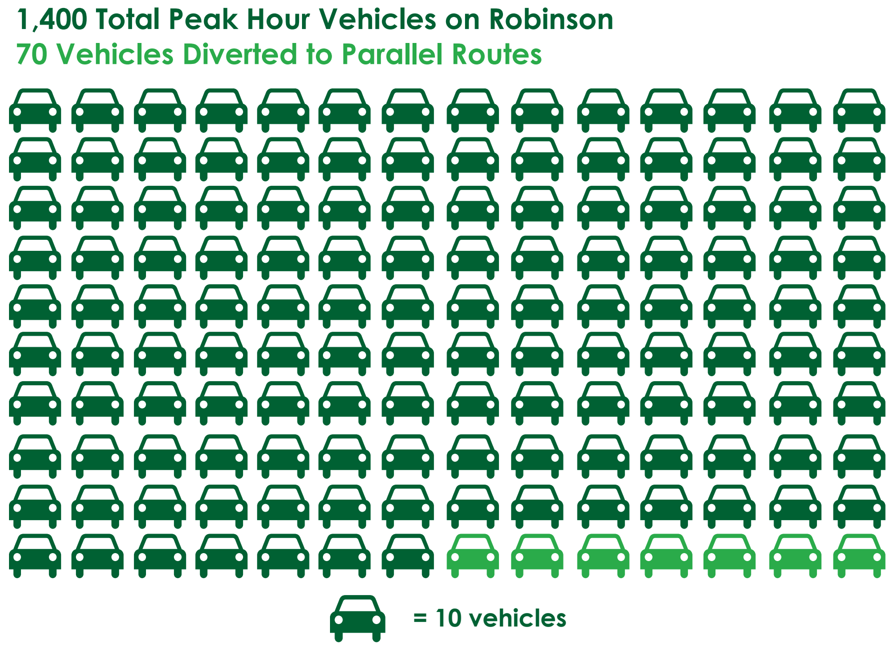
The study team took an iterative approach to evaluate the future corridor operations and the potential for diversion. The analysis was conducted using Highway Capacity Manual (HCM 2010) methodology on Synchro version 8 (a traffic simulation software), and focused on the effect cross section changes have on end-to-end travel time. In a grid network of streets, such as Downtown Orlando, drivers tend to balance themselves across multiple routes. Drivers are likely to divert off of Robinson Street when another route becomes more desirable (i.e. travel times are shorter). The end-to-end travel time for each alternative was compared against the existing travel time on Livingston Street, which is currently 1-3 minutes slower than Robinson Street. If an alternative produces a travel time longer than that of another parallel local street, drivers will likely divert to neighborhood streets.

For this analysis, travel time on Livingston Street was used as a basis for determining potential traffic diversion. The volume on Robinson Street was redistributed to parallel routes until the travel time was once again quicker than Livingston Street.



If Alternative 1 is chosen, it is anticipated that 5% of existing traffic on Robinson Street will divert to parallel routes, during the peak periods only (see **Figure 56**). These vehicles will be spread across multiple routes in Downtown including: State Road 50 (Colonial Street), Amelia Street, Livingston Street, Central Boulevard, South Street, Anderson Street, and State Road 408. It is anticipated that no more than 15 vehicles will divert to any one route during the peak hour (5:00-6:00 PM). This equates to one additional vehicle every four minutes. Diversion is not anticipated with Alternative 2. More detailed travel time analysis is provided in **Appendix J**.

Figure 56 | Alternative 1 Diversion Potential



Future Travel Demand on Robinson Street

Currently, the peak period travel patterns on Robinson Street have about a 75/25 directional split. In the morning, 75% of vehicles are traveling westbound, toward Downtown, and 25% are traveling eastbound. The reverse is true in the PM: approximately 75% of vehicles travel eastbound, out of Downtown. This implies a high percentage of drivers live outside the Study area and commute into Downtown. As described in the Existing Conditions Report, the planned development in Downtown is primarily residential. Any new growth in travel volumes will likely be in the off-peak direction – new residents 'reverse-commuting' out of Downtown in the morning and into Downtown in the evening. Traffic volumes in the peak direction are not expected to increase and may decrease as more Downtown resident choose to walk, bike, and take transit. The existing peak hour, peak direction volumes on Robinson Street represent a reasonable worst-case scenario for future conditions and were used for analysis of alternatives.

Planning Level Cost Estimates

Throughout the majority of the corridor, right-of-way is not needed for any of the alternatives. Additional right-of-way is required only for the Lake Eola District in Alternative 1. Through coordination with the City, it was understood that the City had plans to provide up to a five-foot easement to enhance the bicycle and pedestrian facilities along the park. Alternative 1 is utilizing this easement from the City; therefore, no significant right-of-way costs are anticipated.

The estimated planning level costs for each alternative are[9]:

- Alternative 1A: $6,481,000
- Alternative 1B: $6,449,000
- Alternative 2A: $2,714,000
- Alternative 2B: $3,836,000

The unit costs used for cost estimates and a breakdown of cost by project phase are provided in **Appendix K**.

Summary of Alternatives Evaluation

After evaluating the various performance measures for each need, the Study team synthesized the information and developed a summary matrix to compare the various alternatives.

As shown in **Figure 57**, there is no single alternative that fully addresses every need, but Alternative 1A/1B tend to perform better with many of the needs. The cross section chosen for each district should reflect the most important needs of the district.

9 Cost estimates are based on FDOT Roadway Cost Per Centerline Mile and FDOT 12 Month Moving Averages for Area 8, the area including Orange County.

Figure 57 | Alternatives Evaluation

Alternatives	**Need 1 -** Supports Downtown	**Need 2 -** Pedestrian Needs	**Need 3 -** Bicycle Needs	**Need 4 -** Vehicular Mobility & Neighborhood Character	**Need 5 -** Transit Conditions	**Need 6 –** Character Consistency	**Need 7 –** Corridor Permeability	**Need 8 -** Fiscal Responsibility**
Existing Conditions	◯	◯	◯	●	◯	◯	◯	-
Alternative 1A/1B*	◐	●	●	◔	●	●	●	$6.5M
Alternative 2A	●	◐	◐	◕	◐	◐	◐	$3M
Alternative 2B	●	◕	◐	◐	◐	●	◕	$4M

* Assumes diversion to parallel routes

** Planning level cost estimates includes construction, MOT, mobilization, contingency, design, and CEI (subject to change).

◯ Does not meet the need

◐ Partially meets the need

● Meets the need

8. What Alternatives Best Address the Needs? How do We Advance these Alternatives?

Summary of Public Input

Two public workshops were held to collect feedback on the alternatives being considered. The first workshop was help on October 17, 2016 at 5:30 p.m. at First Unitarian Church. The second workshop was held on October 20, 2016 at 11:30 a.m. at Lake Eola Park. Both workshops followed an open house format with interactive stations to explore components of the alternatives in more detail. During the workshops, the public was asked which alternative they preferred in each character district and had the opportunity to provide comments. Additionally, there was an online survey where the public could provide comments on the alternatives.

Examples of the materials from the public workshops where attendees commented on the spot improvements and provided input on the corridor cross section alternatives.

Two workshops were held to gather input on the short list alternatives.

The public preferred the following alternatives in each character district:

- Central Business District
  - No Build – 17%
  - **Alternative 1 – 66%**
  - Alternative 2 – 17%
- Lake Eola District
  - No Build – 15%
  - Alternative 1A – 28%
  - **Alternative 1B – 51%**
  - Alternative 2 – 6%
- Neighborhood District
  - **Alternative 1 – 58%**
  - No Build/Alternative 2 – 42%
- Milk District
  - **Alternative 1 – 46%**
  - No Build/Alternative 2A – 29%
  - Alternative 2B – 25%

When strung together, Alternative 1B is preferred by the public (**Figure 58**).

The public also shared concerns regarding the different alternatives. Their key comments include:

- Use of sharrows at current posted speed is not ideal
- Potential traffic diversion on neighborhood streets
- Delivery trucks potentially blocking the only through lane
- Reduction of on-street parking from 32 spots (current time-restricted parking) to 12 or less spots (all-day parking) in the Milk District

Other public comments not pertaining to alternative cross sections include:

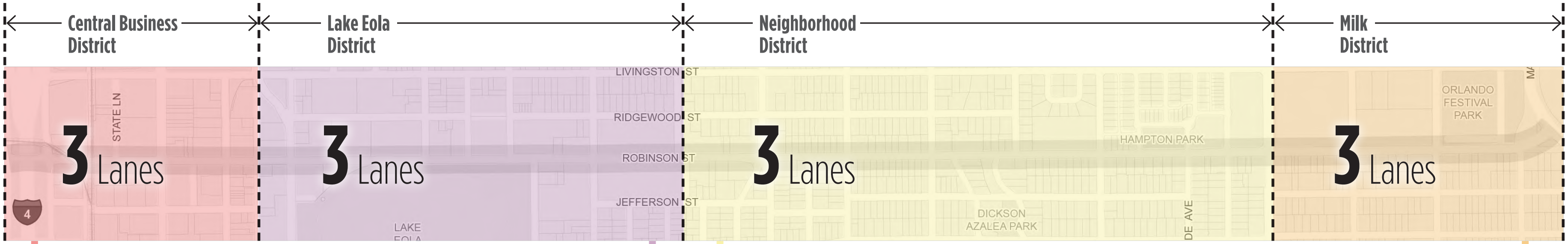
- General
  - Reduce speed
  - Suggestion for reversible two-way left turn lane
- Robinson Street at Broadway Avenue
  - Multiple requests for a traffic signal
  - Multiple requests for a roundabout
  - Limit left turns on and off Robinson Street
- Robinson Street at Eola Drive
  - Multiple requests for crosswalk or signal
  - Limit left turns on and off Robinson Street

Lastly, the public also shared input regarding their concerns on neighborhood streets, including:

- Livingston Street
  - Improve bike lanes
  - Change zoning to office
  - Improve roadway pavement condition
  - Brick streets not in good condition
  - Too much traffic on neighborhood streets
- Speeding on neighborhood streets
- Install measures to discourage cut-through traffic

The materials used during the workshops, a copy of the survey, and a detailed summary of responses are provided in **Appendix C**.

Figure 58 | Alternatives with the Most Support from the Public



Alternative 1

Alternative 1

Alternative 1B

Alternative 1

Recommended Cross Section Alternatives

After reviewing the input received from the public, considering the technical alternatives evaluation, and working with the City of Orlando staff, the Study team recommends advancing the cross sections (shown below and on the following page) to concept development. The recommended alternatives were vetted through the PVT and presented to various FDOT offices and the FDOT management team.

Central Business District

In the CBD, both Alternative 1 and Alternative 2 should be advanced to more detailed concept development. The City is currently conducting an evaluation to determine if Washington Street, an east-west corridor parallel to Robinson Street in the CBD, should have a dedicated bicycle facility. If a bicycle facility is built on Washington Street, a dedicated bicycle facility on Robinson Street in this district may not be as critical, and Alternative 2 with a shared use path and a parking lane could be implemented.

Lake Eola District

In the Lake Eola District, the PVT recommended to advance Alternative 1B, with three travel lanes, a two-way cycle track, and increased separation between vehicles and bicyclists.

Neighborhood District

In the Neighborhood District, Alternative 1 and 2 will be advanced to concept development. This section of Robinson Street has higher traffic volumes and fewer pedestrian generators. With potential limitations in funding, the addition of sharrows to the current four-lane cross section is the recommended interim-solution. After the three-lane section has been implemented elsewhere along the corridor, the Neighborhood District should be reevaluated as a three-lane section.

Alternative 2 (Interim)

Alternative 1 (Ultimate)

Milk District

In the Milk District, Alternative 2B is recommended to be advanced to concept development. Alternative 2B has a three-lane section with on-street parking on the south side.

Alternative 2B

Recommended Spot improvements

Many of the spot improvements can be implemented to help address the Study's needs, with or without cross section changes. This includes short-term improvements that can be advanced in the next five years, long-term improvements that could take 20+ years to complete, and mid-term improvements that would fall within the 5 to 20 year range. **Table 3** summarizes the time frame for each spot improvement and the associated next steps. As discussed in section 6, many of the improvements would require additional engineering analysis before advancing to final design.

Table 3 | Spot Improvement Phasing and Next Steps

Spot Improvements
Add mid-block crossings (various locations)
Mark crossing at existing intersections (Hampton, Palmetto, Dickson Azalea)
Implement intersection control at Broadway (signal, raised intersection)
Refine Howard Middle School driveway
Maintain landscaping/keep sidewalk clear
Fix deteriorating pavement/curbs
Improve drainage at spot locations
Improve sidewalk connectivity and ADA accessibility
Relocate bus stops
Improve ADA compliance at bus stops
Refine signal timing and phasing
Implement other safety improvements (Rosalind Avenue, Eola Drive)
Refine St. James School circulation/parking

Time Frame	Next Steps	Potential for Implementation without Roadway Reconfiguration
Short-Term to Mid-Term	Engineering Study	No
Short-Term to Mid-Term	Engineering Study	No
Short-Term to Mid-Term	Signal Warrant/Engineering Study	Maybe
Short-Term	Coordinate with OCPS	Yes
Short-Term	Coordinate with FDOT/ City Maintenance	Yes
Short-Term to Mid-Term	Coordinate with FDOT/ City Maintenance	Yes
Short-Term to Mid-Term	Coordinate with FDOT/ City Maintenance	Yes
Short-Term to Mid-Term	Coordinate with FDOT/ City Maintenance	Yes
Short-Term to Mid-Term	LYNX approval/adoption	Yes
Short-Term to Mid-Term	LYNX approval/adoption	Yes
Short-Term	Coordinate with City Traffic Operations	Yes
Short-Term to Mid-Term	Safety Study	Maybe
Mid-Term to Long-Term	Coordinate with St. James Cathedral	No

Implementation

Next Steps

This study represents the corridor planning phase of the project development process. The next phase of the project is concept development, where the ideas developed in this planning phase will be evaluated with additional engineering analysis and in more detail. The study team will begin to evaluate the utility, drainage, and right-of-way impacts of the recommended alternative(s). The concept development phase will be led by FDOT District 5 with continued partnership from the City of Orlando, MetroPlan Orlando, and LYNX. As part of the concept development phase, the District will also formally conduct the FDOT lane elimination process and coordinate with FDOT Central Office as part of it.

The design and construction phases are not currently funded. After concept development is complete, the City and MetroPlan Orlando will work together to determine where Robinson Street improvements fit on the MPO's List of Priority Projects. This determines when design and construction of Robinson Street will receive funding, in relation to the MetroPlan Orlando region's other top priorities.

A Call for Continued Partnership

The Robinson Street Corridor Planning Study was the first step conducted by FDOT District 5, in partnership with the City of Orlando to advance multimodal mobility and access along the corridor. Throughout the Study, the City, MetroPlan Orlando, and LYNX have been key partners, helping FDOT evaluate potential solutions and prioritize the needs of the various users on Robinson Street. The implementation of any changes to Robinson Street will require continued partnership with all four agencies and other community stakeholders, including OCPS, GOAA, the Downtown Orlando CRA, the various Main Street districts within the Study area, and community and neighborhood leaders. The current PVT will remain the sounding board and technical advisory team for the concept development phase as the ideas described in the report are further explored and refined.

This study is one of many steps toward the realization of a truly multi-modal Robinson Street corridor. Together with the PVT members, the principles that the Study sets out create a framework for the City of Orlando and corridor stakeholders as they make both land use and transportation decisions regarding the corridor.

Incremental Steps toward the Corridor Vision

The process taken to arrive at these recommended alternatives involved extensive coordination with public agencies, area stakeholders, and the public to arrive at a common vision for the Robinson Street corridor. The recommendations of this Study are consistent with FDOT's Complete Streets policy and shift away from functional class-based design and solutions that focus solely on providing vehicular mobility on State roadways. Instead, the solutions are consistent with FDOT's push toward context based design. As a significant change from previous established processes, the implementation of these solutions for Robinson Street will likely require innovative thinking that apply engineering judgment to established standards and processes.

Some ideas proposed involve incremental implementation of changes to character districts. This will help prioritize improvements as funding becomes available and allows the community to reevaluate its vision for Robinson Street at various stages along the way. This is especially important in districts where the demand for multimodal travel is expected to increase in the future. As Downtown Orlando continues to grow and evolve, travel patterns and preferences will change. Robinson Street should continue to evolve with Downtown to better meet the needs of all users.

View of Robinson Street looking east

FDOT