

THE CITY OF ORLANDO **BICYCLE** **PLAN** UPDATE

2020





Orlando Urban Trail, History of Dinky Line Trail.

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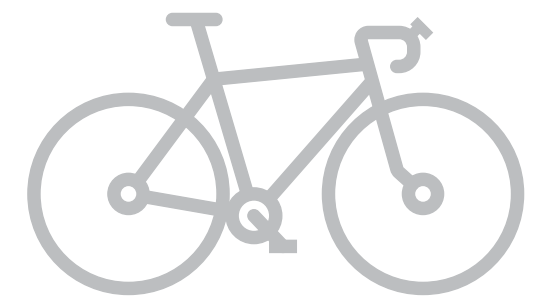
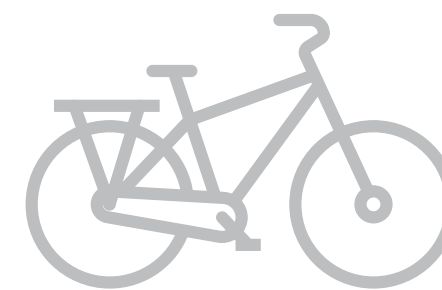
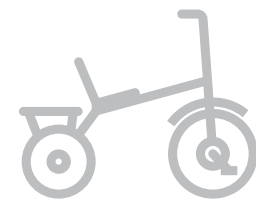
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Mayor Buddy Dyer at the Colonial Drive Overpass, Orlando Urban Trail (2019)

executive summary

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the Bicycle Plan Update process

Orlando initiated a comprehensive update to their citywide Bicycle Plan in the fall of 2018 and followed the latest national best practices for planning bikeway networks.

The process began with a review of the development and history of the city's current and proposed bicycle network and its existing bicycle-related programs. The project team also reviewed current plans, policies and standards that impact bicycle transportation to ensure that the recommendations of the updated Bicycle Plan would be consistent with the latest national best practices.

Community outreach was a central component of the Bicycle Plan Update process, and input from Orlando residents guided the plan's vision and direction from the beginning. Equity was brought to the forefront of the Bicycle Plan Update process to ensure that all of Orlando's residents needs were fairly considered - first, by recognizing and understanding the existing inequities in bicycle infrastructure for marginalized populations of people and historically and systemically excluded groups, and then accounting for and correcting these inequities throughout the planning process. The city used adaptive and targeted outreach efforts to help ensure the direct involvement of these communities in the plan update, and issues of equity were addressed in the plan's performance targets and project evaluation metrics.

The Bicycle Plan Update ran concurrent to the city's development of its Vision Zero Action Plan, a systemic approach that is being used by cities across the world to reduce serious traffic crashes and move towards a future with zero traffic deaths. The study team coordinated efforts to complete a detailed safety analysis of crash types, severity, lighting conditions and surface conditions, as well as the identification of countermeasures to mitigate common bicycle crash types consistent with the principles of Vision Zero.

The proposed bicycle network was then developed based on a review of the existing and planned network and additional network connections identified through a gap analysis. Preferred bikeway types were determined based on the methodology and standards of the 2019 Federal Highway Administration Bikeway Selection Guide. An implementation approach as well as demonstration projects were developed to illustrate the next steps for completing the proposed bikeway network. Key economic benefits associated with network improvements were quantified.

Additional recommendations in the updated Bicycle Plan include potential supporting initiatives, changes to policies and procedures, bikeway signage and wayfinding and bikeway landscape guidelines.

- EXISTING CONDITIONS
- COMMUNITY OUTREACH
- GOALS & OBJECTIVES
- PERFORMANCE TARGETS
- PROJECT EVALUATION METRICS
- SAFETY ANALYSIS
- NETWORK DEVELOPMENT
- PRIORITIZATION & CONCEPT DEVELOPMENT
- ECONOMIC ANALYSIS
- IMPLEMENTATION PLAN



Orlando Bicycle Plan Update Pop-Up Meeting, Engelwood Neighborhood Center (2019)



INITIAL OUTREACH

7 open houses /
pop-ups

340+
completed surveys

100+
interactive online
Mapping tool comments

FINAL PUBLIC MEETING

8 completed
comment forms

100%
supportive
feedback

community engagement

Community input was an important part of the Bicycle Plan Update.

The city held three community workshops and four pop-up meetings between March - June 2019 to kick-off the Bicycle Plan Update process. Targeted meeting locations were used in an effort to include residents from all neighborhoods and backgrounds in the planning process. At these meetings, the community was able to learn about the update of Orlando's Bicycle Plan and participate in a variety of interactive exercises. Additionally, an online survey gathered input on current biking habits and on the Bicycle Plan Update's vision, goals and priorities.

An online mapping comment tool allowed residents to provide input on existing network gaps, safety concerns and wish-list projects. The survey and online comment map were also shared through press releases, NextDoor posts, city newsletters and flyers for those that couldn't attend the meetings.

The draft visionary network was presented at a final community open house near the end of the plan update process to provide the community an opportunity to see how their input helped to shape the plan recommendations and to provide a final opportunity for feedback meetings.

plan organization

CHAPTER 1: BACKGROUND, VISION, GOALS & OBJECTIVES

Chapter 1 begins with the Bicycle Plan's purpose and vision, and is explained in the context of the plan's history and policy framework. The existing conditions of biking in Orlando are summarized into five themes - comfort, connectivity, equity, safety and culture - with the discussion of each theme concluding with a goal and objectives related to the theme.

CHAPTER 2: THE VISIONARY BIKEWAY NETWORK & PROJECT IMPLEMENTATION APPROACH

Chapter 2 contains the engineering recommendations of the Bicycle Plan Update. This includes the bicycle safety analysis, the proposed bicycle network and project prioritization.

CHAPTER 3: RECOMMENDATIONS & STRATEGIES TO SUPPORT A CULTURE OF BICYCLING

A true bicycle friendly community takes more than engineering a safe and comfortable network of bikeways. Chapter 3 identifies recommendations for policies and programs to foster a culture of bicycling in Orlando.

END NOTES

End notes are included at the end of the document and are referenced chronologically by number.

APPENDICES

Additional detail on selected topics is included in more detail in the plan appendices. Applicable appendices are noted throughout the plan.

RIDERSHIP



BIKE TO WORK
0.6%



BIKE SHARE
FLEET SIZE *
LIME + HOPR
750

MONTHLY RIDES
35K



OFF-STREET PATHS/TRAILS
1. LAKE BALDWIN LOOP
2. GERTRUDE'S WALK
3. LAKE UNDERHILL PATH
TOP 3
SHARED USE PATHS

AVERAGE DAILY USERS
3000
PEDESTRIANS + BICYCLISTS
(EXCLUDING LAKE EOLA)

SOURCES: US CENSUS BUREAU, 2012-2016 AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES
CITY OF ORLANDO BICYCLE AND PEDESTRIAN ANNUAL COUNTS FEBRUARY -SEPTEMBER 2019
*BIKE SHARE AS OF APRIL 2019

INFRASTRUCTURE



1 MOUNTAIN BIKE PARK



5 SHARROW ROUTES



53mi NEIGHBORHOOD SIGNED ROUTES



3 BIKE PARKING CORRALS



8 BIKE WAY-FINDING ROUTES



268mi ON-STREET BIKE LANES

NOTE: ON-STREET BIKE LANES REPORTED BY LANE MILES
SOURCE: CITY OF ORLANDO BIKE INVENTORY, SEPT 2018



6 BICYCLE REPAIR STATIONS



43mi OFF-STREET PATHS/TRAILS



+7mi TRAILS CURRENTLY IN DEVELOPMENT

CULTURE



BRONZE BICYCLE FRIENDLY COMMUNITY
2016 - 2020

THE LEAGUE OF AMERICAN BICYCLISTS



1 # OF BICYCLE FRIENDLY BUSINESSES
BIKES BEANS & BORDEAUX



1 # OF BICYCLE FRIENDLY UNIVERSITIES
UCF



2 ANNUAL CITY-SPONSORED BICYCLE EVENTS
200+ PARTICIPANTS

SOURCE: THE LEAGUE OF AMERICAN BICYCLISTS, 2016

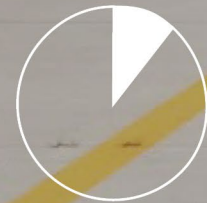
SAFETY



795 CRASHES INVOLVED A BICYCLIST
2012 - 2017



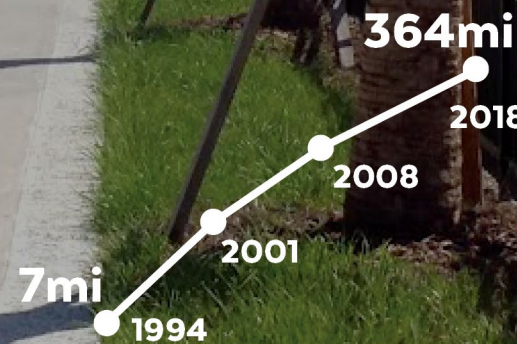
61% MOTORIST AT FAULT
2012-2017



10% OF CRASHES INVOLVING A BICYCLIST RESULT IN AN INCAPACITATING INJURY OR FATALITY
2012 - 2017

SOURCE: CITY OF ORLANDO DRAFT VISION ZERO STUDY, 2019

INVESTMENT



364mi TOTAL MILES OF BIKEWAYS CONSTRUCTED SINCE THE FIRST ORLANDO BIKE PLAN

SOURCES: THE LEAGUE OF AMERICAN BICYCLISTS, 2016
CITY OF ORLANDO BIKE INVENTORY, AUG 2001; JUNE 2008; SEPT 2018

12% TRANSPORTATION PLANNING BUDGET SPENT ON BICYCLING

plan goals & 2030 performance targets



COMFORT:

make bicycling within the city **comfortable** and convenient for people of a wide range of ages and abilities.

↑ bike parking locations

+ 20% miles of separated bikeways



CONNECTIVITY:

create and maintain an integrated network of low-stress bikeways **connecting** residents to activity centers, schools, workplaces, parks and regional bikeway networks.

+ 46 miles of bikeways

↑ 70+ citywide bikescore



EQUITY

ensure that people from **all neighborhoods, backgrounds, abilities and income levels** in the city have access to bicycling infrastructure and resources.

↓ inequities in share of total bikeways across neighborhoods

↓ inequities in share of separated bikeways across neighborhoods



SAFETY

improve the **safety** of people bicycling within the city through engineering, education and enforcement.

↓ 30% bicycle danger index

⊘ fatal crashes



CULTURE

build a **culture** of bicycling through programs and policies.

↑ 150% people who bike to work

↑ 5x bike events per year

↑ 115% avg. monthly trail users



IN THE CITY OF ORLANDO, RIDING A BICYCLE IS A SAFE AND COMFORTABLE EXPERIENCE FOR RESIDENTS AND VISITORS OF ALL AGES, ABILITIES AND BACKGROUNDS. RESIDENTS CONSIDER BICYCLING A PRACTICAL TRAVEL CHOICE ENABLED BY A HIGHLY CONNECTED, CONVENIENT AND LOW-STRESS BIKEWAY NETWORK THAT CONTRIBUTES TO QUALITY OF LIFE THROUGHOUT THE CITY.



micromobility & share programs

Micromobility options have been rapidly evolving over the last couple of years. During the course of the Bicycle Plan Update, the city experienced several changes in its shared micromobility options and service providers - progressing from bikeshare stations, to dockless bikeshare and electric-assist bicycle fleets. The latest change was city approval of an electric scooter one-year pilot program in December 2019. The citywide bike network will become even more important with expanded micromobility options, as bike infrastructure will also be used by people using other small-wheeled vehicles. The city should continue to evaluate micromobility options and trends over the course of its scooter pilot program and throughout the life of this Bicycle Plan as more types of vehicles make use of the available bike infrastructure.

Important considerations moving forward include:

- appropriate widths of bike/micromobility facilities
- levels of separation from or mixing with other modes
- appropriate grouping of various families or classes of vehicles in shared or separated environments based on factors such as speed and the vehicle's mass and dimensions

the future bikeway network

Network planning for the Bicycle Plan Update followed a two-step process. First, a **visionary network** was developed. The visionary bikeway network is illustrative of the highly connected, convenient, low-stress comprehensive bikeway network described in the Bicycle Plan Update vision statement. The visionary network comprehensively completes gaps in the existing network, adds new bikeway connections and identifies upgrades to existing bikeway facilities. The visionary network map does not represent corridor-level feasibility or constructibility; however, it is important for defining the long-term desired connections.

The city's existing network is made up of three designations - signed routes, on-street bike lanes, and off-street paths/ trails - and does not differentiate which bikeways are part of the low-stress network. As the visionary bikeway network represents a primarily low-stress network, alternative designations were used to identify these low-stress bikeway types based on the 2019 FHWA guidance:

1. Neighborhood Bicycle Boulevards - Low traffic volume and low speed residential streets that give bicyclists priority using signs, pavement markings and traffic calming measures to discourage through trips by motor vehicles and provide bicyclists with enhanced crossings of arterial streets. While some of the city's existing signed routes meet the criteria for neighborhood bicycle boulevards, others are not good candidates based on the context of the street.

2. Bike Lanes (Buffered Preferred) - One-way facilities that typically carry bicycle traffic in the same direction as adjacent motor vehicle traffic on the left or right side of the street. A painted flush buffer zone between a bike lane and the adjacent travel lane is preferred to increase the riding comfort for bicyclists as they increase separation from vehicular traffic and/or parked vehicles.

3. Separated Bike Lanes or Shared Use Paths - Physically separated space using a vertical element within a buffer area such as bollards, parked vehicles, raised curbs, or landscaping/planters. These may be shared spaces with pedestrians or dedicated for people on bikes.

The next step was to define a project implementation strategy by determining a priority list of projects to form the visionary network to implement in the near-term. Using a set of evaluation criteria based on the plan goals, segments of the visionary network were assigned relative priority scores, ranging from 0 - 100.

A 10-year planning horizon was chosen to narrow the visionary network into a list of cost-feasible priority projects based on relative priority scores, budget assumptions, bikeway types and planning level cost assumptions.

The **2030 priority network** narrows the visionary network into a list of projects that could be reasonably developed over the next 10-year horizon based on opinion of probable costs and funding assumptions. The 2030 priority project list is intended to provide general guidance but does not restrict bicycle network improvements from being made as opportunities arise related to lower priority projects (e.g., projects that can piggyback on other infrastructure improvements, such as resurfacing, utility or stormwater projects). Project evaluation criteria were used to identify high priority projects for inclusion in the 2030 priority network, which also reflects a mix of facility types from low-cost and easy-to-implement bicycle boulevards, to street retrofits for separated bike lanes, to new sections of shared-use paths.

These networks define long-term desired connections using the ideal level of separation based on traffic volumes and posted speeds at the time of the Bicycle Plan Update. However, it does not represent projects based on corridor-level feasibility or constructibility.

bikeway selection methodology

INTERESTED BUT CONCERNED CYCLISTS



SOMEWHAT CONFIDENT CYCLISTS



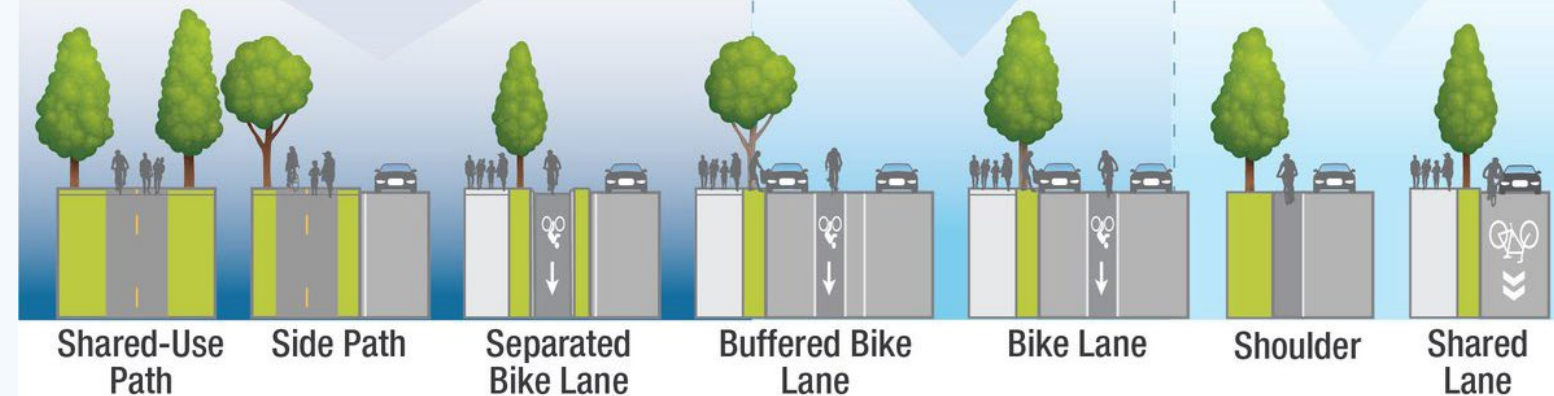
HIGHLY CONFIDENT CYCLISTS



51% – 56%
of the population

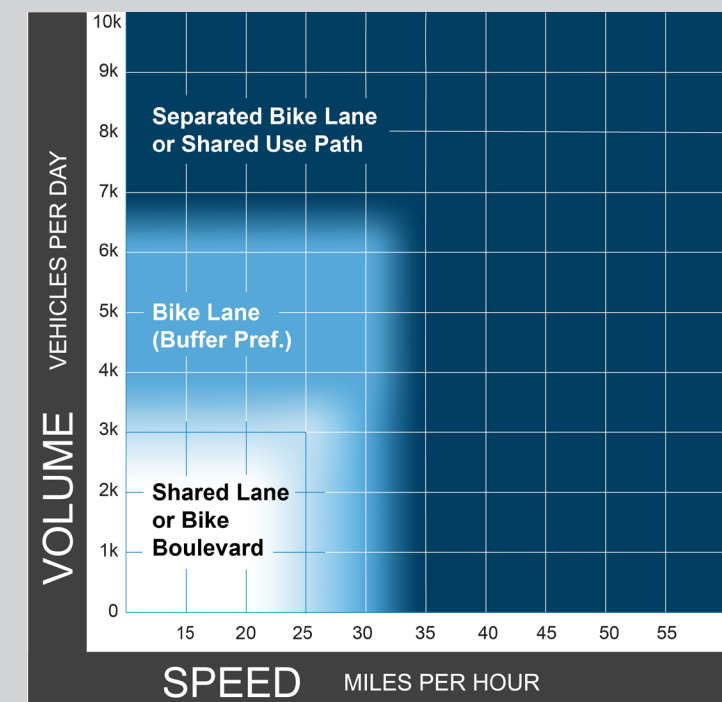
5% – 9%
of the population

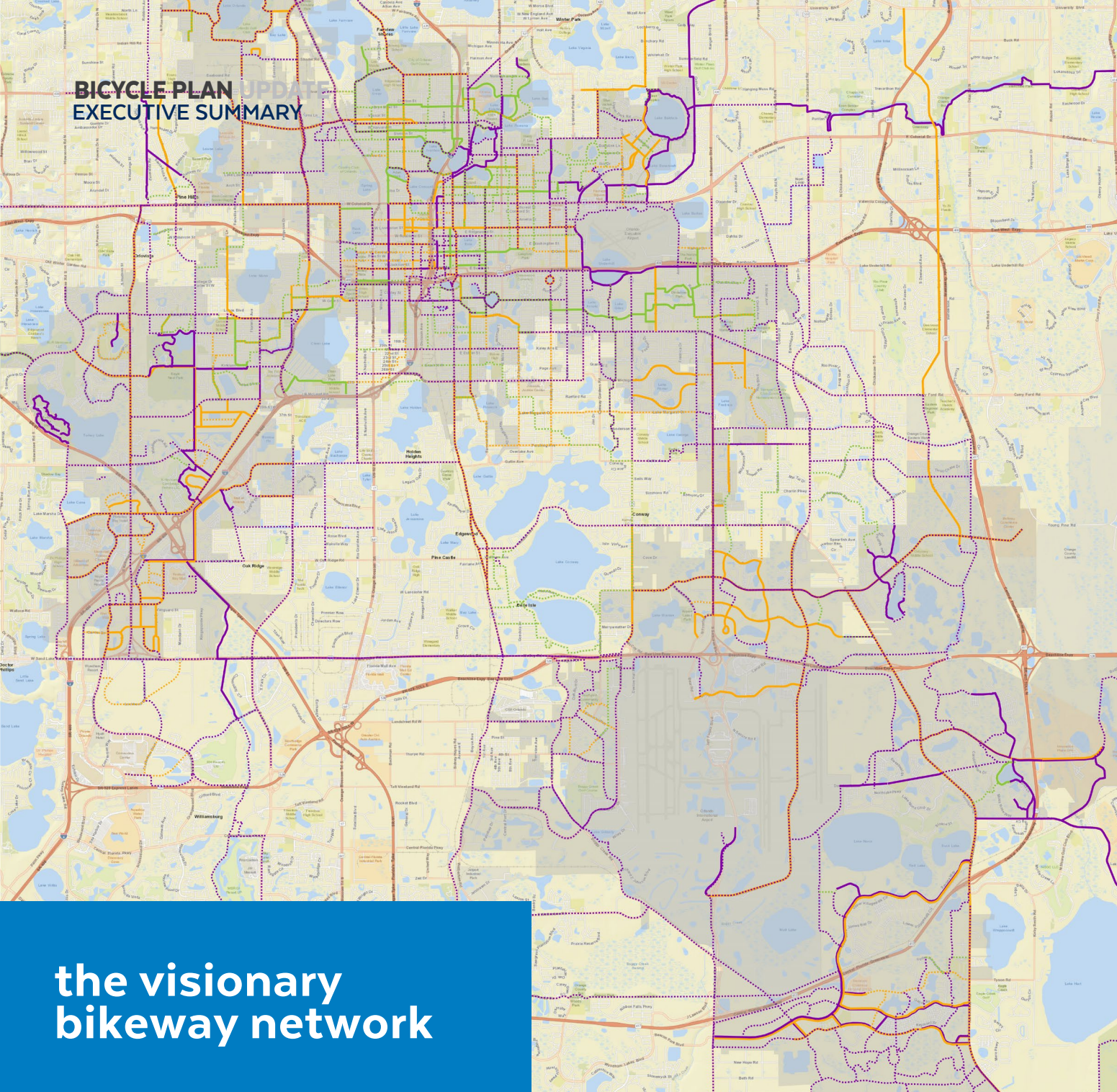
4% – 7%
of the population



fhwa guidelines

The graphic above, from the 2019 FHWA Bikeway Selection Guide shows the different types of bicyclists and the percentage of the general population that they represent. To encourage more people to make trips by bike, it is critical to plan and design for the “interested but concerned” group. This group requires more separation from traffic or very low volume, low speed neighborhood streets to feel comfortable riding a bike. More traditional bike facilities, such as conventional on-street bike lanes, tend to cater to a much smaller portion of the population that is either highly or somewhat confident riding with traffic. The preferred bicycle facility type graphic to the right visually represents the guidelines used to determine the most appropriate bikeway types for individual segments in the visionary bicycle network.






the visionary bikeway network

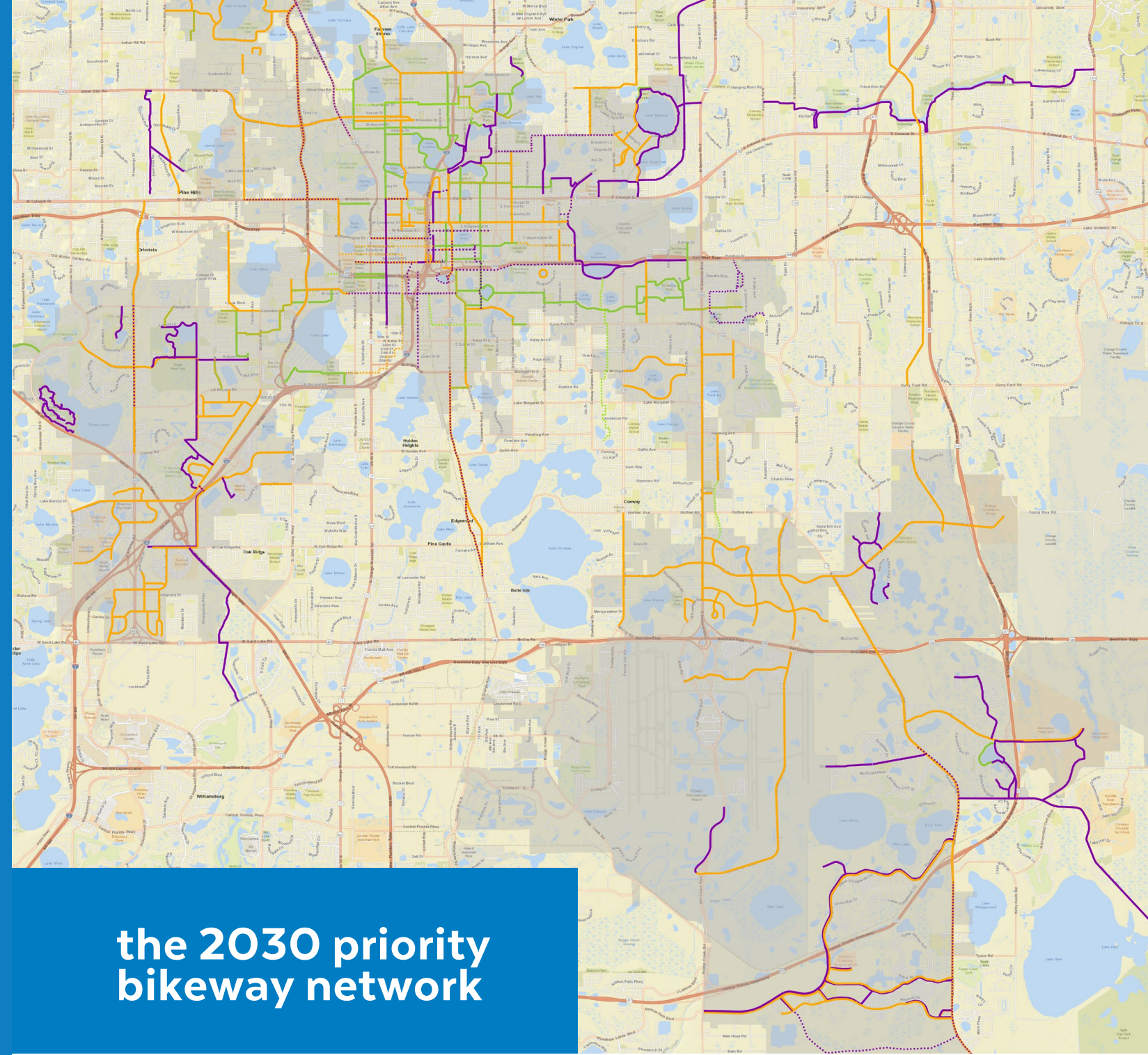
LEGEND

EXISTING

PROPOSED

-  SIGNED ROUTES
-  ON-STREET BIKE LANES
-  OFF-STREET PATHS / TRAILS

-  NEIGHBORHOOD BICYCLE BOULEVARDS
-  BIKE LANES (BUFFERED PREFERRED)
-  SEPARATED BIKE LANES OR SHARED USE PATHS






the 2030 priority bikeway network

LEGEND

EXISTING

PROPOSED

-  SIGNED ROUTES
-  ON-STREET BIKE LANES
-  OFF-STREET PATHS / TRAILS
-  PROGRAMMED SEPARATED BIKE LANES OR SHARED USE PATHS

-  NEIGHBORHOOD BICYCLE BOULEVARDS
-  BIKE LANES (BUFFERED PREFERRED)
-  SEPARATED BIKE LANES OR SHARED USE PATHS

the future
bikeway network:
by the numbers



850+ miles of low-stress bikeways

8mi
OF EXISTING SIGNED ROUTES
UPGRADED TO
SEPARATED BIKE LANES OR
SHARED USE PATHS

62mi
OF EXISTING BIKE LANES
UPGRADED TO
SEPARATED BIKE LANES OR
SHARED USE PATHS

370mi
OF PROPOSED NEW
SEPARATED BIKE LANES OR
SHARED USE PATHS

35mi
OF EXISTING SIGNED ROUTES
UPGRADED TO
NEIGHBORHOOD BICYCLE
BOULEVARDS

71mi
OF PROPOSED NEW
NEIGHBORHOOD BICYCLE
BOULEVARDS

10mi
OF EXISTING SIGNED ROUTES
UPGRADED TO
ON-STREET BIKE LANES

50mi
OF PROPOSED NEW
ON-STREET BIKE LANES
(BUFFERED PREFERRED)

480mi
SEPARATED
BIKE LANES OR
SHARED-USE
PATHS

105mi
NEIGHBORHOOD
BICYCLE
BOULEVARDS

265mi
ON-STREET
BIKE LANES

NOTE: TOTAL MILES OF THE EXISTING + PROPOSED NETWORK

COMFORT

10X
MILES OF
SEPARATED BIKE LANES &
SHARED-USE PATHS

CONNECTIVITY

81%
OF THE CITY IS
WITHIN 1/4 MI OF
A BIKEWAY

95%
OF THE CITY IS
WITHIN 1/2 MI OF
A BIKEWAY

EQUITY

60%
OF NEW BIKEWAY
MILES ARE IN UNDER-
SERVED AREAS

SAFETY

135
PROJECTS ON
HIGH CRASH SEGMENTS

NOTE: THE VISIONARY NETWORK REPRESENTS THE LONG-TERM PLAN, AND APPENDIX H INCLUDES SCORING FOR PROJECTS, INCLUDING PROJECTS LOCATED ON IDENTIFIED HIGH CRASH LOCATIONS

bicycling economics

The continued improvement and expansion of the bikeway network will not only benefit those biking in the city today, but also Orlando's future residents.

More people will choose to bike as low-stress bikeways become accessible to different neighborhoods across the city, and bicycle trips may grow in length and frequency. An economic analysis was completed to project monetized economic benefits of continued bikeway investments for three factors:

- Recreation
- Health
- Reduced Auto Use

The analysis is far from a complete cost/benefit analysis; further benefits and impacts not specifically quantified in the analysis include safety savings, environmental savings, economic growth and higher property values.

This analysis compared a snapshot of 2030 benefits, with and without progress towards the visionary bikeway network, to derive the additional value these investments provide to the city.

Estimates were developed using:

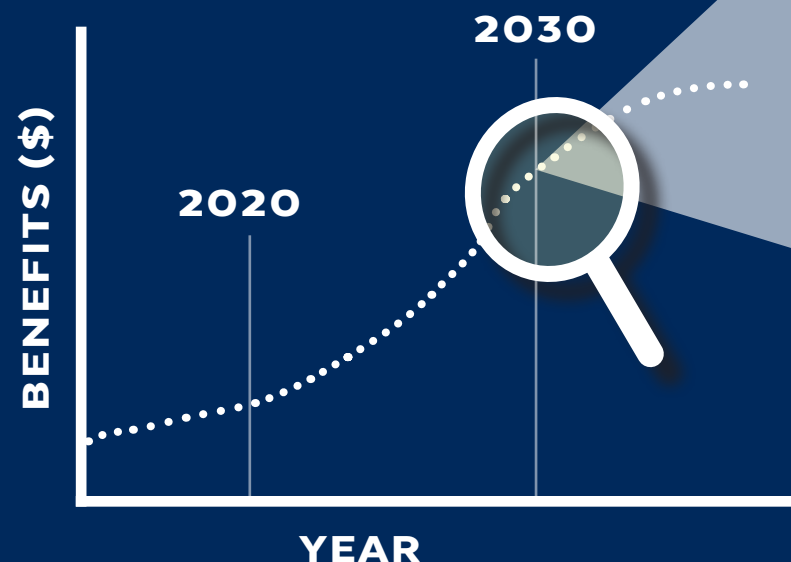
- projections for the number of bicyclists based on population growth, 2019 city trail counts and bike share user data
- frequency and types of bicycle trips based on the Bicycle Plan Update online survey, as well as findings from an Orlando Urban Trail field survey (completed in May, 2019)
- parameters to quantify benefits into monetary values (2018 \$s) based on the methodologies described in the National Cooperative Highway Research Report Program (NCHRP) Report 552: Guidelines for Analysis of Investments in Bicycle Facilities methodology

The benefits analysis took a conservative approach to what may be achieved by 2030 - assuming just +10 miles of separated bike lanes, +22 miles of off street paths/trails, +7 miles of buffered bike lanes and +8 miles of neighborhood bicycle boulevards are constructed over the next 10 years.

Even with this conservative estimate, the monetized annual benefits to health, recreation and reduced auto use quantified in this analysis are projected to amount to **+\$4.4 million (in constant 2018 dollars) for the 2030 calendar year.**

Assuming other things equal, including no additional increase in bikeway network or cycling frequency, a simplified estimate places the aggregate value of the monetized benefits over the subsequent 20 year period (2030 - 2049) at **+\$87 million.**

This simplified estimate does not take into account the additional magnitude of benefits from health, recreation and reduced auto use that would continue to grow as the volumes of cycling and network expands in future years, nor does it account for the incremental benefits as the network expands between 2020 and 2030.



Year 2030 where the priority bike network has been constructed would experience...



...compared to year 2030 with no improvements

NEXT STEPS

Next steps are identified throughout the document at the end of each relevant section. In total, 15 next steps are identified:



IDENTIFY AND PRIORITIZE OTHER INTERSECTIONS ACROSS THE CITY FOR TRAFFIC CONTROL IMPROVEMENTS TO ASSIST BICYCLISTS WITH CROSSINGS ALONG EXISTING OR PROPOSED ROUTES. IDENTIFY AND PROGRAM SPECIFIC CROSSING ENHANCEMENTS.



IN CONJUNCTION WITH THE VISION ZERO ACTION PLAN, WORK TO SYSTEMICALLY INCLUDE FEATURES, COUNTERMEASURES AND TREATMENTS IN ALL TRANSPORTATION PROJECTS TO ADDRESS THE MOST COMMON BIKE CRASH TYPES.



SYSTEMATICALLY COMPLETE MULTIMODAL SAFETY AUDITS AND REGULAR WALKING AND BICYCLING AUDITS OF KEY LOCATIONS AND HIGH CRASH CORRIDORS OR INTERSECTIONS TO IDENTIFY LOCATION-SPECIFIC COUNTERMEASURES.



FORMALIZE STANDARDS FOR BIKE DETECTION AT SIGNALS. CURRENTLY, BIKES TYPICALLY ACTUATE A SIGNAL VIA EITHER VEHICULAR MEANS (VIDEO OR IN-PAVEMENT LOOP DETECTION) OR PEDESTRIAN MEANS (PEDESTRIAN PUSH BUTTON). NEW FACILITY TYPES, SUCH AS STREET-LEVEL SEPARATED BIKE LANES, THAT WILL PROVIDE AN EXCLUSIVE AREA FOR BIKES, WILL NEED TO HAVE SPECIFIC SIGNAL DETECTION STRATEGIES EMPLOYED. THIS MAY INCLUDE PASSIVE DETECTION METHODS (VIDEO, IN-PAVEMENT LOOPS, INFRARED, ETC.) OR ACTIVE DETECTION METHODS (PUSH BUTTONS PLACED AND ORIENTED TO SERVE BICYCLISTS USING THE SPECIFIC FACILITY).



REFINE THE PROJECTS WITHIN THE PRIORITY NETWORK BASED ON THE PROJECT IMPLEMENTATION STRATEGY.



IDENTIFY AND PRIORITIZE AREAS FOR MORE SPECIFIC BIKE INFRASTRUCTURE FEASIBILITY STUDIES. POTENTIAL AREAS FOR STUDY INCLUDE THE MAIN STREET DISTRICTS (SIMILAR TO THE MILLS 50 AND MILK DISTRICT BICYCLE AND PEDESTRIAN STUDY PREVIOUSLY COMPLETED), OR SPECIFIC NEIGHBORHOODS (FOR EXAMPLE, DELANEY PARK, WHICH LACKS GOOD LOW-STRESS BIKE CONNECTIVITY INTO THE CENTRAL BUSINESS DISTRICT, OR ROSEMONT, THE LOCATION OF THE NORTH LANE / LAKE ORLANDO LOOP DEMONSTRATION PROJECT AND A TARGETED OUTREACH AREA BASED ON IT'S COMPOSITE EQUITY SCORE).



REFERENCE THE PLANNED BIKEWAY NETWORK AND EVALUATION SCORES DURING CAPITAL IMPROVEMENT WORK PROGRAMMING TO CONFIRM THAT PROJECTS BEING ADVANCED ARE CONSISTENT WITH THE GOALS AND OBJECTIVES OF THE BICYCLE PLAN.



IDENTIFY AND AGGRESIVELY PURSUE ADDITIONAL FUNDING SOURCES, GRANTS, PARTNERSHIPS AND OTHER AVENUES TO ADVANCE THE PRIORITY LIST OF PROJECTS.



KEEP CITY GIS FILES OF EXISTING BIKE INFRASTRUCTURE, AS WELL AS OTHER SUPPORTING TRANSPORTATION-RELATED DATA (POSTED SPEEDS, NUMBER OF LANES, CROSSING LOCATIONS, ETC.), UP TO DATE.



TARGET AT LEAST A MINOR UPDATE TO THE BICYCLE PLAN EVERY FIVE YEARS, AND A MAJOR UPDATE TO THE PLAN EVERY TEN YEARS.



FINALIZE AND FORMALIZE THE WAYFINDING AND SIGNAGE STANDARDS FOR SHARED-USE PATHS. A FRAMEWORK AND GUIDANCE FOR CITYWIDE WAYFINDING AND SIGNAGE FOR ON-STREET FACILITIES IS PROVIDED IN THIS PLAN, BUT THE CITY IS IN THE PROCESS OF UPDATING SIGN STANDARDS RELATED TO SHARED-USE PATHS.



FORMALIZE GUIDANCE ON THE CONVENTIONS FOR NAMING TRAILS AND BIKEWAYS WITHIN THE NETWORK, INCLUDING THOSE THAT MAY HAVE SUB-NAMES, E.G., THE DINKY LINE OR GERTRUDE'S WALK, WHICH ARE PART OF THE LARGER ORLANDO URBAN TRAIL, ALONG WITH GUIDANCE DOCUMENTS MATCHING CONSISTENCY OF SUPPLEMENTAL SIGNS TO MARK RECREATIONAL LOOPS OR ROUTES.



IDENTIFY A SET OF BICYCLE BOULEVARDS, SUCH AS THE TOP FIVE OR TOP TEN ROUTES, TO MOVE INTO RAPID IMPLEMENTATION IMMEDIATELY FOLLOWING PLAN ADOPTION. DEVELOP SPECIFIC PLANS TO INCLUDE WAYFINDING SIGNS, ALONG WITH SUPPLEMENTAL PAVEMENT MARKINGS AND TRAFFIC CALMING DEVICES. ADDITIONALLY, IDENTIFY AND EVALUATE KEY BUSY INTERSECTIONS ALONG ROUTES FOR POTENTIAL NEW OR ENHANCED TRAFFIC CONTROL DEVICES, SUCH AS RRFBS, PEDESTRIAN HYBRID BEACONS, HALF SIGNALS, ETC.



UPDATE CITY POLICIES, ADOPT PROCEDURAL CHANGES, COMPLETE THE '6 KEY STEPS TO SILVER', AND IMPLEMENT AT LEAST FIVE ADDITIONAL RECOMMENDED INITIATIVES - ONE FOR EACH 'E' BY 2021, AND HIGHLIGHT THESE ITEMS IN THE CITY'S NEXT LEAGUE OF AMERICAN CYCLIST'S BICYCLE FRIENDLY COMMUNITY APPLICATION.



DOCUMENT BASELINE PERFORMANCE MEASURES AND MONITOR PROGRESS ANNUALLY.

acknowledgements

IAN SIKONIA, AICP **PROJECT MANAGER**
BILLY HATTAWAY, PE **TRANSPORTATION DIRECTOR**

ORLANDO BICYCLE PLAN UPDATE WORKING GROUP

ORLANDO BICYCLE ADVISORY COMMITTEE

ORLANDO BIKE COALITION

BIKE/WALK CENTRAL FLORIDA

CONSULTANT TEAM

HDR

JAMIE KRZEMINSKI , PE
JENN RHODES
MATTHEW WIESENFELD, PE, AICP
JEFFERY ARMS, PE, AICP, PMP
MELISSA PORCARO
PETER OGWONOWSKI, PhD
MICHAEL SCHMEDT, GISP
CHERYL ISENBERG, GISP
RICHARD LITTLEFIELD, GISP
CRYSTAL ODOH

CANIN ASSOCIATES, INC

ELIZA JULIANO

QUEST CORPORATION OF AMERICA

CAROLYN FITZWILLIAMS

EQUITABLE CITIES, LLC

CHARLES BROWN

BORELLI + PARTNERS, INC

JORGE BORELLI, RLA
CHRIS RICE, RLA, ASLA
ROSS PIPER

AVCON, INC

CLINT PLETZER, PE
RICK BALDOCCHI, PE

**ADDITIONAL THANKS GOES OUT TO
ALL OF THE PEOPLE OF ORLANDO WHO
PARTICIPATED IN SURVEYS, MEETINGS,
AND OPEN HOUSES, AND PROVIDED
THEIR COMMENTS DURING THIS PLAN
UPDATE.**



Lime Dockless E-Bikes, Exploria Stadium (2019)

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CONNECTIVITY & BICYCLING
EQUITY & BICYCLING
SAFETY & BICYCLING
CULTURE OF BICYCLING



the city bikeable

The City of Orlando has long valued investments in the public realm. A century ago, inspired by the City Beautiful Movement, the city officially designated itself “The City Beautiful” and inaugurated a plan for the systematic beautification of its roadways, lake shores and open spaces. By drawing a connection between the way cities, streets and public spaces are planned and designed and their influence on health, the economy, equity, community pride and quality of life, the City Beautiful Movement recognized that people could care and should care about their cities.

Today, these qualities are commonly referred to as **livability**: a measure meant to quantify a community’s **quality of life** and what ultimately makes somewhere a great place to live. As the City of Orlando continues to aspire to become a place where everyone wants to live and do business, enhancing livability remains a cornerstone in establishing the city’s priorities.

The fabric of livable communities are mixed-use neighborhoods and activity centers, supported by **balanced, multimodal transportation systems** that provide residents and visitors with **transportation choices**. Current demographic and economic trends suggest that many people would prefer to drive less and walk, bike and use public transit more and will shift their transportation mode choice if provided with **convenient and comfortable** options.

One way the city is working to create more livable communities is by helping **make the City Beautiful become the City Bikeable** through the development of a robust and safe bicycling environment. Part of that effort includes this comprehensive update to the city’s Bicycle Plan.



BICYCLE FRIENDLY COMMUNITY

2016 - 2020

THE LEAGUE OF AMERICAN BICYCLISTS

BRONZE

The City of Orlando prides itself on being recognized as a bicycle friendly community by the League of American Bicyclists “Bicycle Friendly America” program, a designation awarded to less than 450 communities nationwide. This designation acknowledges the city’s outstanding efforts to improve bicycling through a combination of engineering, education, enforcement, encouragement, evaluation & planning. As of 2018, only eight Florida communities and less than 130 communities nationwide have surpassed the program’s bronze rating. Best practices of silver, gold and platinum rated communities are integrated into this Bicycle Plan Update to further elevate the city’s bicycle friendly status and set up Orlando to be one the most bikeable communities in the nation.



“THE CITY IS WORKING TO BE NOT ONLY THE CITY BEAUTIFUL BUT ALSO THE CITY BIKEABLE”
- ORLANDO MAYOR BUDDY DYER



Lake Formosa Bridge, Orlando Urban Trail (2016)

PURPOSE

Significant changes have occurred since the last Bicycle Plan Update in 2008. In addition to increases in local ridership and overall interest in bicycling, the introduction of bike sharing technologies, changes to bikeway design standards and updated transportation planning best practices have significantly altered the bicycle planning landscape.

Updates to the Bicycle Plan:

- re-establish **baseline conditions**
- refresh the plan's **goals and direction**
- re-confirm existing proposed network **priorities** and identify new or changed priorities
- guide **planned investments** aligning with updated goals, direction and priorities

OUTCOMES

Highlights of the Bicycle Plan Update include:

- an updated visionary bikeway network and project implementation approach
- design guidance for bikeway projects, including key crash reduction strategies
- strategies to enhance existing bike parking, wayfinding, and shared micro mobility programs
- other policy and program recommendations that further support a bicycle-friendly culture

The focus of the plan is on priority projects, and policy and program recommendations that should be implemented over the next ten years. However, in the lens of the long-term vision, the visionary network map illustrates comprehensive network connections for consideration beyond 2030.

DEFINING THE VISION

TEN YEARS FROM NOW, WHAT WILL BICYCLING IN ORLANDO BE LIKE?

The Bicycle Plan is the city's strategic guide for improving its bicycling environment. To be an effective guide, it's critical to first understand where it is we are supposed to be going.

When the city was developing the first Bicycle Plan 25 years ago - a time when treating bikes the same as cars and trucks was still widely regarded as the best way to accommodate people biking; installing road signs acknowledging bicycle presence was considered radical; and the world wide web had just been introduced - it would have been hard for anyone to anticipate what bicycling in Orlando would look like today. Now, entire bridges are built solely for bicyclists and pedestrians; streets are lined with a shared network of electric bicycles, powered by solar panels and paid for and tracked using cell phones; and record numbers of young people are choosing to live car-free.

Bicycle planning practices have experienced a recent and significant paradigm shift, similar in magnitude to the changes in the early 1990s that ultimately inspired the city's first Bicycle Plan. So while the Bicycle Plan Update will stay true to the essence of the original Bicycle Plan vision and its subsequent updates, the 2030 vision statement provides succinct and clear expectations for this Bicycle Plan Update that directly reflect new best practices for bikeway network planning based on:

- WHO: everyone - residents, workers and visitors of all ages, abilities and backgrounds.
- WHAT: low-stress bikeways
- WHY: as a means of transportation



In the City of Orlando, riding a bicycle is a **safe and comfortable** experience for residents and visitors of **all ages, abilities and backgrounds.**

Residents consider bicycling a **practical travel choice** enabled by a **highly connected, convenient and low-stress** bikeway network that contributes to quality of life throughout the city.



Lake Druid Park, Cady Way Trail (2018)

why plan for bikes?

Orlando has made tremendous strides towards improving its bicycling environment since the city's first Bicycle Plan in 1994. These investments have multifaceted benefits to the community that are acknowledged and supported in city plans and policies.

BENEFITS OF BIKEABLE COMMUNITIES

Many once viewed bicycling exclusively as a means of recreation, leisure and fitness. However, the City of Orlando has long recognized the bicycle's dual function as a legitimate and **practicable mode of transportation**, underscoring this point in the city's first Bicycle Plan in 1994. Mode shifts towards bicycling create quantifiable economic, social and environmental community benefits, even for those who will never ride a bicycle. More people biking improves **health and wellness** by promoting active lifestyles, **reduces congestion** on overburdened transportation networks and **lessens environmental impacts** associated with the production of carbon monoxide and other ozone depleting emissions. Building bikeable communities increases property values, creates jobs and increases **access to opportunity**.



HEALTH, WELLNESS & PUBLIC SAFETY

When compared to previous generations, the U.S. has witnessed a sharp decline in physical activity and active transportation.¹

Our increasingly sedentary lifestyles have been linked to the steady rise in rates of obesity, diabetes, heart disease, stroke and other chronic health conditions.²

HALF OF ORLANDO RESIDENTS FAIL TO MEET AEROBIC ACTIVITY GUIDELINES³

Large U.S. cities ranked highest for health and physical activity are also some of the most bikeable: Portland OR; Seattle WA; Minneapolis MN; and Denver CO.⁴ A bikeable community makes it easier for residents to stay active and healthy by incorporate bicycling into their everyday life.

Bicycling is also good for your mental well-being by creating opportunities for social interactions and chance meetings. In fact, **people who bike to work are found to be the happiest commuters.**⁵ Gentle exercise before work, such as bicycling, also boosts hourly productivity.⁶

Another dimension of community health is the impact caused by crashes, injuries and fatalities from an unsafe transportation network. Bikeable roads not only reduce fatalities and injuries among cyclists, but are **shown to reduce the rates of all types of crashes across all modes.**⁷

***“WHEN I RIDE I’M USUALLY
SMILING. WHEN I SEE
OTHER PEOPLE RIDING I
NOTICE THAT THEY ARE
USUALLY SMILING.”***

***- ONLINE SURVEY
RESPONSE***



SUSTAINABILITY

Greenhouse gas emissions contribute to climate change and are linked to adverse health effects including asthma, diminished lung function, adverse birth outcomes, childhood cancer and cardiovascular disease.⁸

ORLANDO'S TRANSPORTATION SECTOR IS RESPONSIBLE FOR 20 PERCENT OF ITS GREENHOUSE GAS EMISSIONS⁹

Mode shifts for short trips is one of the most cost effective strategies to significantly reducing these emissions. It's estimated that at least **35 percent of current trips could be made by a bicycle in 20 minutes or less.**¹⁰ However, shifting these short trips from cars to walking, bikes or transit requires infrastructure that makes people feel safe walking and biking. Increased rates of bicycling could also **reduce overall demand for raw resource materials.** In addition to fuel savings, bicycles use less material for tires and other vehicle parts. Bicycling requires less paving for parking or road capacity and puts less wear and tear on infrastructure, reducing overall maintenance costs and materials.



OPPORTUNITY

A bikeable community is beneficial for residents from a cost-savings perspective. Of all active transportation modes, bicycling offers an inexpensive alternative to driving. People that ride bicycles save money on fuel, vehicle maintenance, parking and healthcare costs.

This in turn helps local businesses. Money that would have been spent on vehicles and fuel imported from outside the city is instead available for consumers to spend locally.

CUSTOMERS WHO REACH BUSINESSES BY BICYCLE TEND TO STOP BY MORE OFTEN AND SPEND THE SAME AMOUNT OR MORE PER MONTH THAN PEOPLE WHO ARRIVE IN PERSONAL VEHICLES.¹¹

Additionally, businesses may realize a parking cost-savings, as bicycle parking requires significantly less space for the same number of customers.

Enhanced bicycle infrastructure has also been shown to **increase property values¹² and create more jobs per dollar invested than motor vehicle infrastructure.**¹³ Auto-focused transportation networks demand wider roadways and large parking lots, driving buildings and destinations apart. In contrast, networks of bikeways spur infill and redevelopment and encourage connections between neighborhoods and main streets.

A bikeable community expands opportunity by providing safe access to services, jobs and public transit for those that are not able to drive or do not own a motor vehicle.

Outdoor recreation and bicycle-related tourism is part of a multi-billion dollar industry.¹⁴ Central Florida serves as a prime entry point to Florida's statewide trail network. This includes the Coast to Coast Connector, a project that will ultimately connect the Gulf of Mexico in Pinellas County to the Atlantic Ocean in Brevard County by a 250-mile long series of trails that passes through Orange County just north of the city boundaries.

Orlando's regional leaders have worked to diversify the city's economy to create a new breed of high-tech, high-wage career opportunities for residents in cutting edge industries such as digital media and technology, life sciences and modeling, simulation and training.¹⁵ In order for Orlando to attract and retain the talent necessary to remain a global leader in the 21st century innovation economy, the city must have the walkable, bikeable, mixed-use neighborhoods that highly mobile demographics desire.



Shingle Creek Regional Trail, Orlando (2020)

HISTORY OF THE ORLANDO BICYCLE PLAN

1994: ORLANDO'S FIRST BICYCLE PLAN

The history of comprehensive bikeway planning in Orlando begins in 1990, when the City of Orlando was ranked as the second “worst” city for bicycling by Bicycling Magazine in their annual ranking of major cities. City of Orlando officials took the ranking as a challenge to improve conditions for bicyclists, serving as a catalyst for the development of the original Orlando bicycle plan.

As part of the plan’s development, the Orlando “Neighborhood Report Card” survey was conducted in 1993. Results of the survey determined residents:

- did not feel safe bicycling within the city
- preferred bicycling on dedicated bike paths (as opposed to riding in mixed-traffic or on shared-use paths for bicycles and pedestrians)

The Bicycle Plan was adopted by the Orlando City Council in 1994. As a result of the 1994 Bicycle Plan, **the trail network was expanded and the city’s first bike lanes and signed bike routes were constructed.** Further support for the development of the city’s bikeways followed in 1996 when then-Mayor Glenda Hood issued **a challenge to build 100 miles of bikeways throughout the city by the year 2000.**

THE DEVELOPMENT OF THE ORIGINAL BICYCLE PLAN WAS GUIDED BY A VISION FOR MOBILITY ALTERNATIVES:

“A MULTIMODAL TRANSPORTATION SYSTEM FOR ORLANDO WHICH CREATES A HIGH LEVEL OF ACCESSIBILITY, REDUCES DEPENDENCY ON THE AUTOMOBILE, INCREASES TRANSIT USAGE, CREATES A QUALITY PEDESTRIAN ENVIRONMENT AND OFFERS A SAFE AND ATTRACTIVE AMBIANCE FOR BICYCLING”

2002: FIRST BICYCLE PLAN UPDATE

The first update to the Bicycle Plan was adopted in 2002. Upholding the original vision, **the updated plan identified an additional 100 miles of new bikeways**, for a total target of 248 miles of bikeways connecting all parts of the city by 2010.

2008: SECOND BICYCLE PLAN UPDATE

By 2008, the city had built over 256 miles of bikeways, exceeding its 2010 target. **The 2008 Bicycle Plan Update identified an additional 140 miles of new on-street bike lanes and 50 miles of new off-street paths/trails**, with 100 of these additional miles targeted to be built by 2015.

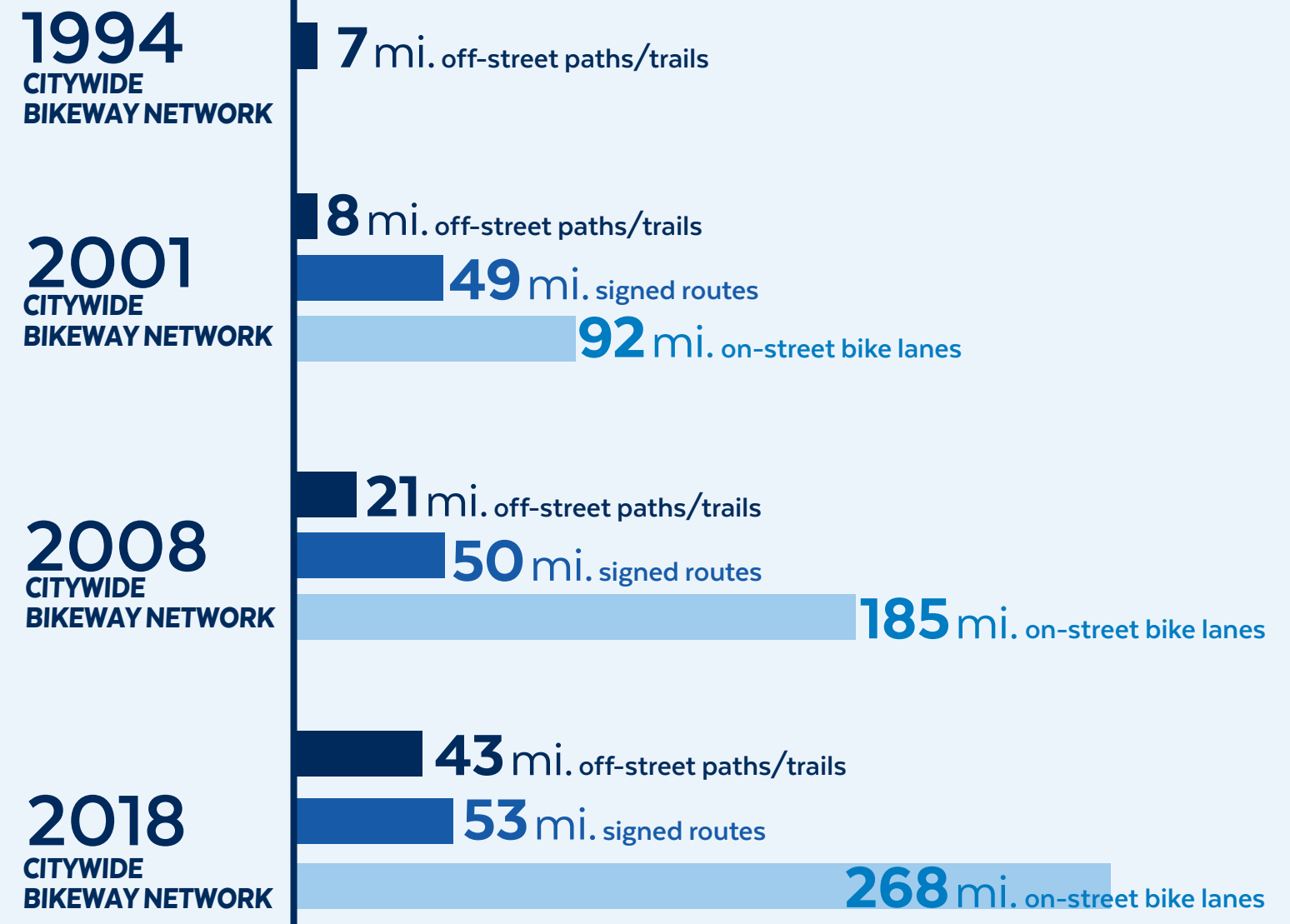
In addition to expanding the city’s bikeway network, the 2008 plan updated the Bicycle Plan vision and incorporated more focused goals, including expanding the city’s off-street path/trail network, targeting bicycle improvements in the city’s Main Street Districts and creating bike parking areas.

2014: PRIMARY BIKE ROUTES STUDY

While not a full update of the Bicycle Plan, the 2014 Orlando primary bike routes study (Appendix A) continued the city’s bikeway planning effort, specifically focused on how bikeways function as a network. The goal of the primary bike routes is the completion of a connected bikeway “spine”, made up of five main family-friendly, paved, multi-use trails connecting the major regions of the city.

The study provided a comprehensive review of the proposed trails from previous plans in the context of this interconnected network, re-evaluated proposed alignments as needed and developed a prioritized implementation plan to complete the trail spine. The study also identified a low-stress network of signed routes that would connect the spine. The study identified a total of 44 trail and signed route priorities, including 104 miles of new trails and 29 miles of new signed routes.

EXPANSION OF ORLANDO'S BIKEWAY NETWORK OVER TIME¹⁶



AREA-SPECIFIC BICYCLE & MULTIMODAL STUDIES

Since the 2014 Primary Bike Routes Study, the city and its transportation partners have proposed strategies, improvements and additions to the city’s bikeway network along specific corridors, neighborhoods and districts as part of various plans and studies.

As part of the Bicycle Plan Update, the bicycle-related recommendations from these plans were evaluated for greater network connectivity, adjusted as needed and integrated into the proposed network.

Significant area-specific studies and other key bicycle planning milestones are detailed chronologically on pages 44 - 45.



Newspaper delivery boys and their bicycles at the Orlando Sentinel-Star newspaper

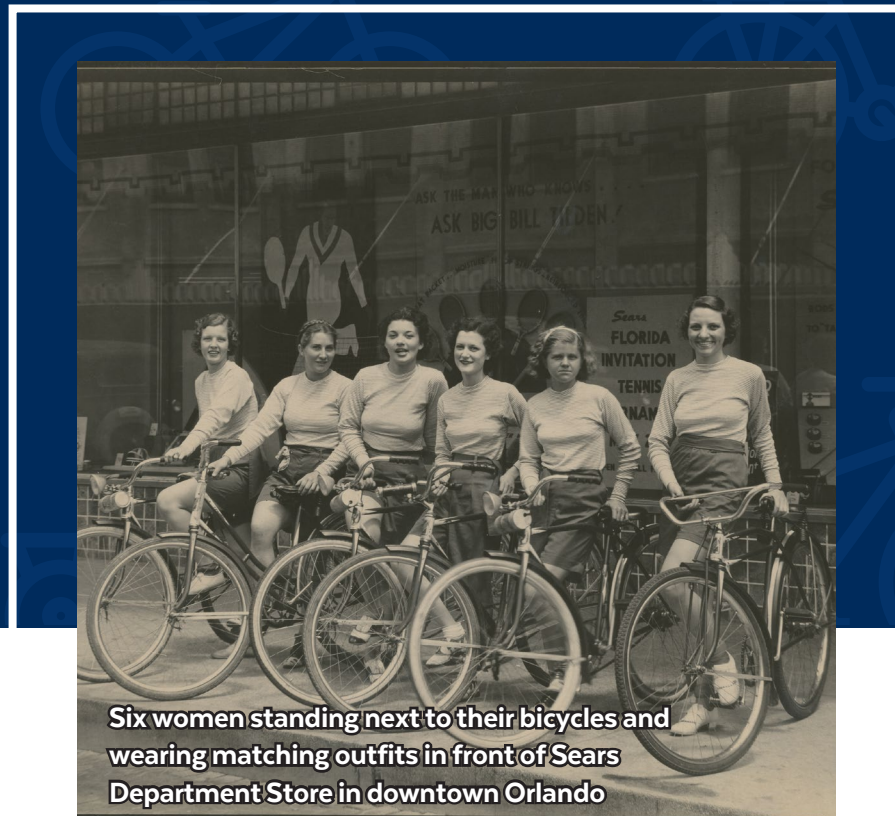


A woman, most likely Zelma Lewter, standing outside in front of a bicycle and picket fence



Gwendolyn Radford, age 17

HISTORICAL PHOTOS OF BICYCLES IN ORLANDO, PROVIDED BY THE ORANGE COUNTY HISTORY CENTER.



Six women standing next to their bicycles and wearing matching outfits in front of Sears Department Store in downtown Orlando



Start of a bicycle race



Orlando Bicycle Club No. 1

POLICY FRAMEWORK

RELATED CITY PLANS & POLICIES

The city’s significant commitment to bicycling is reflected in its current policies, programs and plans.

THE GROWTH MANAGEMENT PLAN

BIKEWAY SYSTEM
(OBJECTIVES 1.26 -1.29; AMENDED AUGUST 17, 2017)

COMPLETE STREETS
(OBJECTIVES 1.33-1.36; ADOPTED MARCH 14, 2016)

**TRANSPORTATION ELEMENT AND FUTURE
LAND USE ELEMENT (GENERAL)**

The growth management plan (GMP) serves as Orlando’s comprehensive plan. The GMP describes the city’s vision for the future and translates that vision into policies, programs and public investments. The bicycling related policies in the GMP have been significantly updated within the last five years, reflecting the city’s direction and current practices in bicycling facilities.

Bicycling is also integrated through the transportation element as part of an overall multimodal approach; Transportation Goal 1 of the GMP is “to create a balanced, multimodal transportation system that supports livability by promoting travel choices including bicycling”.

Sections 1.26 – 1.29 of the transportation element address the city objectives and policies for the bikeway system and were amended in August of 2017. Objective 1.26 specifically calls for the city to “add at least 60 miles of bikeway facilities to the 361 miles of bikeway facilities already constructed within the city” by 2025.

In 2016, the city adopted additional objectives and policies intended to support Complete Streets that address bicycling (1.33 – 1.36) including constructing “safe and convenient bicycle facilities to accommodate cyclists of all ages and abilities” (1.36).

The objectives and policies in the GMP aim to:

- make bicycling comfortable and safe (1.29, 1.35.1)

- minimize travel distances (1.27.2)
- connect key destinations (1.27.1)
- maximize local connectivity (1.26.11, 1.27)
- coordinate to achieve regional connectivity (4.1.5)
- address safety for students bicycling to school (1.27.3-6)

The following strategies are specifically identified in the GMP to achieve these objectives:

- add new bikeways on new and reconstructed roadways
- add new off-street bikeways
- add signed routes on low speed streets
- add bicycle facilities in new development and redevelopments
- create supportive land uses
- acquire right-of-way for new facilities and critical connections
- add bicycle parking
- set quality standards for new bikeways

The GMP states that bicycle facilities along complete street corridors should follow a hierarchy: off-street path/protected cycle way, buffered bike lane, bicycle lane and sharrow (shared lane marking).

GMP PERFORMANCE MEASURES:

- annual reports of bicycle facility changes
- bicycle accident and injury data

THE CODE OF ORDINANCES BICYCLE MOVING VIOLATIONS, BIKE SHARE, BICYCLE PARKING AND BICYCLE TAXIS (PEDI-CABS) CHAPTER 10 (AMENDED 2018)

BICYCLE ACCOMMODATIONS IN NEW DEVELOPMENT LAND DEVELOPMENT CODE (SUBTITLE B)

The City of Orlando Code of Ordinances addresses some bicycle issues including fines for moving violations, bicycle taxis and bicycle parking. The code was updated in 2018 to address bike share providers and to remove prohibitions on bicycling on the sidewalk. The majority of bicycling related issues are addressed in Chapter 10, but there are instances elsewhere in the code. The Land Development Code (Subtitle B) controls provision of bicycle accommodations for new development.



ADOPTED 2019

In December of 2017, Mayor Dyer signed a resolution to adopt a Vision Zero Action Plan, signifying the city’s public commitment to eliminate traffic fatalities and serious injuries by 2040.

Vision Zero is a framework that was first implemented in Sweden in the 1990s as a collaborative campaign to address the crisis of traffic deaths and injuries. It has since been adopted by other cities through the U.S. and the world, including New York, NY; San Francisco, CA; and Portland, OR.

Vision Zero is a systemic approach to increase safety and mobility for all roadway users by:

- engaging communities to expand awareness through education and encouragement
- implementing and maintaining smarter streets for improved driver behavior
- prioritizing improvements in areas with high numbers of pedestrians, cyclists and transit riders

Vision Zero program goals:

- adopt a safe systems approach in roadway design, operations and maintenance
- increase public understanding of the leading causes of crashes resulting in serious injury or fatalities
- support law enforcement efforts to eliminate behaviors leading to serious injury and fatal crashes
- demonstrate continuous progress toward Vision Zero
- improve access and travel time to level 1 trauma centers and other hospitals
- prioritize investments and programs in communities that include underserved populations and higher numbers of vulnerable road users

The study has identified “high injury networks” for drivers, motorcyclists, pedestrians and cyclists. Through a comprehensive analysis of crash types and contributing factors, the Vision Zero Action Plan recommends the following action items to address bicycle crashes:

- review bicycle facilities within intersections confirming space/ separation/ control (bike signals), are easy to understand for all users and reduce the number of potential conflicts (signalized and unsignalized intersections)
- provide mode protection – consider measures such as increasing left turn phase protection and/or restricting right turn on red (signalized intersections)
- add bicycle facilities where none are currently present and confirm those facilities provide a sufficient level of comfort and access to destinations (signalized and unsignalized intersections)
- evaluate current bicycle facilities to determine if they provide a sufficient level of comfort and access to destinations (signalized and unsignalized intersections)
- education and enforcement on yielding laws for motorists (signalized and unsignalized intersections)

The Bicycle Plan Update supports Vision Zero by incorporating and building upon the Vision Zero study findings and recommendations.



ADOPTED 2013;
UPDATED 2018

The Green Works Orlando Community Action Plan was first adopted in 2013 as a road map to transform Orlando into one of the most environmentally-friendly and economically and socially vibrant communities in the nation. As a result of the priorities set in the 2013 plan focused on bicycling, the city adopted a Complete Streets policy, built two new multi-use urban trails and introduced the city's first bike share program.

The Green Works Community Action Plan was updated in 2018 with new strategies and best practices and incorporates new overarching themes of **social equity, climate resiliency and smart technology and innovation.**

Bicycle related 2040 targets include:

- majority of trips made by foot, bike, carpooling or transit
- achieve a gold ranking for the League of American Bicyclists Bicycle Friendly Community Score
- increase miles of safe, sustainable transportation infrastructure (bike lanes and paths, transit lines and sidewalks)
- double street miles within the city that meet Complete Streets criteria
- eliminate pedestrian and bicyclist fatalities

GREEN WORKS PERFORMANCE MEASURES:

- miles of on-street bike lanes
- miles of off-street bike lanes
- bicycle casualty
- bike share program members
- citywide bike score (from walkscore.com)



Gaston Edwards Trail

**ORLANDO BICYCLE
PLANNING
MILESTONES**

1990

Bicycle Magazine ranks Orlando second "worst" city for bicycling

1993

"Neighborhood Report Card" Survey benchmarks residents views on bicycling and preference for dedicated bike paths

1994

City's original Bicycle Plan adopted, establishing the vision for citywide multimodal investments

1996

Mayor Hood issues challenge to build 100 miles of bikeways by 2000

1997

LYNX LYMMO bus rapid transit service begins, giving people fare-free access to public transportation in downtown

2000

City successfully completes 100 miles of bikeways
Inaugural Bike to Work Day

2002

The Bicycle Plan first updated
Edgewater Drive Complete Street Project (lane elimination) completed and recognized as a national model for Complete Streets

- injuries fell 71%
- biking increased 30%
- property values within ½ mile increased 70%

2004

Construction of LYNX Central Station complete
League of American Bicyclists designate the city a bronze level bicycle friendly community

2006

The Downtown Transportation Plan is adopted, establishing a detailed plan for bikeways in downtown and connectivity to transit

2007

Mayor Dyer launches the sustainability initiative Green Works Orlando which prioritizes bringing bike share to the city

2008

Second update to the city Bicycle Plan completed

2013

Green Works Orlando Community Action Plan adopted
Downtown South Safe Neighborhood Improvement Plan completed

2014

City Primary Bike Routes Study completed
FDOT adopts a Complete Streets Policy
SunRail regional commuter rail begins operation

2015

Parramore Comprehensive Neighborhood Plan completed
The city's first bike share, Juice, begins operating with 20 hubs and 200 bikes in greater downtown Orlando, Lake Nona and Winter Park
Lake Druid Park Mountain Bike Park opens
City initiates a business bike rack request program, installing free bike racks within the public right-of-way
As part of the Mayors Challenge for Safer People and Safer Streets, the city starts collecting bicycle and pedestrian counts using two portable electronic counters to better understand bicycle and pedestrian usage on select trails (summarized in annual count reports)
Five bicycle repair stations installed throughout the city

2016

The city's Growth Management Plan is updated with goals, objectives and policies that support livability by promoting travel choices, including bicycling and Complete Streets
City implements its first sharrow route, connecting the Orlando Urban Trail to the Cady Way Trail
Green bicycle pavement markings added along Livingston Street and Metrowest Boulevard

2017

Bikeway policies updated in the Growth Management Plan
Virginia/Lake Highland Transportation and Land Use Study Strategic Plan completed
Robinson Street Corridor Study (FDOT) recommends city's first cycle track
Inaugural "Bike 5 Cities" event
Mayor Dyer signs a resolution to adopt a Vision Zero Action Plan

2018

Green Works Orlando Community Action Plan update completed
City Code of Ordinances updated to address bike share providers, bike taxis, bike parking and to remove prohibitions on bicycling on the sidewalk
Mills50 and Milk District Bicycle and Pedestrian Study completed
City awarded a spot in the inaugural National Complete Streets Coalition Safe Streets Academy and installs the Curry Ford Road separated bike lanes demonstration project

- vehicle speeding decreased 53%
- biking increased 50%

Lime launches Florida's first electric fleet, bringing the first dock less bike sharing program to Orlando
Bicycle Plan Update initiated

2019

Colonial Drive Overpass opens, connecting the Orlando Urban Trail and Gertrude's Walk, SunRail and LYNX Central Station
North Quarter Transportation Vision Study completed
City installs seven additional bicycle and pedestrian electronic counters and one additional bike repair station
Corrine Drive Complete Streets Study (MetroPlan Orlando)
JUMP and HOPR dockless bike share programs launch

THE EXISTING BIKEWAY NETWORK

The city currently identifies 364 miles of facilities as part of its **bikeway network** - defined as the sum of miles of **signed routes**, lane miles of **on-street bike lanes** and miles of **off-street paths/trails**.

These categories and their general associated design features were first adopted during the development of the original Orlando Bicycle Plan and the city has maintained a relatively consistent approach ever since.

SIGNED ROUTES

Signed routes are roadways where bicyclists share the lane with motor vehicles that are designated as part of the bikeway network through posted signage.

The specific type of signage is inconsistent throughout the network. “Bike Route”, “Orlando Bikeway”, “Share the Road” and “Bicycles May Use Full Lane” are examples of the messaging along existing signed routes. These signs are advisory only and are not meant to discourage or prohibit bicyclists from using roads that are not signed routes. Rather, the intention behind signed routes is to alert motorists that bicyclists are likely to be present and help reinforce and legitimize bicyclists full right to the road for both motorists and bicyclists. The city currently has 53 miles of signed routes. Since 2015, shared lane pavement markings, or “sharrows”, have been added along five signed routes.

ON-STREET BIKE LANES

On-street bike lanes are one-way facilities that provide designated space for bicyclists adjacent to the furthest outside travel lanes. On-street bike lanes are a minimum of 4 feet wide and are designated through a combination of striping, pavement markings and signage. The city currently has 268 lane miles of on-street bike lanes, making up the majority of the city’s overall bikeway network mileage.



OFF-STREET PATHS/TRAILS

Off-street paths and trails are physically separated, bi-directional facilities for shared use by bicyclists, pedestrians and other non-motorized uses, such as roller bladers, skateboarders or people on scooters. Off-street paths and trails are typically 8 to 14-feet in width, made of asphalt or concrete sections and have limited roadway crossings and access points. They may run adjacent to a roadway (i.e. off-street path), or on a separate alignment (i.e. trail). Orlando’s trails offer tree-lined shaded rides that are close to nature while still providing convenient connections for both commuters and recreational riders.

Currently, the city has 43 miles of off-street paths/trail system and another seven miles are in development.



EXISTING BIKEWAY NETWORK MAP

THE EXISTING BIKEWAY NETWORK BY THE NUMBERS (2018)

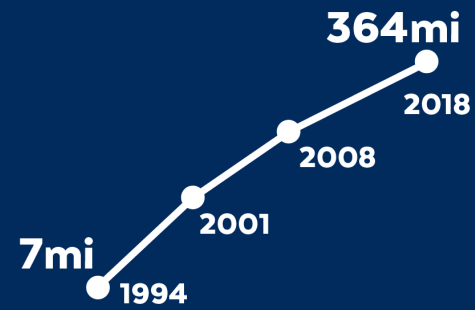
1 BICYCLE/PEDESTRIAN TRAIL OVERPASS

43mi OFF-STREET PATHS/TRAILS

53mi NEIGHBORHOOD SIGNED ROUTES
5 SHARROW ROUTES

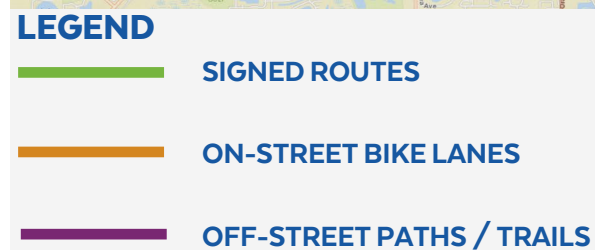
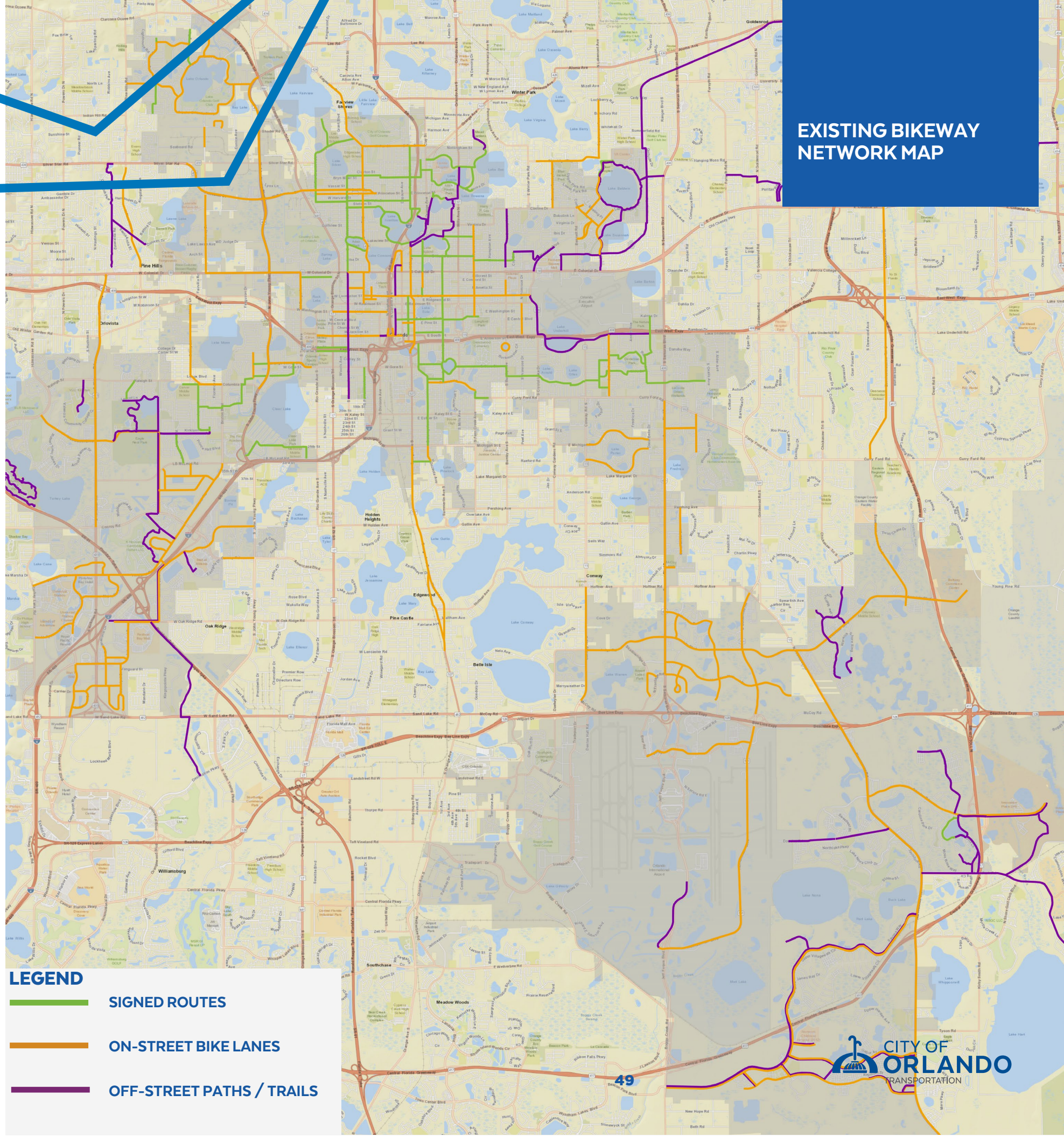
268mi ON-STREET BIKE LANES

NOTE: ON-STREET BIKE LANES REPORTED BY LANE MILES
SOURCE: CITY OF ORLANDO BIKE INVENTORY, SEPT 2018



TOTAL MILES OF BIKEWAYS CONSTRUCTED SINCE THE ADOPTION OF THE ORIGINAL ORLANDO BICYCLE PLAN

+7mi TRAILS CURRENTLY IN DEVELOPMENT





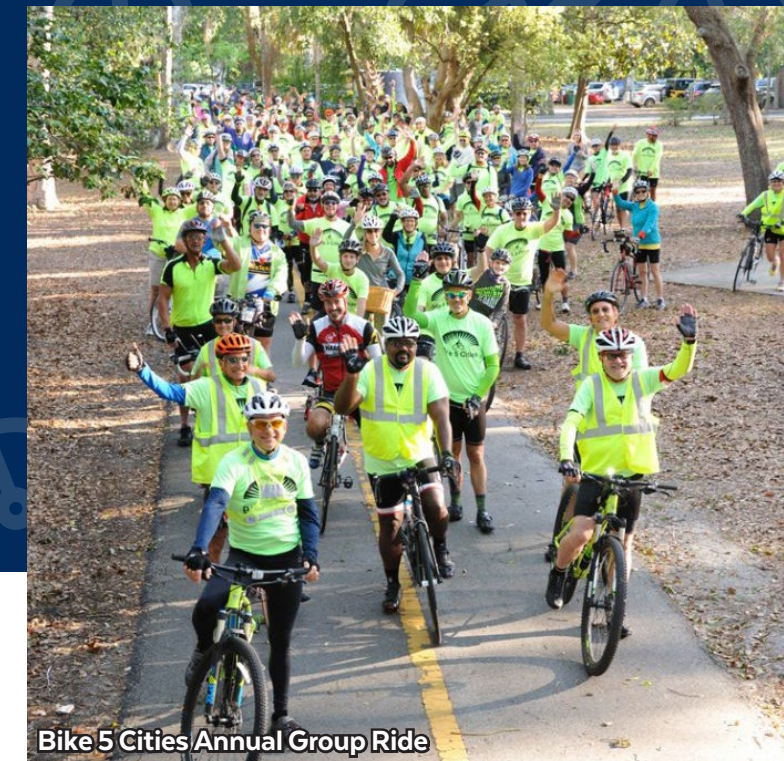
Orlando Critical Mass Ride, Orange Avenue



Bike to Work Day 2019, Colonial Drive Overpass



B3 Cafe Holiday Lights Bike Ride, Corrine Drive



Bike 5 Cities Annual Group Ride



themes, goals & objectives

The updated vision statement can be broken into five Bicycle Planning themes:

1. comfort
2. connectivity
3. equity
4. safety
5. culture

Existing conditions and key considerations for each of these themes were evaluated to better understand the current context beyond a map of existing facilities. The findings provided benchmarks for the development of the Bicycle Plan's goals and objectives that conclude each theme discussion.

City policies and plans, national best practices and input from the community and the Bicycle Plan Update working group were also considered in the development of the plan's goals and objectives.



Mayor Dyer at a Community Bike Event

1

COMFORT & BICYCLING



COMFORT, TARGET USERS & LEVEL OF TRAFFIC STRESS

The new FHWA bicycle selection guide has shifted away from defining bikeway networks by facility type as defined by degree of travel separation, and instead proposes bikeway networks be mapped and planned based on populations that would choose to use particular routes. These networks are identified based on:

- (1) **target users:** who you are planning for
- (2) what kind of facility they would be **comfortable** riding on.

Comfort is defined as **minimizing stress**, anxiety and safety concerns for the target design user. Level of separation from motor vehicle traffic, traffic volumes, traffic speed and difficulty crossing intersections are all factors that can influence a bicyclist’s level of comfort.

National survey data suggests that over 50% of the U.S. population are “interested but concerned” bicyclists – those who tend to avoid bicycling except where they have access to “**low-stress facilities**” – separated bikeways or very low-volume streets with safe roadway crossings.¹⁷ The NACTO Urban Bikeway Design Guide refers to this as the “**all ages and abilities**” network.

Basic bikeway networks in the U.S. tend to yield about a two to three percent bicycle mode share, whereas fully connected low-stress networks have seen bicycling rates from five to fifteen percent.¹⁸

A similar question was posed to Orlando residents through the online survey as part of the Bicycle Plan Update community outreach.¹⁹ While 57% of respondents are currently okay navigating the city by bike through the use of on-street bike lanes or sharing the road, **37% of survey respondents answered that they only ride on low-stress facilities.** Another six percent do not currently ride bicycles at all. This suggests that the development of a low-stress network would not only increase the comfort of current bicyclists, it could also significantly increase Orlando’s bicycle mode share by targeting the “interested but concerned” cyclists.

1. COMFORT & BICYCLING:
THE CURRENT CONTEXT

AMENITIES

The city has made headway in improving bicyclists’ comfort during their ride by including shade, benches, water fountains, wayfinding signage and repair stations as part of the bikeway network. Ensuring end-of-trip facilities, such as safe and convenient bike parking, lockers and showers will further remove the barriers to bicycling as a means of commuting.

THE EXISTING LOW-STRESS NETWORK

Low-stress networks identify a more nuanced set of bicycle facility types, including the use of **buffered bike lanes, one-way separated bike lanes** and **two-way separated bike lanes**.

The 2014 primary routes study was the city’s first shift from basic bikeway network planning (primarily on-street bike lanes and signed routes) towards identifying a low-stress network. This study identified a high priority “spine” of off-street paths/trails, neighborhood routes and wayfinding.

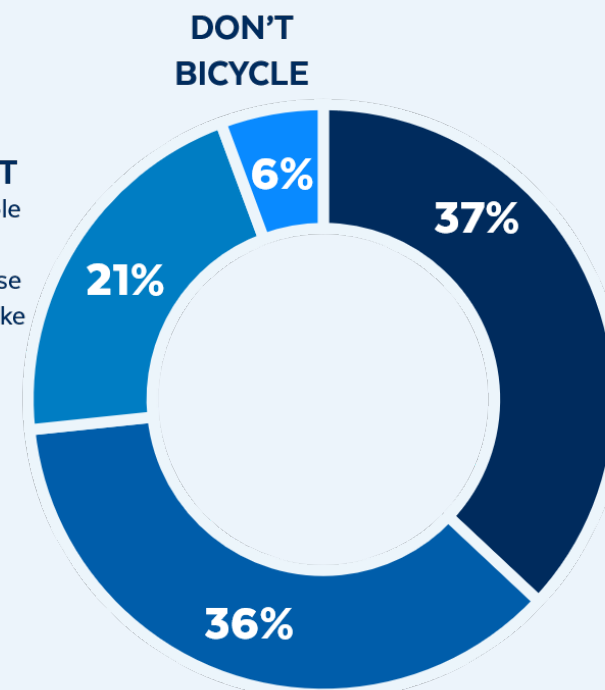
While Orlando does not currently have any separated bikeways, separated bikeways are acknowledged in the city Complete Streets policy, and one-way separated bike lanes were temporarily provided through the Safe Streets Academy Demonstration Project in 2018. The 2017 Robinson Street study proposed the city’s first two-way separated bike lane project. Along state roads, existing bike lanes are being upgraded to buffered bike lanes and/or off-street paths as part of FDOT’s existing work program.

community feedback: results of the Bicycle Plan Update online survey

The majority of survey respondents reported riding a bike one to three times a week, and for the primary purpose of recreation, leisure or health.

Only a small minority of respondents currently bike primarily as a means of travel to work, school or shopping.

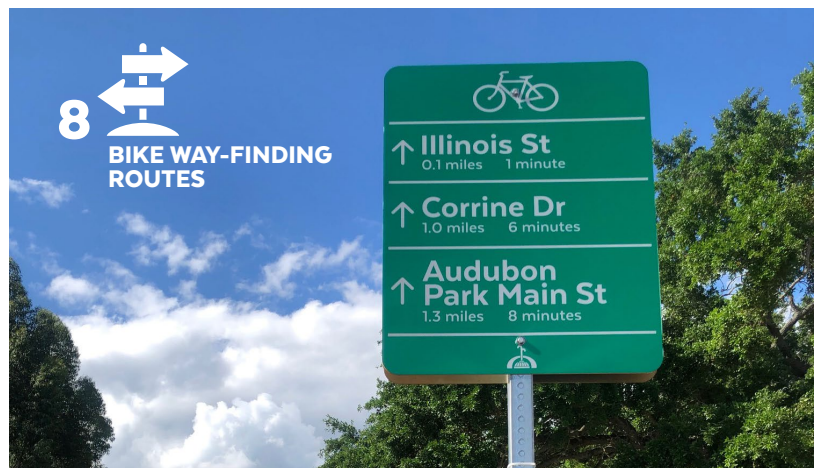
HIGHLY CONFIDENT
“I am comfortable riding in mixed traffic and will use roads without bike lanes”



INTERESTED BUT CONCERNED
“I prefer to bike on off-street trails. On busier streets, I usually bike on sidewalks even if on-street bike lanes are provided”

SOMEWHAT CONFIDENT
“While I generally prefer biking on off-street trails or quiet residential streets, I will bike in on-street bike lanes where provided”

1. COMFORT & BICYCLING
BY THE NUMBERS



 goal 1:
make bicycling within
the city **comfortable**
and convenient for
people of a wide range
of ages and abilities.

OBJECTIVE 1: Provide family-friendly bicycle routes separated from moving traffic where feasible.

OBJECTIVE 2: Plan for bicycle mobility within major corridors throughout the city by providing dedicated bikeways appropriate to the speed and volume of the context.

OBJECTIVE 3: Make neighborhood streets safer and more comfortable for bicycling through traffic calming, Complete Streets design and dedicated bikeways.

OBJECTIVE 4: Provide or require bicycle parking appropriate for different trip types and destinations. Encourage retrofit of existing destinations lacking bicycle parking.

OBJECTIVE 5: Increase the viability of biking in hot weather by prioritizing shade and providing water fountains or other amenities along trails where feasible.

OBJECTIVE 6: Incorporate different types of recreational bicycling, including family bicycling, road biking and off-road biking, into parks, recreation and trail planning.

OBJECTIVE 7: Encourage the provision of enhanced facilities or services such as bicycle lockers, bicycle repair stations and showers in activity centers and workplaces.

CONNECTIVITY & BICYCLING



EXISTING TRAIL SYSTEMS

The city has five main existing trail systems: the Orlando Urban Trail, the Cady Way Trail, the Lake Underhill Path, the Shingle Creek Trail and the Southeast Trail. Maps of the existing trail systems are included in **Appendix B**. These trails have largely been constructed in disconnected segments, and there is limited connectivity between the trail systems today.

THE CADY WAY TRAIL

The Cady Way Trail was the first trail in the city. Located four miles northeast of downtown, it was constructed during the mid 1990s through a partnership between Orlando, Orange County, the City of Winter Park and the US Navy. The Navy Seabees helped with part of the construction in areas adjacent to the Naval Training Center (now home to Baldwin Park). Today the trail continues to the northeast into Seminole County and connects into the Cross Seminole Trail.

THE ORLANDO URBAN TRAIL

The Orlando Urban Trail serves as a north-south spine through the city and was initially developed along the former Dinky Line Rail spur. The first segment was constructed in the mid-2000s. The trail was originally envisioned to provide a greenway connection from the north part of downtown Orlando to Loch Haven Park. A trail connection is planned to continue southwest to ultimately connect to the Shingle Creek Trail.

THE LAKE UNDERHILL PATH

The Lake Underhill Path began as a wide sidewalk on the shore of Lake Underhill, three miles east of downtown. It was widened to a full trail in the 1990s and has now been extended to connect to the Fashion Square Mall area and the Park of the Americas. It is planned to continue east as a primary route and ultimately provide connections to the southeast part of the city.

THE SHINGLE CREEK TRAIL

The Shingle Creek Trail represents a true regional partnership between the cities of Orlando, Kissimmee and Orange and Osceola counties in an effort to provide a north-south regional trail through the Orlando metropolitan area to downtown Kissimmee. An initial segment was completed in Orlando near Mall of Millenia, seven miles southwest of downtown, in the mid 2000s and now segments have been completed within each of the primary partner's jurisdictional limits.

THE SOUTHEAST TRAIL

The Orlando Southeast Trail is located east of the Orlando International Airport near Narcoossee Road, twenty miles from downtown Orlando. The network currently consisting of 13 miles of trails will ultimately link to all the activity centers in the Lake Nona Area. The initial part of the network was developed along a gas easement corridor in the North Lake Park neighborhood of Lake Nona in the early 2000s.

THE DOWNTOWN LOOP

The Downtown Loop, also known as the Orlando Bicycle Beltway, is a collection of existing and planned trail segments that will complete a loop around greater downtown Orlando. The loop is made up of existing portions of the Orlando Urban Trail, the Cady Way Trail and the Lake Underhill Path. A critical component of the Downtown Loop is the **Colonial Drive Overpass**, which opened in early 2019 and is the city's first bicycle/pedestrian overpass project. Within the city's Central Business District, the overpass connects the northern and southern portions of downtown and enhances connectivity between the Orlando Urban Trail and Gertrude's Walk, SunRail and LYNX Central Station.

**community feedback:
desire lines**

At the first public meeting participants were asked to connect the origin and destination of their most frequently biked trip using green ribbon, and their most desired trip which they cannot make today using blue ribbon. The results highlight areas of good existing connectivity:

- downtown, northeast of downtown and into Seminole County
- southeast Orlando

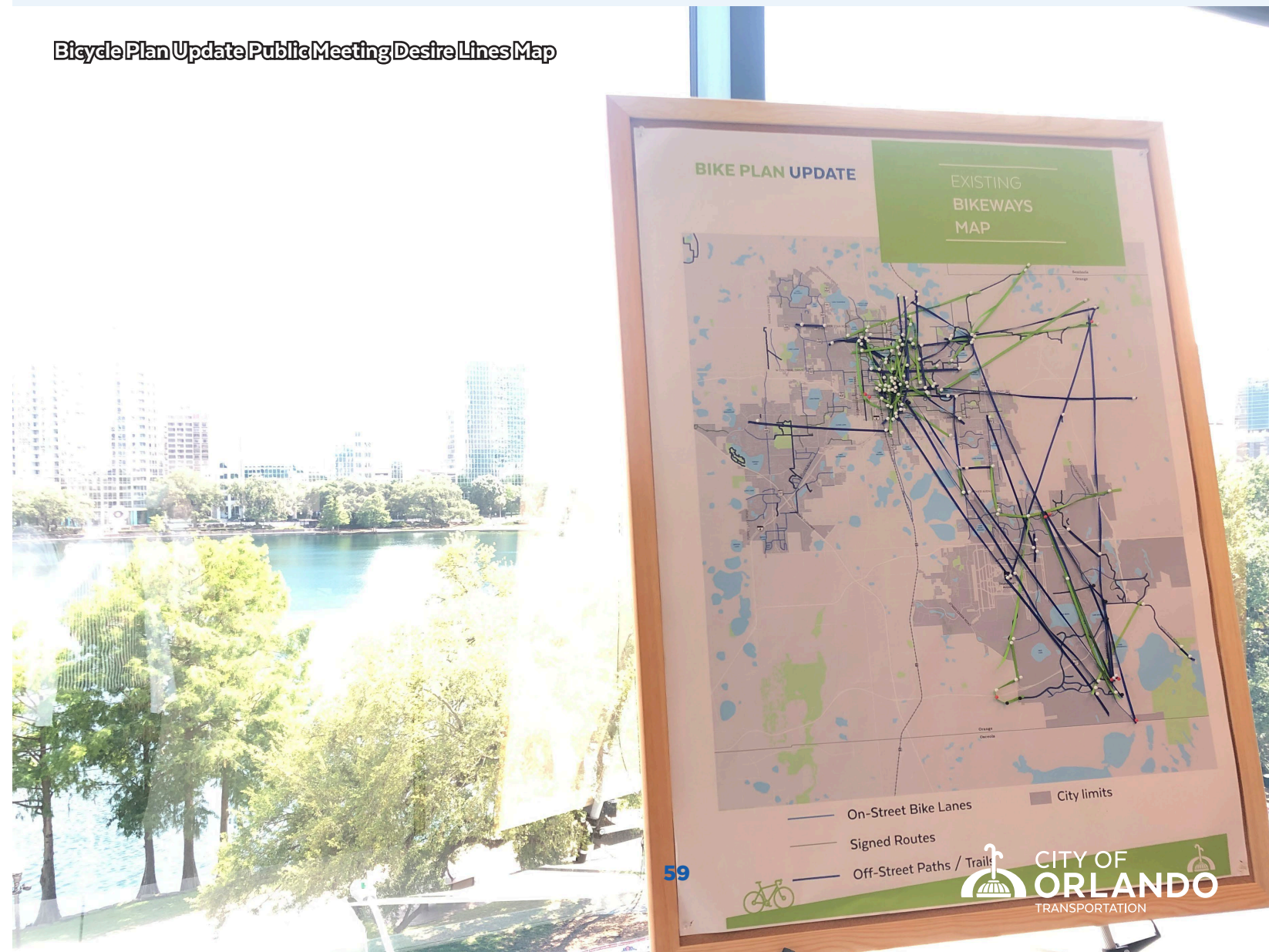
as well as connectivity gaps:

- downtown to southeast Orlando
- downtown to UCF
- southeast Orlando to UCF
- downtown to Metrowest
- east-west connections within downtown and northwest Orlando

"I WOULD LOVE TO SEE LESS FRAGMENTATION IN ORLANDO'S BIKE NETWORK. A GOOD SYSTEM DOESN'T JUST GET YOU FROM POINT A TO POINT B. IT ALLOWS YOU TO GO FROM A TO C TO F TO B, ETC. I WOULD ALSO LIKE TO SEE MORE INFRASTRUCTURE THAT PRIORITIZES CYCLISTS."

- ONLINE SURVEY RESPONSE

Bicycle Plan Update Public Meeting Desire Lines Map



2. CONNECTIVITY & BICYCLING:
BY THE NUMBERS



6/10

**ENGINEERING:
BIKE NETWORK
& CONNECTIVITY
COMMUNITY SCORE**
THE LEAGUE OF
AMERICAN BICYCLISTS
COMMUNITY REPORT
CARD

SOURCE: THE LEAGUE OF
AMERICAN BICYCLISTS COMMUNITY
REPORT CARD, CITY OF ORLANDO
FALL 2016 CATEGORY SCORES

90 - 100
**BIKER'S
PARADISE**

70 - 89
**VERY
BIKEABLE**

50 - 69
BIKEABLE

0 - 49
**SOMEWHAT
BIKEABLE**

**MOST
BIKEABLE
NEIGHBORHOODS:**
LAKE EOLA HEIGHTS 90
CALLAHAN 89
LAKE DOT 87

55 UP 2
POINTS
FROM
2017-2018 ↑
**CITYWIDE AVERAGE
BIKESCORE**

SOURCE: WALKSCORE.COM, 2019
BIKE SCORE IS BASED ON THE
WEIGHTED AVERAGE OF SCORES
ACROSS MANY ADDRESSES IN THE CITY



goal 2:

create and maintain an
integrated network of
low-stress bikeways
connecting residents
to activity centers,
schools, workplaces,
parks and regional
bikeway networks.

OBJECTIVE 1: Complete
at least 45 miles of new low-stress
bikeways within the city by 2030.

OBJECTIVE 2: Create a
hierarchical network of bicycle facilities
for long-distance travel, short-distance
travel, local access and recreation.

OBJECTIVE 3: Connect
the bikeway network to common
destinations such as shopping,
schools, parks and workplaces.

OBJECTIVE 4: Recognize
connected, low-speed, low-volume
streets as part of the short-distance
bikeway network and create new
connections where feasible.

OBJECTIVE 5: Prioritize
gaps in the existing network that
increase access and decrease travel
distances for people riding bicycles.

OBJECTIVE 6: Prioritize
ongoing maintenance and repair
of the bikeway network.

OBJECTIVE 7: Provide
predictable maintenance of operations of
the bikeway network during private and
public construction projects and events.

OBJECTIVE 8: Add
wayfinding along long-distance bike
routes and between neighborhood
streets and dedicated bikeways.

OBJECTIVE 9: Incorporate bicycle
improvements into all street maintenance
and reconstruction projects where feasible.

3

EQUITY &
BICYCLING



Orlando is a diverse, multicultural community that embraces inclusion, compassion, equality and human rights for all. This includes investing in a **balanced transportation system that provides equal access to jobs and opportunities for all residents**. The City of Orlando is one of the fastest growing and most racially and ethnically diverse cities in all of America.

WITH THE OVERWHELMING MAJORITY (65.8%) OF THE CITY'S 280,258 RESIDENTS IDENTIFYING AS RACIAL MINORITIES, ORLANDO IS ONE OF THE FEW MID-SIZE MAJORITY-MINORITY CITIES IN THE COUNTRY.²⁰

However, the significant growth the city has witnessed over the past few decades has come with many cultural, social, political, economic and health challenges. **One of the main challenges the city, region and state has faced is the safety, protection and equitable mobility of pedestrians and bicyclists on its roadways.**

Equitable outcomes for marginalized populations of people and historically and systemically excluded groups remain elusive throughout the country at the national, state and city level. Transportation investments have historically disproportionately benefited motor vehicle travelers and investments in bicycling infrastructure have tended to be distributed unevenly throughout different city neighborhoods. These past inequitable investments directly and indirectly effect health risks and outcomes for certain populations and neighborhoods today.

To combat existing inequities, many cities have established protocols to engage with disenfranchised communities and prioritize bicycle infrastructure investments where there are existing inequities. Currently, Orlando does not have an established mechanism to prioritize bicycle infrastructure investments in neighborhoods of marginalized populations nor does it have a targeted engagement approach to involve these communities during the planning phase.

This Bicycle Plan Update seeks to better understand existing inequities within the City of Orlando and makes recommendations that will prioritize and institutionalize equity within Orlando's plans, programs, processes and overall distribution of resources to ensure that safe infrastructure is built and maintained for the most vulnerable segments of the city's population.

*To set a baseline for existing inequities, the Orlando Bicycle Plan Update expanded on an equity analysis methodology and concept established in the 2014 Seattle Bicycle Master Plan.*²¹

AREAS OF BIKEWAY
UNDER-INVESTMENT

The first measure of inequity evaluated was the inequitable distribution of existing bicycle facilities geographically throughout the city.

Geographic areas of under-investment were identified based on the Census Block Groups with the fewest miles of existing bikeway network, after adjusting for the size of the Census Block Groups and areas of extremely low population density.

Many of the areas of under-investment are along the border of the city's jurisdictional boundary. These results can likely be attributed to a combination of recently annexed parcels and the need for cross-jurisdictional coordination to connect these fragmented parts of the city in a way that is direct and convenient.

SOCIO-ECONOMIC
INDICATORS OF INEQUITY

The second component of the equity analysis determined correlations of inequity in bicycle infrastructure for certain demographic populations in the city. Seven socio-economic indicators were evaluated. The first four indicators are related to characteristics of vulnerable road users, while the remaining three indicators consider historically marginalized populations.

Using 5-year (2012-2016) American Community Survey Census Block Group information, the distribution of on-street bike lanes, signed routes and off-street paths/trails were compared in areas of higher than average and lower than average concentrations of these socio-economic indicators to determine correlations in the number and/or quality of investments where these populations are concentrated.



JuiceBikeShare Station (2017)

VULNERABLE ROAD USERS

Bikeable communities provide safe, independent mobility for non-drivers and allow all residents to have equal access to jobs and opportunity.

IN A TYPICAL COMMUNITY, 20-40% OF RESIDENTS CANNOT, SHOULD NOT OR PREFER NOT TO DRIVE²²

Despite representing a large percentage of a community, groups that travel by means other than a personal motor vehicle face significant inequities. In Central Florida, those that travel by bike are much more likely to be involved in a crash resulting in a serious injury or fatality than national averages would suggest. This may indicate that despite locations of hazardous bicycling conditions, there are populations of people in Orlando already bicycling out of necessity. These populations need equitable access to safe infrastructure.

The socio-economic indicators for vulnerable road users include:

- percentage of means of transportation to work other than personal motor vehicle
- percentage of zero-vehicle households
- percentage of population age 65 or above
- percentage of population 18 or below

MEANS OF TRANSPORTATION TO WORK OTHER THAN PERSONAL MOTOR VEHICLE

4% OF ORLANDO RESIDENTS COMMUTE TO WORK BY WALKING, BIKING OR TAKING TRANSIT²³

Areas with more people commuting to work by means other than a personal motor vehicle tend to have a greater concentration of on-street bike lanes and signed routes.

ZERO VEHICLE HOUSEHOLDS

8% OF ORLANDO HOUSEHOLDS DO NOT OWN A VEHICLE²⁴

The analysis found a positive correlation between the number of zero-vehicle households and the concentration of on-street bike lanes and signed routes. On average, Census Block Groups with greater than average number of zero-vehicle households have a greater concentration of on-street bike lanes and signed-routes per square mile, while areas with the fewest zero-vehicle households (less than 4%) have the fewest on-street bike lanes and signed routes per square mile.

POPULATION 65+

11% OF ORLANDO RESIDENTS ARE 65 OR OLDER²⁵

There is no clear spatial pattern of populations 65 and older throughout the city. However, the analysis found that places where the number of 65+ individuals is greater than the citywide average have the fewest miles of off-street bicycle facilities per square mile.

This is an important finding considering that the population age 65 and above are more likely to rely on trails to ride their bicycles for exercise, social and recreational opportunities.

“IF YOU DON’T HAVE A CAR YOU HAVE A BIKE INSTEAD”

- ONLINE SURVEY RESPONSE

YOUTH POPULATIONS (18 AND YOUNGER)

22% OF ORLANDO RESIDENTS ARE 18 OR YOUNGER²⁶

The percentage of children walking or bicycling to school has dropped precipitously, from approximately 50% in 1969 to just 13% in 2009²⁷. Over the past 40 years, the percentage of children who are overweight and obese has grown to more than 33%²⁸.

Concentrated populations of youth are located west of the city near N. John Young Parkway and southeast by the Orlando International Airport.

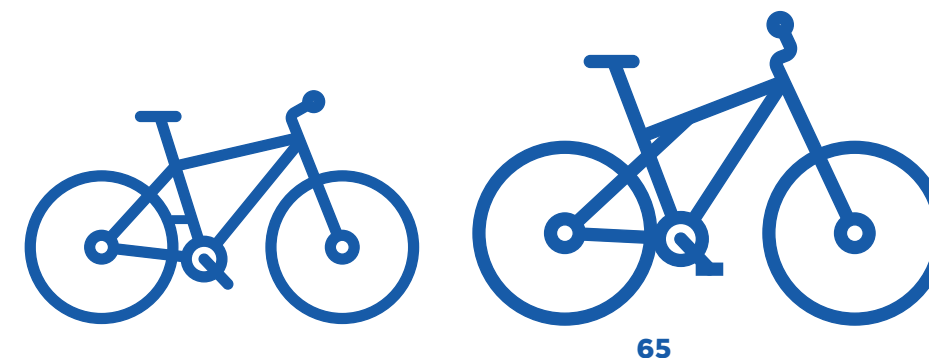
The relative density of youth populations are negatively correlated with the relative density of existing bikeways. Places with the least concentrations of youth (less than 7%) have more miles of signed bike routes, on-street bike lanes and off-street paths/trails per square mile than areas with greater concentrations of youth. These areas also have three times more total miles of bikeways than places with more than 28% of population age 18 and below.

AREAS OF MARGINALIZED POPULATIONS

Marginalized populations have historically been left out of transportation planning efforts. The socio-economic indicators in the first paragraph for marginalized populations include:

- percentage of population below poverty level
- percentage of minority population
- percentage of population with limited English proficiency

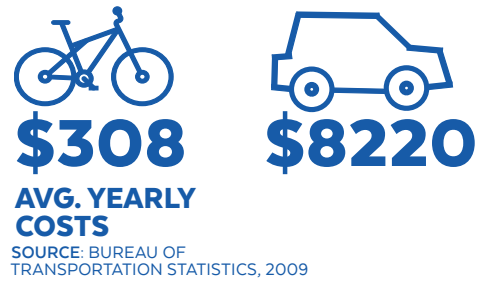
These demographics are disproportionately impacted by pollution from busy roads that pass through their communities, they are disproportionately at risk for bicycle and pedestrian related crashes, injuries and fatalities and they struggle disproportionately with high blood pressure, diabetes, obesity and respiratory illness²⁹. Minority populations and the lowest income households bike for transportation more often than people who are white and households of higher income. While the typical cyclist is still seen as wealthy, male and white, low income and minority populations are bicycling at a growing rate³⁰.



LOW INCOME

**19% OF ORLANDO HOUSEHOLDS
FALL BELOW THE POVERTY LINE³¹**

The nation’s disadvantaged families spend more than 40% of take home pay on getting to work, the highest proportion of any income group.³²



Analysis of Orlando’s neighborhoods found that areas with the greatest concentrations of poverty (greater than 25%) have half the concentration of off-street paths/trails.

Building better integrated bicycling and multimodal networks provides opportunities to reduce transportation costs and close gaps in job access for low-income families and individuals.

MINORITY

**66% OF ORLANDO RESIDENTS
IDENTIFY AS A RACIAL MINORITY³³**

Consistent with national findings, concentrations of poverty and racial minorities are geographically correlated within the city. However, the analysis found an even stronger correlation between bikeway distribution and race than with bikeway distribution and income.

Areas of Orlando with majority white populations have higher concentrations of signed routes, on-street bike lanes and off-street paths/trails on average than areas with average or greater than average racial diversity.

LIMITED ENGLISH PROFICIENCY

**14% OF ORLANDO
HOUSEHOLDS HAVE
LIMITED ENGLISH
PROFICIENCY³⁴**

The analysis found that populations with limited English proficiency are concentrated outside of downtown Orlando.

No strong correlations between English proficiency and concentration of bikeways were found.

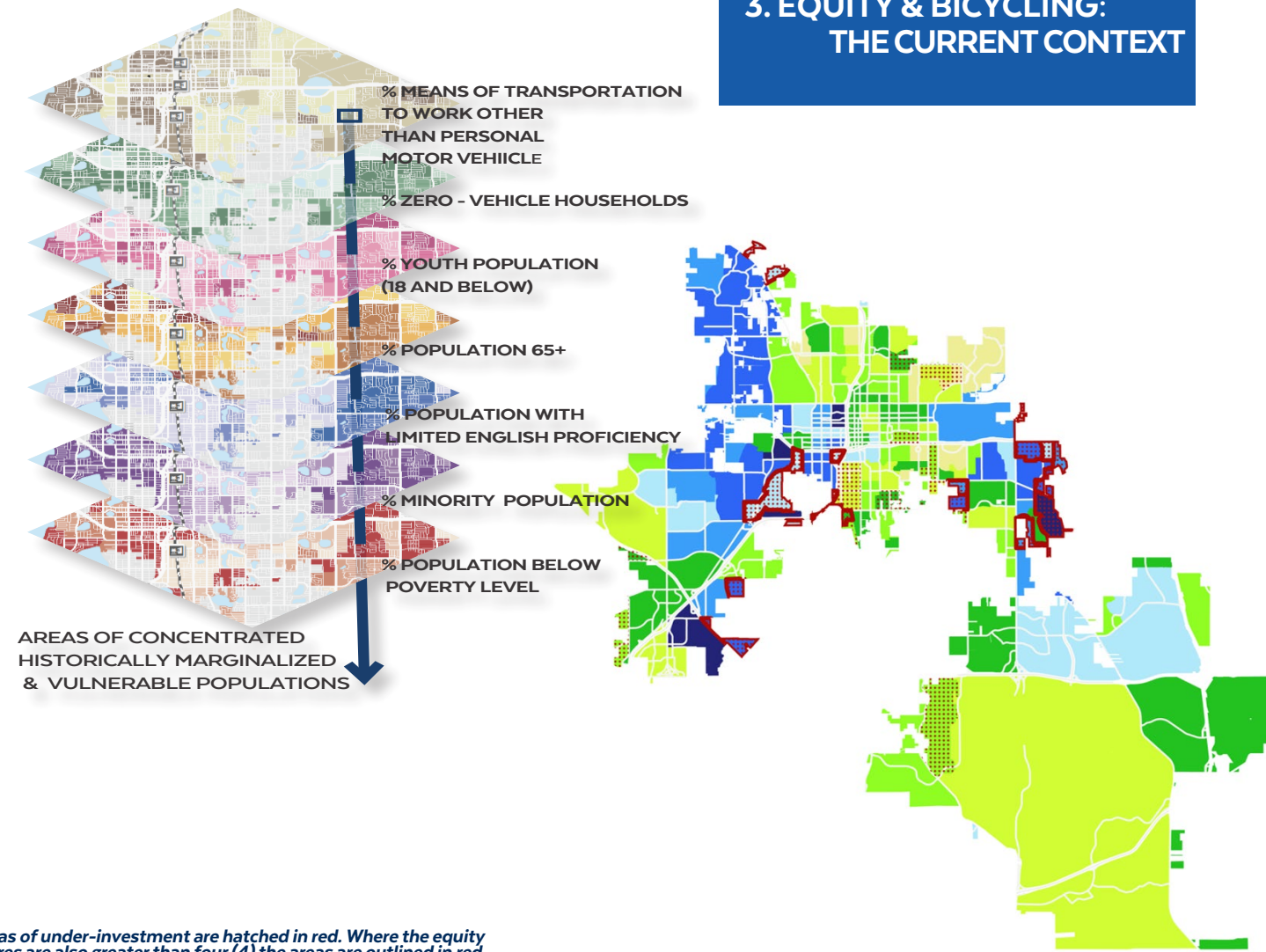
**COMPOSITE INDICATORS
OF INEQUITY**

A composite analysis of the four socio-economic indicators for vulnerable road users and the three socioeconomic indicators for marginalized populations provides an overall indication of under-served populations. The analysis used a threshold for each of the socio-economic indicators, so that those Census Block Groups that had a greater value than the mean value for any given indicator was given a score of one (1). The scores were then summed across the seven socio-economic indicators to generate a composite equity score.

The outcome is illustrated on page 67. Shades of blue represent areas with four or more above average socio-economic indicators, with the darkest blue representing the Census Block Groups with the highest concentrations of vulnerable road users and marginalized populations. The locations with the highest composite equity scores are:

- west of Interstate 4 between Silver Star Road, N. John Young Parkway and W. Colonial Drive
- east of downtown Orlando near S. Semoran Boulevard between Lake Underhill Road and Curry Ford Road

The locations with the lowest equity scores are downtown Orlando east of Interstate 4.



Areas of under-investment are hatched in red. Where the equity scores are also greater than four (4) the areas are outlined in red.

PERCENTAGE OF INFRASTRUCTURE SHARE BY COMPOSITE EQUITY SCORE

EQUITY SCORE	POPULATION	TOTAL EXISTING BIKEWAYS	SHARED-USE PATHS / TRAILS
0 - 1	26%	38%	53%
2 - 3	32%	33%	27%
4-7	41%	29%	20%

As shown in the table above, the Census Blocks with higher composite equity scores have disproportionately fewer overall bikeways relative to their population compared to areas with lower composite equity scores.

When only looking at shared-use paths (a higher quality investment), the discrepancy is even greater, with over half of the city’s shared-use paths located in areas with only one or fewer socio-economic indicators with higher than average concentration.

This analysis suggests under-investment in areas of historically marginalized and vulnerable populations.

Targeting investments in these areas will help to alleviate existing inequities.

Further detail on the equity analysis is included in Appendix C.



goal 3:

ensure that people from **all neighborhoods, backgrounds, abilities and income levels** in the city have access to bicycling infrastructure and resources.

OBJECTIVE 1: Ensure equitable access and infrastructure for people riding bicycles through budgeting and development review processes.

OBJECTIVE 2: Increase bikeways in neighborhoods under-served by the current bikeway network.

OBJECTIVE 3: When expanding bicycle infrastructure or implementing bicycle programs, prioritize neighborhoods where a high percentage of households lack access to an automobile, are below the poverty level, or exhibit high rates of health problems correlated with lack of physical activity.

OBJECTIVE 4: Consider the needs of participants of different ages and abilities by designing for a variety of cycle types including adult tricycles, recumbent bicycles, hand-cycles, cargo bicycles and child-carriers.

OBJECTIVE 5: Make educational and promotional materials available in multiple languages appropriate to the communities being served.

SAFETY & BICYCLING

The City of Orlando is committed to keeping its neighborhoods and downtown a safe place to live, work and play. This means providing for safe travel for people choosing to ride a bicycle for recreation or transportation.

As both the State of Florida as a whole and the Central Florida region specifically continue to be ranked as one of the most dangerous places for bicyclists and pedestrians in the U.S., improving safety outcomes for vulnerable road users has become a focus for both elected officials and transportation agencies in the region.

Low-stress, connected bikeways are positively correlated with improvements in bicyclists' safety. This is in part due to a **phenomenon known as "safety in numbers" - the risk of a bicyclist being involved in a crash decreases as the number of bicyclists increases.**³⁵ The presence of more bicyclists on the road makes motorists more aware and expectant of bicycles. Motorists themselves are also more likely to have had the experience of being a bicyclist and adjust their behaviors accordingly. Low-stress, connected bikeway networks get more people biking and improve bicyclists' safety.

Safety can also be improved with **effective education for both motorists and bicyclists.**

Education programs and initiatives can cover a range of topics, including:

- an introduction to bicycling
- basic riding lessons
- bike handling basics
- safe riding skills and habits
- bicycle maintenance
- rules and etiquette for sharing the road, trail or path with vehicles or pedestrians
- traffic laws and rules of the road
- equipment, gear and accessories
- theft prevention

The City of Orlando partners with Bike/Walk Central Florida to educate residents about Florida bicycling and walking laws. Activities include presentations, public awareness campaigns, helmet and bike light giveaways and cross promotional opportunities at festivals and events.

Child education on safe bicycling practices is provided through bike clinics and rodeos, helmet fitting seminars and driver education classes organized through in-school programs or after-school initiatives.

Other bicycle education programs such as "Cycling Savvy" and "Bike Like a Boss" aim to empower adult bicyclists, traffic engineers and law enforcement officers on proper bicycling behaviors and effective strategies to reduce high risk behaviors, such as:

- bicycling at night without lights
- bicycling without a helmet
- bicycling while impaired
- generally disobeying rules of the road (e.g. bicycling against the flow of traffic, not following stop and yield traffic controls at intersections or turning from the incorrect lane)

While education is one aspect of improving safety, engineering interventions are also effective in reducing the number of crashes and crash severity.

Traditional safety planning applies these engineering interventions at locations with historically high crash rates. More recently, communities have started to **look at safety planning in terms of prevention.** Standardized crash mitigation rates for different engineering interventions have been quantified using *crash typing* - categorizing crash records based on specific circumstances of the crash. Through analysis of recent crash data, communities can identify the most common crash types and programmatically adopt effective countermeasures.

This proactive approach to safety is consistent with the recommendations of the city's ongoing Vision Zero initiative.

Orlando has already begun these types of efforts, through practices such as:

- providing adequate lighting along bikeways for nighttime riding
- implementing video or microwave detection or marked loop detectors at demand-activated signals
- re-timing signals to incorporate or prioritize bicyclist movements
- constructing refuge islands
- adding green colored bicycle lane markings within vehicle - bicycle conflict areas in the downtown core

Too often left out of bicycle planning efforts, Orlando recognizes law enforcement as a critical partner in improving bicyclists' safety. Unlike planners and engineers, police officers are in the field with bicyclists and have the ability to influence behaviors through enforcement. Enforcement policies that prioritize traffic violations that are most likely to lead to crashes, injuries and fatalities, enable officers to improve safety without discouraging bicycling.

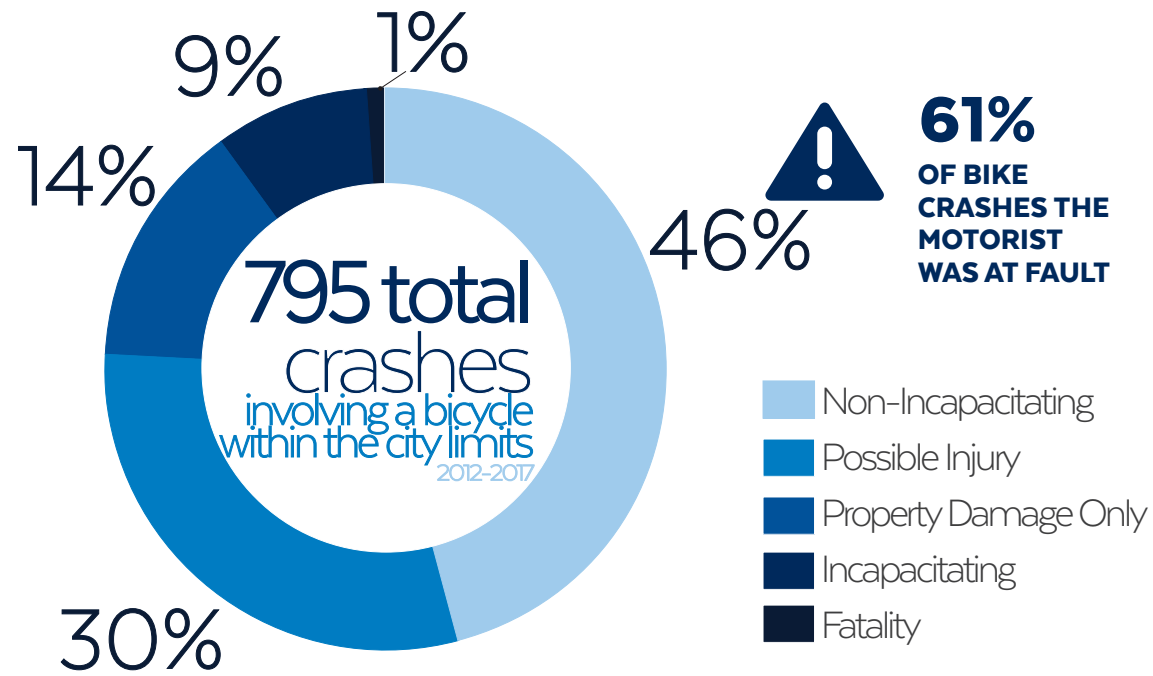
Orlando officers are also encouraged to communicate potential bicyclist safety hazards they observe while in the field to city engineers and planners. A city officer serves on Orlando's Bicycle Advisory Committee and officers take bicycle training courses that include data on crash types, number of crashes and crash locations.

The Bicycle Plan Update builds on the work of Vision Zero by identifying counter measures to the most common bicycle crash types, provides recommendations for corridor specific engineering interventions and recommends updates to safety related policies and standards for engineering, education and enforcement.



OFD Bike Patrol, Downtown Orlando

4. SAFETY & BICYCLING:
BY THE NUMBERS



SOURCE: CITY OF ORLANDO DRAFT VISION ZERO STUDY, 2019

3/10
MOTORIST AWARENESS & BICYCLING SKILLS COMMUNITY SCORE

2/10
ENFORCEMENT: PROMOTING SAFETY AND PROTECTING BICYCLISTS' RIGHTS COMMUNITY SCORE
THE LEAGUE OF AMERICAN BICYCLISTS COMMUNITY REPORT CARD
SOURCE: THE LEAGUE OF AMERICAN BICYCLISTS COMMUNITY REPORT CARD, CITY OF ORLANDO

4TH
FLORIDA'S NATIONAL RANKING BY
% OF TOTAL TRAFFIC FATALITIES INVOLVING BIKING OR WALKING
2012 - 2016
League of American Bicyclists Benchmarking Report, 2019

1.4%
OF ALL CRASHES IN ORLANDO INVOLVED A BICYCLE
6.7%
OF FATAL CRASHES INVOLVED A BICYCLE
2012 - 2017

goal 4:
improve the **safety** of people bicycling within the city through engineering, education and enforcement.

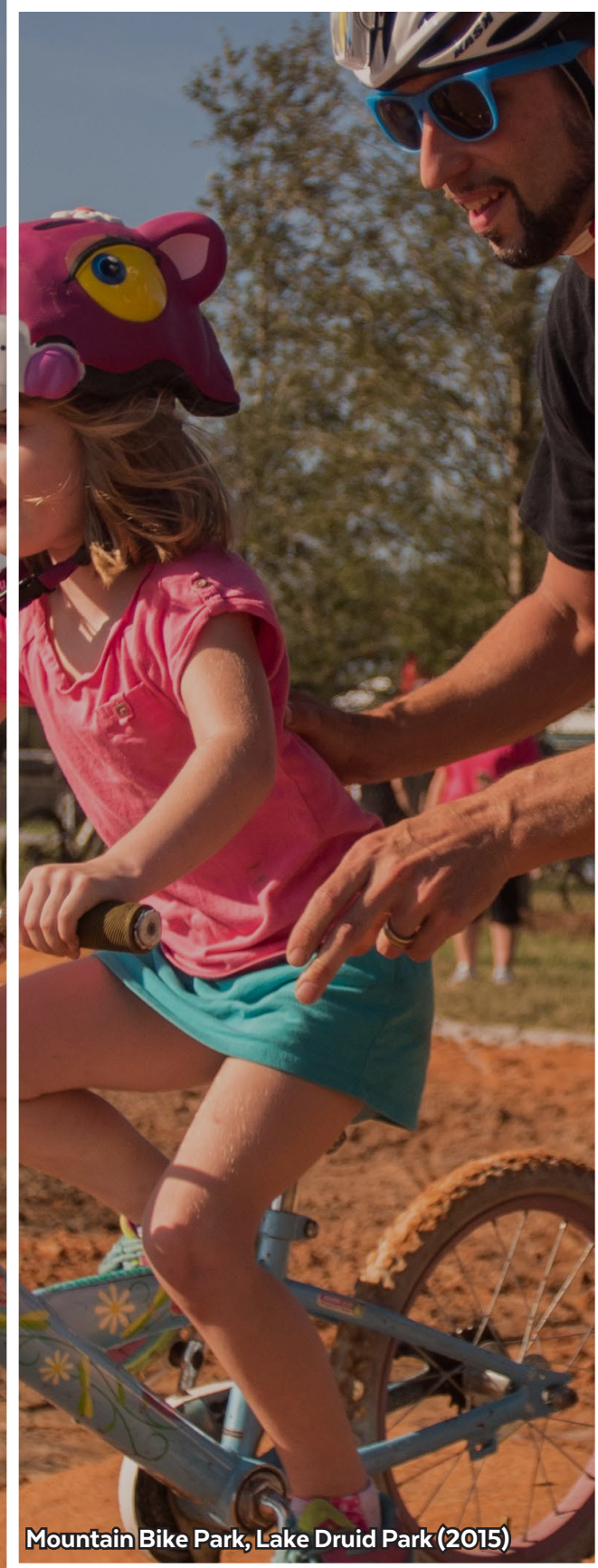
OBJECTIVE 1: Address locations or corridors with high collision rates with design changes or enforcement as appropriate.

OBJECTIVE 2: Educate current and potential bicycle riders on safe riding practices and bicyclist rights and responsibilities through programs and materials.

OBJECTIVE 3: Design new bicycle facilities with best practices that will improve bicycle safety.

OBJECTIVE 4: Educate drivers to help them understand safe operation around people riding bicycles.

OBJECTIVE 5: Collaborate with the Orlando Police Department to focus enforcement efforts on traffic violations that pose the greatest threats to bicyclist safety.



Mountain Bike Park, Lake Druid Park (2015)

5 CULTURE OF BICYCLING



Many believe there is a strong social component to bicycling; **the more people in your social network that bike, the stronger the chance that you will bike.**

While choosing to bike is ultimately an individual choice, the city can influence the culture around bicycling by making it easier for residents to bicycle, promoting and normalizing bicycling as a transportation option through city communications, events and programs and providing a variety of opportunities and incentives for residents to bike. Active local bicycling advocacy groups and bicycling clubs and associations further support a community's bicycling culture.

MAKING BICYCLING AN EASY CHOICE

The physical environment is a key determinant in whether people will get on a bike and ride. The most bicycle friendly communities have well-connected and maintained low-stress bicycle networks and readily available, secure and convenient bike parking accessible throughout the community. While the city's bikeway network is not there yet, Orlando has made great strides in making planning for bicycles the status quo. **Since the city's adoption of the Complete Streets ordinance in 2016, more than 75% of city road projects have included bicycle facilities.**³⁶ The existing bikeway network is supported by publicly accessible bicycle parking, bicycle repair stations and both electric and non-motorized bicycles through bike share programs.

Bicycle supportive practices are integrated throughout city policies, such as:

- a prescribed hierarchy of bikeway types
- utilizing utility corridors for trails
- maximum car parking standards
- paid public parking

- shared-parking allowances
- bike parking requirements for new developments
- density bonuses for providing end of trip facilities such as showers and lockers

These investments and policy changes are paying off. The number of people bicycling in the city is growing, as evidenced by record numbers of participants at Bike to Work Day 2018 and the ever growing number of bike share users.

ADVOCATING FOR BICYCLING CITY POLICIES, PROGRAMS AND PARTNERSHIPS PROMOTIONAL MATERIALS

The city maintains citywide trail and bikeway maps and detailed maps of each of the major trails. Maps are available on the city's bicycle webpage, provided in hard-copy at city sponsored events and included along trails as part of way-finding signage. The city also develops bicycle brochures and other branded promotional items such as "Bike Orlando" magnets.

COMMUTER ASSISTANCE

reThink Your Commute is a FDOT program that promotes alternative commute options in the greater Central Florida region. In 2015 they organized the inaugural "Go DTO: Downtown Orlando Commute Challenge", a program that provides downtown Orlando companies and residents with information on commute options and incentivizes residents to try biking to work.

The city partners with reThink Your Commute to provide Orlando commuters with the Emergency Ride Home program. Commuters who use an alternative form of transportation to get to work at least two times a week (carpool/vanpool, transit, biking or walking) and are registered with reThink are eligible for up to \$150 reimbursement for the cost of a taxi, rental car or mileage for an emergency ride home due to illness or unscheduled overtime up to four times a year.

5. CULTURE OF BICYCLING: THE CURRENT CONTEXT

BIKE WALK CENTRAL FLORIDA

Bike/Walk Central Florida is a 501(c)(3) non-profit organization formed in 2010 that promotes walkable and bikeable communities in Lake, Orange, Osceola and Seminole counties through raising public awareness and advocating for safe, active transportation and recreation by:

- educating pedestrians, cyclists, motorists and transit riders about Florida's road laws, their rights and responsibilities and courteous behaviors
- supporting transportation corridor planning and design using Complete Streets principles
- encouraging the development and maintenance of trails throughout Florida
- and promoting a built environment that supports physical, environmental and economic health, provides for safe transportation choices and encourages interaction among citizens of all ages, incomes and abilities

Bike/Walk Central Florida organized the inaugural **Bike 5 Cities event** in 2017. Bike 5 Cities is a 28-mile organized group ride and family-friendly bicycling route through five of Central Florida's bicycle-friendly cities: Orlando, Winter Park, Casselberry, Maitland and Eatonville.

Events like these help to celebrate what the region has accomplished, as well as demonstrate how transportation patterns could change if all of Central Florida's cities were connected to the regional trail network through low-volume, low-speed bikeway routes.

MOUNTAIN BIKE PARK

Recognizing the importance of encouraging bicycling for recreation opportunities as well, the City of Orlando opened its first mountain bike park at Lake Druid Park in 2015. The mountain bike park includes a pump track, junior pump track and single track trail.

ENGAGING THE BUSINESS COMMUNITY

Since 2015, the city has worked to make businesses more accessible to bicyclists through its free bicycle rack request program. The program helps local business owners recognize the benefits of bicyclists as potential customers and understand the need for adequate bicycle parking to accommodate them. Business owners can apply for bicycle racks to be installed on nearby public property or sidewalks by the city at no cost to the them. Over 40 bicycle racks were installed in the first year of the program, which continues to be well received by the business community. The city also shares information with business owners on the League of American Bicyclists' Bicycle-Friendly Business Program.

COMMUNITY EVENTS

Annual city-led bicycle related community events include:

- Downtown Orlando Commute Challenge
- Bike to Work Day
- Bike to School Day

The Orlando Chamber of Commerce, Main Street Districts, Downtown Development Board and Tourism Board support efforts to encourage and grow Orlando's bicycling culture by sharing and promoting bike related information and events, such as educational materials and announcements for community rides and ribbon-cutting celebrations for new bikeway projects.

In addition to city-led events and initiatives, the city supports other community bicycling events, such as charity bicycle races and group rides, by providing police presence and maintenance of traffic through road closures and detour routes. In some instances, bicycle valet parking during community festivals and sporting events is provided by local non-profits or bicycle advocacy agencies.

PROMOTING DATA-DRIVEN ANALYSIS

One of the biggest challenges to bikeway network planning is the ability to understand habits and ridership trends of cyclists across the network.

While it is obvious that the Bicycle Plan should encourage and accommodate more people on bikes, insufficient data makes it hard to not only justify new bikeway investments, but also to measure effectiveness post-investment.

New initiatives have provided the city with better insight into the numbers of people bicycling as well as their bicycling travel patterns than it has ever had in the past. With access to these new datasets, the city will have to decide how much of a data-driven approach it wants to adopt as part of its future bikeway investment decisions.

CITY BICYCLE AND PEDESTRIAN COUNT PROGRAM

In 2015 the city invested in two bicycle and pedestrian automated counters. While the automatic counters cannot differentiate between bicyclists and pedestrians, they do provide a better understanding of baseline data and trends related to overall activity on select trails and sidewalks. The count program is summarized in annual reports which tracks:

- Daily Data
- Weekly Profile
- Hourly Profile during Weekdays
- Hourly Profile during Weekend
- Busiest Days
- Daily Average
- Total Traffic
- Distribution by Direction

Importantly, the program has quantified the heavy usage of the city's trail system and communicated these findings to elected officials through the annual summary reports. The counters have also been used to evaluate pre- and post-project conditions, such as intersection crossing counts prior to the construction of the Colonial Drive Overpass.

In 2019, the city invested in seven additional automated counters in order to expand count locations to other parts of the city.

REGIONAL PARTNERSHIPS

Data-sharing between regional transportation agencies further supplements the city's ridership data. Through their own respective programs, FDOT and MetroPlan Orlando have conducted manual and automated bicycle and pedestrian counts at various locations throughout greater Central Florida since 2014. FDOT and MetroPlan Orlando have also provided Strava Metro data for the Central Florida region in an effort to better understand bicycling patterns throughout the region. Strava Metro provides planners with location-based information on bicyclists using the Strava GPS mobile application, including origin and destination information, network-wide activity counts and counts and wait times at intersections. This first Strava data was obtained in 2012.

BIKE SHARE DATA

GPS data from bike share providers further supplements ridership data, allowing planners to better understand both the overall number of active bicyclists in the city, as well as the relative usage of different routes. This ridership data can be used to make more informed investment decisions for bikeway improvements by targeting high use corridors. Based on initial bike share data, the city added sharrow markings along corridors in downtown with the highest bike share use.

LOCAL ADVOCACY GROUPS

Local bicycle advocacy groups include:

- Bike/Walk Central Florida
- Orlando Bike Coalition
- Commute Orlando
- Best Foot Forward
- Florida Freewheelers
- Bike Florida
- Florida Bicycle Association
- Winter Park Health Foundation

Orlando also has many local and regional bike clubs and associations for all types of bicyclists, from recreational riding, mountain biking, racing clubs, to slow ride groups.

5. CULTURE OF BICYCLING:
BY THE NUMBERS

BRONZE

BICYCLE FRIENDLY COMMUNITY

2016 - 2020

THE LEAGUE OF AMERICAN BICYCLISTS

1

OF BICYCLE FRIENDLY BUSINESSES

BIKES BEANS & BORDEAUX

1

OF BICYCLE FRIENDLY UNIVERSITIES

UCF
SOURCE: THE LEAGUE OF AMERICAN BICYCLISTS, 2016



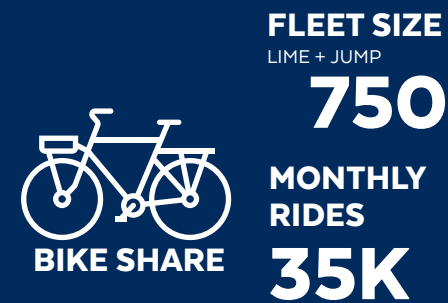
1 **MOUNTAIN BIKE PARK**



2 **ANNUAL CITY-SPONSORED BICYCLE EVENTS**

200+ PARTICIPANTS

WHO IS RIDING



PEDESTRIANS + BICYCLISTS
SOURCES: US CENSUS BUREAU, 2012-2016 AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES
CITY OF ORLANDO BICYCLE AND PEDESTRIAN ANNUAL COUNT REPORT, 2017
LIME MONTHLY REPORT, FEBRUARY 2019
FLEET SIZE PROJECTION AS OF MARCH 2019



goal 5:
build a culture of bicycling through programs and policies.

OBJECTIVE 1: Help current and potential bicycle riders understand how to navigate the bikeway system with directional signage and up-to-date mapping options.

OBJECTIVE 2: Ensure that city staff, including law enforcement officers, understand how to address bicycle-related issues that may arise during the course of their work.

OBJECTIVE 3: Highlight the city's commitment to bicycling through promotional programs and materials.

OBJECTIVE 4: Normalize bicycling as a transportation option by including bicycling directions and parking when transportation is addressed in city promotional or informational materials.

OBJECTIVE 5: Support programs that encourage bicycling as a transportation option for city staff and the general public and help people understand the personal and community benefits of bicycling.

OBJECTIVE 6: Support responsible bicycle rental and bikeshare programs.

OBJECTIVE 7: Provide temporary bicycle parking at major events when feasible.

OBJECTIVE 8: Achieve a Silver Bicycle Friendly Community rating by 2025 and a Gold ranking by 2040.

OBJECTIVE 9: Expand outreach to communities, schools and businesses.



chapter 2 |

the visionary bikeway network
& project implementation approach

NETWORK PLANNING PROCESS

82

METHODOLOGY & GUIDING PRINCIPLES
TYPES OF IMPROVEMENTS

THE VISIONARY BIKEWAY NETWORK

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VISIONARY BIKEWAY NETWORK MAP
BICYCLE SAFETY & KEY CRASH REDUCTION STRATEGIES
PROJECT IMPLEMENTATION APPROACH
BIKEWAY DESIGN TOOLBOX
DEMONSTRATION PROJECTS
LANDSCAPE GUIDELINES & PLANT PALETTES
ACHIEVING THE VISION: BY THE NUMBERS

THE 2030 PRIORITY BIKEWAY NETWORK

130

COSTS
PRIORITIZATION STRATEGY
2030 PRIORITY BIKEWAY NETWORK MAP
PRIORITY PROJECTS LIST
BENEFITS & IMPACTS RELATED TO THE 2030 NETWORK



network planning process

METHODOLOGY & GUIDING PRINCIPLES

Network planning for the Bicycle Plan Update followed a two-step process.

First, a **visionary network** was developed. The visionary bikeway network is illustrative of the highly connected, convenient, low-stress comprehensive bikeway network described in the Bicycle Plan Update vision statement. The visionary network comprehensively completes gaps in the existing network, adds new bikeway connections and identifies upgrades to existing bikeway facilities. **The visionary network map does not represent corridor-level feasibility or constructibility; however, it is important for defining the long-term desired connections.**

The city's existing and planned bikeways map GIS layers were used as the starting point for the development of the visionary network. The layers were edited based using the following approach:

- updated existing network data as needed to more accurately reflect the current network, including the addition of existing eight-foot or wider sidewalks on state roadways outside of the downtown core
- adjusted planned network data as needed to integrate the recommended routes from the Orlando 2014 Primary Bike Route Study
- revised the planned network as needed based on an inventory and assessment of planned projects to reflect the recommendations of recently completed area-specific studies, focusing on plans and projects that would impact the connectivity of the overall network
- added new routes and identified sub-standard existing routes based on an analysis of remaining network gaps and supplemented with community input

The visionary network not only fills existing gaps and adds new connections to the existing network, but also considers upgrades to existing bikeways to change them to be lower stress facilities, e.g., change from existing conventional on-street bike lanes to separated bike lanes on a multilane, high speed street.

The methodology from the 2019 Federal Highway Administration (FHWA) Bikeway Selection Guide (based on segment road volumes and speed) shown on page 83 was used to assign the preferred bikeway type to segments of the proposed network, and confirm or reassign the bikeway type of the existing network. Where a bikeway on the existing network did not match the preferred degree of separation from traffic based on the FHWA guidelines (for example, an existing bike lane on a roadway with daily vehicle volumes > 7,000 and a speed limit of 35 mph), the segments were reviewed. If it was found that there was no reasonable low-stress alternative route, the segment was included as a new project in the visionary network as a bikeway type with greater separation from traffic (in this example, a shared use trail or separated bike lanes).

Additional features of the visionary bikeway network, including safety countermeasures, bikeway design enhancements and landscape design guidelines are also described in this chapter.

The next step was to define a project implementation strategy by determining a priority list of projects from the visionary network to implement in the near-term.

Using a set of evaluation criteria based on the plan goals, segments of the visionary network were assigned relative priority scores, ranging from 0 - 100. A 10-year planning horizon was chosen to narrow the visionary network into a list of cost-feasible priority projects based on relative priority scores, budget assumptions, bikeway types and planning level cost assumptions.

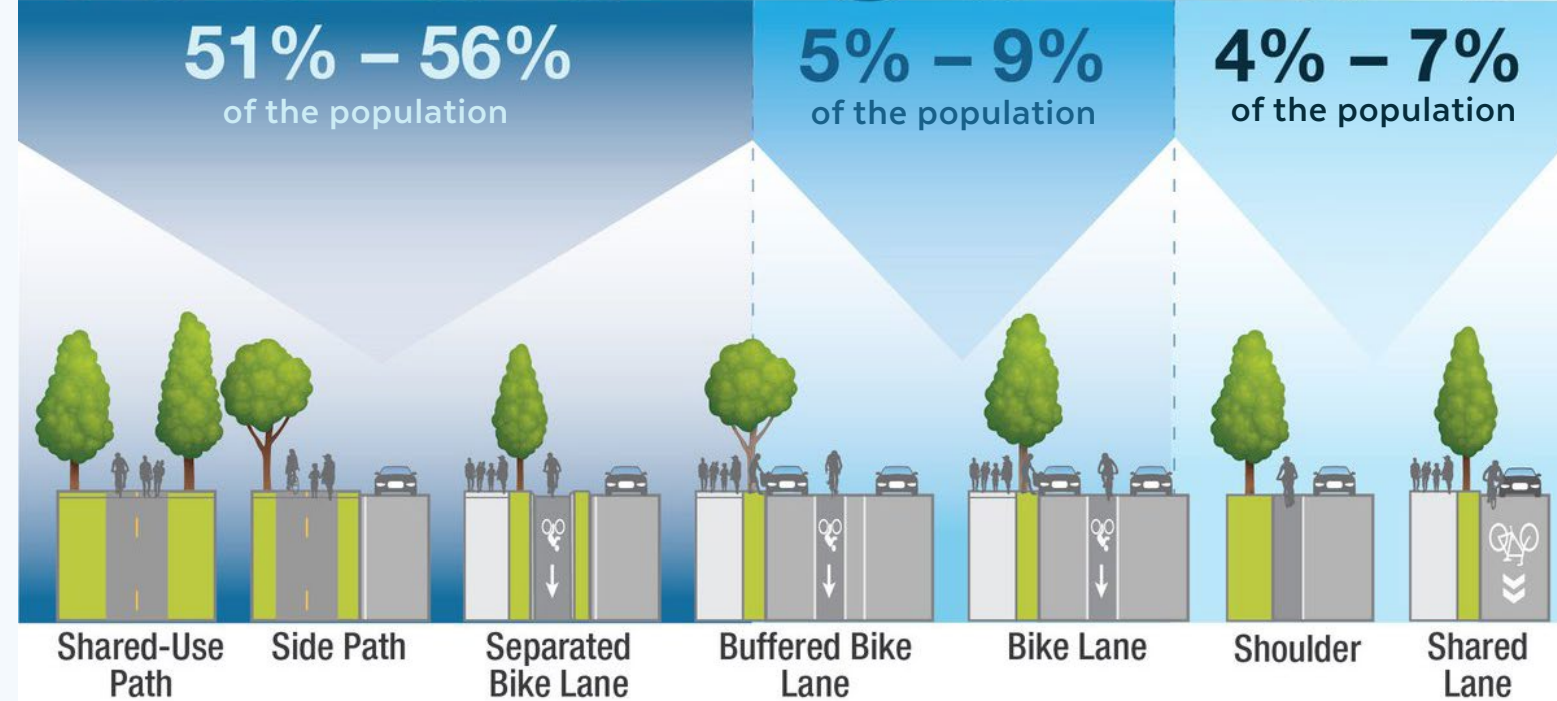
INTERESTED BUT CONCERNED CYCLISTS



SOMEWHAT CONFIDENT CYCLISTS

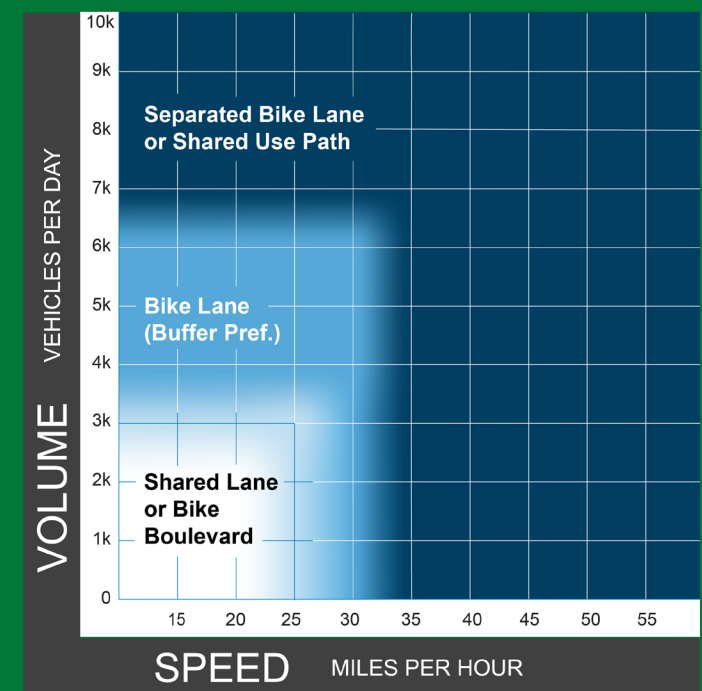


HIGHLY CONFIDENT CYCLISTS



fhwa guidelines

The graphic above, from the 2019 FHWA Bikeway Selection Guide shows the different types of bicyclists and the percentage of the general population that they represent. To encourage more people to make trips by bike, it is critical to plan and design for the “interested but concerned” group. This group requires more separation from traffic or very low volume, low speed neighborhood streets to feel comfortable riding a bike. More traditional bike facilities, such as conventional on-street bike lanes, tend to cater to a much smaller portion of the population that is either highly or somewhat confident riding with traffic. The preferred bicycle facility type graphic to the right visually represents the guidelines used to determine the most appropriate bikeway types for individual segments in the visionary bicycle network.



BICYCLE PLAN UPDATE
CHAPTER 2 | NETWORK PLANNING PROCESS

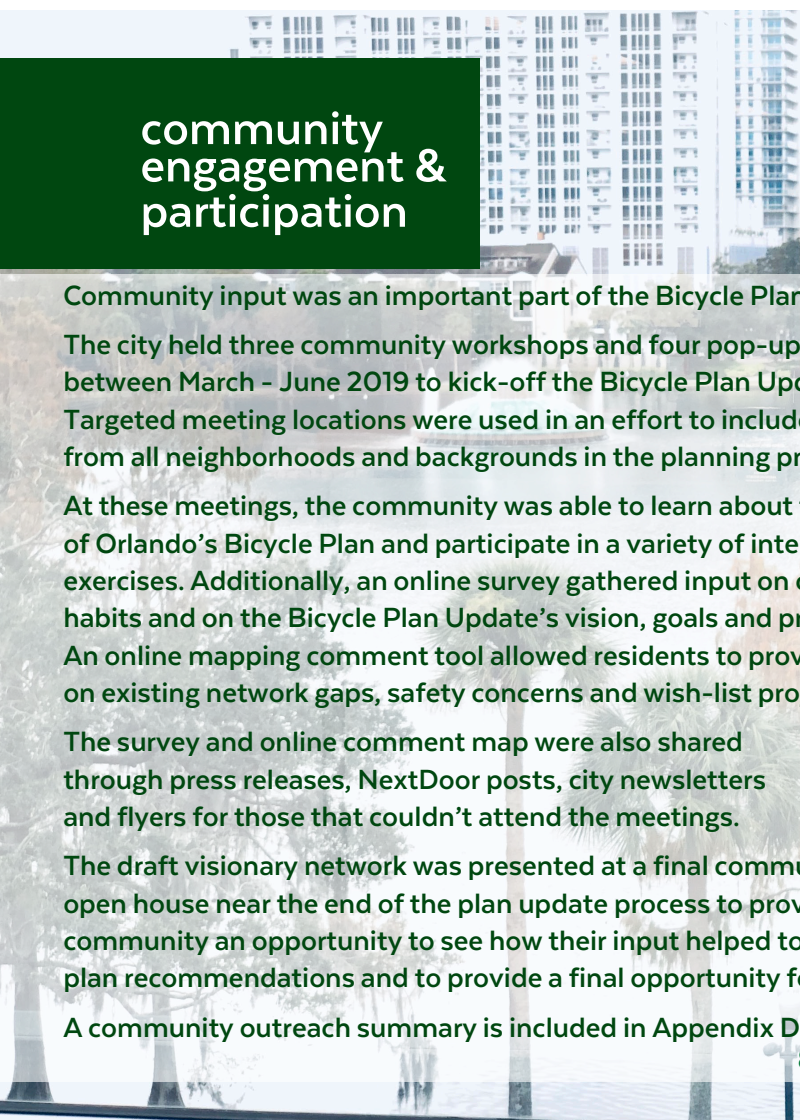
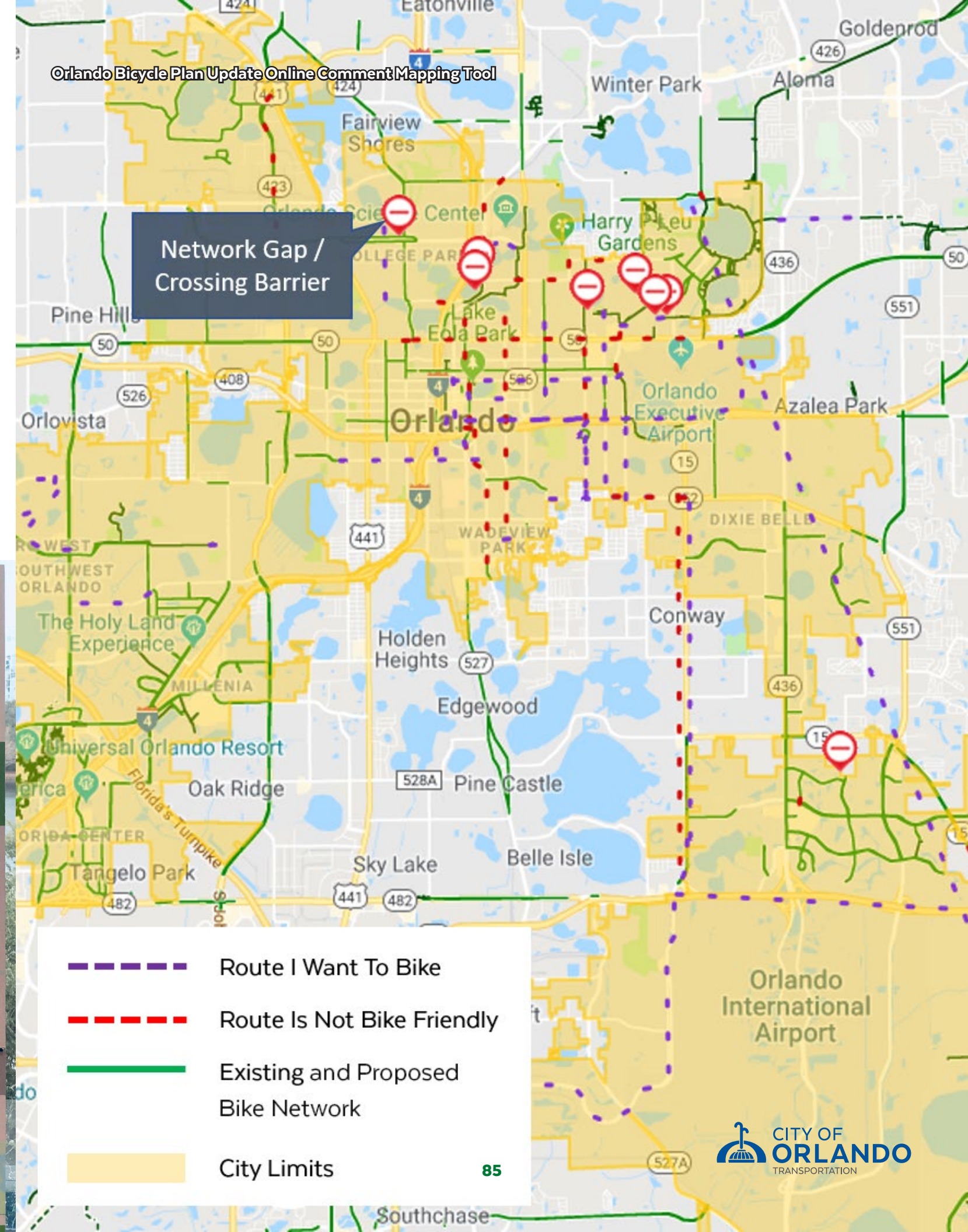
NETWORK GAP ANALYSIS

The existing and planned bicycle network was reviewed for remaining gaps. New connections were proposed based on the following:

- Crossing major barriers - such as I-4, SR 408, SR 417, railroad corridors and the airport - a bikeway connection was added at each of the available existing crossings to minimize the segmentation of the network
- Safety - high crash segments and intersections were reviewed in comparison to the planned network. If no improvement was currently identified, these segments were added to the visionary network
- Equity analysis - identified potential new routes within the low-service areas and the high composite equity score areas

- Neighborhood connections - especially those that are disconnected from the network, such as large apartment complexes and residential subdivisions, were added to provide these residents with connections to the existing and planned trail system
- Connections to regional trails and other city /county bike networks - the existing and planned bicycle and trail networks of adjacent jurisdictions were reviewed to consider continuity between jurisdictions
- Online mapping comment tool - members of the community as well as the project working group provided input on desired connections. These comments were reviewed and incorporated into the visionary network where a connection was not already planned

Route **simplicity, visibility and directness** were prioritized during the gap analysis, with new connections often identified along the city's major roadway corridors.



community engagement & participation

Geographic Representation of Community Input

BIKE PLAN UPDATE PUBLIC MEETING

WHERE DO YOU LIVE?

Community input was an important part of the Bicycle Plan Update. The city held three community workshops and four pop-up meetings between March - June 2019 to kick-off the Bicycle Plan Update process. Targeted meeting locations were used in an effort to include residents from all neighborhoods and backgrounds in the planning process. At these meetings, the community was able to learn about the update of Orlando's Bicycle Plan and participate in a variety of interactive exercises. Additionally, an online survey gathered input on current biking habits and on the Bicycle Plan Update's vision, goals and priorities. An online mapping comment tool allowed residents to provide input on existing network gaps, safety concerns and wish-list projects. The survey and online comment map were also shared through press releases, NextDoor posts, city newsletters and flyers for those that couldn't attend the meetings. The draft visionary network was presented at a final community open house near the end of the plan update process to provide the community an opportunity to see how their input helped to shape the plan recommendations and to provide a final opportunity for feedback. A community outreach summary is included in Appendix D.


TYPES OF IMPROVEMENTS

The city's existing network is made up of three designations - signed routes, on-street bike lanes, and off-street trails - and does not differentiate which bikeways are part of the low-stress network. As the visionary bikeway network represents a primarily low-stress network, alternative designations were used to identify these low-stress bikeway types based on the 2019 FHWA guidance:

1. Neighborhood Bicycle Boulevards
2. Bike Lanes (Buffered Preferred)
3. Separated Bike Lanes or Shared Use Paths


These generalized designations may result in a variety of bikeway designs in practice. The table below generally defines the types of improvements these designations encompass:

NEIGHBORHOOD BICYCLE BOULEVARDS

TREATMENT	DESCRIPTION	KEY FACTORS
	<ul style="list-style-type: none"> • Low traffic volume and low-speed streets that are designated to give bicyclists priority • Use signs, pavement markings and traffic calming measures to discourage through trips by motor vehicles and provide bicyclists with enhanced crossing of arterial streets • Typically applied along low-volume, low-speed residential streets to define multimodal priority and wayfinding 	<ul style="list-style-type: none"> • Provide bicyclists of all abilities with low-stress route • Enhanced safety due to reduced exposure to moving traffic • Provide enhanced wayfinding • Approved for use within Manual on Uniform Traffic Control Devices (MUTCD)


Guidance: FHWA Bikeway Selection Guide, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide

BIKE LANES (BUFFERED PREFERRED)

TREATMENT	DESCRIPTION	KEY FACTORS
	<ul style="list-style-type: none"> • Created by painting a flush buffer zone between a bike lane and the adjacent travel lane • Buffers may also be provided between bike lanes and parking lanes to demarcate the door zone and discourage bicyclists from riding closely next to parked vehicles • Used in locations where separation between active travel lanes and/or parked cars is needed 	<ul style="list-style-type: none"> • Provides a warning for motorists and bicyclists that the street is multi-purpose • Buffered bike lanes increase the riding comfort for bicyclists as they increase separation from vehicular traffic and/or parked vehicles • Approved for use within MUTCD

Guidance: FHWA Bikeway Selection Guide, NACTO Urban Bikeway Design Guide, Florida Department of Transportation (FDOT) Design Manual (FDM)

BIKE LANE

	<ul style="list-style-type: none"> • Portion of the street designated for preferential use by bicyclists • One-way facilities that typically carry bicycle traffic in the same direction as adjacent motor vehicle traffic on the left or right side of the street • Acceptable alternative to buffered bike lanes in locations with limited right-of-way, lower travel speeds and volumes 	<ul style="list-style-type: none"> • Provide dedicated space for bicyclists to ride separated from vehicular traffic • Reduces stress caused by acceleration and operating speed differentials between bicyclists and motorists • Approved for use within Manual On Uniform Traffic Control Devices (MUTCD)
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Guidance: FHWA Bikeway Selection Guide, NACTO Urban Bikeway Design Guide, FDOT FDM

SEPARATED BIKE LANES OR SHARED USE PATHS

TREATMENT	DESCRIPTION	KEY FACTORS
SEPARATED BIKEWAY (CYCLE TRACK / PROTECTED BIKEWAY)		
	<ul style="list-style-type: none"> • Physically separated lane for bicycles using a vertical element within a buffer area such as bollards, parked vehicles, raised curbs, or landscaping/planters • Used in locations where physical protection and separation is required to improve bicyclist comfort • Also known as a cycle track or protected bikeway • Can be installed as one-way, two-way, or contra-flow 	<ul style="list-style-type: none"> • Physical barrier provides added level of separation between travel lane and bicyclist, increasing bicyclist comfort and attracting a wider range of users • Combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane • Approved for use within MUTCD
Guidance: FHWA Bikeway Selection Guide, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, FHWA Separated Bike Lane Planning & Design Guide, NACTO Urban Bikeway Design Guide		
RAISED CYCLE TRACK		
	<ul style="list-style-type: none"> • Physically protected and raised lane for bicycles using raised curbs or landscaping/planters • Used in locations where physical protection and separation is required to improve bicyclist comfort • Can be installed as one-way, two-way, or contra-flow 	<ul style="list-style-type: none"> • Raised barrier provides added level of separation between travel lane and bicyclist, increasing bicyclist comfort • Can be raised to same elevation as adjacent sidewalk or in between sidewalk and adjacent roadway elevation • Approved for use within MUTCD
Guidance: NACTO Urban Bikeway Design Guide		
SHARED-USE PATH (SIDE PATH / TRAIL)		
	<ul style="list-style-type: none"> • Physically separated from motorized traffic by an open space or barrier within the right-of-way or within an independent right-of-way • Designed typically for two-way pedestrian and bicycle traffic • Often run parallel to roadways, following alignments through natural areas and parks and along corridors with limited crossings like waterfronts, creeks and current/former railroad lines 	<ul style="list-style-type: none"> • Provides low-stress environment for bicycling and pedestrian activity away from roadway traffic • Can serve as arterials of the active transportation system for urban and suburban communities • Compared with other facility types, can be the most expensive to construct
Guidance: American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities; FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts; NACTO Urban Street Design Guide; FDOT FDM		
SHARED USE SIDEWALK		
	<ul style="list-style-type: none"> • Designed for bicycle usage to avoid conflicts between single direction motor vehicle traffic in low volume pedestrian locations • Sidewalks may include additional signage, ground markings and special curb cuts to facilitate bicycle travel • Physical separation between wheeled and non-wheeled users is recommended to minimize potential conflicts between users • Used sparingly to facilitate connections in locations with limited right-of-way and high speed travel lanes 	<ul style="list-style-type: none"> • Physically removes bicyclists from travel lanes • Approved for use within MUTCD
Guidance: FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, FDOT FDM, FDOT Traffic Engineering Manual (TEM)		

BICYCLE SAFETY & KEY CRASH REDUCTION STRATEGIES

As Orlando implements the visionary bikeway network, these expanded transportation options must be safe. The mission of Orlando’s Vision Zero Action Plan is to eliminate traffic deaths and serious injuries within the city by 2040. Vision Zero is a systematic approach to increase safety by planning under the premise that crashes are not accidents and tragedies on our roadways are:

- predictable and preventable
- caused by shortcomings of the transportation system, enforcement and/or the built environment

The safety analysis completed for the Bicycle Plan Update was closely coordinated with the ongoing work for Vision Zero, and was based on citywide crash data between 2012 and 2017.

Based on the historic trends, Orlando bicyclists involved in a reported crash have less than a 15% chance of avoiding injury, and one in 10 times, the crash results in an incapacitating injury or fatality. Across the 795 crashes that involved a bicyclist between 2012 and 2017, the motorist was at fault 62 percent of the time. In fact, the motorist is at fault for the top four most frequent bicycle crash types.

Engineering countermeasures are actions or methods related to roadway design and operations that help to prevent, avert or reduce a specific type of crash. Data-driven engineering countermeasures were identified to address the five most common bicycle crash types citywide, which in total account for over 44 percent of all bicycle crashes that occurred over the analysis period. These countermeasures should be proactively incorporated into the planning and design of all future bikeway projects. Additionally, crash reports for the roadway segments and intersections with the highest instances of bicycle crashes from 2012 - 2017 citywide (as identified in the table to the right) were reviewed to identify the most applicable countermeasures for these locations, as summarized in the table on pages 91 - 96.


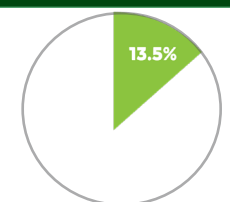
TOTAL BICYCLE CRASHES (2012 - 2017)	INTERSECTION / ROADWAY SEGMENT
24	Semoran Blvd Curry Ford Rd to Lake Underhill Rd
16	Orange Ave Drennen Rd to Michigan St
14	Conway Rd Curry Ford Rd to Lake Underhill Rd
13	Orange Ave Michigan St to Kaley St
11	Colonial Dr Primrose Dr to Maguire Blvd
10	John Young Pkwy Old Winter Garden Rd to Colonial Dr
9	Central Blvd Orange Ave to Rosalind Ave
9	Curry Ford Rd Semoran Blvd to Colton Dr
9	Colonial Dr Mercy Dr to John Young Pkwy
9	Colonial Dr Mills Ave to Bumby Ave
9	Edgewater Dr Smith St to Par St
7	Conway Rd and Curry Ford Rd Intersection
7	Semoran Blvd and Curry Ford Rd Intersection
5	Colonial Dr and John Young Pkwy Intersection
5	Colonial Dr and Primrose Dr Intersection
5	Conroy Rd and Kirkman Rd Intersection
5	Semoran Blvd and Lake Underhill Rd Intersection
5	Semoran Blvd and Pershing Ave Intersection
4	Central Blvd and Orange Blossom Trl Intersection
4	Central Blvd and Orange Ave Intersection
4	Colonial Dr and Bumby Ave Intersection
4	John Young Pkwy and Orange Blossom Trl Intersection
4	LB McLeod Rd and Rio Grande Ave Intersection
4	Michigan St and Orange Ave Intersection
4	Orange Blossom Trl at the EB I-4 Off-Ramp
4	Orange Ave and Magnolia Ave Intersection
4	Orange Ave and Virginia Dr Intersection

As part of the Vision Zero Action Plan, a bicycle high injury network map was developed, made up of more than 20 intersections and 50 roadway segments across the city that are targeted for safety improvements. Additionally, 14 segments and intersections were identified as a ‘Vision Zero bicycle focus corridor’.

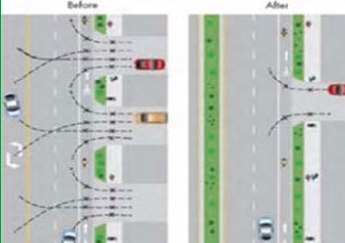
More information on Vision Zero and the bicycle safety analysis completed as part of the Bicycle Plan Update can be found in Appendix E.

MOST FREQUENT BICYCLE CRASH TYPES CITYWIDE (2012 - 2017) & PROVEN SAFETY COUNTERMEASURES

#1 MOTORIST EXITING A COMMERCIAL DRIVEWAY OR ALLEY

DESCRIPTION	PROPORTION OF CITYWIDE BICYCLE CRASHES	KEY INTERSECTIONS / ROADWAY SEGMENTS
 <p>Motorist fails to yield to the bicyclist at the sidewalk or shared use path crossing when pulling out of a commercial driveway or alley</p>	 <p>13.5%</p> <p>107 / 795</p>	<ul style="list-style-type: none"> • Colonial Dr from Mercy Dr to John Young Pkwy • Colonial Dr from Mills Ave to Bumby Ave • Colonial Dr from Primrose Dr to Maguire Blvd • Conway Rd from Curry Ford Rd to Lake Underhill Rd • Curry Ford Rd from Semoran Blvd to Colton Dr • Edgewater Dr from Smith St to Par St • John Young Pkwy from Old Winter Garden Rd to Colonial Dr • Orange Ave from Drennen Rd to Kaley St • Semoran Blvd from Curry Ford Rd to Lake Underhill Rd


RECOMMENDED COUNTERMEASURES

TREATMENT	EXAMPLES	PURPOSE
DRIVEWAY IMPROVEMENTS		
	<ul style="list-style-type: none"> • Consolidate driveways • Reduce driveway radii to 15 - 20 ft • Convert driveways to right-in/right-out • Level/raised crossings • Pavement markings 	<p>Every driveway and street connection is a potential conflict point among bicyclists, pedestrians, and motorists. Managing the spacing, access, directional flow of side streets and driveways protects users traveling along corridors by:</p> <ul style="list-style-type: none"> • reducing the number of conflict points among bicyclists and motorists • lessening crash severity by slowing the speed of motorists entering roadway


SHARED USE PATH / SEPARATED BIKE LANE INTERSECTION IMPROVEMENTS

	<ul style="list-style-type: none"> • Add pavement markings • Add warning / regulatory signs • Implement stop-controlled approach • Add path transitions 	<p>Since motorists are not expecting bicyclists from both directions, they may not look for them. Careful planning and construction at intersections where crossings must occur:</p> <ul style="list-style-type: none"> • alerts drivers and improves motorist expectations for bicyclists • minimizes crossing delays for path users
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SIGHT DISTANCE IMPROVEMENTS

	<ul style="list-style-type: none"> • Remove or replace signs / landscaping • Adjust limits of on-street parking spaces • Add curb extensions • Realign skewed intersections 	<p>Adequate sight distance provides bicyclists with vision of the movements of motor vehicles and vice versa. Keeping streets and intersections clear improves the line of sight for all traffic modes</p>
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SIGN IMPROVEMENTS

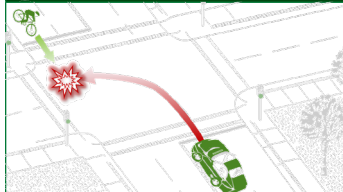
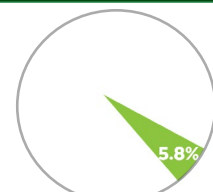
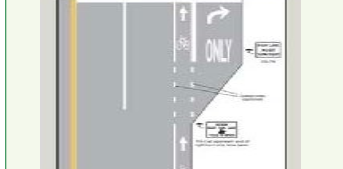


	<ul style="list-style-type: none"> • ‘Two-way crossing’ sign • Stop sign • Yield Sign • ‘Bike May Use Full Lane’ sign 	<p>Signs let bicyclists and motorists know what to expect and increases driver awareness of bicyclists.</p>
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MOST FREQUENT BICYCLE CRASH TYPES CITYWIDE (2012 - 2017) & PROVEN SAFETY COUNTERMEASURES		
#2 MOTORIST DRIVING THROUGH A STOP-CONTROLLED INTERSECTION		
DESCRIPTION	PROPORTION OF CITYWIDE BICYCLE CRASHES	KEY INTERSECTIONS / ROADWAY SEGMENTS
 <p>Motorist violated the sign or flashing signal and drove into the crosswalk area or intersection and collided with the bicyclist</p>	 <p>13%</p> <p>103 / 795</p>	<ul style="list-style-type: none"> Conway Rd from Lake Margaret Dr to Michigan St Conway Rd from Curry Ford Rd to Lake Underhill Rd Curry Ford Rd from Semoran Blvd to Colton Dr Orange Ave from Michigan St to Kaley St Semoran Blvd from Curry Ford Rd to Lake Underhill Rd
RECOMMENDED COUNTERMEASURES		
TREATMENT	EXAMPLES	PURPOSE
CURB RADII REVISIONS		
 <p>R1 = Actual Curb Radius R2 = Effective Radius</p>	<ul style="list-style-type: none"> Tighten curb radii to the effective radius of the design vehicle Design 90-degree intersection corners 	<p>Using the effective curb radius rather than the actual curb radius:</p> <ul style="list-style-type: none"> reduces vehicle turning speeds improves motorist awareness for right-turning cyclists
SHARED USE PATH / SEPARATED BIKE LANE INTERSECTION IMPROVEMENTS		
	<ul style="list-style-type: none"> Add pavement markings Add warning / regulatory signs Implement stop-controlled approach Add path transitions 	<p>Since motorists are not expecting bicyclists from both directions, they may not look for them. Careful planning and construction at intersections where crossings must occur:</p> <ul style="list-style-type: none"> alerts drivers and improves motorist expectations for bicyclists minimizes crossing delays for path users
SIGHT DISTANCE IMPROVEMENTS		
	<ul style="list-style-type: none"> Remove or replace signs / landscaping Adjust limits of on-street parking spaces Add curb extensions Realign skewed intersections 	<p>Adequate sight distance provides bicyclists with vision of the movements of motor vehicles and vice versa. Keeping streets and intersections clear improves the line of sight for all traffic modes.</p>

SIGN IMPROVEMENTS		
	<ul style="list-style-type: none"> 'Two-way crossing' sign Stop sign Yield Sign 'Bike May Use Full Lane' sign 	<p>Signs let bicyclists and motorists know what to expect and increases driver awareness of bicyclists</p>
VISUAL NARROWING		
	<ul style="list-style-type: none"> Contrasting paving Roadway markings Street furniture Striping bike lanes Street lighting Landscaping 	<p>"Traffic calming" technique which suggests motorists reduce speed due to the visual perception of a narrow, multi-use roadway. This technique also:</p> <ul style="list-style-type: none"> enhances the functional separation of roadway increases motorist attentiveness

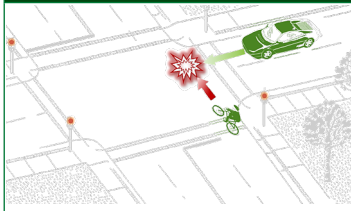



MOST FREQUENT BICYCLE CRASH TYPES CITYWIDE (2012 - 2017) & PROVEN SAFETY COUNTERMEASURES		
#3 MOTORIST MAKING A RIGHT TURN ON RED		
DESCRIPTION	PROPORTION OF CITYWIDE BICYCLE CRASHES	KEY INTERSECTIONS / ROADWAY SEGMENTS
 <p>Motorist stopped at red signal and then drove into the crosswalk area or intersection and collided with the bicyclist while attempting to make a right turn on red</p>	 <p>6.3%</p> <p>50 / 795</p>	<ul style="list-style-type: none"> Central Blvd and Orange Blossom Trl Intersection Colonial Dr from Mission Rd to Mercy Dr Conway Rd and Curry Ford Rd Intersection Lake Underhill Rd from Dixie Belle Dr to Semoran Blvd Semoran Blvd and Pershing Ave Intersection
RECOMMENDED COUNTERMEASURES		
TREATMENT	EXAMPLES	PURPOSE
CURB RADII REVISIONS		
	<ul style="list-style-type: none"> Tighten curb radii to the effective radius of the design vehicle Design 90-degree intersection corners 	Using the effective curb radius rather than the actual curb radius: <ul style="list-style-type: none"> reduces vehicle turning speeds improves motorist awareness for right-turning cyclists
ROUNDBABOUT		
	<ul style="list-style-type: none"> Discontinue bike lane approaching roundabout Yield lines Consider bike volumes Bicycle ramp to sidewalk 	A circular, raised island at an intersection of two or more streets is an alternative to a signalized intersection. A properly designed roundabout will have operating speeds that will allow bicyclists to navigate comfortably around the roundabout. These lower speeds enhance safety of all road users by eliminating left turns and angle collisions.
SIGHT DISTANCE IMPROVEMENTS		
	<ul style="list-style-type: none"> Remove or replace signs / landscaping Adjust limits of on-street parking spaces Add curb extensions Realign skewed intersections 	Adequate sight distance provides bicyclists with vision of the movements of motor vehicles and vice versa. Keeping streets and intersections clear improves the line of sight for all traffic modes.
TURNING RESTRICTIONS		
	<ul style="list-style-type: none"> 'No Turn On Red' signs Digital blank out signs that read 'No Turn On Red', and may also read 'Yield to Peds' during concurrent phasing Restrict turns with diverters and partial diverters 	Traffic signal phasing can be used to allow left turning vehicles to turn only during a dedicated signal phase separate from pedestrian and bicycle phases.


MOST FREQUENT BICYCLE CRASH TYPES CITYWIDE (2012 - 2017) & PROVEN SAFETY COUNTERMEASURES		
#4 MOTORIST TURNS LEFT IN FRONT OF BICYCLIST FROM OPPOSITE DIRECTION		
DESCRIPTION	PROPORTION OF CITYWIDE BICYCLE CRASHES	KEY INTERSECTIONS / ROADWAY SEGMENTS
 <p>Motorist turns left in front of a bicyclist coming from the opposite direction</p>	 <p>5.8%</p> <p>46 / 795</p>	<ul style="list-style-type: none"> Central Blvd and Orange Ave Intersection Colonial Dr from Mission Ave to Mercy Dr Colonial Dr and John Young Pkwy Intersection Colonial Dr and Bumby Ave Intersection Orange Ave and Magnolia Ave Intersection John Young Pkwy and Orange Blossom Trl Intersection
RECOMMENDED COUNTERMEASURES		
TREATMENT	EXAMPLES	PURPOSE
INTERSECTION MARKINGS		
	<ul style="list-style-type: none"> Dashed lines Colored pavement (green) Bike box Advanced stop bar 	Pavement markings at intersections improve awareness and visibility of bicyclists at these points of conflict. Dashed lines indicate the proper path for bicyclists, and colored pavement indicate the weaving area for bicyclists and motor vehicles when right turning.
MEDIAN / CROSSING ISLAND		
	<ul style="list-style-type: none"> Raised median with non-conflicting landscape Diagonal median opening Median pocket access Mid-block crossing 	Medians and crossing islands provide refuge for bicyclists who intend to cross busy thoroughfare. These islands provide sufficient time for bicyclists to focus on one direction of travel at a time. A median helps to manage traffic and reduce the number of conflict areas.
ROUNDBABOUT		
	<ul style="list-style-type: none"> Discontinue bike lane approaching roundabout Yield lines Consider bike volumes Bicycle ramp to sidewalk 	A circular, raised island at an intersection of two or more streets is an alternative to a signalized intersection. A properly designed roundabout will have operating speeds that will allow bicyclists to navigate comfortably around the roundabout. These lower speeds enhance safety of all road users by eliminating left turns and angle collisions.
TURNING RESTRICTIONS		
	<ul style="list-style-type: none"> 'No Turn On Red' signs Digital blank out signs that read 'No Turn On Red', and may also read 'Yield to Peds' during concurrent phasing Restrict turns with diverters and partial diverters 	Traffic signal phasing can be used to allow left turning vehicles to turn only during a dedicated signal phase separate from pedestrian and bicycle phases.

**MOST FREQUENT BICYCLE CRASH TYPES CITYWIDE (2012 - 2017)
& PROVEN SAFETY COUNTERMEASURES**


#5 BICYCLIST RIDES THROUGH A SIGNALIZED INTERSECTION

DESCRIPTION	PROPORTION OF CITYWIDE BICYCLE CRASHES	KEY INTERSECTIONS / ROADWAY SEGMENTS
 <p><i>Bicyclist violated the signal and rode into the intersection and collided with the motorist</i></p>	 <p>5.5% 44 / 795</p>	<ul style="list-style-type: none"> • Central Blvd and Orange Ave Intersection • Colonial Dr and Bumby Ave Intersection • Colonial Dr and John Young Pkwy Intersection • Conroy Rd and Kirkman Rd Intersection • Conway Rd and Curry Ford Rd Intersection • John Young Pkwy and Orange Blossom Trl Intersection • LB McLeod Rd and Rio Grande Ave Intersection • Michigan St and Orange Ave Intersection • Orange Ave and Virginia Ave Intersection • Orange Ave and Magnolia Ave Intersection • Semoran Blvd and Lake Underhill Rd Intersection


RECOMMENDED COUNTERMEASURES

TREATMENT	EXAMPLES	PURPOSE
BICYCLE ACTIVATED SIGNALS		
	<ul style="list-style-type: none"> • Bike symbol placement • Detection located at conspicuous locations • Advanced bicycle detection • Shorter signal cycle length 	<p>Bike-activated signal detections are either active or passive. Passive detection is preferred as it automatically detects the presence of the user, whereas active detection activates the signal phase through push button. Benefits of bicycle-activated signals:</p> <ul style="list-style-type: none"> • deters red light running through reduction of delay • improves safety, comfort, and convenience of bicyclists


BICYCLE SIGNAL HEADS

	<ul style="list-style-type: none"> • Standard lenses • Bicycle symbol lenses 	<p>These intersection signals are used as an additional traffic control device. The three-lens signal head is used at locations where signal phases with pedestrians and bicycles are the same. An interim approval by the Federal Highway Administration (FHWA) has issued conditional approval on optional use of bicycle signal heads with green, yellow, and red.</p>
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INTERSECTION MARKINGS

	<ul style="list-style-type: none"> • Dashed lines • Colored pavement (green) • Bike box • Advanced stop bar 	<p>Pavement markings at intersections improve awareness and visibility of bicyclists at these points of conflict. Dashed lines indicate the proper path for bicyclists, and colored pavement indicate the weaving area for bicyclists and motor vehicles when right turning.</p>
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LIGHTING IMPROVEMENTS

	<ul style="list-style-type: none"> • Street lighting poles • Tunnel lighting 	<p>Illumination of the roadway improves visibility for nighttime bicyclists. Although the majority of crashes occur in the daylight, good illumination prevents the rise of collisions between motor vehicles and bicyclists during the nighttime. Improved lighting may reduce crashes that occur in less than optimal light conditions.</p>
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ROUNDAABOUT

	<ul style="list-style-type: none"> • Discontinue bike lane approaching roundabout • Yield lines • Consider bike volumes • Bicycle ramp to sidewalk 	<p>A circular, raised island at an intersection of two or more streets is an alternative to a signalized intersection. A properly designed roundabout will have operating speeds that will allow bicyclists to navigate comfortably around the roundabout. These lower speeds enhance safety of all road users by eliminating left turns and angle collisions.</p>
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→ Additional guidance related to bicycle safety countermeasures can be found at the FHWA Pedestrian & Bicycle Crash Analysis Tool (PBCAT) and BIKESAFE application.

NEXT STEPS

- ❑ IDENTIFY AND PRIORITIZE OTHER INTERSECTIONS ACROSS THE CITY FOR TRAFFIC CONTROL IMPROVEMENTS TO ASSIST BICYCLISTS WITH CROSSINGS ALONG EXISTING OR PROPOSED ROUTES. IDENTIFY AND PROGRAM SPECIFIC CROSSING ENHANCEMENTS.
- ❑ IN CONJUNCTION WITH THE VISION ZERO ACTION PLAN, WORK TO SYSTEMICALLY INCLUDE FEATURES, COUNTERMEASURES AND TREATMENTS IN ALL TRANSPORTATION PROJECTS TO ADDRESS THE MOST COMMON BIKE CRASH TYPES.
- ❑ SYSTEMATICALLY COMPLETE MULTIMODAL SAFETY AUDITS AND REGULAR WALKING AND BICYCLING AUDITS OF KEY LOCATIONS AND HIGH CRASH CORRIDORS OR INTERSECTIONS TO IDENTIFY LOCATION-SPECIFIC COUNTERMEASURES.



PROJECT IMPLEMENTATION APPROACH






The visionary network defines long-term desired connections using the ideal level of separation based on traffic volumes and posted speeds at the time of the Bicycle Plan Update. However, it does not represent projects based on corridor-level feasibility or constructibility.

A project specific feasibility review should be completed as specific network segments are identified for advancement, whether as a standalone bikeway project or part of other capital improvements.


The purpose of this review is to:

1 Consider alternatives: determine if there is a more preferable alternative bike route to satisfy the connectivity need

Key principles of route selection include:

-  **CONNECTIVITY:**
Route connects to the overall bike network and to destinations
-  **WAYFINDING:**
Route is easy to follow
-  **SAFETY:**
Conflicts with motor vehicles are limited
-  **DIRECTNESS:**
Bicycling distances and stops are minimized
-  **LIVABILITY:**
Route directs bicyclists through greenspaces and promotes economic prosperity

2 Evaluate feasibility: identify potential fatal flaws to implementation

-  Route limits impacts to private properties, utilities, traffic operations, on-street parking, freight, transit and other potential conflicts.

3 Determine bikeway design type: confirm and refine the preferred bikeway type based on the corridor typical section

Based on available right-of-way, lane widths and sidewalk locations, identify the best option(s) for the bikeway design. For bike lane projects this includes the width of the buffer. For separated bike lanes or shared use paths, this includes a determination of multi-use versus exclusive bicycle use; sidewalk-level versus street-level; one-way versus two-way operations; facility width; and buffer type and width. In some cases, it may be desirable to provide a greater level of separation versus what is identified in the vision plan.

4 Identify potential locations for specific bikeway design treatments, such as at intersections or crossings

The bikeway design toolbox on pages 99 - 112 identifies treatments that should be considered during subsequent phases of planning and design for all new or improved bikeway projects. These include:

- alternative bikeway design types
- enhanced crossings and intersections
- signs and pavement markings
- traffic calming and safety enhancements
- traffic signal improvements

Many of the treatments in the design toolbox are also pedestrian treatments, as people biking commonly use pedestrian treatments to access destinations when leaving or entering bicycle facilities or when crossing major roadways that connect neighborhood streets.


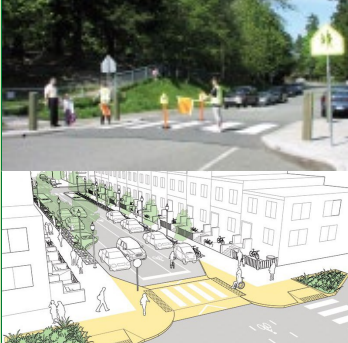

Bicycle crash countermeasures, as discussed on pages 91 - 96, should also be considered.

➔ *Bikeway planning and design best practices and additional guidance are referenced in the bikeway design toolbox below each corresponding design strategy.*

BIKEWAY DESIGN TOOLBOX

ALTERNATE BIKEWAY DESIGN TYPES

TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
CONTRA-FLOW BIKE LANE			
	<ul style="list-style-type: none"> • Bike lanes that allow bicyclists to legally ride in the opposite direction of traffic • Requires conversion of a one-way street into a two-way street which maintains a one-way orientation for motor vehicles while providing two-way traffic for bicyclists • Used to connect two-way bicycle facilities across a one-way street, typically on lower-volume residential streets 	<ul style="list-style-type: none"> • Enhances connectivity for bicyclists traveling in both directions • Decreases sidewalk riding • Allows more direct travel for bicyclists • Approved for use within MUTCD 	Low (< \$10,000)
Guidance: NACTO Urban Bikeway Design Guide			
ADVISORY BIKE LANE			
	<ul style="list-style-type: none"> • Uses dashed lane line to distinguish bike lane and allow for drivers to encroach into the bike lane when bicyclists are not present to avoid an oncoming vehicle in the opposite direction • Used on streets with less than 4,000 vehicles per day (vpd), no centerline and limited right-of-way 	<ul style="list-style-type: none"> • Brings greater awareness to the street as shared space • Encourages slower vehicular travel speeds and reduces cut through traffic • Experimental within MUTCD 	Medium (\$10,000-\$100,000)
Guidance: FHWA Bikeway Selection Guide			
BIKE / BUS LANE			
	<ul style="list-style-type: none"> • Marking is intended to alert bicyclists and bus drivers that both users are encouraged to occupy the same space • Special pavement markings warn motorists of the presence of people biking • Include special stop designs to allow passing by bicyclists when buses are stopped • Applied in locations with low frequency and low speed bus service and limited right of way 	<ul style="list-style-type: none"> • Encourages safer passing practices (including changing lanes, if necessary) • Allow bicyclists to remove themselves from flow of general traffic • Approved for use within MUTCD 	Medium (\$10,000-\$100,000)
Guidance: NACTO Urban Bikeway Design Guide			

ENHANCED CROSSINGS & INTERSECTIONS			
TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
MARKED CROSSWALKS			
	<ul style="list-style-type: none"> • FDOT standard is ladder-style markings • Typically used at signalized, all-way stop-controlled intersections and midblock crossing locations • Designated pedestrian crossings should be considered at locations with at least 20 crossings of people walking or biking per hour and/or with high vehicle-pedestrian/bicycle collisions 	<ul style="list-style-type: none"> • Can provide a false sense of security, especially at uncontrolled multilane crossings due to multiple threat risk; consider installing additional improvements to reduce vehicle speeds, shorten the crossing distance, or increase the likelihood of motorists stopping and yielding • FHWA recommends against colors that result in driver confusion regarding the intended purpose of crosswalk 	Low (<\$10,000)
Guidance: FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, NACTO Urban Street Design Guide, FDOT FDM, FDOT TEM			
RAISED CROSSWALKS			
	<ul style="list-style-type: none"> • Speed tables outfitted with crosswalk markings and signage to facilitate bicyclist and pedestrian crossings. Located at crosswalks to provide bicyclists and pedestrians with a level street crossing • Applied in locations where modal hierarchy is desired to promote better bicycling and pedestrian yielding compliance by drivers 	<ul style="list-style-type: none"> • Provide safer crossing for bicyclists and pedestrians • Channelize bicyclists and pedestrians to an enhanced crossing • Slows vehicular travel speeds • Improves bicyclist and pedestrian visibility and accessibility 	Medium (\$10,000-\$100,000)
Guidance: FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, NACTO Urban Bikeway Design Guide			
RAISED CROSSWALK AT CHANNELIZED RIGHT TURN			
	<ul style="list-style-type: none"> • Marked crosswalks that are raised to slow driver turning speed and increase yielding compliance • Tighter angles in right turn channelization make crossing bicyclists and pedestrians more visible, slow down right turning vehicles and make turns easier for drivers as they do not have to turn their head as far to check for gaps in traffic • Used in locations with high bicycle and pedestrian activity combined with higher speed right turning vehicular traffic 	<ul style="list-style-type: none"> • Provide safety advantage to bicyclists and pedestrians with demonstrated increased yielding by drivers • Slows driver turning speeds 	Medium (\$10,000-\$100,000)
Guidance: ITE Implementing Context Sensitive Design on Multimodal Thoroughfares, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts			

ENHANCED CROSSINGS & INTERSECTIONS (CONT.)			
TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
MEDIAN REFUGE ISLANDS			
	<ul style="list-style-type: none"> • Raised islands in the center of a street separate opposing lanes of traffic with cutouts for bicycle and pedestrian access and provide a refuge area for people crossing a street • Used in locations on single or multi lane streets in each direction where there is a defined midblock crossing desire line or at intersections 	<ul style="list-style-type: none"> • This measure allows bicyclists and pedestrians to cross the street in two stages, focusing on each direction of traffic separately • The refuge provides bicyclists and pedestrians with a better view of oncoming traffic and drivers can more easily see bicyclists and pedestrians • Can supplement other bicycle and pedestrian facility treatments 	Medium (\$10,000-\$100,000)
Guidance: FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, Institute of Transportation Engineers (ITE) Implementing Context Sensitive Design on Multimodal Thoroughfares, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, NACTO Urban Street Design Guide, NACTO Urban Bikeway Design Guide, FDOT FDM			
OFFSET CROSSWALKS			
	<ul style="list-style-type: none"> • Crosswalks in the street are staggered such that a person walking or biking crosses half the street and then must walk towards traffic to reach the second half of the crosswalk • Used in locations on single lane or multi lane streets where there is a defined midblock crossing desire line 	<ul style="list-style-type: none"> • Increases the concentration of bicyclists and pedestrians at a crossing and the provision of better traffic views for bicyclists and pedestrians by forcing them to look towards traffic on the second half of the crossing • Motorists are better able to see bicyclists and pedestrians as they walk through the staggered refuge 	Medium (\$10,000-\$100,000)
Guidance: NACTO Urban Bikeway Design Guide			
RAISED INTERSECTIONS			
	<ul style="list-style-type: none"> • Flat raised areas covering an entire intersection, with ramps on all approaches and often textured materials. The raised intersection makes crosswalks more visible by motorists and provides level street crossing • Applied in locations where modal hierarchy is desired to promote better bicycling and pedestrian yielding compliance by drivers • Also considered in locations where neighborhood or commercial gateway is desired 	<ul style="list-style-type: none"> • Increases awareness of people walking and biking • May be used as a neighborhood gateway feature • Calms two streets at once • Slows vehicular travel speeds • Improves bicycle and pedestrian visibility and accessibility 	High (> \$100,000)
Guidance: NACTO Urban Street Design Guide			

ENHANCED CROSSINGS & INTERSECTIONS (CONT.)

TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
PROTECTED INTERSECTIONS			
	<ul style="list-style-type: none"> Intersection design that provides separated space for pedestrians and bicyclists leading up to and through an intersection Typically applied at the intersection of two protected bike lanes or in locations where additional intersection protection is desired 	<ul style="list-style-type: none"> Protected Intersections reduce the potential for people on bicycles to mix with vehicular traffic at the intersection, shorten exposed crossing distances, and provide a continuous low-stress facility when combined with protected bike lanes Combines multiple treatments in one intersection (reduced curb radii, intersection markings and protected bike lanes) Enhances right-turning drivers' visibility of approaching cyclist through setback of bike lane crossing Works better with larger setbacks between the bikeway and adjacent lane, which provide better visibility and more space for vehicles to wait and yield to people on bikes Challenging to implement at intersections with large volumes of turning trucks Approved for use within MUTCD 	High (> \$100,000)
Guidance: NACTO Don't Give up at the Intersection, Designing All Ages and Abilities Bicycle Crossings, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts			
GRADE-SEPARATED CROSSING			
	<ul style="list-style-type: none"> Pedestrian and bicyclist-only overpass or underpass over or under a street or topographical barrier Provides complete separation of pedestrians and bicyclists from motor vehicle traffic, normally where no other pedestrian facility is available Typically applied in locations with defined pedestrian and bicycle desire line that extends across a major barrier 	<ul style="list-style-type: none"> Allows for the uninterrupted flow of pedestrian and bicycle movements separate from vehicular traffic Eliminates conflict between pedestrians and bicyclists and moving traffic One draw back of this solution is that it creates a grade change which is challenging for less fit bicyclists and is indirect and inconvenient for short distance trips Underpass configuration can reduce energy expenditure for bicyclists by spanning existing topography 	High (> \$100,000)
Guidance: AASHTO Guide for the Development of Bicycle Facilities; ITE Transportation Planning Handbook: Bicycle and Pedestrian Facilities			


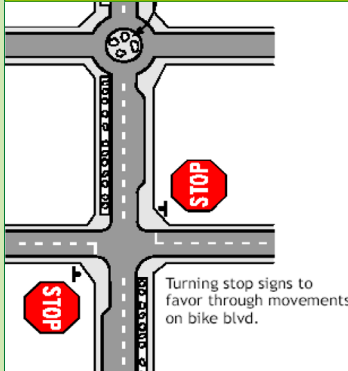
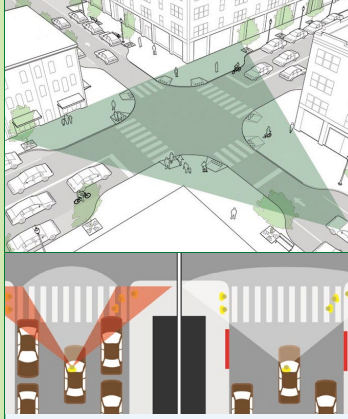
SIGNS & PAVEMENT MARKINGS

TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
SHARROW/SHARED LANE MARKING			
	<ul style="list-style-type: none"> Marking alerts road users to the lateral position bicyclists are likely to occupy within the traveled way to be most visible to drivers and to help avoid conflicts with parked cars Used in locations to connect adjacent bicycle facilities and along neighborhood bikeways typically on low-volume and low-speed streets Can provide wayfinding guidance for bicyclists 	<ul style="list-style-type: none"> Provide guidance to bicyclists and motorists in situations where separate bicycle facilities are not provided Encourages safer passing practices (including changing lanes, if necessary) Encourages bicyclists to ride outside of the parked vehicle door zone Approved for use within MUTCD on roads with posted speeds of 35 mph or less May give cyclists a false sense of security in shared use environments 	Low (<\$10,000)
Guidance: FHWA Bikeway Selection Guide, NACTO Urban Bikeway Design Guide, FDOT FDM			
ADVANCED YIELD LINES			
	<ul style="list-style-type: none"> White yield lines are placed in advance of marked, uncontrolled crosswalks or at crossings with Rectangular Rapid Flashing Beacons Used to establish the location in which drivers should stop and yield to pedestrians and bicyclists (used in conjunction with "Yield Here To Pedestrians" sign) Useful in areas where pedestrian and bicyclist visibility is low 	<ul style="list-style-type: none"> Increases the visibility between pedestrians and bicyclists and motorists Reduces the number of vehicles encroaching on the crosswalk when a pedestrian or bicyclist is present Helps reduce multiple threat crash typology where two lanes of traffic approach a crosswalk from the same direction and one driver yields to the crossing pedestrian or bicyclist but the other does not due to limited visibility of the person crossing caused by the first vehicle 	Low (<\$10,000)
Guidance: FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, NACTO Urban Street Design Guide			
IN-STREET PEDESTRIAN CROSSING SIGNS			
	<ul style="list-style-type: none"> Regulatory pedestrian signage posted on lane edge lines and road centerlines Used to remind road users of laws regarding right-of-way at an unsignalized pedestrian crossing, especially midblock crossings Typically installed on raised median island along single-lane streets 	<ul style="list-style-type: none"> Highly visible to motorists and has a positive impact on pedestrian and bicyclist safety at crosswalks Good driver compliance with yielding to pedestrians and bicyclists though compliance decreases on multi-lane streets 	Low (< \$10,000)
Guidance: FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations			

SIGNS & PAVEMENT MARKINGS (CONT.)

TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
HIGH-VISIBILITY SIGNS & MARKINGS			
	<ul style="list-style-type: none"> High-visibility colored signs are posted at crossings to increase driver awareness of the pedestrian and bicycle crossing and regulatory (state law) requirements Typically applied at unsignalized and signalized locations where pedestrian or bicycle movements need to be emphasized 	<ul style="list-style-type: none"> Beneficial in areas where drivers might not expect a pedestrian or bicycle crossing or where a higher level of driver attention is required due to potential pedestrian and bicycle conflicts 	Low ($< \$10,000$)
Guidance: FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, FDOT FDM			
INTERSECTION MARKINGS			
	<ul style="list-style-type: none"> Consists of using green and white colored pavement markings at conflict points such as at the start of right turn lanes adjacent to bike lanes, or additional bike symbols such as turn queue boxes within the intersection Increases the visibility of bicyclists to drivers, identifies areas of potential conflict and provides guidance to bicyclists on their intended alignment through the intersection Typically applied on high ease-of-use facilities and at high conflict locations 	<ul style="list-style-type: none"> Increases visibility of bicyclists Raises driver and bicyclists awareness of conflict areas Increases driver yielding behavior Increases bicyclists comfort level Two-Stage Bicycle Turn Boxes require formal request and approval from FHWA to use under current interim approval 	Medium ($\$10,000-\$100,000$)
Guidance: NACTO Don't Give up at the Intersection, Designing All Ages and Abilities Bicycle Crossings, FHWA Separated Bike Lane Planning and Design Guide, NACTO Urban Bikeway Design Guide, FDOT FDM			
BIKE BOXES			
	<ul style="list-style-type: none"> Applied in locations with high volumes of bicyclists where there may be right or left turning conflicts with vehicles Also applied in conjunction with red signal indication where there is a desire for bicyclists to transition from one side of the street to the other at signalized intersections 	<ul style="list-style-type: none"> Provides dedicated space at the intersection for bicyclists, improving visibility to drivers during a red signal indication Brings bicyclists to the front of the queue, prioritizing bicycle traffic Does not benefit bicyclists approaching on a green signal indication Bicycle boxes require formal request and approval from FHWA to use under current interim approval 	Medium ($\$10,000-\$100,000$)
Guidance: FHWA Separated Bike Lane Planning and Design Guide, NACTO Urban Bikeway Design Guide, FDOT FDM			




TRAFFIC CALMING & SAFETY ENHANCEMENTS

TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
SPEED CUSHIONS			
	<ul style="list-style-type: none"> Humps or speed tables with wheel cutouts to allow large vehicles to pass at regular speed while slowing down smaller vehicles Extend across one direction of travel from centerline with longitudinal gap for wide wheel base vehicles to avoid going over hump 	<ul style="list-style-type: none"> Allows most bikes to pass through one of the gaps in the humps Allow emergency vehicles and transit vehicles to pass with vehicle wheels on either side of the raised area Calms automobile traffic while allowing critical service vehicles to maintain travel times 	Low ($< \$10,000$)
Guidance: NACTO Urban Street Design Guide, NACTO Urban Bikeway Design Guide			
STOP SIGN REORIENTATION			
	<ul style="list-style-type: none"> Reorienting two-way or reconfiguring all-way stop controlled approaches to provide neighborhood bikeway approaches with the right-of-way at the intersection Utilized along neighborhood bikeway facilities to minimize stop delay for bicyclists 	<ul style="list-style-type: none"> Reduces delay and energy expenditure for bicyclists and thereby encourages more bicyclists to use the street Need to consider current traffic control configuration to understand impacts of changing stop control and the potential to create unintended traffic operational or safety consequences 	Low ($< \$10,000$)
Guidance: NACTO Urban Bikeway Design Guide			
INTERSECTION DAYLIGHTING			
	<ul style="list-style-type: none"> Parking is restricted 20 feet back from any flashing beacon or traffic control signal Applied in locations to improve sightlines between drivers and pedestrians and bicyclists 	<ul style="list-style-type: none"> Improves visibility of pedestrians or bicyclists to drivers Works well in conjunction with bulbouts which help slow vehicles as they approach the intersection 	Low ($< \$10,000$)
Guidance: NACTO Urban Street Design Guide			

TRAFFIC CALMING & SAFETY ENHANCEMENTS (CONT.)

TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
CURB EXTENSIONS / BULBOUTS			
	<ul style="list-style-type: none"> Consists of an extension of the sidewalk space into the street, narrowing the street at a pedestrian crossing Considered at intersections and midblock locations where there is high crossing activity and no travel lane conflicts Typical application in locations with on-street parking 	<ul style="list-style-type: none"> Shortens the distance pedestrians and bicyclists have to cross, decreasing exposure time, and allows for shorter signal cycles and pedestrian/bicycle signal clearance intervals Improves pedestrian and bicyclist visibility Lowers vehicle turning speeds Provides opportunity to increase the sidewalk space and/or opportunity to store and treat stormwater runoff Where applicable, allows for traffic control and warning devices to be placed closer to travel lane Often involves an on-street parking trade-off 	Medium (\$10,000-\$100,000)
Guidance: FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, ITE Implementing Context Sensitive Design on Multimodal Throughfares, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, NACTO Urban Street Design, NACTO Urban Bikeway Design Guide, FDOT FDM			
CHOKERS / NECKDOWNS			
	<ul style="list-style-type: none"> Curb extensions at midblock locations that narrow a street Applied at midblock locations along single lane streets where reduced speeds are desired 	<ul style="list-style-type: none"> Can have positive aesthetic value Shortens pedestrian and bicycle crossing distance Slows vehicular travel speeds May make it more difficult for vehicles to safely pass bicyclists 	Medium (\$10,000 - \$100,000)
Guidance: NACTO Urban Bikeway Design Guide			
TRAFFIC CIRCLES / MINI-ROUNDAABOUTS			
	<ul style="list-style-type: none"> Installation of a small circulating island in the middle of residential street intersection. Traffic circulates counter-clockwise around the central island Applied on local, residential streets (often neighborhood bikeways) where increased compliance with traffic control, reduced speeding and reduced cut-through traffic are desired Can be installed as mountable in locations where larger vehicles may not be able to circulate around the circle 	<ul style="list-style-type: none"> Can reduce crash frequency and severity and have positive aesthetic value Placed at an intersection, they can calm two streets at once Can often be developed to fit within existing right-of-way constraints Larger vehicles and emergency responders can turn left in front of island when no conflicting traffic is present Can be installed as an all-way yield condition or as an all-way stop condition depending on location 	Medium (\$10,000- \$100,000)
Guidance: NACTO Urban Street Design Guide, NACTO Urban Bikeway Design Guide			



TRAFFIC CALMING & SAFETY ENHANCEMENTS (CONT.)

TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
CHICANES			
	<ul style="list-style-type: none"> Curb extensions that alternate from one side of the street to the other, forming S-shaped curves along the street. They interrupt straight stretches of street and force vehicles to shift horizontally Chicanes can be created by alternating on-street parking between each side of the street Applied in residential or neighborhood locations where increased compliance with traffic control, reduced speeding and reduced cut-through traffic are desired 	<ul style="list-style-type: none"> Can be as restrictive as necessary Negotiable by large vehicles except under heavy traffic conditions 	Medium (\$10,000 - \$100,000)
Guidance: NACTO Urban Street Design Guide, NACTO Urban Bikeway Design Guide			
REDUCED CURB RADII			
	<ul style="list-style-type: none"> The radius of a curb is reduced requiring motorists to make a tighter turn Considered in locations with non-traditional intersection geometry or larger radii and minimal truck traffic 	<ul style="list-style-type: none"> Shortens the distance people walking and biking have to cross Reduces traffic speeds and increases driver awareness (like curb extensions) Improves ADA ramp alignment and provides more sidewalk space Improves traffic control device visibility 	High (> \$100,000)
Guidance: ITE Implementing Context Sensitive Design on Multimodal Throughfares, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, NACTO Urban Street Design Guide, FDOT FDM			
DIVERTERS			
	<ul style="list-style-type: none"> Landscaped islands placed diagonally across an intersection, blocking through movements and creating two separate, L-shaped streets They are often staggered to create circuitous routes through the neighborhood as a whole, discouraging non-local traffic while maintaining access for local residents Used along neighborhood bikeways or in locations where reduction in cut-through traffic is desired, while accommodating through bicycle and pedestrian traffic 	<ul style="list-style-type: none"> Do not require a full intersection closure, only a redirection of existing streets Able to maintain full pedestrian, bicycle and emergency vehicle access May result in a diversion of traffic to adjacent streets 	High (> \$100,000)
Guidance: NACTO Urban Bikeway Design Guide			



TRAFFIC CALMING & SAFETY ENHANCEMENTS (CONT.)



TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
HALF CLOSURES			
	<ul style="list-style-type: none"> Landscaped islands that block travel in one direction for a short distance on otherwise two-way streets Used along neighborhood bikeways or in locations where reduction in vehicular traffic is desired, while accommodating through bicycle and pedestrian traffic 	<ul style="list-style-type: none"> Maintains two-way bicycle access Effective in reducing traffic volumes Provides opportunities for controlled crossing by pedestrians and bicyclists May result in a diversion of traffic to adjacent streets 	High (> 100,000)
Guidance: NACTO Urban Bikeway Design Guide			
FULL CLOSURES			
	<ul style="list-style-type: none"> Barriers placed across a street to completely close the street to through-traffic, usually leaving access open only for bicyclists and pedestrians via cut-throughs Can be applied at the end of the block or within a median of an intersecting street Used along neighborhood bikeways or in locations where reduction in vehicular traffic is desired, while accommodating through bicycle and pedestrian traffic 	<ul style="list-style-type: none"> Maintains pedestrian and bicycle access Barriers can be landscaped Provides opportunities for controlled crossing by pedestrians and bicyclists May result in a diversion of traffic to adjacent streets 	High (> \$100,000)
Guidance: NACTO Urban Bikeway Design Guide			


TRAFFIC SIGNAL IMPROVEMENTS

TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
PEDESTRIAN COUNTDOWN SIGNALS			
	<ul style="list-style-type: none"> Pedestrian signal head that displays the amount of time remaining during the pedestrian clearance interval Standard treatment for signalized intersections that have pedestrian signals 	<ul style="list-style-type: none"> Reduces pedestrian-vehicle conflicts Provides people walking and biking with increased awareness of how much time they have remaining to finish crossing the street when timed to end concurrently with adjacent vehicle signal phase 	Low (< \$10,000)
Guidance: FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, FDOT FDM			
BICYCLE SIGNALS			
	<ul style="list-style-type: none"> Dedicated signal head for bicyclists Used in locations with separated bicycle facilities Limited to use in situations where bicycles moving on a green or yellow signal indication are not in conflict with any simultaneous motor vehicle movement at the intersection, including right (or left) turns on red 	<ul style="list-style-type: none"> Provides ability for a separate signal phase for bicyclists when desired for enhanced safety or non-traditional signal operations Past national studies have shown an increase in compliance with signal indication Bicycle Signals require formal request and approval from FHWA to use under current interim approval 	Low (< \$10,000)
Guidance: NACTO Don't Give up at the Intersection, Designing All Ages and Abilities Bicycle Crossings, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, FHWA Separated Bike Lane Planning and Design Guide, NACTO Urban Bikeway Design Guide			

TRAFFIC SIGNAL IMPROVEMENTS (CONT.)			
TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
LEADING PEDESTRIAN / BICYCLE INTERVALS			
	<ul style="list-style-type: none"> Traffic signal timing that provide people walking and biking with a few seconds head start prior to motor vehicles on the parallel street being given the green light (bicyclists allowed to use pedestrian signals via signage or local code / state law provisions) Typically applied in locations with high pedestrian and bicyclist conflicts with turning vehicles or vulnerable pedestrian populations 	<ul style="list-style-type: none"> Provides pedestrian and bicyclist visibility for turning vehicles and driver yielding compliance for pedestrians Helps reduce conflicts between turning vehicles and pedestrians and bicyclists 	Low ($< \$10,000$)
Guidance: NACTO Don't Give up at the Intersection, Designing All Ages and Abilities Bicycle Crossings, ITE Implementing Context Sensitive Design on Multimodal Thoroughfares, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, FHWA Separated Bike Lane Planning and Design Guide, NACTO Urban Street Design Guide, FDOT TEM			
PROTECTED TURN PHASING			
	<ul style="list-style-type: none"> Traffic signal phasing and signal equipment that only allows turning vehicles to enter the intersection during a dedicated signal phase separate from the pedestrian and/or bicycle through phases Typically applied in locations with high pedestrian and bicyclist conflicts with turning vehicles or vulnerable pedestrian populations 	<ul style="list-style-type: none"> Eliminates conflicts between left turning vehicles and pedestrians which is one of the most common types of crashes involving pedestrians and bicyclists and vehicles 	Low ($< \$10,000$)
Guidance: NACTO Don't Give up at the Intersection, Designing All Ages and Abilities Bicycle Crossings			
TURN RESTRICTION BLANK-OUT SIGNS			
	<ul style="list-style-type: none"> Digital sign typically mounted on signal mast arm that displays message prohibiting turning movements, such as 'No Turn on Red', which can also show supplementary messages such as 'Yield to Peds' Turn prohibition linked to pedestrian actuation or set to recall automatically Also applied at locations with bike boxes or protected intersections 	<ul style="list-style-type: none"> Reduces potential conflicts between turning vehicles and pedestrians and bicyclists that might be crossing during the conflicting traffic signal phase 	Low ($< \$10,000$)
Guidance: NACTO Don't Give up at the Intersection, Designing All Ages and Abilities Bicycle Crossings			

TRAFFIC SIGNAL IMPROVEMENTS (CONT.)			
TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
SIGNAL COORDINATION (LOWER SPEED LIMIT PROGRESSION)			
	<ul style="list-style-type: none"> Developing a traffic signal coordination plan that is based around a slower travel speed usually between 12-18 mph for bicyclists and slower for pedestrians Applied along signalized corridors with high pedestrian or bicyclist volumes Often referred to as a "Green Wave" 	<ul style="list-style-type: none"> Reduces start and stop delay for bicyclists Promotes a more uniform travel speed for all road users Makes for a more comfortable street to bike Reduces crash severity based on slower vehicular travel speeds Shorter cycle lengths reduce delay for non-motorized users 	Low (Less than \$10,000)
Guidance: FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, NACTO Urban Street Design Guide			
RECTANGULAR RAPID FLASH BEACONS (RRFB)			
	<ul style="list-style-type: none"> Rapid flashing LED strobe lights post-mounted in between a pedestrian or trail crossing warning sign and down arrow sign The beacons may be push-button activated or activated with passive pedestrian detection Typically applied on two-lane or four-lane streets where there is a defined midblock crossing desire line and meets established evaluation criteria 	<ul style="list-style-type: none"> Increases driver yielding compliance Solar panels reduce energy costs associated with the device Wireless capabilities reduce installation costs 	Medium (\$10,000-\$100,000)
Guidance: FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, NACTO Urban Bikeway Design Guide, FDOT TEM			

TRAFFIC SIGNAL IMPROVEMENTS (CONT.)			
TREATMENT	DESCRIPTION	KEY FACTORS	RELATIVE COST (construction per mile or unit)
BICYCLE DETECTION			
	<ul style="list-style-type: none"> In-pavement or above ground detection system that allows bicyclists to be detected at signalized intersections Typically installed at signalized locations along bike routes with lower side street approach volumes 	<ul style="list-style-type: none"> Decreases delay for bicyclists at signalized intersections Encourages bicyclists to wait for signal indication Identifies where bicyclist should position themselves to be detected Allows for implementation of lengthened clearance interval when bicyclists are present Actuation buttons (if used) should provide feedback indication of actuation 	Medium (\$10,000-\$100,000)
Guidance: NACTO Urban Bikeway Design Guide			
PEDESTRIAN HYBRID BEACON (PHB) / HIGH INTENSITY ACTIVATED CROSSWALK (HAWK)			
	<ul style="list-style-type: none"> Pedestrian-actuated beacon that is a combination of a beacon flasher and a traffic control signal When actuated, the beacon displays a yellow (warning) indication followed by a solid red During pedestrian clearance, the driver sees a flashing red "wig-wag" pattern until the clearance interval has ended and the signal goes dark Can be considered along higher speed multi-lane streets where increased driver visibility of multimodal crossing is desired and meets established evaluation criteria 	<ul style="list-style-type: none"> Reduces pedestrian-vehicle conflicts and increases driver compliance with yielding to pedestrians Reduces vehicle delay when compared to standard pedestrian traffic signals 	High (> \$100,000)
Guidance: NACTO Urban Bikeway Design Guide, FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts, NACTO Urban Bikeway Design Guide, FDOT TEM			

NEXT STEPS 

FORMALIZE STANDARDS FOR BIKE DETECTION AT SIGNALS. CURRENTLY, BIKES TYPICALLY ACTUATE A SIGNAL VIA EITHER VEHICULAR MEANS (VIDEO OR IN-PAVEMENT LOOP DETECTION) OR PEDESTRIAN MEANS (PEDESTRIAN PUSH BUTTON). NEW FACILITY TYPES, SUCH AS STREET-LEVEL SEPARATED BIKE LANES, THAT WILL PROVIDE AN EXCLUSIVE AREA FOR BIKES, WILL NEED TO HAVE SPECIFIC SIGNAL DETECTION STRATEGIES EMPLOYED. THIS MAY INCLUDE PASSIVE DETECTION METHODS (VIDEO, IN-PAVEMENT LOOPS, INFRARED, ETC.) OR ACTIVE DETECTION METHODS (PUSH BUTTONS PLACED AND ORIENTED TO SERVE BICYCLISTS USING THE SPECIFIC FACILITY).

DEMONSTRATION PROJECTS

Two demonstration projects, identified as ‘separated bike lanes or shared use paths’ in the visionary bikeway network, illustrate the approach to the feasibility review and application of the bikeway design toolbox for retrofitting more comfortable bike facilities on existing streets.

One-way, sidewalk-level separated bike lanes are recommended for the first project, while a two-way street-level separated bike lane is recommended for the second project. Conceptual corridor plans illustrate the review findings and recommendations.



DEMONSTRATION PROJECT

PROJECT SNAPSHOT

PROJECT NAME: Highland Avenue Bikeway

PROJECT TYPE: Shared use path or separated bike lanes

PROJECT LIMITS: Highland Ave from Colonial Dr to Orange Ave

PROJECT LENGTH: 0.6 miles

EXISTING CONTEXT:

- Existing signed bike route
- 3,900 AADT
- 30 mph posted speed
- Supporting land use context
- Tree-lined, shaded corridor
- In proximity of two high bicycle crash intersections
- Support for project during community outreach

NETWORK CONNECTIVITY:

- Existing on-street bike lanes begin south of Colonial Dr, which continue into the Lake Eola Heights neighborhood north of downtown
- Intersects the existing Orlando Urban Trail near Lake Highland Dr, which continues three miles north to Mead Gardens in Winter Park
- Existing Gaston Edwards Park Trail begins along the north side of Orange Ave at Lake Ivanhoe

OPINION OF PROBABLE COST: \$750,000

DISCUSSION

Based on the speed limit and vehicle volumes, the visionary network identified a potential trail or separated bike lanes project along this existing signed route. This area has a high latent demand, and provides a connection to the existing trail system.

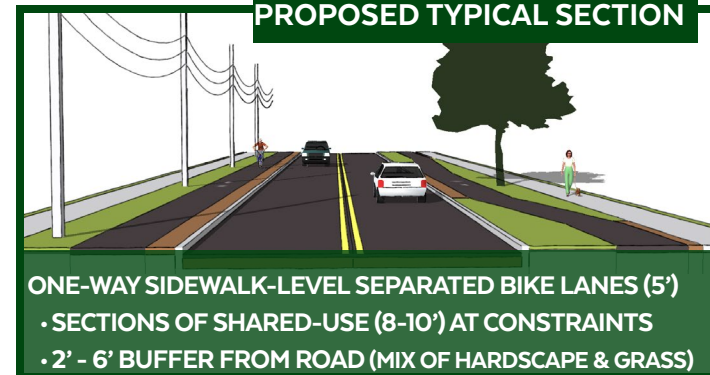
Based on the existing right-of-way, lane widths, and sidewalk location, it was determined that one-way sidewalk-level separated bike lanes would be the most feasible project. Additional considerations are denoted on the project area map below.

EXISTING TYPICAL SECTION



TWO-LANE UNDIVIDED SECTION (24')
CONTINUOUS 5' SIDEWALKS
APPROXIMATE 60' ROW

PROPOSED TYPICAL SECTION



ONE-WAY SIDEWALK-LEVEL SEPARATED BIKE LANES (5')
 • SECTIONS OF SHARED-USE (8-10') AT CONSTRAINTS
 • 2' - 6' BUFFER FROM ROAD (MIX OF HARDSCAPE & GRASS)

- 1 Provide 8-10' shared-use path connection to Gaston Edwards Park Trail. Truncate right turn lane at Highland Avenue to provide curb extension at the southeast intersection corner. Add leading pedestrian interval (LPI) to signal for crossing to and from the park.
- 2 Acquire a narrow strip of land on the east side of the street to provide a 8-10' shared-use path. Alternatively, provide shared lane markings from Orlando Urban Trail (OUT) crossing to Orange Ave.
- 3 Begin separated bike lanes (SBLs) at OUT.
- 4 Consider removal of northbound right turn lane to allow additional space for northbound SBL.
- 7 Inlets in the radii of the southeast and southwest intersection corners may necessitate the need to use the existing curb ramps for the northbound and southbound SBL movements. Reconfigure the curb ramp in the northeast corner to provide two ramps or a single larger ramp that is flush around the entire corner.
- 10 Provide raised crossings on the east and west legs of the intersections for the sidewalk and northbound/southbound SBLs.
- 13 Modify curb lines on the four corners to remove "notched" configuration and better accommodate northbound/southbound SBLs. Add leading pedestrian intervals for northbound / southbound movements.

- 14 Continue SBLs south to Hillcrest St to connect to existing on-street bike lanes.
- 15 South of Hillcrest St, existing conventional bike lanes could be converted to buffered bike lanes through the addition of a second stripe and reduction of the travel lane widths to 10'.

Accommodating mature trees, electrical cabinets, utility poles and constrained ROW

- 5
- 6
- 8
- 9
- 11
- 12

In infrequent locations, the SBL would conflict with large, mature trees, electrical / signal cabinets, or utility poles. At these locations, the SBL should be merged with the sidewalk to create a shared-use path and widened as much as feasible. Where a row of mature trees exist, the sidewalk should be widened to 8' even if just between the trees.

Smaller trees, such as crepe myrtles, may be removed to accommodate the SBL. Consult with the City of Orlando Arborist in planning stages to evaluate landscaping that may interfere with design.

Curb ramps

Curb ramps should be modified to accommodate a 10' crossing width.

PROJECT AREA MAP



PROJECT SNAPSHOT

PROJECT NAME: North Ln / Lake Orlando Pkwy (loop)
PROJECT TYPE: Shared use path or separated bike lanes
PROJECT LIMITS: North Ln from Pine Hills Rd to Lake Orlando Pkwy (loop)
PROJECT LENGTH: 4.2 miles
EXISTING CONTEXT:

- 9,400 AADT
- 25 mph posted speed
- Within a high equity score area
- Support for project during community outreach

NETWORK CONNECTIVITY:

- East - connects to Lake Breeze Dr existing on-street bike lanes
- North - connects to Cinderlane Pkwy and Signal Hill Rd bike lanes

OPINION OF PROBABLE COST: \$3.8 million

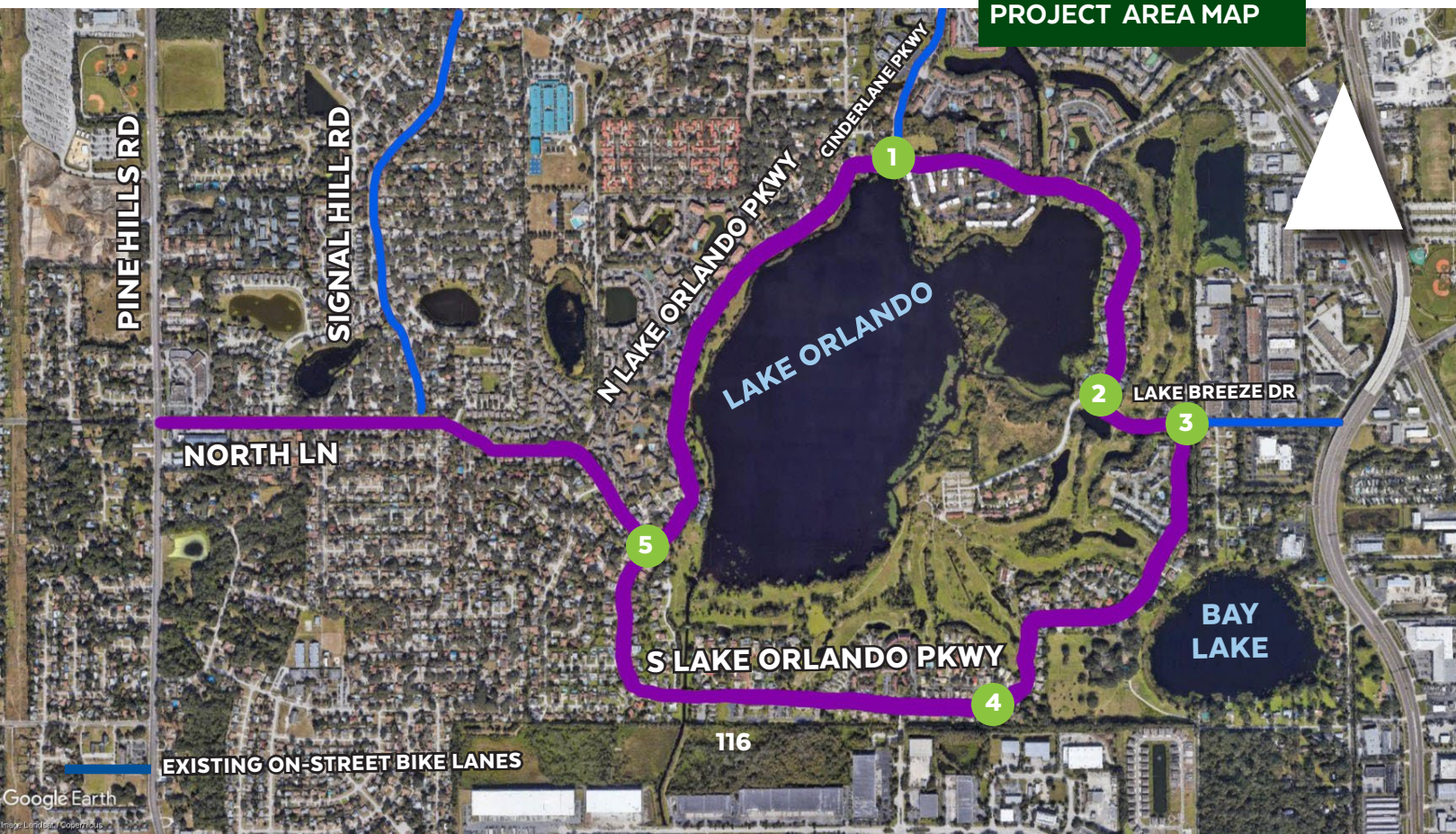
EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION



PROJECT AREA MAP



DISCUSSION

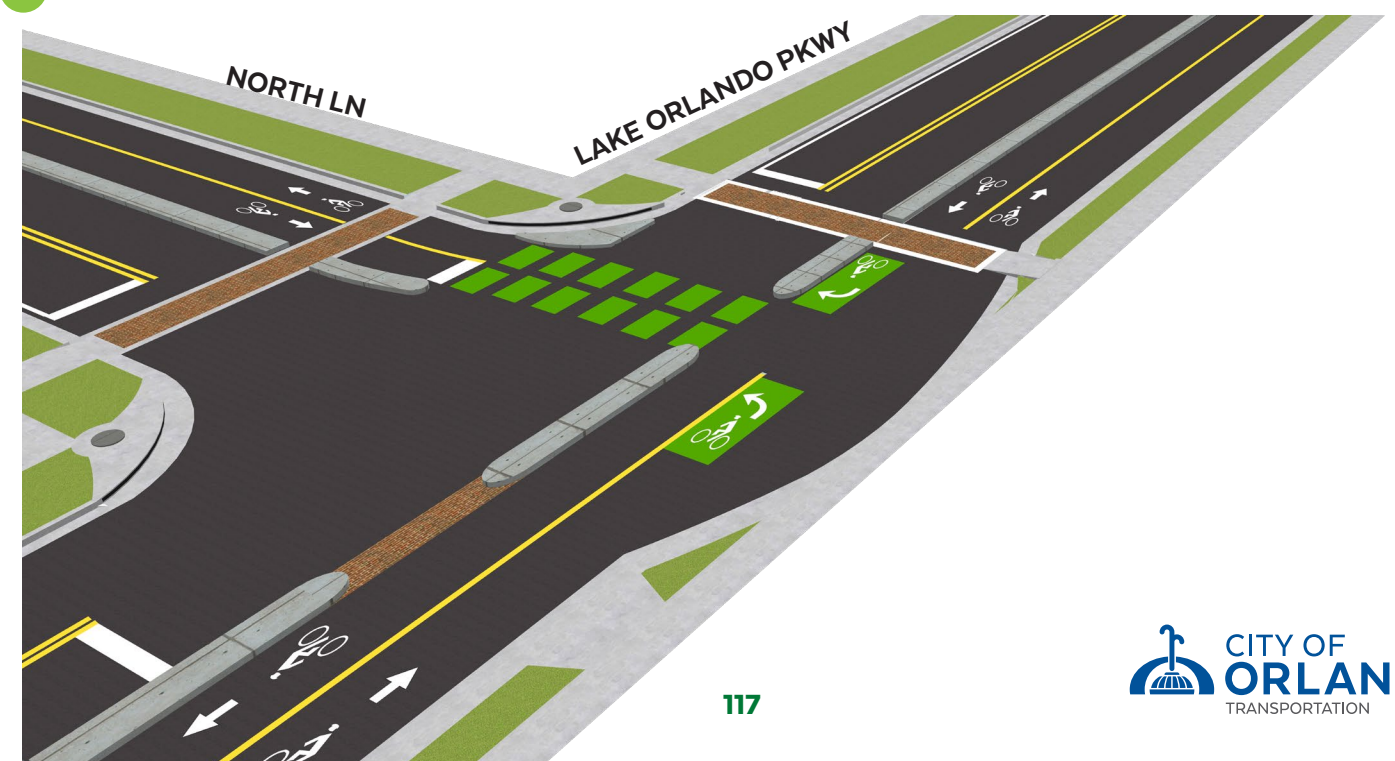
Based on the existing vehicle volumes, the visionary network identified a potential trail or separated bike lanes project in place of the existing bike lanes along North Ln and Lake Orlando Pkwy. This project is seen as a priority as it's within a high equity score area.

Based on the existing width between the curbs, there is an opportunity to reallocate lane space by narrowing the travel lanes to 10', and converting the existing bike lanes to a two-way separated bike lane, with a 3' concrete buffer. Because Lake Orlando Pkwy is a loop around a lake, there are minimal conflict areas, making this design more feasible. Additional considerations are denoted on the project area map on page 116.

- 1 At the existing roundabout, transition to a shared-use path.
- 2 Reconfigure intersection to an all-way stop.
- 3 At the existing roundabout, transition to a shared-use path. Requires minor curb adjustments and possible easement / acquisition of golf course property right-of-way.
- 4 Proposed driveway / cross street treatment:



- 5 Proposed North Ln intersection improvement:



DEMONSTRATION PROJECT

landscape guidelines & plant palettes

Landscape treatments are an important part of the bikeway network, especially in Florida. Trees and other plants can provide shade and placemaking as well as serve as visual buffers along the city's bikeways. The following pages contain landscape design guidelines for separated bike lanes and shared use path projects in Orlando's bikeway network. These guidelines help provide consistency along separated bike lanes and shared use paths across the city. Landscape plans and costs should be incorporated into the design plans for all future separated bike lane and shared use paths, including developer-driven projects.

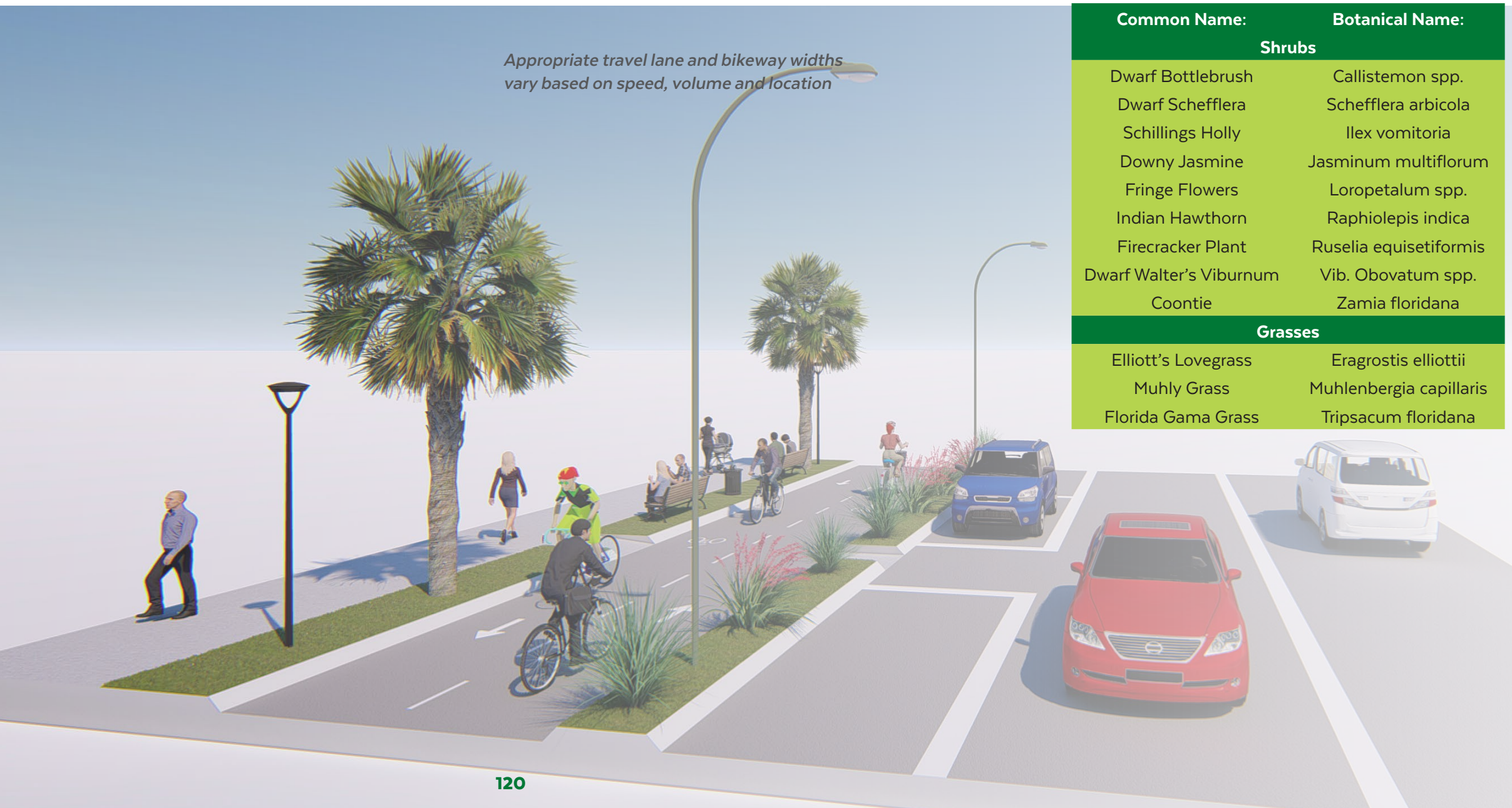


Gertrude's Walk (2019)

STREET-LEVEL TWO-WAY SEPARATED BIKE LANES WITH PERMANENT BUFFER

- BIKEWAY SHOULD BE 10'-12' WIDE
- A CONCRETE CURB BUFFER SEPARATES THE BIKEWAY FROM THE TRAVEL LANES
- FREQUENT BREAKS WITHIN THE BUFFER ALLOW PEDESTRIANS WALKING OUT OF THEIR PARKED CARS TO CROSS THE BIKE LANE ONTO THE SIDEWALK AND AID IN DRAINAGE
- OPTIONAL ON-STREET PARKING SPACES RANGING FROM 7'-9' OUTSIDE THE BUFFER FURTHER SEPARATE BICYCLISTS AND PROVIDE TRAFFIC CALMING

Appropriate travel lane and bikeway widths vary based on speed, volume and location



PLANTING STRIP

Plants in the roadside buffer offer a protective barrier to cyclists from the street while also calming vehicular traffic. Plants within this buffer should not exceed 36" in height to allow clear visibility for cyclists and vehicular traffic. Species should require limited, if any, irrigation once established. Plantings should be designed to allow for safe maintenance practices along roadway. Where the bikeway approaches an intersection all FDOT sight line requirements will need to be met.

Common Name:	Botanical Name:
Shrubs	
Dwarf Bottlebrush	Callistemon spp.
Dwarf Schefflera	Schefflera arbicola
Schillings Holly	Ilex vomitoria
Downy Jasmine	Jasminum multiflorum
Fringe Flowers	Loropetalum spp.
Indian Hawthorn	Raphiolepis indica
Firecracker Plant	Ruselia equisetiformis
Dwarf Walter's Viburnum	Vib. Obovatum spp.
Coontie	Zamia floridana
Grasses	
Elliott's Lovegrass	Eragrostis elliottii
Muhly Grass	Muhlenbergia capillaris
Florida Gama Grass	Tripsacum floridana

TREES

A 5'-10' landscape buffer in between the bike lane and the sidewalk provides a clear separation of bicycle and pedestrian traffic. Landscape in this buffer should incorporate native plants and trees that allow for vertical visibility in the 2'-8.5' range. Trees should be selected from species that don't produce a lot of litter or fruit. Tree root barriers can allow for certain species with spreading roots to grow without affecting the adjacent pavement. Larger trees are preferred as they provide a greater amount of shade.

Common Name:	Botanical Name:
Smaller Trees with No Root Barrier	
Crape Myrtle	Lagerstroemia indica
Chickasaw Plum	Prunus angustifolia
Trumpet Tree	Tabebuia spp.
Larger Trees with Root Barrier	
Nuttall Oak	Quercus nutallii
Magnolia	Magnolia grandiflora
Live Oak	Quercus virginiana
Bald Cypress	Taxodium distichum
Winged Elm	Ulmus alata
Palms	
Date Palms	Phoenix spp.
Cabbage Palm	Sabal palmetto
Butia Palm	Butia capitata
Washington Palm	Washingtonia robusta

Hand Water Schedule for New Plantings:	
Days 1-30	Everyday
Days 31-60	Every Other Day
Days 61-90	Every Third Day
Days 91-120	As Needed Until Established

Consult with City of Orlando Arborist in planning stages to evaluate landscaping that may interfere with design.

STREET-LEVEL TWO-WAY SEPARATED BIKE LANES WITH PLANTERS

- BIKEWAY SHOULD BE 10’-12’ WIDE
- PLANTERS SEPARATE THE BIKEWAY FROM THE TRAVEL LANES IN BUFFERED AREAS OF AT LEAST 3’
- OPTIONAL ON-STREET PARKING SPACES RANGING FROM 7’-9’ OUTSIDE THE BUFFER FURTHER SEPARATE BICYCLISTS AND PROVIDE TRAFFIC CALMING

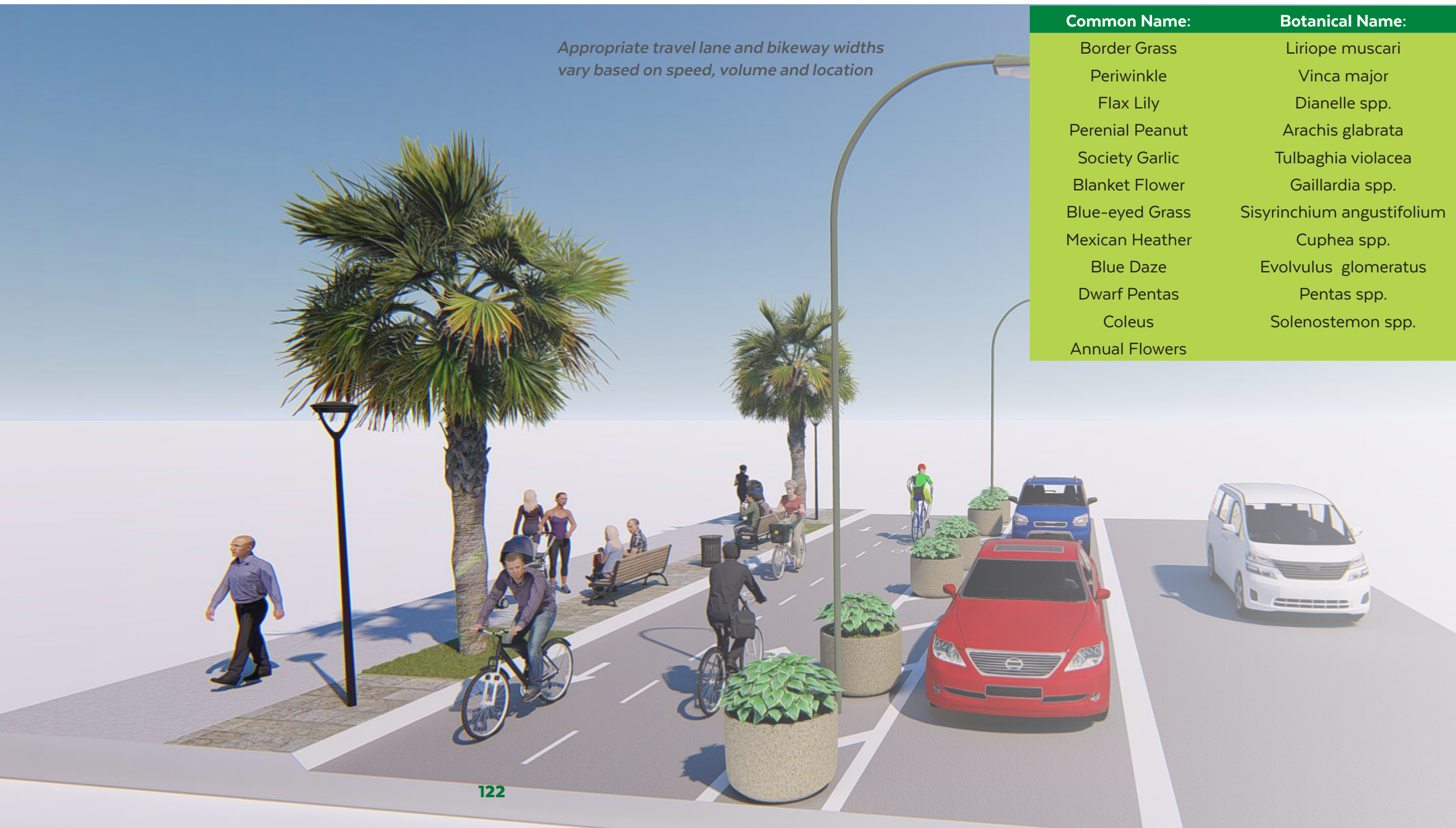
PLANTERS

The planters create a safer environment for cyclists while also providing a visual aesthetic quality. The planters should incorporate native drought tolerant species whenever possible, in order to increase their survivability and limit a need for external irrigation. The plant selection should also not exceed 42” height including planter height. With an average planter height of 30”, the plants within the planter should not exceed 12” in height. Where the bikeway approaches an intersection, all FDOT sight line requirements will need to be met. Planters cannot be used within 100 feet of intersection approaches. Low curbs or other barriers may be used in place of planters.

TREES

A 5’-10’ landscape buffer in between the bikeway and the sidewalk provides a clear separation of bicycle and pedestrian traffic. Landscape in this buffer should incorporate native plants and trees that allow for visibility in the 2’-8.5’ vertical range to meet FDOT view requirements as well as bicycle head clearance. Trees should be selected from species that don’t produce a lot of litter or fruit. Tree root barriers can allow certain species with spreading roots to grow without affecting the adjacent pavement. Larger trees are preferred as they provide a greater amount of shade.

Appropriate travel lane and bikeway widths vary based on speed, volume and location



Common Name:	Botanical Name:
Border Grass	Liriope muscari
Periwinkle	Vinca major
Flax Lily	Dianelle spp.
Perennial Peanut	Arachis glabrata
Society Garlic	Tulbaghia violacea
Blanket Flower	Gaillardia spp.
Blue-eyed Grass	Sisyrinchium angustifolium
Mexican Heather	Cuphea spp.
Blue Daze	Evolvulus glomeratus
Dwarf Pentas	Pentas spp.
Coleus	Solenostemon spp.
Annual Flowers	

Smaller Trees with No Root Barrier	
Common Name:	Botanical Name:
Crape Myrtle	Lagerstroemia indica
Chickasaw Plum	Prunus angustifolia
Trumpet Tree	Tabebuia spp.

Larger Trees with Root Barrier	
Nuttall Oak	Quercus nutallii
Magnolia	Magnolia grandiflora
Live Oak	Quercus virginiana
Bald Cypress	Taxodium distichum
Winged Elm	Ulmus alata

Palms	
Date Palms	Phoenix spp.
Cabbage Palm	Sabal palmetto
Butia Palm	Butia capitata
Washington Palm	Washingtonia robusta

Hand Water Schedule for New Plantings:	
Days 1-30	Everyday
Days 31-60	Every Other Day
Days 61-90	Every Third Day
Days 91-120	As Needed Until Established

Consult with City of Orlando Arborist in planning stages to evaluate landscaping that may interfere with design.

SIDEWALK-LEVEL ONE-WAY SEPARATED BIKE LANES

- BIKEWAY SHOULD BE 5 - 8' WIDE EACH DIRECTION
- AN OPTIONAL LANDSCAPE BUFFER CAN BE PROVIDED BETWEEN THE EDGE OF THE CURB AND THE BIKE LANE AND/OR BETWEEN THE BIKE LANE AND THE SIDEWALK



Appropriate travel lane and bikeway widths vary based on speed, volume and location

LANDSCAPE GUIDELINES & PLANT PALETTES

PLANTING STRIP

Plants in the roadside buffer offers a protective barrier to cyclists from the street while also calming vehicular traffic. Plants within this buffer should not exceed 36" in height to allow clear visibility for cyclists and vehicular traffic. Species should require limited, if any, irrigation once established. Plantings should be designed to allow for safe maintenance practices along roadway. Where the bikeway approaches an intersection all FDOT sight line requirements will need to be met.

TREES

A 5'-10' landscape buffer in between the bike lane and the sidewalk provides a clear separation of bicycle and pedestrian traffic. Landscape in this buffer should incorporate native plants and trees that allow for vertical visibility in the 2'-8.5' range. Trees should be selected from species that don't produce a lot of litter or fruit. Tree root barriers can allow certain species with spreading roots to grow without affecting the adjacent pavement. Larger trees are preferred as they provide a greater amount of shade.

Common Name:	Botanical Name:
Shrubs	
Dwarf Bottlebrush	Callistemon spp.
Dwarf Schefflera	Schefflera arbicola
Schillings Holly	Ilex vomitoria
Downy Jasmine	Jasminum multiflorum
Fringe Flowers	Loropetalum spp.
Indian Hawthorn	Raphiolepis indica
Firecracker Plant	Ruselia equisetiformis
Dwarf Walter's Viburnum	Vib. Obovatum spp.
Coontie	Zamia floridana
Flax Lily	Dianella spp.
Grasses	
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Muhly Grass	Muhlenbergia capillaris
Florida Gama Grass	Tripsacum floridana

Common Name:	Botanical Name:
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Chickasaw Plum	Prunus angustifolia
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Magnolia	Magnolia grandiflora
Live Oak	Quercus virginiana
Bald Cypress	Taxodium distichum
Winged Elm	Ulmus alata
Palms	
Date Palms	Phoenix spp.
Cabbage Palm	Sabal palmetto
Butia Palm	Butia capitata
Washington Palm	Washingtonia robusta

Hand Water Schedule for New Plantings:	
Days 1-30	Everyday
Days 31-60	Every Other Day
Days 61-90	Every Third Day
Days 91-120	As Needed Until Established

Consult with City of Orlando Arborist in planning stages to evaluate landscaping and street trees that may interfere with design.

SHARED-USE PATH

- PATH SHOULD BE 10’-15’ WIDE TO OFFER ROOM FOR PEDESTRIANS AND CYCLISTS TO USE SIMULTANEOUSLY
- TWO-WAY SHARED-USE PATH IS RAISED UP FROM THE VEHICULAR ROADWAY WITH A CURB AND HAS A BUFFER ON EITHER SIDE

Appropriate travel lane and bikeway widths vary based on speed, volume and location



PLANTING STRIP

Plants in the roadside buffer offers a protective barrier for the path users from the street while also calming vehicular traffic. Plants within this buffer should not exceed 36” in height to allow clear visibility for trail users and vehicular traffic. Species should require limited, if any, irrigation once established. Plantings should be designed to allow for safe maintenance practices along roadway. Where the cycletrack approaches an intersection, all FDOT sight line requirements will need to be met.

Common Name:	Botanical Name:
Shrubs	
Dwarf Bottlebrush	Callistemon spp.
Dwarf Schefflera	Schefflera arbicola
Schillings Holly	Ilex vomitoria
Downy Jasmine	Jasminum multiflorum
Fringe Flowers	Loropetalum spp.
Indian Hawthorn	Raphiolepis indica
Firecracker Plant	Ruselia equisetiformis
Dwarf Walter’s Viburnum	Vib. Obovatum spp.
Coontie	Zamia floridana
Grasses	
Elliott’s Lovegrass	Eragrostis elliottii
Muhly Grass	Muhlenbergia capillaris
Florida Gama Grass	Tripsacum floridana

Hand Water Schedule for New Plantings:	
Days 1-30	Everyday
Days 31-60	Every Other Day
Days 61-90	Every Third Day
Days 91-120	As Needed Until Established

Consult with City of Orlando Arborist in planning stages to evaluate landscaping that may interfere with design.

TREES

A 5’-10’ landscape buffer behind the shared-use path provides a buffer between neighboring properties and the shared-use path. Landscape in this buffer should incorporate native plants and trees that allow for visually screening as well as noise abatement to neighboring properties. Trees should be selected from species that don’t produce a lot of litter or fruit. Tree root barriers can allow certain species with spreading roots to grow without affecting the adjacent pavement. Larger trees are preferred as they provide a greater amount of shade.

Common Name:	Botanical Name:
Smaller Trees with No Root Barrier	
Crape Myrtle	Lagerstroemia indica
Chickasaw Plum	Prunus angustifolia
Trumpet Tree	Tabebuia spp.
Larger Trees with Root Barrier	
Nuttall Oak	Quercus nutallii
Magnolia	Magnolia grandiflora
Live Oak	Quercus virginiana
Bald Cypress	Taxodium distichum
Winged Elm	Ulmus alata
Palms	
Date Palms	Phoenix spp.
Cabbage Palm	Sabal palmetto
Butia Palm	Butia capitata
Washington Palm	Washingtonia robusta
Large Shrubs	
Pineapple Guava	Acca sellowiana
Century Plant	Agave spp.
Stoppers	Eugeniaa spp.
Florida Anise	Illicium floridanum
Fringe Flower	Loropetalum spp.
Wax Myrtle	Myrica cerifera
Wild Coffee	Psychotria nervosa
Dwarf Palmetto	Sabal minor
Walter’s Viburnum	Vib. Obovatum
Sweet Viburnum	Vib. Odoratissimum



850+ miles of low-stress bikeways

ACHIEVING THE VISION:
BY THE NUMBERS

8mi
OF EXISTING SIGNED ROUTES
UPGRADED TO
SEPARATED BIKE LANES OR
SHARED USE PATHS

62mi
OF EXISTING BIKE LANES
UPGRADED TO
SEPARATED BIKE LANES OR
SHARED USE PATHS

370mi
OF PROPOSED NEW
SEPARATED BIKE LANES OR
SHARED USE PATHS

35mi
OF EXISTING SIGNED ROUTES
UPGRADED TO
NEIGHBORHOOD BICYCLE
BOULEVARDS

71mi
OF PROPOSED NEW
NEIGHBORHOOD BICYCLE
BOULEVARDS

10mi
OF EXISTING SIGNED ROUTES
UPGRADED TO
ON-STREET BIKE LANES

50mi
OF PROPOSED NEW
ON-STREET BIKE LANES
(BUFFERED PREFERRED)

480mi
SEPARATED
BIKE LANES OR
SHARED-USE
PATHS

105mi
NEIGHBORHOOD
BICYCLE
BOULEVARDS

265mi
ON-STREET
BIKE LANES

NOTE: TOTAL MILES OF THE EXISTING + PROPOSED NETWORK



COMFORT

10X
MILES OF
SEPARATED BIKE LANES &
SHARED-USE PATHS



CONNECTIVITY

81%
OF THE CITY IS
WITHIN 1/4 MI OF
A BIKEWAY

95%
OF THE CITY IS
WITHIN 1/2 MI OF
A BIKEWAY



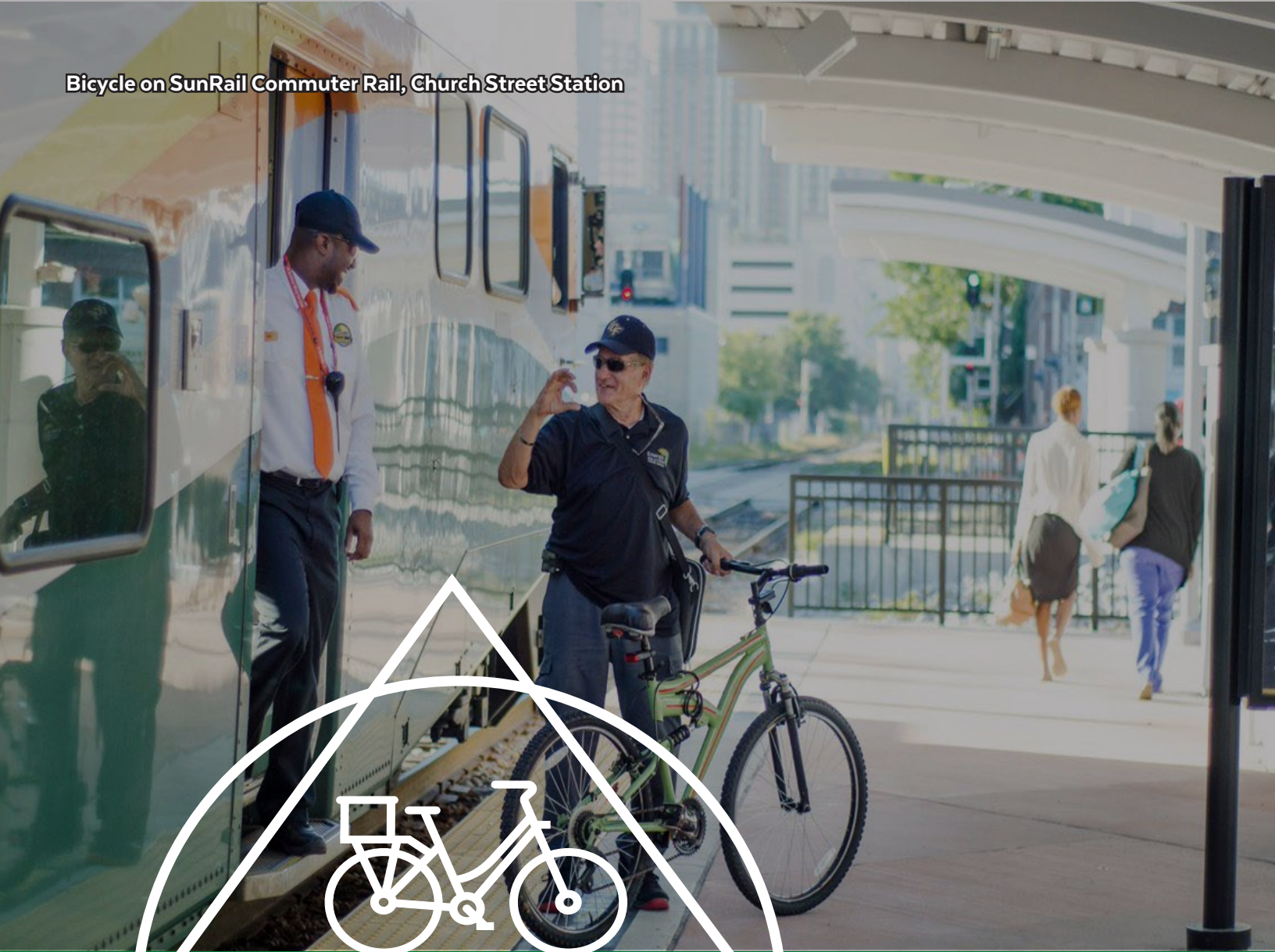
EQUITY

60%
OF NEW BIKEWAY
MILES ARE IN UNDER-
SERVED AREAS

SAFETY



135
PROJECTS ON
HIGH CRASH SEGMENTS



2030 PRIORITY NETWORK

The 2030 priority network narrows the visionary network into a list of projects that could be reasonably developed over the next 10-year horizon based on opinion of probable costs and funding assumptions. The 2030 priority project list is intended to provide general guidance but does not restrict bicycle network improvements from being made as opportunities arise related to lower priority projects (e.g., projects that can piggyback on other infrastructure improvements, such as resurfacing, utility or stormwater projects). Project evaluation criteria were used to identify high priority projects for inclusion in the 2030 priority network, which also reflects a mix of facility types from low-cost and easy-to-implement bicycle boulevards, to street retrofits for separated bike lanes, to new sections of shared-use path.

COST

Generalized per mile planning level cost assumptions were developed for the three bikeway improvement types in 2018 dollars. Costs were based on engineering judgement as informed by experience with similar projects previously completed by the city. These costs are based on the typical features, dimensions and other project assumptions summarized below. Costs account for mobilization; maintenance of traffic; prevention, control and abatement of erosion and water pollution; and clearing and grubbing associated with projects. A 10% contingency is included for additional project unknowns, and an additional 10% is included for projected CEI costs.

While variations from these assumptions may greatly affect the overall project cost for any particular project, these assumptions are meant to represent the average per mile costs to be expected, and are intended to illustrate the relative magnitude of dedicated funding necessary to implement the visionary bikeway network. These per mile costs, coupled with 10-year funding assumptions, help refine the number and types of projects that may be cost-feasible by 2030.

Additional detail on the planning level cost assumptions are included in **Appendix F**.

SEPARATED BIKE LANES OR SHARED-USE PATH

\$983,000/mi

Separated bike lanes or shared-use path projects assume an average per mile cost of **\$983,000**. This cost assumes no change to the existing roadway width or the existing curb and gutter, and no milling and resurfacing unless otherwise noted. As the specific method of separation will be determined as part of the next steps of project implementation (see page 98), the improvement cost was derived by averaging the generalized costs between:

- 1 mile of shared-use path (\$1,293,000/mi)
- 1 mile of sidewalk level separated bicycle lanes (\$907,000/mi)
- 1 mile of on-street separated bicycle lanes with a 3 foot continuous concrete buffer (\$750,000/mi)

SHARED-USE PATH ASSUMPTIONS

Per mile shared-use path costs assumed:

- a 12-ft wide concrete path would replace an existing sidewalk on a single side of the street
- new or adjusted drainage structure on a single side of the street
- 5 intersections per mile with replaced curb cut ramps
- 40 wayfinding or regulatory signs
- 70 reconstructed driveways to meet ADA compliance
- pavement markings
- \$50,000 for landscaping (assumes small plants)

SIDEWALK LEVEL SEPARATED BICYCLE LANE ASSUMPTIONS

The per mile sidewalk level separated bicycle lane costs were informed in part by the Highland Avenue demonstration project concept plan (pages 114 - 115). Costs assumed:

- 5 intersections per mile with replaced curb cut ramps
- 7 raised speed tables (located at side street crossings)
- 30 wayfinding or regulatory signs
- spot replacement of sidewalk
- pavement markings
- \$50,000 for landscaping (assumes small plants)

ON-STREET SEPARATED BICYCLE LANE ASSUMPTIONS

The per mile on-street separated bicycle lane costs were informed in part by the North Lane / Lake Orlando Loop demonstration project concept plan (pages 116 - 117). Costs assumed:

- 1 inch mill and overlay
- 0.6 miles of 3 ft concrete separator
- 0.4 miles of stamped asphalt (typical driveway treatment)
- 5 intersections per mile with replaced curb cut ramps
- 30 wayfinding or regulatory signs
- pavement markings
- \$50,000 for landscaping (assumes small plants)

NEIGHBORHOOD BICYCLE BOULEVARDS

\$83,000 / mi

Neighborhood bicycle boulevard projects assume an average per mile cost of **\$83,000**. This cost assumes no change to the existing roadway width or the existing curb and gutter, and no milling and resurfacing. The per mile neighborhood bicycle boulevard costs assumed:

- 10 raised speed tables
- 36 wayfinding signs
- pavement markings

BIKE LANES (BUFFERED PREFERRED)

\$41,000 / mi

Buffered bike lane projects assume an average per mile cost of **\$41,000**. This cost assumes no change to roadway width or existing curb and gutter, and no milling and resurfacing. Conflicting markings to be removed by hydro-blasting and replaced with buffered bicycle lane pavement markings.

BASED ON THE PER MILE PROJECTED COSTS, THE TOTAL PROJECTED COST TO IMPLEMENT THE VISIONARY BIKEWAY NETWORK IS OVER \$440 MILLION

PRIORITIZATION STRATEGY

Orlando’s bikeway funding falls significantly short of what would be needed to implement the visionary network within the foreseeable future. Therefore, the prioritization of the visionary bikeway network improvements helps to identify projects which are relatively better at advancing the city towards the goals and objectives of the Bicycle Plan.

The 2030 priority projects list identifies a short-list of bikeway project priorities for the city to focus on implementing over the next ten years. These projects were selected based on:

- priorities defined through the community outreach process
- weighted project scores calculated based on comfort, connectivity, equity and safety evaluation criteria

The 2030 priority projects list is not intended as a priority order checklist for implementation. Instead, projects should be implemented as they best fit in with each future year’s work program.

The priority network is intended to provide general guidance but does not restrict bicycle network improvements from being made as opportunities arise related to lower priority projects from the visionary network. In addition to the priority list, the city should continually look for opportunities to accelerate the completion of the visionary network through projects that can piggyback on other infrastructure improvements, such as resurfacing, utility or stormwater projects, or as developer-driven projects.

10-YEAR FUNDING ASSUMPTIONS

City staff projections of total available funding between 2020 - 2030 for bicycle projects were developed based on the city’s historical implementation of the bicycle work program through use of the bike implementation fund, impact fees, general funds, grants and other funds.

FUNDING SOURCE	NOTES	10-YEAR LOW PROJECTION	10-YEAR HIGH PROJECTION
BICYCLE IMPLEMENTATION PLAN FUND	SIGNS AND PAVEMENT MARKINGS	\$1,000,000	\$1,500,000
IMPACT FEE, GENERAL FUND AND GRANTS	10-YEAR AVERAGE OF FUNDS	\$4,000,000	\$10,000,000
OTHER FUNDS	INCLUDES PIGGYBACK PROJECTS	-	\$3,000,000
TOTAL		\$5,000,000	\$14,500,000

Bikeway funding per individual year is projected to range from \$500,000 to \$1,450,000. Some years experience higher levels of funding based on the receipt of grants or other miscellaneous funds.

These projections only capture the capital budget, excluding funding for bikeway operations and maintenance (O&M), bicycle parking and other bicycle programs.

Additional bikeway network mileage is likely to occur from developer-driven projects and projects completed by partner agencies (e.g. FDOT). However, for the purposes of developing the 2030 priority project list, no partner-funded or developer-funded project miles or funding assumptions were assumed.

The passage of a local sales tax referendum will greatly increase the projected available funds for capital improvements, and would make bikeway projects beyond what are identified in this section cost feasible.

PROGRAMMED PROJECTS

Eleven projects in the city’s trail system (11.35 miles) are currently funded for construction. These projects miles were assumed separately from the 10-year funding assumptions and project prioritization, and are identified as programmed on the 2030 priority network map.

Airport Gap Trail: 0.4 miles along Maguire Blvd, from Livingston St to Colonial Dr

Division Avenue: 1.35 miles from Gore St to Michigan St

Downtown Bike Gap: 1.1 miles from Greenwood Trail at Summerlin Ave to Gertrudes Walk at Pine St

Gertrude’s Walk Phase 4: 0.25 miles from Livingston St to Jefferson St

Greenwood Trail: 2.0 miles along Anderson St from Lake Underhill Path to Delaney Ave

Kirkman Road: 1.85 Miles from LB McCleod Rd to Raleigh St & Metrowest Blvd

Narcoossee Road: 1.6 miles from Northlake Pkwy to Lake Nona Blvd

Orlando Urban Trail Gap: 0.3 miles from Colonial Overpass to Magnolia Ave

Primrose Trail: 0.5 miles from Amelia St to Primrose Dr

Shingle Creek Trail: 2 miles from Oak Ridge Rd to Sand Lake Rd

**community feedback:
results of the
Bicycle Plan Update
online survey**

The 2030 priority network must balance the goal of connectivity, through the expansion of the bikeway network, with the goals of comfort, equity and safety as they relate to improvements needed along the existing bikeway network. This is especially important as it relates to the plan's equity objectives, as the existing bikeways within the socio-economic target areas tend to be higher stress compared to other neighborhoods citywide.

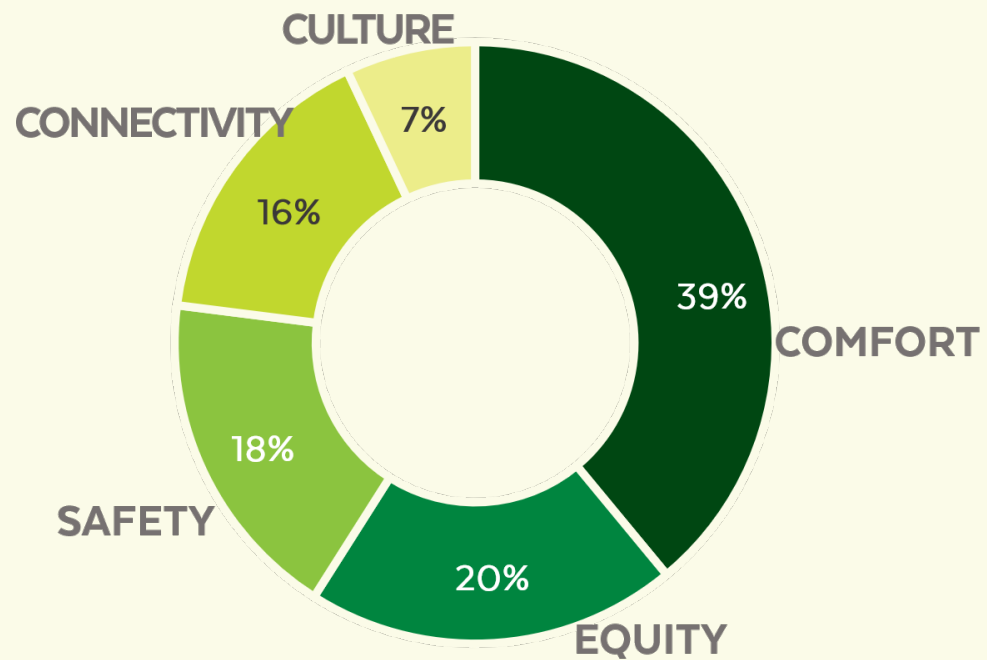
Surveys completed during the community outreach pop-up meetings, which specifically aimed to increase participation of residents from racial/ethnic minorities and families with small children, indicated that making bicycling comfortable for all ages and abilities was the most important goal of the Bicycle Plan Update, followed by providing equitable access to all neighborhoods, backgrounds and income levels.

These priorities contrasted starkly with the survey responses generated at the traditional community workshops and from the city website, where more than half of respondents chose connectivity as the most important goal.

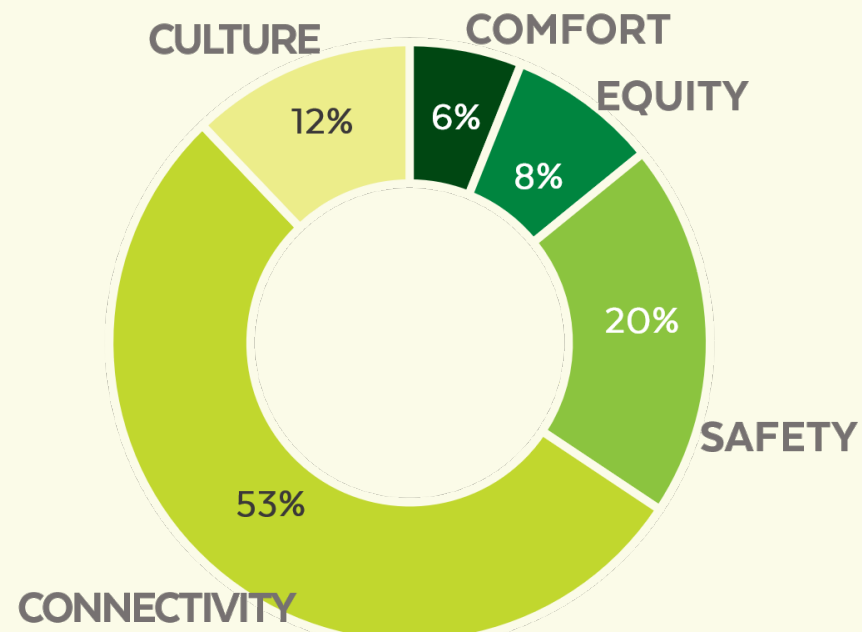
These results are important to keep in mind when deciding between a project to expand the bikeway network or a project that upgrades an existing facility, as the benefits of new low-stress network connections will be limited by its accessibility through the existing network.

“WHICH OF THE BICYCLE PLAN UPDATE GOALS DO YOU FEEL IS MOST IMPORTANT?”

COMMUNITY CENTER POP-UPS







TRADITIONAL WORKSHOPS & ONLINE



EVALUATION CRITERIA

The following evaluation criteria and weighting approach was developed with the Bicycle Plan Update Working Group. Evaluation criteria were developed based on the plan goals and were used to score segments of the visionary network for their relative priority, with possible scores ranging from 0 - 100.

While these scores are not intended to be absolute project rankings, they are helpful in determining relative project priorities.

GOAL & WEIGHTED SCORE	EVAULATION CRITERIA	JUSTIFICATION
30% COMFORT 	PROJECT IS PART OF THE 2014 PRIMARY BIKE ROUTES RECOMMENDED NETWORK	100 THE 2014 PRIMARY ROUTES STUDY PRIORITIZED AN 'ALL AGES AND ABILITIES' SPINE FOR THE CITYWIDE BIKEWAY NETWORK. THE COMPLETION OF THESE STRATEGIC CONNECTIONS SHOULD CONTINUE TO BE PRIORITIZED
	PROJECT PROVIDES A CONNECTION ACROSS A ROADWAY WITH 6 OR MORE LANES OR A RAILROAD TRACK	100 THE CROSSING OF A MAJOR INTERSECTION OR RAILROAD ALONG AN OTHERWISE LOW-STRESS BIKEWAY CAN MAKE THE ENTIRE TRIP FEEL UNCOMFORTABLE AND UNSAFE. PROJECTS THAT ADDRESS THESE BARRIERS HELP TO MOVE FORWARD A CONNECTED, LOW-STRESS NETWORK
	PROJECT PROVIDES A CONNECTION ACROSS A 4- OR 5-LANE ROADWAY	60
30% CONNECTIVITY 	PROJECT LATENT DEMAND SCORE	1 - 100 COMPOSITE LAND USE SCORE BASED ON DISTANCE FROM SUNRAIL STATIONS AND TRANSIT STOPS, SCHOOLS, COLLEGES, AND UNIVERSITIES, CITY LANDMARKS, THE CENTRAL BUSINESS DISTRICT, EMPLOYMENT CENTERS, AND POINTS OF INTEREST; POPULATION AND EMPLOYMENT DENSITY; POPULATION AND EMPLOYMENT RATIO; AND THE COMPOSITE EQUITY SCORE
	PROJECT COMPLETES A GAP BETWEEN EXISTING BIKEWAYS	100 PRIORITIZE NEAR-TERM OPPORTUNITIES TO CLOSE GAPS IN THE NETWORK
	PROJECT COMPLETES A GAP BETWEEN PLANNED BIKEWAYS	50
20% EQUITY 	SOCIO-ECONOMIC EQUITY TARGET AREA	70 BASED ON THE EQUITY ANALYSES DESCRIBED IN CHAPTER 1, THESE AREAS HAVE HIGHER PERCENTAGES OF PEOPLE RIDING BIKES AND FEWER EXISTING BIKE FACILITIES
	BIKEWAY UNDER-INVESTMENT AREA	70
20% SAFETY 	PROJECT IS WITHIN A HIGH CRASH SEGMENT, INTERSECTION OR VISION ZERO HIGH INJURY NETWORK	100 BASED ON THE SAFETY ANALYSES DESCRIBED ON PAGE 90 AND THE HIGH INJURY BIKE NETWORK IDENTIFIED IN THE VISION ZERO ACTION PLAN

More information on the latent demand scores are provided in Appendix G.

Project evaluation scores are included in Appendix H.

community feedback: results of the Bicycle Plan Update online survey

Online survey responses indicate that the community views upgrading existing facilities to have more separation, as well as improving connections through neighborhood bicycle boulevards as slightly more important than expanding the trail network.

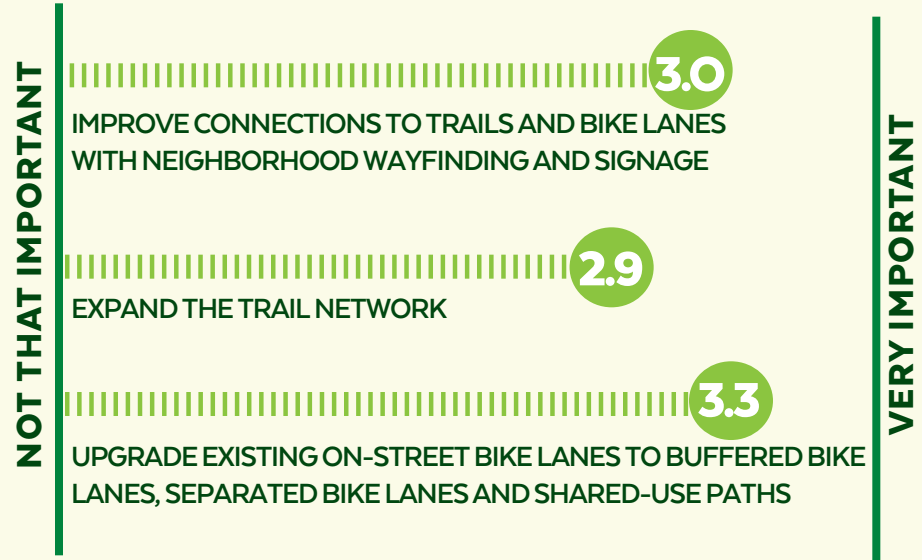
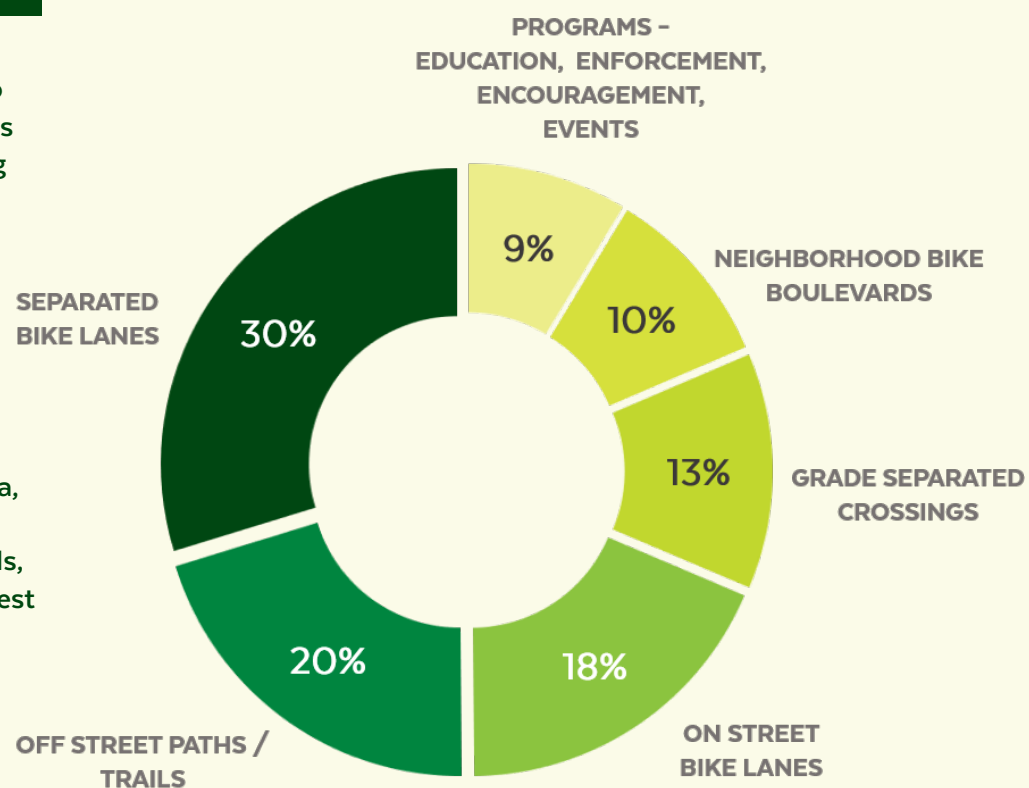
community feedback: “fund your priorities” money box exercise

Attendees of the public meetings were given \$100 in play money (two \$20s, four \$10s, four \$5s) to place as they wished into boxes representing different funding options.

The breakdown of results is represented in the graph below and shows a preference for 50% of funding to go towards separated bike lanes or shared-use paths.

There were slight differences in preference based on geographic area, with the open house in Lake Nona seeing a stronger preference for trails, while the open house in the southwest part of the city saw a stronger preference for grade separated crossings and the downtown open house seeing a stronger preference for neighborhood bike boulevards.

These preferences were considered when developing the 2030 priority network, with the majority of the funding allocated to separated bike lanes and trails.



NEIGHBORHOOD BICYCLE BOULEVARDS

ENHANCING EXISTING SIGNED ROUTES

As part of the 2030 priority network, the city should prioritize investments in existing signed routes on low-volume low-speed streets in order to provide a consistent neighborhood bicycle boulevard treatment citywide through signage, pavement markings (such as sharrows) and traffic calming features (such as speed tables and traffic circles). These projects are relatively inexpensive and simple to implement, as they do not require dedicated space for bicyclists, but provide significant value in emphasizing bicycle use of low-stress street environments.

The 2030 priority project list includes improvements to the 35 miles of existing signed routes along low-volume, low-speed neighborhood streets. The 18 miles of existing signed routes which do not meet the threshold for a neighborhood bicycle boulevard are proposed to be upgraded to a more separated facility type. When feasible, these improvements should be planned and implemented in combination with other intersecting bikeway projects, such as new buffered bike lanes, separated bike lanes, or shared-use paths.

PROPOSED: 35 MILES

COST: \$2,900,000

NEW NEIGHBORHOOD BICYCLE BOULEVARDS

The visionary bikeway network also includes approximately 68 miles of new neighborhood bicycle boulevards along low-volume, low-speed neighborhood streets that are not currently part of the bikeway network. These additional neighborhood bicycle boulevards provide relatively inexpensive and simple to implement low-stress connections between the existing and planned bikeway and trail system, and can function as an alternative to a more long-term direct connection along higher volume and higher speed roadways. Providing consistent signage and pavement markings along these routes can help to close gaps in the citywide network in the near-term.

Ten proposed neighborhood bicycle boulevard projects (approximately 13 miles) are included in the 2030 priority project list (priority scores greater than 56).

PROPOSED: 13 MILES

COST: \$1,079,000



**BIKE LANES
(BUFFERED PREFERRED)**

**UPGRADE EXISTING SIGNED
ROUTES TO BIKE LANES**

Existing signed routes which do not meet the threshold for a neighborhood bicycle boulevard are proposed to be upgraded to a more separated facility type. Ten miles of existing signed routes are identified in the visionary bikeway network to be upgraded to buffered bicycle lanes.

In an effort to eliminate the unclear ‘signed route’ designation from Orlando’s bikeway network, the 2030 priority project list includes improvements for all ten miles.

PROPOSED: 10 MILES

COST: \$410,000

NEW BUFFERED BIKE LANES

The visionary bikeway network also identifies approximately 48 miles of new buffered bike lanes along streets that are not currently part of the bikeway network.

Five proposed buffered bike lanes (approximately 7 miles) have priority scores between 58 - 84 and are included in the priority project list.

PROPOSED: 7 MILES

COST: \$287,000

**SEPARATED BIKE LANES AND
SHARED-USE PATHS**

**UPGRADE EXISTING SIGNED ROUTES TO
SEPARATED BIKE LANES OR SHARED USE PATHS**

Approximately 8.5 miles of existing signed routes are identified in the visionary bikeway network to be upgraded to separated bike lanes or shared-use paths.

The 2030 priority project list includes the highest priority score project meeting this description (approximately 0.6 miles). Other projects meeting this description have relatively low priority scores, so are not included in the priority project list.

PROPOSED: 0.6 MILES

COST: \$590,000

**UPGRADE EXISTING BIKE LANES TO SEPARATED
BIKE LANES OR SHARED-USE PATHS**

Existing bike lanes on high-volume, high-speed roadways are proposed to be upgraded to a more separated facility type. Approximately 62 miles of existing bike lanes are identified in the visionary bikeway network to be upgraded to separated bike lanes or shared-use paths.

Nine of these projects (approximately 14 miles) are included in the 2030 priority project list.

PROPOSED: 14 MILES

COST: \$13,762,000

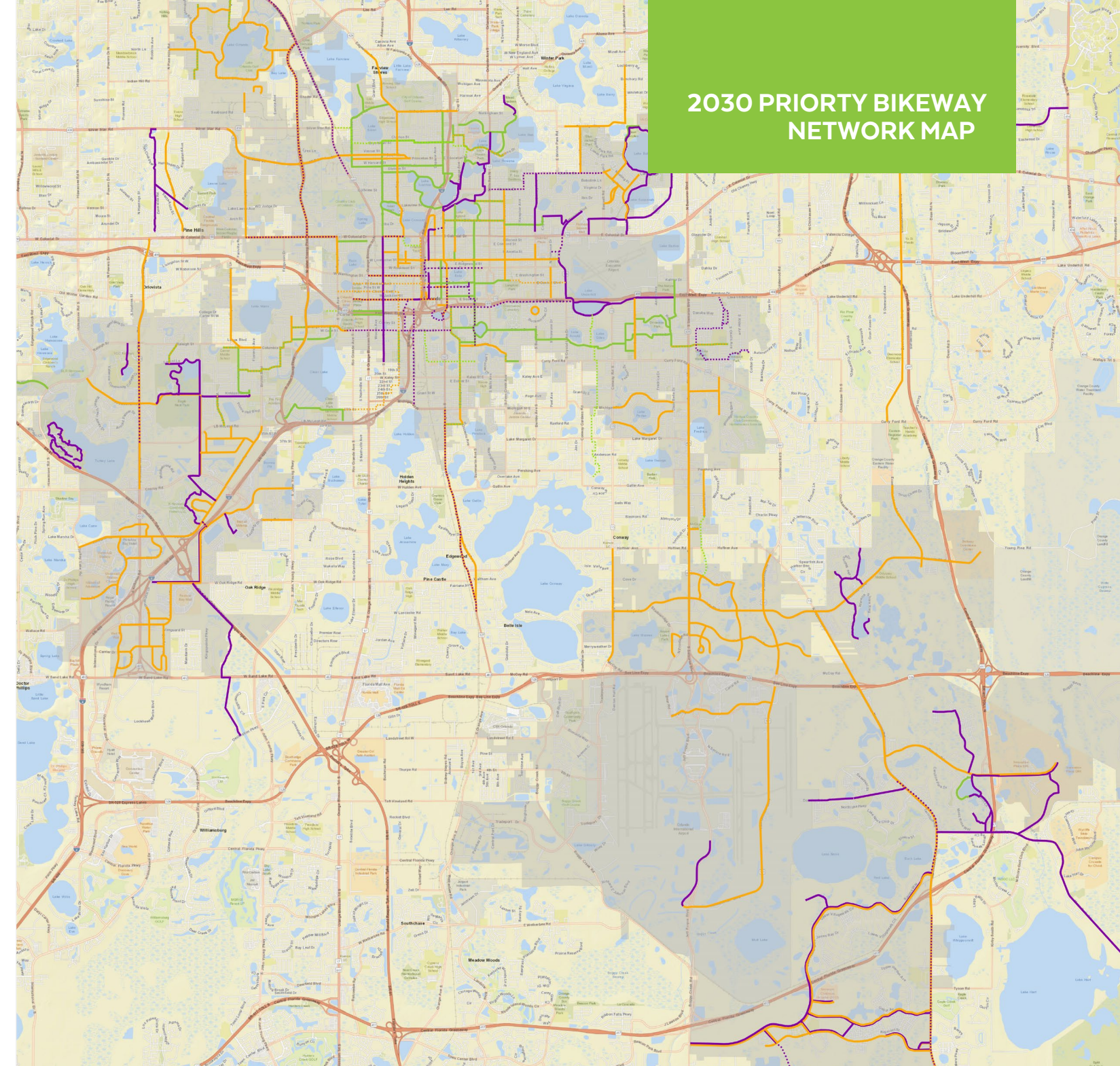
**NEW SEPARATED BIKE LANES
OR SHARED-USE PATHS**

Additionally, the visionary bikeway network identifies approximately 437 miles of new separated bike lanes or shared-use paths.

14 proposed projects (approximately 15 miles) with priority scores between 69 - 88 are included in the priority project list.

PROPOSED: 15 MILES

COST: \$14,745,000




**2030 PRIORITY BIKEWAY
NETWORK MAP**

LEGEND

EXISTING

-  SIGNED ROUTES
-  ON-STREET BIKE LANES
-  OFF-STREET PATHS / TRAILS
-  PROGRAMMED SEPARATED BIKE LANES OR SHARED USE PATHS

PROPOSED

-  NEIGHBORHOOD BICYCLE BOULEVARDS
-  BIKE LANES (BUFFERED PREFERRED)
-  SEPARATED BIKE LANES OR SHARED USE PATHS

PRIORITY PROJECTS LIST*

ID	STREET / ROUTE	FROM	TO	LENGTH	PRIORITY SCORE
NEW SEPARATED BIKE LANES OR SHARED USE PATHS					
547	Corrine Dr	Mills Ave	Forest Ave	0.65 mi	88
234	Division Ave	Gore St	Anderson St	0.4 mi	87
510	Corrine Dr	Forest Ave	Bennett Rd	1.45 mi	85
561	Orange Blossom Trl	Lake Lawne Trl	Cinderlane Pkwy	3.4 mi	85
617	Robinson St	Gertrude's Walk	Mills Ave	0.95 mi	78
171	Gore St	Orange Center Blvd	Delaney Ave	1.75 mi	78
212	Engelwood Trail	Avalon Trail	Lake Underhill Trail	2.8 mi	78
317	Millenia Blvd I-4 Trail Connection	Radebaugh Way	Vineland Rd	0.7 mi	76
589	Washington St	Orange Blossom Trl	Gertrude's Walk	1.0 mi	73
585	Lucerne Cir	Orange Ave	Orange Ave (loop)	0.5 mi	69
NEW BUFFERED BIKE LANES					
498	Parramore Connector Route	28th St	Orlando Urban Trail	2.8 mi	75
173	Hughey Ave	Church St	Colonial Dr	0.9 mi	74
174	Central Blvd	Rio Grande Ave	Gertrude's Walk	1.25 mi	71
574	Church St	Tampa Ave	Parramore Ave	1.0 mi	65
342	Central Blvd	Celia Ln	Crystal Lake Dr	0.95 mi	58
NEW NEIGHBORHOOD BICYCLE BOULEVARDS					
235	North College Park Connector	Taft Ave	Lake Formosa Dr	2.8 mi	84
571	Airport North On-Street Connector	McCoy Rd	Avalon Trail	1.25 mi	79
623	Danube Way	Engelwood Trail	Romano Ave	0.9 mi	71
616	Robinson St	Mills Ave	Bumby Ave	1.3 mi	68
624	Shine Ave	Livingston Ave	Virginia Ave	1.5 mi	66
621	Eola Dr	Jackson St	Robinson St	0.3 mi	63
177	Concord St	Colonial Dr	Hughey Ave	0.4 mi	59
338	Sligh Blvd	Gore St	Summerlin Ave	1.3 mi	58
359	Long St	Sunset Dr	Tampa Ave	0.2 mi	57
222	Conway N-S On-Street Connector	McCoy Rd	Lake Underhill Rd	3.1 mi	57

*Projects shown within this list were ranked based on evaluation criteria and are subject to change at the discretion of the Transportation Department. This list was created to provide guidance to City staff and priorities will be reevaluated based on funding options, grants, and needs assessments.

ID	STREET / ROUTE	FROM	TO	LENGTH	PRIORITY SCORE
UPGRADE EXISTING SIGNED ROUTES TO SEPARATED BIKE LANES OR SHARED USE PATHS					
53	Summerlin Ave	Briercliff Dr	Anderson St	0.6 mi	53
UPGRADE EXISTING BIKE LANES TO SEPARATED BIKE LANES OR SHARED USE PATHS					
20	South St	Hughey Ave	Orange Ave	0.25 mi	64
22	Rosalind Ave	Lucerne Cir	Washington St	0.7 mi	56
29	South St	Rio Grande Ave	Division Ave	1.0 mi	54
42	John Young Pkwy	Colonial Dr	Orange Blossom Trl	3.25 mi	54
5	Colonial Dr	Westmoreland Dr	Edgewater Dr	0.35 mi	51
40	Orange Ave*	Locust Ave	Michigan St	3.35 mi	49
27	Radebaugh Way	Millenia Blvd	Vineland Rd	0.1 mi	48
16	Colonial Dr	Mercy Dr	Tampa Ave	1.5 mi	47
519	Narcoossee Rd	Boggy Creek Rd	Lee Vista Blvd	3.5 mi	47
UPGRADE EXISTING SIGNED ROUTES TO BIKE LANES					
96	King St	Dade Ave	Lake Shore Dr	1.25 mi	61
89	Orange Center Blvd	Goldwyn Ave	John Young Pkwy	0.25 mi	49
98	Nimons St / Mable Butler Ave	Aaron Ave	Goldwyn Ave	1.3 mi	47
52	Delaney Ave	Michigan St	Anderson St	1.7 mi	35
50	Romano Ave	La Costa Dr	Lake Underhill Rd	1.0 mi	32
82	Columbia St	Campanella Ave	Aaron Ave	0.25 mi	29
63	Pineloch St	Orange Ave	Osceola Ave	0.3 mi	29
71	Poppy Ave	Poppy Park	Raleigh St	0.35 mi	29
65	Signal Hill Rd	Donovan St	North Ln	0.5 mi	29
90	Signal Hill Rd	Point LookOut Rd	End of Street	0.07 mi	28
72	Willie Mays Pkwy	LB McLeod Rd	Kirkland Blvd	0.5 mi	27
80	Long Rd	Lake Orlando Pkwy	Teresa Rd	0.6 mi	23
91	Lake Highland Ave	Ferris Ave	Ferncreek Ave	0.5 mi	22
79	Marks St	Magnolia Ave	Ferncreek Ave	1.0 mi	22
60	Ferncreek Ave	Lancaster Dr	Briercliff Dr	0.1 mi	16
ENHANCE EXISTING SIGNED ROUTES TO NEIGHBORHOOD BICYCLE BOULEVARDS					
All existing signed routes not identified as a more separated facility (see map)				35 mi	n/a

*Bike network improvements within the Downtown South business district should be closely coordinated with the ongoing work on the Downtown South Neighborhood Improvement District Plan, Downtown South Complete Streets Plan, and the Pulse Museum/Survivor Walk improvements



THE BUSINESS CASE

The continued improvement and expansion of the bikeway network will not only benefit those biking in the city today, but also Orlando's future residents.

More people will choose to bike as low-stress bikeways become accessible to different neighborhoods across the city, and bicycle trips may grow in length and frequency. An economic analysis was completed to project monetized economic benefits of continued bikeway investments for three factors:

- Recreation
- Health
- Reduced Auto Use

The analysis is far from a complete cost/benefit analysis; further benefits and impacts not specifically quantified in the analysis include safety savings, environmental savings, economic growth and higher property values.

This analysis compared a snapshot of 2030 benefits, with and without progress towards the visionary bikeway network, to derive the additional value these investments provide to the city.

Estimates were developed using:

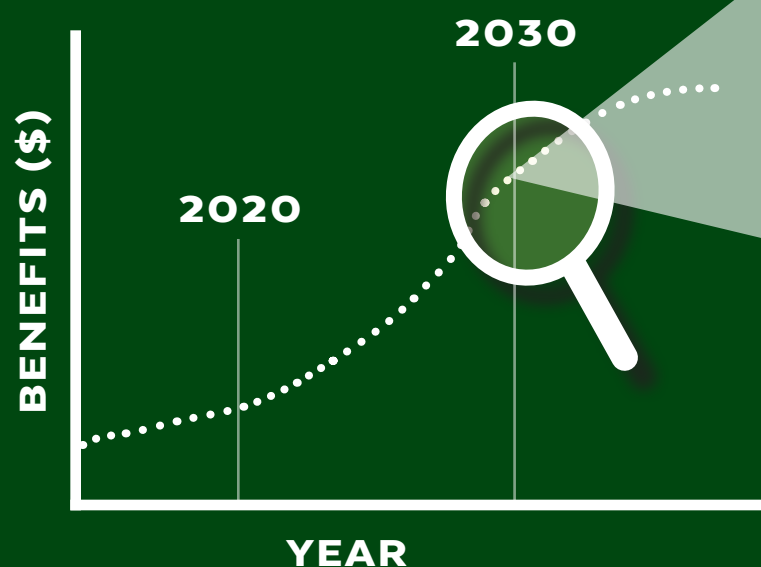
- projections for the number of bicyclists based on population growth, 2019 city trail counts and bike share user data
- frequency and types of bicycle trips based on the Bicycle Plan Update online survey, as well as findings from an Orlando Urban Trail field survey (completed in May, 2019)
- parameters to quantify benefits into monetary values (2018 \$s) based on the methodologies described in the National Cooperative Highway Research Report Program (NCHRP) Report 552: Guidelines for Analysis of Investments in Bicycle Facilities methodology

Even with this conservative estimate, the monetized annual benefits to health, recreation and reduced auto use quantified in this analysis are projected to amount to **+\$4.4 million (in constant 2018 dollars) for the 2030 calendar year.**

Assuming other things equal, including no additional increase in bikeway network or cycling frequency, a simplified estimate places the aggregate value of the monetized benefits over the subsequent 20 year period (2030 - 2049) at **+\$87 million.**

This simplified estimate does not take into account the additional magnitude of benefits from health, recreation and reduced auto use that would continue to grow as the volumes of cycling and network expands in future years, nor does it account for the incremental benefits as the network expands between 2020 and 2030.

See Appendix I for more information.



Year 2030 where the priority bike network has been constructed would experience...



...compared to year 2030 with no improvements

NEXT STEPS



- ❑ REFINE THE PROJECTS WITHIN THE PRIORITY NETWORK BASED ON THE PROJECT IMPLEMENTATION STRATEGY OUTLINED ON PAGE 98.
- ❑ IDENTIFY AND PRIORITIZE AREAS FOR MORE SPECIFIC BIKE INFRASTRUCTURE FEASIBILITY STUDIES. POTENTIAL AREAS FOR STUDY INCLUDE THE MAIN STREET DISTRICTS (SIMILAR TO THE MILLS 50 AND MILK DISTRICT BICYCLE AND PEDESTRIAN STUDY PREVIOUSLY COMPLETED), OR SPECIFIC NEIGHBORHOODS (FOR EXAMPLE, DELANEY PARK, WHICH LACKS GOOD LOW-STRESS BIKE CONNECTIVITY INTO THE CENTRAL BUSINESS DISTRICT, OR ROSEMONT, THE LOCATION OF THE NORTH LANE / LAKE ORLANDO LOOP DEMONSTRATION PROJECT AND A TARGETED OUTREACH AREA BASED ON IT'S COMPOSITE EQUITY SCORE).
- ❑ REFERENCE THE PLANNED BIKEWAY NETWORK AND EVALUATION SCORES DURING CAPITAL IMPROVEMENT WORK PROGRAMMING TO CONFIRM THAT PROJECTS BEING ADVANCED ARE CONSISTENT WITH THE GOALS AND OBJECTIVES OF THE BICYCLE PLAN.
- ❑ IDENTIFY AND AGGRESIVELY PURSUE ADDITIONAL FUNDING SOURCES, GRANTS, PARTNERSHIPS AND OTHER AVENUES TO ADVANCE THE PRIORITY LIST OF PROJECTS.
- ❑ KEEP CITY GIS FILES OF EXISTING BIKE INFRASTRUCTURE, AS WELL AS OTHER SUPPORTING TRANSPORTATION-RELATED DATA (POSTED SPEEDS, NUMBER OF LANES, CROSSING LOCATIONS, ETC.), UP TO DATE.
- ❑ TARGET AT LEAST A MINOR UPDATE TO THE BICYCLE PLAN EVERY FIVE YEARS, AND A MAJOR UPDATE TO THE PLAN EVERY TEN YEARS.

community feedback:
comments on the
draft Bicycle Plan

I FULLY SUPPORT THESE PROJECTS. I LOOK FORWARD TO BEING ABLE TO BIKE ALL AROUND DOWNTOWN ORLANDO. I HOPE TO ONE DAY BE ABLE TO COMMUTE TO WORK VIA BIKE AND FOR MY DAUGHTER TO HAVE SAFE, SEPARATED BICYCLE FACILITIES TO USE IN HER EVERYDAY LIFE. THANK YOU AND KEEP UP THE GOOD WORK!

ONE-WAY SEPARATED BIKE LANE DESIGN & RAISED INTERSECTIONS ARE A GOOD IDEA FOR ALL BIKE TRAILS. PRIORITIZE SAFETY OVER TRAFFIC.

I APPRECIATE THE CITY'S DEDICATION TO A PROGRESSIVE PROGRAM WHICH PROMOTES HEALTH & SUSTAINABILITY

ALL PROJECTS ARE EXCITING FOR US AND MUCH NEEDED. SEPARATED BIKE LANES AND CONNECTED BIKE INFRASTRUCTURE WOULD ALLOW US TO GET RID OF OUR CARS AND UTILIZE BIKES FOR ALL TRANSPORTATION.



Colonial Drive Overpass, Orlando Urban Trail

chapter 3 | recommendations & strategies to support a culture of bicycling

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PLAN PERFORMANCE MEASURES 190





Lake Underhill Path, Orlando Urban Trail

signage & wayfinding

Signage and wayfinding is an efficient way to communicate and highlight on-street bicycle-friendly routes between the city's main trail systems and other bikeways. Wayfinding elements solidify a bicycle route as a unified entity that can be easily identified and traveled. The city has already developed a robust branding, signage and wayfinding plan for the main trail systems. A wayfinding conceptual plan for a proposed bicycle boulevard - the North College Park Connector - demonstrates a proposed wayfinding approach that could be implemented throughout the remaining components of Orlando's bikeway network (i.e. neighborhood connectors, separated bike lanes and on-street bike lanes).

TRAIL SIGNAGE STRATEGY

In conjunction with a recent citywide re-brand, the Office of Communications and Neighborhood Relations has developed a robust branding, signage and wayfinding package to be used to replace the existing signage along the city's main trail system. The proposed changes will provide brand consistency and uniformity for signage along trails citywide.

As part of the ongoing work to complete the Downtown Loop trail system, this plan was used to develop a more detailed implementation strategy for directional, destination, and confirmation trail signs along the Downtown Loop. The strategy focuses on minimizing sign clutter and limiting destinations to those that are easy to reach through existing family-friendly trail infrastructure. Additional destinations and signage can be added over time as the trail and bikeway network expands.

DIRECTIONAL SIGNS

Directional signs will be placed at segment trailheads and at major intersections along the trail segment. These signs may also include a regional trail map. The name of the regional trail network will be included at the top of the sign, with the name of the segment following.

Three destinations will be listed below, with the first destination the trail segment terminus.



Destinations should be determined based on their importance in the community - public facilities such as schools, hospitals, parks and other trails; activity and cultural hubs - such as museums and main street districts; and intermodal connections such as SunRail stations. Proximate distances and directional arrows will also be included.

ON-TRAIL DESTINATION SIGNS

On-trail destination signs are intended to direct bicyclists and pedestrians over short distances to the closest destination located directly along the current trail segment. These signs confirm the regional trail name, the trail segment and the relative location to the bicyclist or pedestrian, and include the proximity of the nearest destination.

On-trail destination signs should be placed within 0.0 to 0.2 miles of the destination for all on-trail destinations.



OFF-TRAIL DESTINATION SIGNS



Off-trail destinations direct the user to exit the current trail segment and take another trail, bikeway or sidewalk to reach nearby destinations. Destinations should only be signed if the off-trail route is bicycle- and pedestrian-friendly, and preferably continues wayfinding messaging to reach the signed destination.

CONFIRMATION SIGNS

Confirmation signs aim to highlight the trail identity and confirm to pedestrians and bicyclists that they are using the correct route. Confirmation signs should be placed approximately every 0.5 miles. Distance may vary according to site specific conditions, such as existence of other signs. Pole wraps are preferred in place of stand-alone signs to limit sign clutter.



NEXT STEP



- FINALIZE AND FORMALIZE THE WAYFINDING AND SIGNAGE STANDARDS FOR SHARED-USE PATHS. A FRAMEWORK AND GUIDANCE FOR CITYWIDE WAYFINDING AND SIGNAGE FOR ON-STREET FACILITIES IS PROVIDED IN THIS PLAN, BUT THE CITY IN THE PROCESS OF UPDATING SIGN STANDARDS RELATED TO SHARED-USE PATHS.

SUPPLEMENTAL BIKEWAY WAYFINDING STRATEGY

The following outlines a proposed approach for supplemental wayfinding for bikeways off of the main trail system. An example of this approach is detailed for the North College Park Connector Bicycle Boulevard in the following section.

SIGNAGE

The Manual on Uniform Traffic Control Devices (MUTCD) allows for the addition of a pictograph or text to identify an associated route or agency that has jurisdiction over a route. The city should utilize its new fountain logo and bike symbol on all bikeway signage to identify that these routes are within the City of Orlando.

Three signage types are recommended:

TURNING SIGNS:

used when the bike route physically changes direction a the cyclist needs to be informed of a turn.



CONFIRMATION

SIGNS:

used when the trail does not turn or cross a key decision point for a distance greater than 0.5 miles. They help cyclists confirm they are on the bike route, especially in the absence of other signage.



DECISION SIGNS:

used to inform a cyclist how far, in what direction, and how long it will take to reach a certain destination.



The following methodology was used to determine the destinations to include on decision signs:

- distances to destinations should be limited to 2.5 miles (15 minutes for an average cyclist at 10 mph)
- wayfinding messaging should be limited to 3 options per sign in order to limit visual clutter which could possibly slow the cyclist's ability to make a decision.
- destination signs should be attached separately from the standard bike route signs to allow them to be updated, added, or removed

Destinations should be determined based on their importance in the community. This can include public facilities such as schools, hospitals, parks, and connections to other trails; activity and cultural hubs, such as museums and main street districts; and intermodal transportation connections such as SunRail stations.

Pavement Arrow

PAVEMENT TREATMENTS

Branded or coordinated pavement treatments can provide wayfinding along a bike route:

BRANDED CROSSWALKS: Colored or decorated crossings indicate to the cyclist that the bike route continues across a pedestrian crosswalk or intersection. They can be stamped, painted, or bricked to achieve different effects.

PAVEMENT ARROWS: Shared lane markings, or sharrows (two chevrons above a bicycle symbol) should be used along bike routes to signal to both bicyclists and motorists that shared use is to be expected. Symbols or arrows painted on the pavement can also be used to highlight the direction of a particular route.

COLORED LANES: Colored lanes or patterns that a cyclist can easily and quickly recognize as a bike route.



NEXT STEPS



- FORMALIZE GUIDANCE ON THE CONVENTIONS FOR NAMING TRAILS AND BIKEWAYS WITHIN THE NETWORK, INCLUDING THOSE THAT MAY HAVE SUB-NAMES, E.G., THE DINKY LINE OR GERTRUDE'S WALK, WHICH ARE PART OF THE LARGER ORLANDO URBAN TRAIL, ALONG WITH GUIDANCE DOCUMENTS MATCHING CONSISTENCY OF SUPPLEMENTAL SIGNS TO MARK RECREATIONAL LOOPS OR ROUTES.
- IDENTIFY A SET OF BICYCLE BOULEVARDS, SUCH AS THE TOP FIVE OR TOP TEN ROUTES, TO MOVE INTO RAPID IMPLEMENTATION IMMEDIATELY FOLLOWING PLAN ADOPTION. DEVELOP SPECIFIC PLANS TO INCLUDE WAYFINDING SIGNS, ALONG WITH SUPPLEMENTAL PAVEMENT MARKINGS AND TRAFFIC CALMING DEVICES. ADDITIONALLY, IDENTIFY AND EVALUATE KEY BUSY INTERSECTIONS ALONG ROUTES FOR POTENTIAL NEW OR ENHANCED TRAFFIC CONTROL DEVICES, SUCH AS RRFBS, PEDESTRIAN HYBRID BEACONS, HALF SIGNALS, ETC.

DEMONSTRATION PROJECT

PROJECT SNAPSHOT

PROJECT NAME: NORTH COLLEGE PARK CONNECTOR
PROJECT TYPE: NEIGHBORHOOD BICYCLE BOULEVARD
PROJECT LIMITS: ORANGE BLOSSOM TRAIL TO ORLANDO URBAN TRAIL
PROJECT LENGTH: 3.1 MILES
EXISTING CONTEXT:

- GENERALLY LOW-VOLUME AND LOW-SPEED STREETS
- HIGHEST PRIORITY SCORING ON-STREET BIKE BOULEVARD PROJECT
- SIGNED BIKE ROUTE ALONG SHARED STREETS (NO BIKE LANES)
- SUPPORT FOR PROJECT DURING COMMUNITY OUTREACH

NETWORK CONNECTIVITY:

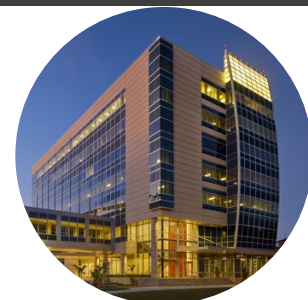
- CONNECTS THE WEST SIDE OF COLLEGE PARK NEAR ORANGE BLOSSOM TRAIL TO THE EAST SIDE OF I-4 NEAR LOCH HAVEN PARK WHERE IT CONNECTS TO THE ORLANDO URBAN TRAIL

ESTIMATED COST: \$28,000

DISCUSSION

The North College Park Connector connects the west side of College Park, near Orange Blossom Trail, to the east side of I-4, near Loch Haven Park, where it connects into the Orlando Urban Trail. This route was initially identified as part of the 2014 Primary Bike Routes Study, and was chosen as a demonstration project based on its priority score and community input to improve connectivity between College Park and the Central Business District.

MAJOR DESTINATIONS ALONG THE ROUTE



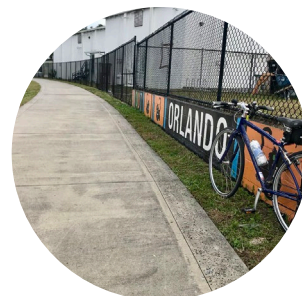
ADVENT HEALTH



ORLANDO SCIENCE CENTER



SUNRAIL STATION



ORLANDO URBAN TRAIL

NORTH COLLEGE PARK NEIGHBORHOOD BICYCLE BOULEVARD SIGNAGE CONCEPT

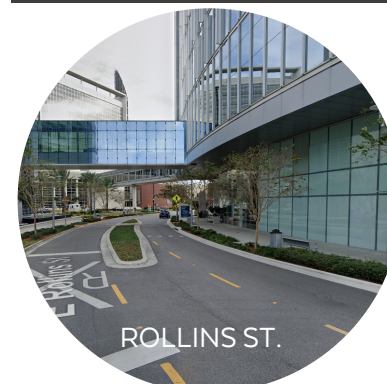
STUDY AREA MAP



EXISTING SIGNAGE

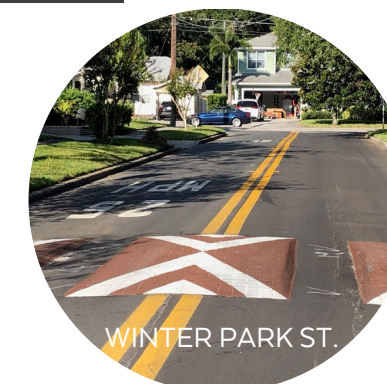
Existing signage includes directions to different bike routes, signs for shared roadways, and turn signs to indicate the direction of the trail. There are at least four different styles of signs, many quite outdated. While there is a lot of signage, there is no consistent imagery or symbols, making it confusing to the user. Some of the signs on the route have also been vandalized, show signs of extreme wear, or are currently obstructed from view by vegetation or utilities.

EXISTING TRAFFIC CALMING FEATURES



ROLLINS ST.

CHICANING & NARROWING
 Extending the curb and narrowing the road at the hospital creates a pinch point in the traffic network which greatly slows drivers while allowing others freedom of movement.



WINTER PARK ST.

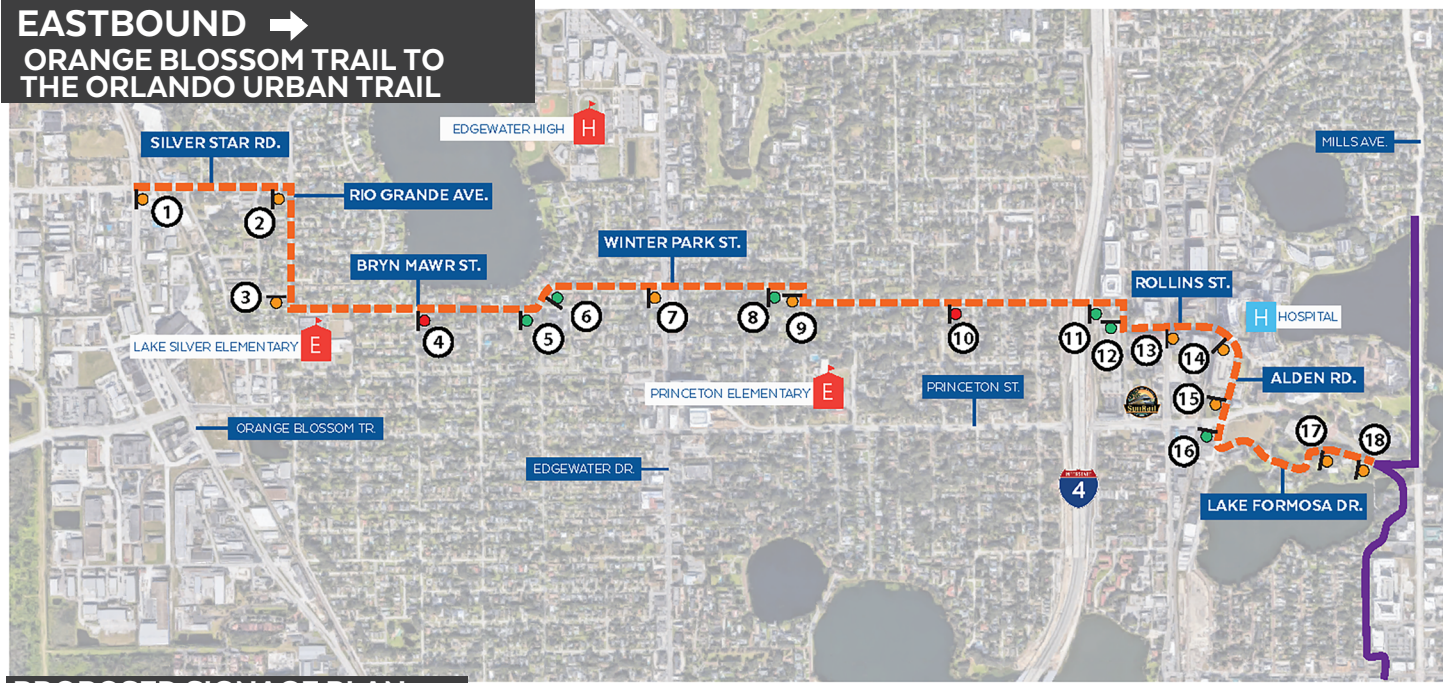
SPEED CUSHIONS
 These recently added cushions are better than speed humps since they have gaps which allow cyclists to pass through without slowing and emergency vehicles to straddle them.



BRYN MAWR ST.

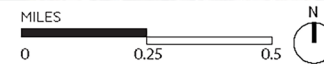
MINI-ROUNDBABOUTS
 This smaller roundabout helps break up a long straight road within a neighborhood that was prone to speeding on Bryn Mawr Street.

EASTBOUND →
**ORANGE BLOSSOM TRAIL TO
THE ORLANDO URBAN TRAIL**



PROPOSED SIGNAGE PLAN

- EXISTING ORLANDO URBAN TRAIL
- PROPOSED ON STREET BICYCLE BOULEVARD
- TURNING SIGNS
- SCHOOL
- HOSPITAL
- CONFIRMATION SIGNS
- SUNRAIL STATION
- DECISION SIGNS

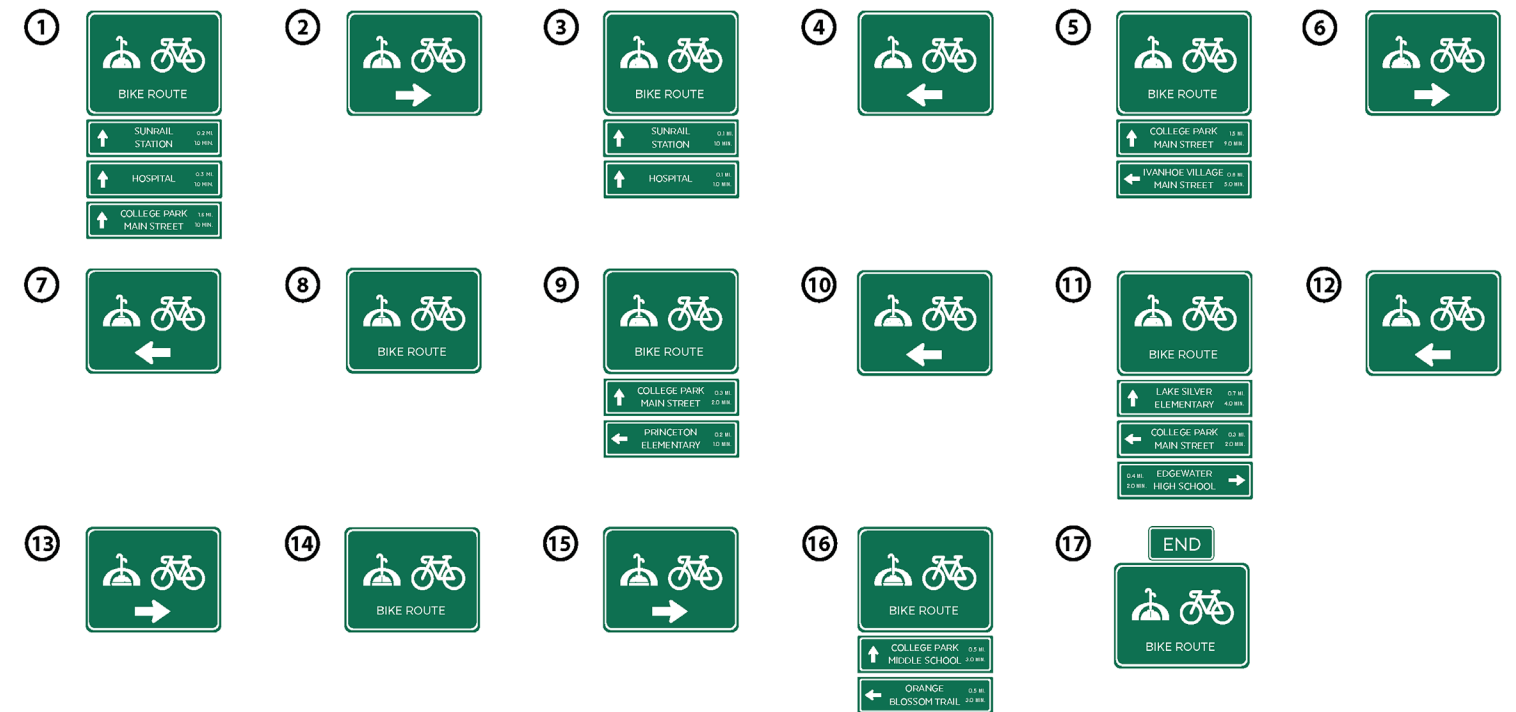


← WESTBOUND
**THE ORLANDO URBAN TRAIL TO
ORANGE BLOSSOM TRAIL**



PROPOSED SIGNAGE PLAN

- EXISTING ORLANDO URBAN TRAIL
- PROPOSED ON STREET BICYCLE BOULEVARD
- TURNING SIGNS
- SCHOOL
- HOSPITAL
- CONFIRMATION SIGNS
- SUNRAIL STATION
- DECISION SIGNS





Public Bike Rack, The Milk District (2019)

end-of-trip facilities

End-of-trip facilities are critical for a high-quality, high-functioning bike culture where bikes are used for everyday trips including errands and commuting. The most common and fundamental end-of-trip facility is secure bike parking. Having adequate bike parking can encourage people to ride to common destinations, reduce theft and reduce damage to trees or street furniture from informal bike parking. Other types of amenities such as lockers and showers can improve the experience of people bicycling and address common obstacles to bicycling for everyday transportation.

BICYCLE PARKING RECOMMENDATIONS

PUBLIC BIKE PARKING

CURRENT PROGRAMS

The City of Orlando currently has programs to expand the availability of bike parking and amenities. Chief among these is the bike rack request program which enables businesses to request bike racks in the public right of way adjacent to their businesses. In addition, the city has installed three bike parking corrals, six bike repair stations and encourages bike valet parking during community festivals and sporting events. One relatively new bicycle parking challenge is dockless bike share. In addition to traditional bicycle parking, the city has installed some parking pads and designated parking areas specifically for dockless bikeshare.

RECOMMENDATIONS

EXPAND THE BIKE RACK REQUEST PROGRAM

Currently the bike rack request program is focused on businesses that are interested in bike parking to increase accessibility to their stores. However, store owners may not be bike users or may not be aware of how their patrons arrive. The city should consider expanding the program to crowdsource recommendations from bike users.

The City of Cambridge, MA solicits bike rack requests using the 'SeeClickFix' application. New York City solicits feedback on suggested rack locations as well as reporting of damaged racks or abandoned bikes through online forms.

CREATE AN ONLINE PUBLIC BIKE PARKING MAP

Providing accessible information on available bike parking can assist potential riders in trip planning. In addition, having a mapped inventory of public bike parking can help staff to identify areas that are deficient.

For examples of public bike parking maps see Portland, OR and Cambridge, MA.

EXPLICITLY PERMIT LOCKING OF BIKES TO PUBLIC SIGNAGE

It will take time to increase public bike parking to adequate levels. In the meantime, bike users will continue to use informal bike parking locations. The city should consider being explicit about what public locations and installations are appropriate for informal bike parking and which are inappropriate.

If such a clear standard is adopted it is also important to educate the bicycling community about such standards. One downside of parking to street signs is that some street signs are not secured to ground creating the potential for theft by removal of the sign; this should be noted in educational materials.

The City of Cambridge is an example of a city ordinance that lists in plain language where informal bike parking is permissible and where it is not permissible.

Bikes are permitted to park against a building, street sign pole (except any street sign pole that designates a disability/handicap parking space), or on a bike rack or other facility specifically intended for that purpose.

Bikes are not permitted to be parked to fire hydrants, hand railings, benches, trees, trash receptacles and parking meters or any sign pole, light pole and utility pole that has a sign designating a disability/handicap parking space.

**INCLUDE BIKE PARKING IN
STREETSCAPE, RESURFACING
AND SIDEWALK PROJECTS**

When a new design for streetscaping is considered, particularly along commercial corridors, bike parking should be included in the design scope. Potential impacts on informal bike parking should also be considered when changes are made to the design of other streetscape infrastructure. For instance, decorative sign poles, which are often larger in diameter than conventional sign poles, may be too large to accommodate a U-Lock. If this type of change is proposed, the design may be reconsidered, augmented, or additional bike parking can be added to compensate for the loss. Streetscaping projects that include on-street parking provide an opportunity to consider additional bike corrals.

**COORDINATE WITH OTHER CITY
DEPARTMENTS AND OTHER PUBLIC ENTITIES**

It is important that the city set an example for the private sector by providing modern and adequate bike parking at city buildings and public spaces.

The city should strive to replace or supplement bike racks which do not meet the current standards on design and placement. There are many different governmental and quasi-governmental entities operating within the city limits. While private businesses with out-of-date facilities may be reluctant to invest in bike infrastructure if not required by ordinance, the city may find more willing partners in other public agencies such as Orange County, OCPS, LYNX, SunRail, Orange County Courthouse and venues which the city sponsors or partners with. Encouraging these agencies to add or update bike parking, signage, security and policies will help provide a more consistent and supportive experience for city residents who bike.

TRACK BIKE THEFTS

In order to track the adequacy and security of bike parking, it may be helpful to partner with the Orlando Police Department to track bike thefts over time. This can help identify evolving needs as Orlando's bike culture matures including areas with insufficient parking, education on locking habits and styles and the need for a registration program. It will be helpful to have some standardization of reporting such as estimated time of day, whether the theft was of parts, accessories or a complete bike, whether the bike was locked (and type of lock) and the location (public property/private property, commercial / residential). It is important to note that bike thefts are likely to increase in frequency as bike use increases; an increase in raw number of thefts may indicate an increase in bicycling rather than an increase in the rate of theft. One frequently reported type of bike theft is the theft of unsecured bikes from single-family properties including carports and porches. Educating residents that they should always lock bikes stored outdoors can help to reduce these types of opportunistic thefts.

**PROVIDE EDUCATION
FOR DOCKLESS BICYCLE PARKING**

The city has already begun to identify designated spaces for dockless bicycle parking. The most effective tools for improving outcomes will likely be education and empathy. Given the difficulty in enforcement, people are unlikely to behave better based on fear of consequences.

The City of Seattle has partnered with local advocates to produce a video encouraging users to "Do The Right Thing" sharing the real experiences of local residents with disabilities in navigating an environment with poorly parked dockless bicycles.

In some areas, the city has supplemented parking areas with additional space designated specifically for dockless bicycles. In commercial and multi-family areas with sufficient sidewalk widths and furniture zones, appropriate places to park dockless bikes are fairly common.

A particularly challenging context to find appropriate places for dockless bike parking is lower-density residential streets which have narrower sidewalks abutted by grass planting areas. The best solution to residential areas is likely to encourage users to park on major corridors and walk the last block home. Ensuring sufficient sidewalk widths and/or parking pads on nearby corridors can help to encourage better behavior but it may still be a challenge to get users to walk longer distances.

**bike parking
basics**

SECURITY

Typically, secure bike parking means a well-designed bike rack with two points of contact. Problems to look out for include unusual designs that do not provide proper support and bike rack tubes too wide to accommodate standard U-Locks. Security can also include alternatives to bike racks such as bike lockers, secure bike rooms or cages, or valet bike parking. Security can be enhanced by cameras or sight lines from a reception area or other staffed locations.

INSTALLATION

Even a well-designed bike rack can be foiled by poor installation. Problems to look out for include: installation too close to walls, curbs, objects or landscaping; installation in the wrong orientation or too close to adjacent bike racks; and lack of secure connection to the pavement.

VISIBILITY

Ideally bike parking should be clearly visible from the main entrance of the establishment. If it is not feasible to have bike parking in this location, directional signage should be provided guiding users from the entrance to the bike parking location. If a building has multiple entrances and/or multiple tenants, this may mean multiple bike parking locations.

ACCESS

Bike parking should be accessible via a clear and comfortable route from nearby sidewalks and/or bikeways. This means a paved access without steps or tight turns. The addition of a curb ramp connecting the street level with sidewalk levels could be included when bike parking is located at sidewalk level.



Dockless Scooter and Bicycle Parking,
Orange Avenue Downtown Orlando

PRIVATE BIKE PARKING

The city requires bike parking as part of new development, substantial improvements, substantial enlargements and when the use of an existing building or structure is changed to another use. In addition, the bike parking requirements were updated in 2019 to provide more detail on correct dimensional requirements and to reference images and best practices from the Association of Pedestrian and Bicycle Professionals. As such, the bike parking requirements are largely up to date with current best practices.

ENCOURAGE OWNERS OF OLDER PROPERTIES TO BRING BIKE PARKING UP TO THE CURRENT STANDARDS

One challenge with bike parking is that, although current regulations require bike parking in most new buildings, older buildings may have out-of-date facilities or lack bike parking altogether.

While ideally these property owners would upgrade facilities voluntarily; the reality is that this is rare resulting in large number of businesses with deficient bike parking. This is a particularly daunting problem in suburban areas where public bike parking is unlikely to provide a satisfactory solution.

A few possibilities exist to improve this situation:

- Encourage businesses, particularly large campuses such as shopping centers, to install up-to-date bike parking through outreach. Identify properties with insufficient or outdated bike parking and provide educational information to owners and property managers on modern bike parking. Education and outreach could be facilitated by a partnership organization like reThink Your Commute.
- Permit property owners to convert a small percentage of existing vehicular parking to bike parking through a modification of standards or a determination.

- Allow business owners to request matching grants for private racks and rack upgrades. Prioritize businesses where public bike parking is not a feasible alternative because sufficient right-of-way is not available or parking lots separate the main entrance from the public right-of-way.
- Provide grants for non-profit organizations wishing to install or update bike parking on their properties where public bike parking is not a feasible alternative.
- When providing education or grants for outdated bike parking, prioritize properties with “schoolyard”/comb or wheelwell type racks because these styles provide little or no secure parking opportunities and property owners may be unaware of the deficiency.

RECONSIDER THE “LONG-STANDING BUILDINGS” EXEMPTION FOR BIKE PARKING

Currently buildings more than 30 years old, which today means buildings built before 1990, are exempt from meeting current parking standards when they make substantial improvements (City Code of Ordinances Sec. 58.1161). While this is likely sensible for vehicular parking which is closely tied to the geometry of the site, bike parking can be added to existing structures at a much lower cost and with smaller space requirements. Older buildings may not be able to become fully compliant with the current bike parking requirements but even the addition of a small number of spaces or the replacement of a dysfunctional rack-type can be a major benefit.

REVISE CONFUSING LANGUAGE ON PRIVATE BIKE PARKING

Currently the language under “Parking a Bike Sec. 10.03a(5)” requires explicit permission from a property owner (satisfied by the installation of a bike rack) for a person to park a bike on a private property. Since most commercial properties are required by current codes to provide bike parking this implies that owners of non-conforming properties that are deficient in provision of bike parking can prohibit or remove bikes from their properties including those of customers and visitors.

For any public accommodation this creates an unreasonable bias against people arriving by bike to locations where motor vehicle parking is often provided free of charge.

In contrast some jurisdictions explicitly require accommodations of bicycles in out-of-date buildings. New York City has created a ‘Bike Access to Office Buildings Law’ which requires office buildings to provide reasonable access for bikes when feasible and requested by a tenant.

ALLOW “ON-STREET” BIKE PARKING

The ordinance 61.333 is currently silent on whether private bike parking requirements can be satisfied within the public right-of-way. In situations where the building entrance is located adjacent to the sidewalk, locating bike parking within the sidewalk often provides the most convenient location for users. Language explicitly permitting parking provided within the public right-of-way to satisfy short-term bike requirements could expand the ability to provide parking at existing buildings.

The city may prefer to accept “payments-in-lieu” and install the parking to better control change in the right-of-way. This approach should only be permitted to satisfy bike parking requirements where the main entrance of the building is located adjacent to the sidewalk without intervening surface parking.

REQUIRE SIGNAGE WHEN NEEDED

It is good practice to require signage when bike parking is not easily visible either because of non-conformance due to site conditions or for longer term or overflow parking.

Sample language from the City of Portland: “If required bike parking is not visible from the street or main building entrance, a sign must be posted at the main building entrance indicating the location of the parking.”

It is also advisable to place signage indicating overflow or additional parking when available, particularly at assembly uses and venues. For instance, signage on short-term bike racks or along typical approach pathways may read “Additional bike parking available ahead/left/in parking garage.”

CONSIDER “INTERMEDIATE-TERM” BIKE PARKING

The city’s bike parking requirements are current with best practices in distinguishing between short and long-term parking. However, some use cases do not fall neatly into long-term or short-term uses. This is particularly applicable to assembly or entertainment uses which often host visitors for between 2 and 4 hours. For these uses, some flexibility of design should be encouraged. Covered parking is preferred. Parking must be easily located by first-time visitors but for longer or larger events visitors may also be willing to park further from the venue entrance. Security is a particular concern for venues which host time-certain events such as performing arts, religious, or sports events; bikes are left unattended for a fixed time period; information that can be easily accessed by potential thieves.



BICYCLE PLAN UPDATE

CHAPTER 3 | END-OF-TRIP FACILITIES

Additional security such as security cameras or a location near staffed desks is advisable. It is worth noting that such venues may have accessory uses that require more traditional short-term parking such as box offices or gift shops. Basic changes to the notes on the “Minimum Number of Bicycle Parking Spaces Required” table to address this are recommended in Appendix J. Additional opportunities for improvement may be identified in the future based on these concepts and this option should be considered if new uses are added to the bicycle parking table.

PLAN FOR BIKES OF DIFFERENT SHAPES AND SIZES

For future updates to the bike parking ordinance, the city may consider the addition of a set-aside in larger parking areas for oversized bikes including recumbent, cargo and family bikes. These bikes have a longer wheelbase or are wider than typical bikes and may obstruct pathways or encounter obstructions if parking in a normal bike parking space.

While it is not efficient to make all bike parking spaces large enough to accommodate these comparatively rare bike types, it may be helpful to reserve a few appropriate spaces for larger bikes in facilities designed to accommodate a large number of bikes. Five percent is a reasonable target for larger facilities. If provided, it is also important to designate these spaces with signage to reserve them for the appropriate users.

ENCOURAGE BICYCLE-FRIENDLY HOMES

While it is not customary to require bicycle parking for single-family homes there may be opportunities to educate homebuilders on opportunities to make their products more bike-friendly particularly for smaller homes on constrained lots. Common issues include insufficient storage or storage that is not easily accessible when cars are parked in the garage or driveway. Anecdotal reports of bike thefts from single family homes also indicate that residents have trouble finding appropriate, accessible bike storage. While people may be willing to move a car to access a bicycle for weekend recreation, they are less likely to bike for daily commuting or a quick trip to the store if the bike is hard to access. Builders can use bike friendly features to market to sustainability or health-focused buyers.

OTHER UPDATES TO THE BIKE PARKING REQUIREMENTS

Recommended updates to the bike parking requirements are included in Appendix J. These are primarily focused on better defining long and short-term parking. The primary purpose of long-term parking is providing greater security for bikes that are to be parked for long periods of time such as those of employees or of residents.

TRANSIT STATION BIKE PARKING

Bicycle-parking near transit stations and bus stops can help to solve the “last-mile” problem of transit. The City of Orlando serves on the boards of and is a funding partner for both local transit agencies, SunRail and LYNX, and therefore is well-positioned to influence these organizations. Key issues for transit parking are security and weather protection. Whenever possible, bike parking at transit stations should be covered because bikes are likely to be left at these locations for at least a few hours at a time. Providing simple bicycle parking at bus stops should be a consideration as part of station furniture design and can discourage the use of bus stop signs as bicycle parking. However, these simple parking arrangements have limited opportunities for security. One solution some transit users have found to the security problem is the use of dockless bike share as evidenced by the bikes parked near stops. Expanding the concrete pad to better accommodate dockless bike parking can encourage users to park without blocking access to bus stop seating or boarding areas.

It is important to limit the number of people with access to the cage to maintain a reasonable level of security. Charging a small monthly fee for access will likely be necessary to limit access to serious users. Fees could be waived for special cases such as students, but this should be done with care and perhaps only for those with a monthly SunRail pass or history of usage. Limiting a given user’s pass access to a single station area would provide additional security. If this type of more secure parking is provided, regular short-term parking will still be needed for those who have not signed up for parking passes. When the local governments take over management of SunRail, motor vehicle parking fees may provide a new revenue source for these types of station improvements.

SUPERSTOPS AND SUNRAIL STATIONS

Extra security measures would benefit any transit user but are easier to provide at larger stations. Video monitoring can help to provide extra security for open bike racks at larger stations. Signage should be present indicating that monitoring is in effect to provide a deterrence to potential thieves and reassure users.

Lockers were previously provided at LYNX Central Station but were removed because they were not viewed to be effective. An intermediate form of security would be a limited access room or “cage” that requires an entry pass. Users then use personal locks to secure their bikes at a typical bike rack within the limited access area.

For SunRail stations, it may be possible to use SunCards, which are equipped with RFID, as a personalized bike cage pass.

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Bicycle parking sign located at a transit station in the City of Chicago

BIKE PARKING AT SPECIAL EVENTS

Special events present unique challenges and opportunities for bicycle parking. Such events can entice even occasional riders to dust off their bikes to avoid traffic and high costs for motor vehicle parking. Events often occur on weekends when transit access is reduced, and bicycle parking can be accommodated much more efficiently than vehicular parking. For outdoor events there is unlikely to be sufficient permanent bike parking to accommodate all users. Informal bike parking may be inconvenient for people riding to the event, not provide adequate security for bikes, and be a nuisance for nearby property owners.

Encouraging the provision of temporary bicycle parking for large events is a common solution. Several annual events in Orlando have started to include free “valet” bicycle parking usually sponsored by a local business or non-profit organization.

Valet parking is typically more space efficient than permanent bike parking. Bike owners are given a claim ticket which they use to reclaim their bike at the end of the visit and security is maintained by one or more attendants for the duration of the event. Valet is typically free but sometimes tips are collected for the attendants or to benefit a charity.

Valet or attended bike parking may also be an asset for venue-based events that have insufficient permanent bike parking, expect unusually high attendance, or where the security of the existing bike parking is a concern.

BIKE PARKING RESOURCES

ASSOCIATION OF PEDESTRIAN &
BICYCLE PROFESSIONALS :

ESSENTIALS OF BICYCLE PARKING:
SELECTING AND INSTALLING BICYCLE
PARKING THAT WORKS (2015)

BICYCLE PARKING GUIDELINES,
2ND EDITION (2010)

The city can encourage a culture of bicycling by hosting or securing bike valet for large city sponsored events. The city can encourage the provision of bike valet at private events by purchasing and lending or renting out temporary bike racks to permitted events within the city limits. Ultimately the city may want to require bike valet at larger events as part of the permitting process.

This is a reasonable requirement given the amount of traffic generated by such events. An important element of providing bike valet is to make sure that potential users know it will be available to encourage those bicycling not to park informally and to encourage more people to bike rather than drive. The availability of bike valet should be incorporated into promotional materials and anywhere the directions for motor vehicle parking are addressed in the event's digital and print collateral.

OTHER END-OF-TRIP BIKE FACILITY RECOMMENDATIONS

Additional end-of-trip facilities can help to build a culture of bicycling and address obstacles people encounter when deciding whether to ride a bike to common destinations.

SHOWERS & CHANGING ROOMS

Particularly in the Florida heat, many potential bike commuters are concerned about arriving to work after having worked up a sweat. Many commuters find they can overcome this challenge with other means, but for longer trips the availability of showers at or near places of employment can be a major benefit.

Showers are of most concern for individuals commuting to work, so showers in or near office buildings are of highest value. For new buildings pursuing LEED accreditation, providing showers provides points towards accreditation. Some employers have expressed concerns about additional liability associated with providing showers. For employers willing to install showers, they may find they benefit other users besides bike commuters such as employees interesting in exercising during lunch hours or other scheduled breaks.

A more achievable way to provide access to showers for some buildings may be partnership with existing facilities. For instance, nearby pools, gyms or health clubs may be able to provide shower access-only memberships for individuals riding long distances to work, or buildings owners or employers may be able to arrange a group access package.

For new buildings that will incorporate a gym, shower access could be worked out in advance as part of the building plan. Some other facilities, such as hospitals, may already provide employees with showers that could be used by bicycle commuters. Innovators such as coworking spaces may be open to consider creative membership options.

A more basic alternative to showers is to provide changing rooms or locker rooms that enable employees an appropriate location to change clothes before entering the workspace.

For a small business, a single "privacy room" could provide for multiple needs such as pumping spaces for nursing mothers or a comfortable place to administer medication in addition to changing space for bicycle commuters.

An increasing number of American cities are host to membership-based facilities specifically geared toward bike commuters called bike commuter centers that incorporate showers, repair facilities and bike parking. Bike & Park operates several such centers in Chicago, Santa Monica and Cincinnati. The city could encourage such uses. It may be several years before Orlando has a sufficient number of bicycle commuters to support a large-scale operation. The ability for these institutions to gain membership will also be tied to the economics of alternative transportation options. For instance, to the extent that employers provide "parking cash out" or withdraw motor vehicle parking subsidies, there will be more room for bicycle-based business to provide cost-competitive options.

LOCKERS & COAT / BAG CHECK

One common challenge encountered by people who bike is the lack of locations to store bicycle accessories, weather gear and bags at common destinations such as restaurants, bars, cultural venues and government buildings. This is a challenge shared with other active commuters such as those walking or taking transit. In some cases, this is a mere inconvenience; for instance, necessitating carrying a backpack or raincoat for the duration of a social engagement. However, as security increases at certain venues such as the Dr. Phillips Center for the Performing Arts, sports venues and the Orange County Courthouse, larger bags, bicycle helmets, or work items such as tablets or laptops may be prohibited from venues altogether. Bike repair tools commonly carried by commuters and bike messengers may also be considered dangerous by some security screens. The cultural expectation in a region where most residents drive is that these items will be left in a parked car.

However, if one is bike commuting or taking transit, this is not an option. For some major events, such as concerts at the Amway Center, mobile locker services have started to provide storage services for fans caught unaware by security requirements. In many older (and colder) cities, museums, theaters and upscale restaurants, regularly provide a coat or bag check for a small fee or for tips. The City of Tokyo has pervasive locker systems available in most transit stations as well as other public locations. Lockers are paid for with credit cards or mobile payment systems. Rather than providing a bag check at each venue, venues merely direct patrons to the nearest public locker. The provision of public lockers has become less common in the U.S. in recent years due to concerns about terrorism. Actual incidents involving public lockers are rare and other common public street furniture such as trash cans also create similar risks.

Providing smaller lockers, requiring trackable payment, locating lockers strategically and video surveillance could mitigate security concerns.

A simple educational tactic that the city can employ to improve the user experience for people bicycling is to implement security screeners at public venues who are informed to consistently allow reasonable bicycle accessories such as bicycle helmets and bike lights into public buildings and venues. A definitive determination of which, if any, bicycle tools are safe and appropriate may also be warranted so that information can be shared and enforced predictably.

A more robust long-term solution will be to either install public lockers or plan for coat and bag check services for new public or publicly supported venues and consider the feasibility of retrofitting existing venues. Many of the locations where items are prohibited, rather than merely inconvenient, are either city-owned buildings or venues in which the city is a major partner and is therefore in a good position to address the issue.

REPAIR FACILITIES

Repair facilities ranging from a simple repair station to a staffed repair facility can augment larger bike parking areas. The installation of bike repair stations in residential or office bike rooms should be encouraged. Some parking garages host visiting car wash operations that wash an employee's car during the workday. Similarly, mobile bicycle repair operations, such as Vancouver-based Velofix, can develop relationships with building managers to provide regular tune-ups and similar services in locations with many bike commuters. This service saves time, allowing bike commuters to maintain their vehicles or deal with emergencies without extra trips to a brick-and-mortar shop.



Bicycle Banner, College Park Main Street

city policies & procedures

This section identifies potential changes to city policies and procedures that were found to be unclear or inconsistent with the vision, goals and objectives of the Bicycle Plan Update. These recommended changes would provide a more robust and supportive framework for building a more bike-friendly culture.

PROPOSED POLICY REVISIONS

GROWTH MANAGEMENT PLAN (GMP)

Substantial changes in policies are not recommended.

The incorporation of the Complete Streets policies has resulted in bicycling being addressed at length in two different locations (TE 1.36 and 1.26-1.29) with the potential for overlap. In future updates, consolidating these sections is advised.

Policies TE 1.26.2-5 include detailed metrics on the widths of bicycle lanes and paths. The recommended approach would be to revise the policies to refer to the Bicycle Plan or public works standards rather than include specific metrics in the GMP as appropriate lane and path widths may vary based on speed, volume and network location.

CITY OF ORLANDO CODE OF ORDINANCES

Sec. 5.19: This chapter includes penalties for violations including bicycle parking,

Penalties for bicycling violations should be reviewed in relationship to motor vehicle violations. In no case should penalties for bicycling moving and parking violations be greater than for similar vehicular infractions and, in most cases, should be less due to the lesser impact of bicycle related violations and the city's stated desired to promote bicycling.

The recommendations in this section do not apply to the operation of bicycle related businesses. No recommendations on bicycle related businesses (including bike share) are proposed at this time.

Chapter 10 – Bicycles and Bicycle Paths

Sec. 10.01. - Definitions - Review bicycle definition to include recumbent bicycles.

Sec. 10.02 – Riding on Sidewalks and Bicycle Paths -

Full Text: "It is hereby made unlawful and a violation of this section to ride a bicycle on a sidewalk or bicycle path, or any portion thereof, where prohibited by clearly visible signs or markings, except that this section does not apply to government officials operating a bicycle within the scope of their lawful authority and for a public purpose."

This language is unclear and seems to suggest that it is sometimes prohibited to ride a bicycle on a bicycle path. It is unclear why bicycling on a bicycle path would be prohibited.

It may be appropriate to reference state statute regarding operation of bicycles as is done in **Chapter 39 – Orlando Traffic and Parking** including language related to yielding to pedestrians on sidewalks. Given the growth in electric assist bicycles, it may be advisable to specify speed limits for bicycling on sidewalks.

Consider the use of signage encouraging cyclists to be considerate of slower traffic (such as pedestrians), as an alternative to prohibiting bicycles in some congested areas.

Sec. 10.03 – Parking a Bicycle - Changes to this section to support the end-of-trip facilities recommendations detailed earlier in this chapter are included in **Appendix J**.

Sec. 10.04 – Bicycle Sharing - The bicycle section was updated in 2018 to reflect the anticipated entry of dockless bicycle parking and further refined in 2019.

No updates are recommended at this time.

Chapter 39 – Orlando Traffic and Parking Code

Sec. 39.02. - Definitions - Definition of bicycle differs from that in 10.01. These should be revised to be consistent.

Chapter 55 – Regulation of Taxicabs, Limousines, Luxury Passenger Vehicles, Shuttles and Other Vehicles for Hire

ARTICLE II. – Non-Motorized Vehicles - addresses the operation of pedicabs.

Sec. 55.107

Pedicabs routinely operate on the sidewalk in the International Drive Area which is currently prohibited by code. The city should consider whether this prohibition should be enforced or eliminated.

Portions of the code duplicate state statute. E.g. Prohibited Conduct: "(8) To operate or ride more than two abreast, except when overtaking and passing a bicycle or vehicle proceeding in the same direction."

Subtitle B – Land Development Code

The Land Development Code has multiple references to the inclusion of bicycle infrastructure in new construction. The following sections are notable or contain items on which review is recommended.

Sec. 60.130. – Access to Residential Areas Discouraged.

"Unless specifically required by the city, no streets shall be extended to the boundaries of non-residential subdivisions so as to connect with or to provide future connection with adjacent streets within existing or future residential areas."

The language in the section appears to discourage bicycle connections between residential origins and non-residential destinations which is counter-productive to providing bicycle connectivity on low-stress local streets.

While bicycle access is required in residential subdivisions, there is no mention of bicycle access in non-residential subdivisions or building site design (which may be applicable to larger building sites).

Sec. 61.221. – General Requirements. (Local Public Streets and Right of Way) - Requires bicycle and pedestrian access within large blocks and at cul-de-sacs. This requirement is beneficial for bicycle connectivity. No update is recommended.

Sec. 61.330-335 Bicycle Parking Requirements - In March of 2019 the bicycle parking requirements were updated to address dimensional requirements, add photographs of preferred rack styles and address building with multiple entrances. Changes to this section to support the end-of-trip facilities recommendations detailed earlier in this chapter are included in **Appendix J**.

POTENTIAL NEW ORDINANCE TO REQUIRE BIKE IMPROVEMENTS

The city should consider a potential new ordinance that would require any capital improvements or projects on city maintained streets to incorporate the bicycle facility from the Bicycle Plan on the corresponding street section as shown in the visionary network. The bike infrastructure would be required unless it can be demonstrated through a written alternatives analysis that the visionary network improvement is not feasible or is impractical.

A similar ordinance was adopted by the City of Cambridge, Massachusetts in 2019 entitled "Cycling Safety Ordinance".

PROPOSED PROCEDURAL CHANGES

INCLUDE BICYCLES IN PROMOTIONAL MATERIALS

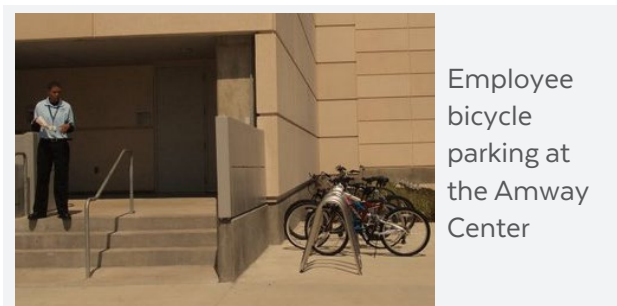
A low-cost way to nudge Orlando’s culture towards a multimodal mindset is to make sure that bicycling (and potentially transit) is included when giving directions or discussing parking for city venues and events. For instance, on the city’s current website for City Hall, the section on “parking instructions” addresses parking only for motor vehicles. Instructions on the locations for bicycle parking could be added to this and similar websites and collateral. Similarly, any venue or event in which the city is an investor could be influenced to update their materials. For instance, the Dr. Phillips Center for the Performing Arts “parking and transportation” page addresses motor vehicle parking and public transportation but not bike parking. Furthermore, the Venue’s safety & security page has confusing language about bicycles directing visitors to “leave these bicycles at home” when visiting the Seneff Arts Plaza, despite the fact that the Seneff Arts Plaza includes bike parking. The intent is to discourage sports activities on the plaza, but the language is confusing and potentially discouraging to people who would consider arriving by bike. These are examples of fixed assets. In addition, promotion of special events should include similar parity for biking in promotional materials addressing transportation.

EMPLOYEE SUPPORT & EDUCATION

The City of Orlando employs over 4,400 people on a temporary or permanent basis. Outreach to this group has the potential to influence their families and neighbors and set an example for other employers within the region.

There are three main types of support the city can provide to its employees to encourage biking and set an example for other employers:

- (1) Facilities:** The city can provide secure bike parking, showers, and bike repair stations, and other infrastructure support described in this document for people bike commuting to work at city facilities.
- (2) Incentives:** One of the strongest incentives for biking to work an employer can provide is “parking cash out.” Particularly for downtown businesses with parking garages, parking is expensive to provide. While charging employees for parking is unpopular, giving employees back the cost of their parking as a cash incentive for those who commute by other means, like biking, is feasible and frees up parking for other users. This is a program that the city currently has and should continue to promote and/or expand. The city can also incorporate bike commuting as a qualifying activity for any other cash or perk incentive programs such as health insurance credit.
- (3) Education:** The city should continue to provide its employees with information about or supplement participation in existing educational programs. Education could range from promoting existing programs like reThink Your Commute, providing a 15-minute consultation with the city’s bicycle coordinator for employees considering biking to work to discuss potential routes and challenges, or distributing bicycle maps. The city could also provide on-site bicycle safety courses or free/subsidized admission to off-site bicycle safety courses as an employee benefit. Time off for participation in such courses could also encourage participation and represent a significant benefit.



PEOPLE BIKING AS CITY CUSTOMERS

Customer service is a value for the city and people on bikes are one type of customer city employees may serve or encounter. There are multiple types of employees whose work directly or indirectly affects people biking. Preparing employees for people riding bikes can help to improve outcomes and enhance the culture of biking in the city. This could range from providing directions to bike parking at a city venue to properly inspecting bike racks at a construction site.

Here are some examples of ways to enhance the culture of bicycling through employee training:

- train parking attendants, receptionists, and security guards to be knowledgeable about the location of bike parking
- have clear policies and train employees to be knowledgeable about the ability to bring bicycles, bicycle helmets, bicycle tools, and accessories into public buildings
- train plan reviewers to be knowledgeable about best practices for bike parking
- guide inspectors for Certificate of Occupancy inspections to be aware of proper bike parking installation, access routes and common mistakes
- guide Orlando Police Department staff to be knowledgeable about bike laws best practices and the city’s priorities in terms of enforcement, education, and safety

CONTINUED COMMUNITY ENGAGEMENT

Providing more formalized opportunities for city residents to learn about and provide feedback on the city’s bicycle planning and implementation between Bicycle Plan updates would help people who ride bikes in the city to feel more engaged and informed, and improve outcomes by maintaining continuous two-way information.

The city currently provides information about bicycle planning on its website and maintains an informal bicycle-pedestrian committee. Additional engagement could include providing staff time to increase the frequency of the informal bike-pedestrian committee meetings, the establishment of a formal bicycle-pedestrian committee or advisory council, or periodic advertised bicycle community meetings. The advantage of a formal bicycle-pedestrian committee would be more frequent, regularly scheduled meetings, the opportunity for additional members of the bicycle community to attend and provide public comments intermittently, and formal review opportunities for upcoming bicycle projects and multimodal plans. It would also provide a mechanism for formal advisory feedback to City Council. A less formal alternative to a bicycle/pedestrian committee, would be to hold well-advertised “bicycle community meetings” once or twice per year to provide the bicycling public the opportunity to learn about upcoming changes in the bicycle network and provide ongoing feedback. While much of this information is already available online, holding events will draw more attention to changes and provide the opportunity for conversations that can be difficult to administer in an online format.

The city should promote and expand existing opportunities for online feedback mechanisms for users to report problems such as damaged or deteriorating bike infrastructure, derelict bikes on public property, blocked bike lanes, safety hazards, improperly installed bike racks, gaps in bike parking, and other concerns. This can provide the city with valuable information about deficiencies and send a message to people biking that the city cares about their user experience. There are multiple ways to collect this information such as 311, SeeClickFix, or custom forms. In any case, it is important that the city be clear that it is interested in feedback on bike infrastructure.

While there should be opportunities for generalized feedback, it is also helpful to be explicit about specific types of reports that are actionable and in what manner. For instance, a derelict bike report should result in relatively short-term action to free up the bike parking and remove blight from the city's streets. Resident bike parking requests in contrast may be logged as a crowdsourcing exercise where areas with a high number of requests are ranked and prioritized; in this case it should be clear that the feedback will be incorporated into a prioritization exercise and that requests will not be responded to individually. Categorizing and standardizing reporting can also assure that each report is directed to the person best able to address the issue and that the right information is provided to address it efficiently.

BIKEWAY PROJECT SCOPES OF WORK

As the city continues to expand its family-friendly bike network, it is important that long-distance, premium bike routes are strongly connected to the locations where people live and work. This is comparable to creating "on-ramps" and "off-ramps" for an interstate. The major highway itself is important and represents a significant investment, its operation depends on these critical connections to the local street network. Typically, major bicycle facilities are designed through a contract with an engineering firm. In order to verify that these local connections are properly addressed, a task for local connections should be included in the scope of work and budgetary planning for any major new bike route or gap project. The scope for a new or enhanced facility should include evaluation of connections to existing bikeways which intersect or are located within ¼ mile, existing sidewalks, and the adjacent low-speed street network. This will enable the holistic identification of additions such as the addition of curb ramps connecting local

streets, crosswalks, and bike detection at signalized intersections, or realignment of intersecting bike facilities that could be addressed at relatively low cost as part of a larger project. Addressing these local connections will increase access to and the effectiveness of the new facility.

CONSTRUCTION & MAINTENANCE OF TRAFFIC

Reliability and predictability are an important element of any transportation experience. Unexpected travel delays can result in missed appointments and frustration. Changes to routes resulting from construction or events are occasionally necessary and must be mitigated which is why the city requires Maintenance of Traffic (MOT) plans for all modes of travel for certain construction activities and events. MOT plans must take special care with bike facilities because of the safety challenges, the limited number of existing facilities in the city, and the greater impact of increases in travel distance to people riding bikes.

MAINTENANCE OF TRAFFIC DURING CONSTRUCTION

The first choice for maintaining reliability in the bicycle network is always to maintain a bicycle facility of similar quality to the permanent network throughout construction.

In 2019 New York City added detailed guidelines for MOT for different bicycle facility types during construction activities accompanied by recommended policies from the 2019 bicycle plan requiring "a temporary bikeway to be maintained whenever feasible" and that separated bike lanes (referred to as "protected bike lanes" or PBLs) should be maintained at all times "including during construction." The detailed guidelines provide a useful reference for signage, striping, and placement, as well as temporary infrastructure solutions. The level of temporary infrastructure also varies by the length of the permit with more substantial infrastructure required for longer

permits. The guideline document does not provide specific guidance on when to use temporary bikeways versus shared lanes other than providing minimum dimensions for each solution. The New York City Department of Transportation (NYCDOT) guidelines do provide for narrowing of motor vehicle lanes and temporary parking restrictions on both the nearside and far side to allow for temporary bikeways to be installed. The NYCDOT guidelines do not address closures of off-street paths. Closure of these facilities is rare but will typically require detours, which may be lengthy.

New York City's policies for bicycle MOT focus on the separated bike lane network. Given that the City of Orlando's current bike network lacks separated bike facilities (with a limited number of off-street facilities), it will be important for the city to identify most or all existing bike lanes as primary routes which provide critical access through the city today and are important to maintain during construction in the near term. In addition to temporary parking restrictions, other measures such as temporary closures of turn lanes or elimination of parallel motor vehicle lanes should be considered as alternatives to a bicycle lane closure or shared lanes on key long-distance bicycle routes.

When shared lanes are the only feasible bicycle facility during construction, connectivity to sidewalks or temporary sidewalks should also be considered. While biking on sidewalks is not encouraged, many people who feel comfortable in a bike lane or separated bike lane will not be comfortable bicycling in shared traffic with motor vehicles particularly on higher speed or higher volume roadways. A temporary shared bicycle/pedestrian pathway may be preferred by many riders over a shared lane with motor vehicle traffic where the sidewalk is also impacted by construction.

The need for sidewalk closures can also be mitigated through the use of scaffolding, however this does represent an additional cost; the cost is covered by the private sector if construction is development-related.

Where closures or shared lanes are necessary, another tactic to address MOT for people biking is improved directional signage. This is especially important in areas with limited or irregular connectivity. Rather than simply noting road closures, providing clearly marked detour routes on low-stress streets or more detailed information on the extent of the closure can help riders to make efficient alternative plans. For instance, "Share Lane next 300 feet" is more helpful than "Share the Road." People on bikes are traveling slower than people driving and may be able to stop and read a posted map or more detailed directional signage without disrupting traffic in a way that people driving cannot. More hesitant riders may be willing to detour to avoid lane sharing.

EVENT CLOSURES

Street closures for events frequently result in lane closures adjacent to bike lanes, particularly in the downtown area. The placement or storage of traffic modification signage and materials in bike lanes is a common nuisance for people biking. Vendors and permit-holders should be informed to avoid this practice. The city may also consider adding “Except Bicycles” signage when appropriate to areas that are closed to vehicular traffic but not to pedestrian traffic as well as guidance for traffic modification vendors to avoid closing bicycle lanes when feasible.

INFORMATION ABOUT
CONSTRUCTION CLOSURES

One low cost way to limit the negative impact of bicycle facility closures would be to add bike lane and bike path closures to the city’s existing road closures map or provide a comparable map for bike facilities closures. While biking on sidewalks is not encouraged, the reality is that people biking regularly use sidewalks to make connections where bike facilities are lacking, particularly on higher speed roadways or one-way streets. Thus, significant sidewalk closures should also be added to the closure map. A significant sidewalk closure could be classified as a closure resulting in a detour of more than 1000 feet. The length of a closure itself is less important than the length of the detour necessitated. Another potential hazard to people bicycling (and walking) is simultaneous closures resulting from adjacent construction activities, particularly in low network locations. Mapping these closures can help both city staff and network users identify potential problem areas.



Bicycle lane detour sign in Seattle, Washington.

micromobility & share programs

Micromobility options have been rapidly evolving over the last couple of years. During the course of the Bicycle Plan Update, the city experienced several changes in its shared micromobility options and service providers - progressing from bikeshare stations, to dockless bikeshare and electric-assist bicycle fleets. The latest change was city approval of an electric scooter one-year pilot program in December 2019. The citywide bike network will become even more important with expanded micromobility options, as bike infrastructure will also be used by people using other small-wheeled vehicles. The city should continue to evaluate micromobility options and trends over the course of its scooter pilot program and throughout the life of this Bicycle Plan as more types of vehicles make use of the available bike infrastructure.

Important considerations moving forward include:

- appropriate widths of bike/micromobility facilities
- levels of separation from or mixing with other modes
- appropriate grouping of various families or classes of vehicles in shared or separated environments based on factors such as speed and the vehicle’s mass and dimensions



other potential initiatives

As part of the League of American Bicyclists (LAB) "Bicycle Friendly America Program", communities are given a report card and feedback report along with their rating which explain the rating and provide suggestions for improving in each of the "Five E's" - engineering, education, encouragement, enforcement and evaluation & planning. The LAB introduced a "6th E", equity, diversity and inclusion, in 2014.

ENGINEERING: This category considers the design, connectivity, and robustness of the city's existing bicycle infrastructure, the existence and content of a bicycle master plan, and the availability of secure bike parking.

EDUCATION: This category considers the availability of bicycle safety education to both bicyclists and motorists, through classes and other means of distribution.

ENCOURAGEMENT: This category considers how a community promotes and encourages cycling, including events such as Bike to Work Day, community bike rides, commuter incentive programs, wayfinding signage and bike maps, as well as facilities that have been built to promote the culture of bicycling, such as off-road facilities and BMX parks.

ENFORCEMENT: This category considers bicycling related laws as well as the relationship between law enforcement and the cycling community.

EVALUATION & PLANNING: This category considers how well a community tracks bicycle related performance measures.

EQUITY, DIVERSITY & INCLUSION: This category considers the ways in which communities address and correct for historical disparities and systemic inequities across each of the Five E's.

Engineering was the highest scoring category on Orlando's Bicycle Friendly Community Fall 2016 Report Card, but showed that the city has significant room for improvement in the other 4 "E's", which depend less on capital investments and instead on the overall culture of bicycling in a city.

Additionally, six "Key Steps to Silver" were identified on the 2016 report card. The city has already made significant progress towards completing three of the steps and should prioritize completing the remaining steps, as shown on page 179.

Building on the feedback and guidance from LAB, additional potential initiatives were identified for each "E" that could further promote a culture of bicycling in Orlando. These initiatives are summarized in the tables on the following pages, including targeted implementation timelines and coordination responsibilities.

The city should consider implementing at least 15 of these initiatives by 2030 to improve the non-engineering "E's" in concert with the work on the 2030 priority network.

THE LEAGUE OF AMERICAN BICYCLISTS' FALL 2016 REPORT CARD



KEY STEPS FOR ORLANDO TO ACHIEVE A BICYCLE FRIENDLY COMMUNITY SILVER RATING

1 UPDATE THE 2008 BICYCLE PLAN

CONSIDER UTILIZING TECHNOLOGY SUCH AS BIKESHARE DATA, STRAVA, AND/OR ELECTRONIC COUNTERS INTO THE PLANNING PROCESS



COMPLETE

- Since 2016 the city has expanded its permanent counter system and added additional bikeshare service providers
- Bikeshare, permanent counter and Strava data helped establish baseline conditions for the Bicycle Plan Update

2 ADOPT A COMPREHENSIVE SAFETY PLAN

A COMPREHENSIVE SAFETY PLAN, SUCH AS VISION ZERO, IDENTIFIES SPECIFIC STRATEGIES TO REDUCE TRAFFIC CRASHES AND DEATHS, INCLUDING BICYCLISTS



COMPLETE

- The city adopted a Vision Zero resolution and developed a Vision Zero Action Plan
- Bicycle crash reduction strategies were incorporated in the Bicycle Plan Update

3 TARGETED OUTREACH METHODS

ENGAGE FAMILIES, WOMEN, NON-ENGLISH SPEAKING COMMUNITIES AND MOTORISTS



COMPLETE

- "Go-to-them" outreach conducted during the Bicycle Plan Update focused on getting input from families, non-english speaking communities, racial/ethnic minorities, and motorists

4 IMPROVE THE ON-STREET BIKE NETWORK

UTILIZE A BROADER RANGE OF DESIGNS AND TREATMENTS FOR ON-STREET NETWORK IMPROVEMENTS



IN-PROGRESS

- The Bicycle Plan Update follows the methodology of the 2019 FHWA Bikeway Selection Guide and NACTO Urban Bikeway Design Guide and emphasizes separated facilities

5 INCREASE BIKE PROGRAM STAFF

CREATE A NEW STAFF POSITION OR CHANGE RESPONSIBILITIES OF CURRENT STAFF TO INCREASE A FOCUS ON BIKE/PED ISSUES



RECOMMENDED

6 SAFE ROUTES TO SCHOOLS

WORK WITH LOCAL BICYCLE GROUPS AND INTERESTED PARENTS TO DEVELOP AND IMPLEMENT A SAFE ROUTES TO SCHOOL PROGRAM FOR ALL SCHOOLS



RECOMMENDED



EDUCATION

GIVING PEOPLE OF ALL AGES AND ABILITIES THE SKILLS AND CONFIDENCE TO RIDE

IMPLEMENTATION TARGET: SHORT-TERM (BEFORE 2025)

INITIATIVE	DETAILS	COORDINATION
Expand use of bicycle education pamphlets which provides an easy to understand, easy to distribute, and cost-effective method of conveying basic safe cycling concepts to the public.	Distribute these pamphlets at events and post on the updated city's website.	Transportation Department Office of Communications and Neighborhood Relations
Update the city's website to better showcase and highlight all of the work being doing to advance bicycling throughout the city.	The existing website doesn't fully showcase the city's commitment and investments in bicycle infrastructure and education.	Transportation Department Office of Communications and Neighborhood Relations
Consider the formation of a city-led youth bicycle academy and leadership program, building on the foundational elements of the city's past program, "Got Bikes?...Ride'em!"	Re-launch and promote the city's Got Bikes...Ride'em program and make it an official youth bicycle academy and leadership program.	Transportation Department Bike/Walk Central Florida Office of Communications and Neighborhood Relations
Guide the creation of classes (i.e., classroom-based and information sessions and workshops) for adults that include on-bicycle education.	If classes are available but not offered through the city, list online the for-profit and non-profit organizations that provide the training for adults, such as Cycling Savvy or the League of American Bicyclists' Smart Cycling program.	Transportation Department reThink Your Commute
Provide on-bicycle education opportunities focused on the needs and concerns of parents and families.	These classes are geared towards families.	Transportation Department Bike/Walk Central Florida Office of Communications and Neighborhood Relations
Provide a variety of targeted bicycle events (e.g., Bangladesh Day and Mexican Gastronomic Festival "Ven a Comer") to engage women, people of color, seniors, and other demographic groups that may benefit from non-traditional or group-specific bicycle events.	Identify a list of existing cultural events and leverage those events to promote and educate attendees on bicycling in the city.	Transportation Department Bike/Walk Central Florida Office of Communications and Neighborhood Relations

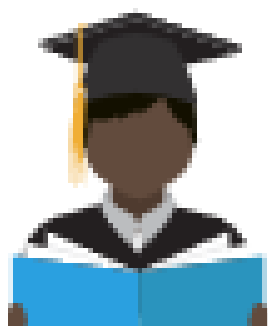
INITIATIVE

DETAILS

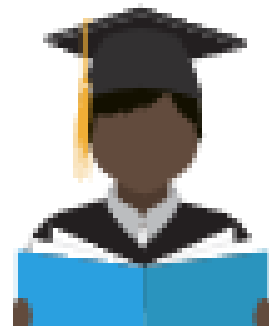
COORDINATION

IMPLEMENTATION TARGET: LONG-TERM (BEFORE 2030)

Create a Bicycle Ambassador program that comprises a group of community members who work to get more people on bicycles and educate community members to make the roadways safe and comfortable for all users.	Ambassadors teach classes, educate community members at events, report infrastructure opportunities and lead by example by riding safely and legally.	Transportation Department Office of Communications and Neighborhood Relations reThink Your Commute
Design and publish a local bike map focused on safe routes to school, giving priority to low-stress and separated routes that are suitable for children and families.	The map should outline the existing on and off-road bicycle network by infrastructure type and could mark the locations of landmarks, public restrooms, water fountains, bike repair stations and bike parking.	Transportation Department
Work with local bicycle groups, interested parents, and the school district(s) to make on-bicycle education available in more public and private elementary, middle and high schools.	Identify all public and private schools in the area. Survey all schools to ascertain their interests. Develop an advisory committee composed of city staff and residents to encourage its success and sustainability. Coordinate with OCPS to make bike education curriculum for elementary schools similar to WalkSafe.	Transportation Department Bike/Walk Central Florida Office of Communications and Neighborhood Relations Orange County Public Schools Office of Communications and Neighborhood Relations



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ENCOURAGEMENT

CREATING A STRONG BIKE CULTURE THAT WELCOMES AND CELEBRATES BICYCLING

IMPLEMENTATION TARGET: SHORT-TERM (BEFORE 2025)

INITIATIVE	DETAILS	COORDINATION
Encourage local colleges and universities to become League of American Bicyclists' Bicycle-Friendly Universities.		Transportation Department Office of Communications and Neighborhood Relations
Encourage local businesses to become League of American Bicyclists' Bicycle-Friendly Businesses.	Leverage the success and support of the city's Main Street Program to encourage business participation.	Transportation Department Economic Development Department Office of Communications and Neighborhood Relations
Create a trip reduction ordinance that either requires or provides incentives for congestion mitigation actions by all or some of developers, large employers, and transportation management associations or districts.		Transportation Department City Planning Division

IMPLEMENTATION TARGET: LONG-TERM (BEFORE 2030)

Target messages to resonate with the problems in your community that can be addressed by biking, such as public health issues, environmental concerns, traffic congestion, or economic development.	Transportation Department Office of Communications and Neighborhood Relations
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INITIATIVE

Promote cycling throughout the year by offering or supporting more family-oriented community rides, and bicycle-themed festivals, parades or shows.

Encourage local businesses to provide discounts for customers arriving by bicycle or promote existing bicycle discount programs.

DETAILS

Leverage the success and support of the city's Main Street Program to encourage business participation.

COORDINATION

Transportation Department
Bike/Walk Central Florida
Office of Communications and Neighborhood Relations
Transportation Department
Economic Development Department
Office of Communications and Neighborhood Relations



ENFORCEMENT

ENSURING SAFE ROADS FOR ALL USERS

IMPLEMENTATION TARGET: SHORT-TERM (BEFORE 2025)

INITIATIVE	DETAILS	COORDINATION
Increase the use of bikes as a patrol or public safety tool for your community.		Transportation Department Orlando Police Department
Continue to establish that police officers are educated on traffic laws as they apply to bicyclists and motorists and bicycling skills.		Transportation Department Orlando Police Department

IMPLEMENTATION TARGET: SHORT-TERM (BEFORE 2025)

Publish raw data on traffic enforcement citations and make data available on the Vision Zero webpage to help the public understand traffic safety priorities and how those priorities are furthered by traffic enforcement.		Transportation Department Orlando Police Department
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EVALUATION & PLANNING

PLANNING FOR BICYCLING AS A SAFE AND VIABLE TRANSPORTATION OPTION

IMPLEMENTATION TARGET: SHORT-TERM (BEFORE 2025)

INITIATIVE	DETAILS	COORDINATION
Increase the Bicycle Advisory Committee meetings from quarterly to monthly and consider upgrading from the current informal meetings to a formal Committee.		Transportation Department
Acquire dedicated funding for the implementation of the bicycle master plan.		Transportation Department
Work with LYNX and SunRail to coordinate bicycling improvements around fixed route transit stops.		Transportation Department
Increase city bicycle program staff	Create a new staff position or change responsibilities of current staff to increase a focus on bike/ped issues.	Transportation Department
Specifically allocate bicycle-related funding to high priority locations and low-income and minority communities.	Refer to the High Priority locations identified in the city's Bicycle Plan. Publish annually the percentage of dollars invested in the high priority locations versus their counterparts.	Transportation Department
Conduct regular statistically valid community bicycle surveys to understand the needs of bicyclists in the community and what sort of investments might entice people to bike more often or fix barriers that currently prevent them from biking more.	The surveys can be distributed in-person at community events or via an online platform.	Transportation Department Bike/Walk Central Florida Office of Communications and Neighborhood Relations
Conduct a travel diary survey or verify community oversampling occurs in a national or state travel diary survey in order to get a statistically valid understanding of how all residents move around your community.	This information is great for monitoring changes in how people move around and community goals related to active transportation. The National Household Travel Survey (NHTS) conducts similar surveys on a federal level.	Transportation Department Office of Communications and Neighborhood Relations



INITIATIVE

Coordinate with the East Central Florida Regional Planning Council to add Level of Traffic Stress analysis to their Land Overlaid on Transportation Information System (LOTIS) application based on the data collected for the three-county area, including within the City of Orlando.

DETAILS

Level of Traffic Stress analysis focuses on low-stress connectivity, defined as “the ability of a network to connect traveler’ origins to their destinations without subjecting them to unacceptably stressful links.”

COORDINATION

Transportation Department

**IMPLEMENTATION TARGET:
LONG-TERM (BEFORE 2030)**

Encourage the addition of a feedback mechanism to help the community meet goals for the implementation of your bicycle plan.

This could include additional in-person meetings or ways for the public to provide comments and feedback online.

Transportation Department
Office of Communications and Neighborhood Relations

EQUITY

THE LEAGUE OF AMERICAN BICYCLIST’S RECOGNIZE THE SIXTH ‘E’ - EQUITY, DIVERSITY AND INCLUSION (EDI).

TO TRULY ACHIEVE THE VISION OF A BICYCLE FRIENDLY CITY FOR EVERYONE, EQUITY, DIVERSITY AND INCLUSION ARE THE ESSENTIAL LENSES THROUGH WHICH ALL OTHER ELEMENTS MUST BE VIEWED.

For the purposes of this Bicycle Plan and the protection of marginalized and historically and systemically excluded populations, the following nine equity variables have been included:

- (1) Racial/ethnic equity
- (2) Language equity
- (3) Geography/spatial equity
- (4) Process/participation equity
- (5) Physical ability equity
- (6) Income equity
- (7) Gender equity
- (8) Culture equity
- (9) Mode equity

ACTION #1: FOSTER MORE EQUITABLE TREATMENT OF DIVERSE LANGUAGES IN THE PUBLIC SPHERE, COMMUNICATIONS AND MARKETING, AND PLANNING PROCESSES (LANGUAGE EQUITY)

Nearly half (47%) of Orlando children age 5-17 are persons with languages other than English spoken at home and nearly 40% of adults age 18+ speak a language other than English at home.

While Spanish is the second most commonly spoken language at home for children and adults (29.5% and 26.4%, respectively), the other languages spoken at home among adults are a diversity of languages of Indo-European and Asian/Islander origin. Given this language diversity, it is important that all citywide communications and marketing take this into account when directly and indirectly engaging with its residents. Doing so would establish language equity and remove barriers to obtaining information related to access and mobility (like cycling) for residents who speak languages other than English.

Success metric: Greater diversity in languages used in print / digital communications and marketing materials, as well as increases in non-English speaking residents attending and participating in public outreach and engagement events, including for project planning efforts related to cycling and other forms of mobility.

Responsibility: City of Orlando Office of Communications and Neighborhood Relations



ACTION #2: PRIORITIZE STREET AND BIKEWAY INVESTMENTS, AND MAINTENANCE IN LOW-SERVICE AREAS (RACIAL & SPATIAL EQUITY)

The low-service areas are those that lack adequate bicycle facilities as compared to the rest of the city. To provide equitable access and mobility for all residents, regardless of where they live in the city, it's imperative that investments in on-street, off-street and signed bike routes and infrastructure be made in low-service areas.

Success metric: Increased investment and maintenance of streets and bikeways in low-service areas.

Responsibility: City of Orlando Public Works Department and Transportation Department

ACTION #3: ENCOURAGE THE FULL AND FAIR PARTICIPATION OF LOW-INCOME AND MINORITY COMMUNITIES IN THE TRANSPORTATION DECISION-MAKING PROCESS (PROCESS EQUITY)

Public outreach and engagement are vital to ensuring the transportation system meets and addresses the collective needs and safety concerns of all Orlando residents. Additionally, Environmental Justice (EJ) Executive Order 12898 demands full and fair participation of low-income and minority populations throughout the entire transportation decision-making process. Given the history of systemically excluding certain populations from fully participating in transportation processes on the basis of their race, religion and sexual preference, ensuring their full and fair participation is paramount.

Success metric: Participation of low-income and minority population in transportation decision-making processes

Responsibility: City of Orlando Transportation Department and City Planning Division

ACTION #4: DOCUMENT AND INCREASE MOBILITY AND ACCESS FOR THE ELDERLY AND PERSONS WITH DISABILITY (ABILITY EQUITY)

Orlando's transportation network presents unique challenges and opportunities for the elderly and persons with disabilities to safely access and move throughout the city whether for leisure, recreation, or commuting purposes. Moreover, these populations are increasingly vulnerable and often times more likely to be victims of traffic violence. Understanding their unique infrastructure needs and potential barriers to safe access and mobility is critical in providing protection and opportunities for viable transportation options.

Success metric: Reductions in the number and percentage of injuries and deaths of the elderly and persons with disability.

- Infrastructure investments catering to the safety, security and mobility of the elderly and persons with disability.
- Establishment of a Senior Citizen Advisory Council (If not already established)

Responsibility: City of Orlando Public Works Department, Transportation Department and Office of Community Affairs

ACTION #5: ENGAGE WITH WOMEN TO DEEPEN UNDERSTANDING OF BEHAVIOR AND USAGE DIFFERENCES TO IMPROVE OVERALL ACCESS AND MOBILITY (GENDER EQUITY)

When it comes to accessing cycling infrastructure, women have unique safety and mobility challenges/needs than men. As such, it is imperative that a deeper understanding of collective needs and challenges be documented and analyzed to better reflect and respond to collective demands for increased cycling access and mobility in Orlando.

Success metric: Reduction in the number and percentage of fatalities and injuries among women while bicycling.

- Establishment of a Women's Advisory Committee
- Documentation and mitigation of issues affecting women while bicycling.

Responsibility: City of Orlando Transportation Department and City Planning Division

ACTION #6: ENGAGE WITH FOREIGN-BORN POPULATIONS TO DEEPEN UNDERSTANDING OF BEHAVIOR AND USAGE DIFFERENCES TO IMPROVE OVERALL ACCESS AND MOBILITY (CULTURAL EQUITY)

Nearly one-quarter (24.6%) of Orlando's population is foreign-born. In order to improve cultural equity among Orlando's foreign-born residents, it is imperative that cultural differences be documented to understand how it impacts a population's perception and understanding of bicycling within the American context.

Success metric: Reduction in the number and percentage of fatalities and injuries among foreign-born populations while bicycling.

- Documentation and mitigation of issues affecting foreign-born populations while bicycling.

Responsibility: City of Orlando Transportation Department and City Planning Division

ACTION #7: PARTNER AND COLLABORATE WITH LOCAL NON-PROFIT ORGANIZATION TO PROVIDE BICYCLES TO LOW-INCOME AND MINORITY RESIDENTS (INCOME EQUITY)

Increasing the number and percentage of people bicycling on Orlando's streets will help improve the safety and mobility of all bicyclists in the city.

Unfortunately, many low-income and minority residents do not own, have access to, or utilize bike share at a rate comparable to their counterparts. National best practices prove that city and non-profit partnerships and collaboration increase the number of bicycles available to low-income and minority residents.

Success metric: Establishment of a partnership/collaboration with a non-profit that provides free and reduced cost bicycles to low-income and minority residents.

- Increases in the number of low-income and minority residents biking within the city, as documented anecdotally and periodically through surveying of cyclists.

Responsibility: City of Orlando Public Works Department, Transportation Department and City Planning Division

ACTION #8: INCREASE CITYWIDE INVESTMENTS IN BIKE INFRASTRUCTURE AND MAINTENANCE (MODAL EQUITY)

Historically, a disproportionate share of infrastructure investments has gone towards the goals of improving vehicular mobility on Orlando's streets. However, these investments have not yielded increased mobility and have ultimately stunted the growth of more efficient and economically productive forms of urban transport. Thus, given the growth cycling across the city and the disproportionate share of bicyclists involved in fatal and serious injuries, it is imperative that additional funds go towards new and improved bikeway infrastructure to improve safe access and equitable mobility for all Orlando's residents.

Success metric: Increase in investments in new bike infrastructure and maintenance.






Responsibility: City of Orlando Transportation Department



plan performance measures

Performance measures are important for assessing whether the plan is meeting its goals over time and provide a method of tracking investments to outcomes. The plan performance measures are indicators, but will not track all recommendations of the plan.

The plan performance measures are based on the five goals of the plan. Suggested baseline metrics are based on available or accessible data. While 10 year targets are defined, this data should be collected on a regular basis to track progress and identify any necessary adjustments in approach to guide the achievement of plan goals. Additional information on the performance measures is included in Appendix K.

GOAL	PERFORMANCE MEASURES	BASELINE	DESIRED TREND	2030 TARGET
 COMFORT	PUBLIC BIKE PARKING LOCATIONS	BASELINE NEEDED*	↑	TBD
	MILES OF SEPARATED/OFF-STREET BIKEWAYS	42 MILES	↑	20% INCREASE
 CONNECTIVITY	MILES OF BIKEWAYS **	361 MILES	↑	407 MILES
	CITYWIDE AVERAGE BIKE SCORE	55	↑	70
 EQUITY	EQUITY RATIO -BIKEWAYS PER SQUARE MILE	0.67	↑	0.8
	EQUITY RATIO - SEPARATED / OFF-STREET PER SQUARE MILE	0.5	↑	0.8
 SAFETY	BICYCLE DANGER INDEX	39	↓	30% REDUCTION
	NUMBER OF FATAL CRASHES	9***	↓	ZERO FATAL CRASHES
 CULTURE	CITY SPONSORED BIKE EVENTS PER YEAR (SUCH AS BIKE TO WORK DAY OR BIKE 5 CITIES)	2	↑	10
	CITY EMPLOYEE PARTICIPATION	BASELINE NEEDED****	↑	15%
	PERCENT BIKE TO WORK	0.60%	↑	1.50%
	AVERAGE MONTHLY TRAIL USERS	232K	↑	500K

*This will be available if the city produces a public bike parking map

** Includes shared street facilities such as signed routes and neighborhood bicycle boulevards

***Orlando Vision Zero, 2012-2017

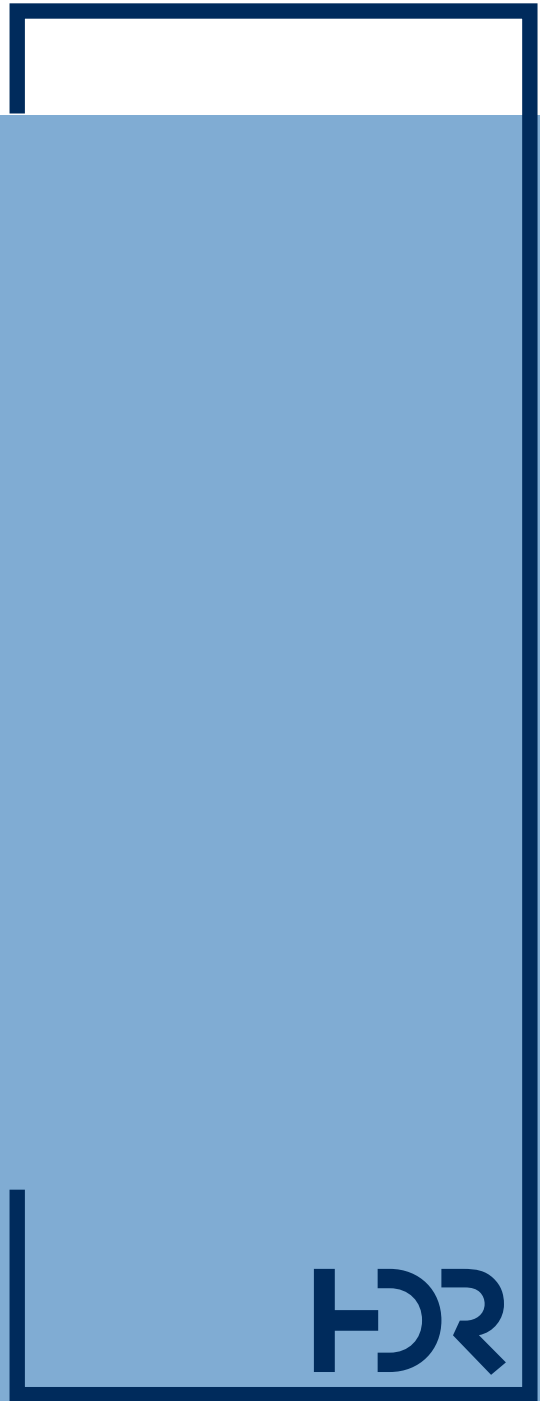
****Percent of city employees who have participated in a bike training program or are currently participating in a bike incentive program

NEXT STEPS

- ❑ UPDATE CITY POLICIES, ADOPT PROCEDURAL CHANGES, COMPLETE THE '6 KEY STEPS TO SILVER', AND IMPLEMENT AT LEAST FIVE ADDITIONAL RECOMMENDED INITIATIVES - ONE FOR EACH 'E' BY 2021, AND HIGHLIGHT THESE ITEMS IN THE CITY'S NEXT LEAGUE OF AMERICAN CYCLIST'S BICYCLE FRIENDLY COMMUNITY APPLICATION.
- ❑ DOCUMENT BASELINE PERFORMANCE MEASURES AND MONITOR PROGRESS ANNUALLY.

- 1 Centers for Disease Control and Prevention. Promoting Physical Activity – 2nd Edition: A Guide for Community Action; 2010. <http://www.cdc.gov/physicalactivity/strategies/communityguide.html>
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- 4 ACSM American Fitness Index 2019 Summary Report. https://americanfitnessindex.org/wp-content/uploads/2019/05/2019-American-Fitness-Index-Summary-Report_FINAL-20190422.pdf
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- 8 EPA’s Endangerment Finding Health Effects. (2016.) https://www.epa.gov/sites/production/files/2016-08/documents/endangermentfinding_health.pdf
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- 11 Flusche, D. (2012, July) Bicycling Means Business: The Economic Benefits of Bicycle Infrastructure. League of American Bicyclists. https://www.bikeleague.org/sites/default/files/Bicycling_and_the_Economy-Economic_Impact_Studies_web.pdf
- 12 North Carolina Department of Transportation, Division of Bicycle and Pedestrian Transportation. (2004, July). Pathways to Prosperity: The Economic Impact of Investments in Bicycle Facilities, A Case Study of the North Carolina Northern Outer Banks.
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- 14 People for Bikes. <https://peopleforbikes.org/our-work/statistics/statistics-category/?cat=economic-statistics#economic-benefits-of-the-bicycling-industry-and-tourism>
- 15 OrlandoEDC.com

- 16 Previous Orlando Bike Plans and 2018 Staff Reference Sources
- 17 FHWA (2019) Bikeway Selection Guide.
- 18 FHWA (2019) Bikeway Selection Guide.
- 19 See Appendix D Outreach Summary for full survey results.
- 20 See Appendix C Equity Analysis.
- 21 2014 Seattle Bicycle Master Plan. http://www.seattle.gov/Documents/Departments/SDOT/About/DocumentLibrary/BicycleMasterPlan/SBMP_21March_FINAL_full%20doc.pdf
- 22 See Appendix C Equity Analysis.
- 23 See Appendix C Equity Analysis.
- 24 See Appendix C Equity Analysis.
- 25 See Appendix C Equity Analysis.
- 26 See Appendix C Equity Analysis.
- 27 Safe Routes to School. The Decline of Walking and Bicycling. http://guide.saferoutesinfo.org/introduction/the_decline_of_walking_and_bicycling.cfm
- 28 Centers for Disease Control and Prevention. Childhood Obesity Facts. <https://www.cdc.gov/obesity/data/childhood.html>
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- 30 Bicycle Equity: The Equity of Access to Bicycle Infrastructure.
- 31 See Appendix C Equity Analysis.
- 32 Bicycle Equity: The Equity of Access to Bicycle Infrastructure.
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- 35 Jacobsen PLSafety in numbers: more walkers and bicyclists, safer walking and bicycling Injury Prevention 2003;9:205-209.
- 36 Orlando’s League of American Bicyclists Bicycle Friendly City Application 2016.



PREPARED FOR:

